Fact Book

Fiscal Year

2012

U.S. Department of Health and Human Services
National Institutes of Health
National Heart, Lung, and Blood Institute

Fact Book

Fiscal Year

2012

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For Administrative Use

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National Heart, Lung,

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U.S. Department of Health and Human Services
National Institutes of Health
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1. Abbreviated Staff Directory*

Office of the Director	Bldg.	Room	Phone	MSC**†
Director, **Gary H. Gibbons, M.D.**	31	5A48	496–5166	2486
Deputy Director, **Susan B. Shurin, M.D.**	31	5A48	496–5166	2486
Chief of Staff, **Sheila Pohl**	31	5A48	594–5355	2486
Administrative Officer, **Tho-Van Tran**	RKL2‡	8095	435–6373	7921
Associate Director, Administrative Management, **Kathleen B. O'Sullivan**	31	5A48	496–2411	2490
Associate Director for Basic Research, **Alan M. Michelson, M.D., Ph.D.**	10	7N258	451–8041	1654
Office of Management				
Executive Officer, **Kathleen B. O'Sullivan**	31	5A48	496–2411	2490
Acting Deputy Executive Officer, **Ariel Herman**	31	5A48	496–2411	2490
Administrative Officer, **Kathleen D. Rechen**	RKL2	8095	435–6373	7921
Program Advisor, **Marilyn G. Jackson**	RKL1§	6130	594–4690	7994
Ethics Office				
Deputy Ethics Counselor, **Nancy O'Hanlon, J.D.**	31	5A33	496–6471	2486
Lead Ethics Specialist, **Kim Y. Brinson**	31	5A33	496–6471	2486
Ethics Coordinator, **Hedy S. Tam**	31	5A33	496–6471	2486
Administrative Officer, **Tho-Van Tran**	RKL2	8095	435–6373	7921
Program Management Office				
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Acting Director, **Kathleen B. O'Sullivan**	RKL1	6100	435–0119	7994
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Customer Support Branch				
Acting Chief, **Brian Kotula**	RKL1	6106	435–0119	7994
Infrastructure Engineering Branch				
Acting Chief, **Brian Kotula**	RKL1	6106	435–0119	7994
Operation and Performance Management Branch				
Acting Chief, **Matthew S. Raschka**	RKL1	6112	435–0119	7994
Software Engineering Branch				
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Administrative Management Branch				
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* Current as of September 30, 2012. 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.

‡ RKL2—Rockledge II Building.

§ RKL1—Rockledge I Building.

Office of the Director (continued)	**Bldg.**	**Room**	**Phone**	**MSC**
Freedom of Information and Privacy Act Branch				
Chief, **Suzanne A. Freeman**	RKL1	6054	496–9737	7957
Management Services Branch				
Chief, **Michael Corriere**	31	5A16	496–5931	2490
Administrative Officer, **Cheryl R. Wagoner**	RKL2	8095	435–6373	7921
Office of Communications				
Acting Director, **Carl Roth, Ph.D., LL.M.**	31	5A07	496–6331	2482
Acting Deputy Director, **Ann M. Taubenheim, Ph.D.**	31	4A10	496–4236	2480
Administrative Officer, **David J. Andrews**	RKL2	8095	435–6373	7921
Health Campaigns and Consumer Services Branch				
Chief, **Ann M. Taubenheim, Ph.D.**	31	4A10	496–4236	2480
Public Affairs Branch				
Chief, **Diane E. Striar**	31	4A10	496–4236	2480
Office of Global Health				
Director, **Arun Chockalingam, Ph.D.**	31	5A06	496–3620	2490
Deputy Director, **Cristina Rabadan-Diehl, Ph.D.**	31	5A06	496–3620	2490
Administrative Officer, **Melissa K. Hiers-Wilkison**	RKL2	8095	435–6373	7921
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, **J. Nikki Howell**	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, **Terri B. Pike**	RKL2	8095	435–6373	7921
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
Office of Technology Transfer and Development				
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Center for Population Studies				
Director, **Daniel Levy, M.D.**	73 Mt. Wayte Avenue, Suite 2 Framingham, MA 01702–5827 508–935–3458			
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Christopher J. O'Donnell, M.D., M.P.H.	73 Mt. Wayte Avenue, Suite 2 Framingham, MA 01702–5827 508–935–3435			

Division of Cardiovascular Sciences

Office of the Director				
Director, **Michael S. Lauer, M.D.**	RKL2	8128	435–0422	7940
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	8132	435–0510	7940
Atherothrombosis and Coronary Artery Disease Branch				
Chief, **Yves D. Rosenberg, M.D.**	RKL2	8146	435–1292	7956
Heart Developmental and Structural Diseases Branch				
Chief, **Jonathan R. Kaltman, M.D.**	RKL2	8104	435–0510	7940
Heart Failure and Arrhythmias Branch				
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				
Chief, **Marissa Miller, D.V.M., M.P.H.**	RKL2	8214	435–0513	7940
Vascular Biology and Hypertension Branch				
Chief, **Zorina S. Galis, Ph.D.**	RKL2	8116	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	10216	435–0305	7936
Epidemiology Branch				
Chief, **Paul D. Sorlie, Ph.D.**	RKL2	10210	435–0456	7936
Women's Health Initiative Branch				
Chief, **Jacques E. Rossouw, M.D.**	RKL2	9192	402–2900	7913
Jackson Heart Study				
Director, **Herman A. Taylor, Jr., M.D.**	Jackson Medical Mall, Suite 701 350 West Woodrow Wilson Drive Jackson, MS 39213 601–979–8744			

Division of Lung Diseases

Office of the Director				
Director, **James P. Kiley, Ph.D., M.S.**	RKL2	10042	435–0233	7952
Deputy Director, **Gail G. Weinmann, M.D.**	RKL2	10042	435–0233	7952
Administrative Officer, **Amy W. Sheetz**	RKL2	8095	435–6373	7921
Airway Biology and Disease Branch				
Chief, **Thomas L. Croxton, Ph.D., M.D.**	RKL2	10042	435–0202	7952
Lung Biology and Disease Branch				
Chief, **Dorothy B. Gail, Ph.D.**	RKL2	10042	435–0222	7952

Division of Lung Diseases (continued)	**Bldg.**	**Room**	**Phone**	**MSC**
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				
Director, **W. Keith Hoots, M.D.**	RKL2	9136	435–0080	7950
Deputy Director, **Donna M. DiMichele, M.D.**	RKL2	9132	435–0080	7950
Administrative Officer, **Amy W. Sheetz**	RKL2	8095	435–6373	7921
Special Advisor to the Director, **Norma B. Lerner, M.D.**	RKL2	9132	435–0080	7950
Senior Program Analyst, **Susan E. Pucie**	RKL2	9138	435–0080	7950
Blood Diseases Branch				
Chief, **Harvey S. Luksenburg, M.D.**	RKL2	9160	435–0050	7950
Thrombosis and Hemostasis Branch				
Chief, **Jamie E. Siegel, M.D.**	RKL2	9030	435–0080	7950
Transfusion Medicine and Cellular Therapeutics Branch				
Chief, **Simone A. Glynn, M.D.**	RKL2	9142	435–0065	7950
Research Training Programs				
Leader, **Lis Welniak, Ph.D.**	RKL2	9143	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				
Director, **Denise G. Simons-Morton, M.D., Ph.D.**	31	4A11	496–5437	2480
Acting Deputy Director, **Karen A. Donato, S.M.**	31	4A11	496–5437	2480
Administrative Officer, **Tho-Van Tran**	RKL2	8095	435–6373	7921
Senior Manager for Program Operations				
Mishyelle Croom, M.A.	31	4A11	496–5437	2480
Enhanced Dissemination and Utilization Branch				
Acting Chief, **Karen A. Donato, S.M.**	31	4A11	496–5437	2480
Research Translation Branch				
Acting Chief, **Denise G. Simons-Morton, M.D., Ph.D.**	31	4A11	496–5437	2480
Division of Extramural Research Activities				
Office of the Director				
Director, **Stephen C. Mockrin, Ph.D.**	RKL2	7100	435–0260	7922
Deputy Director, **Jodi B. Black, Ph.D.**	RKL2	7104	435–0260	7922
Chief of Staff, **Marianna Mertts, Ph.D.**	RKL2	7220	435–0260	7922
Administrative Officer, **Veronica M. VanWagner**	RKL2	8095	435–6373	7921
Office of Acquisitions				
Director, **John C. Taylor**	RKL2	6100	435–0330	7902
Deputy Director, **Joanna Magginas**	RKL2	6106	435–0330	7902
Special Assistant to the Director				
Debra C. Hawkins	RKL2	6224	435–0361	7902
Consolidated Operations Acquisition Center Services Branch				
Chief, **Richard A. Phillips**	RKL2	6150	402–6462	7902

Division of Extramural Research Activities (continued)	**Bldg.**	**Room**	**Phone**	**MSC**
NHLBI Extramural Contracts Branch				
Chief, **Susan B. Pearlman**	RKL2	6136	435–6672	7902
Office of Committee Management				
Director, **Kathryn M. Valeda**	RKL2	7110	435–0255	7922
Deputy Director & Scientific Review Evaluation Activities				
Administrator, **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, **Dana A. Phares, Ph.D.**	RKL2	7176	435–0314	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, **Ryan C. Lombardi**	RKL2	7172	435–0166	7926
Blood Diseases and Resources and Lung Diseases Branch				
Chief, **Theresa R. Jarosik**	RKL2	7156	435–0166	7926
Cardiovascular Sciences Branch				
Chief, **Teresa F. Marquette**	RKL2	7130	435–0166	7926
Office of Translational Alliances and Coordination				
Acting Director, **Jodi B. Black, Ph.D.**	RKL2	7104	435–0260	7922
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**	3	3E02	451–0892	0303
Animal Program				
Director, **James B. Hawkins, D.V.M.**	14E	105C	451–6743	5570
Animal Care and Use Committee				
Program Coordinator, **Kelly E. Cole**	14E	106C	451–6459	5570
Imaging Probe Development Center/Road Map Initiative				
Acting Chief, **James B. Mitchell, Ph.D.**	10	B3B69	402–9013	1002
Laboratory of Animal Medicine and Surgery				
Chief, **Robert Hoyt, D.V.M.**	14E	105B	496–9673	5570
Murine Phenotyping Core				
Head, **Danielle Springer, D.V.M.**	14E	107A	594–6171	5570
Office of Education				
Director, **Herbert M. Geller, Ph.D.**	10	6N248	451–9440	1754

* 10CRC—Building 10 Clinical Research Center.

Division of Intramural Research (continued)	**Bldg.**	**Room**	**Phone**	**MSC**
Office of the Clinical Director				
Acting Director, **Richard R. Childs, M.D.**	10CRC	3-5330	451–7128	1230
Deputy Director, **Nicole J. Gormley, M.D.**	10CRC	6-5140	451–4645	1608
Center for Human Immunology, Autoimmunity, and Inflammation				
Chief, **Neal S. Young, M.D.**	10CRC	3-5140	496–5093	1202
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				
Head, **J. Philip McCoy, Ph.D.**	10	8C104	451–8824	1357
Cardiovascular-Pulmonary Branch				
Chief, **Andrew E. Arai, M.D.**	10	B1D416	496–3658	1061
Animal MRI/Imaging Core				
Head, **Stasia Anderson, Ph.D.**	10	B1D416	402–0908	1061
Biochemistry and Biophysics Center				
Director, **Nico Tjandra, Ph.D.**	50	3503	402–3029	8013
Biophysics Core				
Head, **Grzegorz Piszczek, Ph.D.**	50	3124	435–8082	8012
Biochemistry Core				
Head, **Duck-Yeon Lee, Ph.D.**	50	3120	435–8369	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
Center for Molecular Medicine				
Chief, **Toren Finkel, M.D., Ph.D.**	10CRC	5-3330	402–4081	1454
Induced Pluripotent Stem Cell Core				
Head, **Guokai Chen, Ph.D.**	10	5N214	594–4717	1754
Transgenic Core				
Head, **Chengyu Liu, Ph.D.**	50	3305	435–5034	8018
Genetics and Development Biology Center				
Director, **Alan M. Michelson, M.D., Ph.D.**	10	7N258	451–8041	1654
Electron Microscopy Core				
Head, **Mathew Daniels, Ph.D.**	14E	111B	496–2898	5570
Pathology Core				
Acting Head, **Zu-Xi Yu, Ph.D.**	10	6D19	496–5035	1590
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, **Keji Zhao, Ph.D.**	10	7B06A	496-2098	1674
Proteomics Core				
Head, **Marjan Gucek, Ph.D.**	10	8C103C	594-1060	1774

NIH Mailing Address Formats

NHLBI staff e-mail addresses can be found by using the NIH Directory and E-mail Forwarding Service located on the Internet at http://directory.nih.gov.

Please use the following formats for NIH mailing addresses:

Building 10	Full Name NHLBI, NIH Building 10, Room ____ 10 Center Drive MSC* ____ Bethesda, MD 20892–MSC**
Building 14E	Full Name NHLBI, NIH Building 14E, Room ____ 14 Service Road West MSC*____ Bethesda, MD 20892–MSC**
Building 31	Full Name NHLBI, NIH Building 31, Room ____ 31 Center Drive MSC*____ Bethesda, MD 20892–MSC**
Building 50	Full Name NHLBI, NIH Building 50, Room ____ 50 South Drive MSC* ____ Bethesda, MD 20892–MSC**
Rockledge I Building	Full Name NHLBI, NIH One Rockledge Center, Room ____ 6705 Rockledge Drive MSC* ____ Bethesda, MD 20817–MSC**
Rockledge II Building	Full Name NHLBI, NIH Two Rockledge Center, Room ____ 6701 Rockledge Drive MSC* ____ Bethesda, MD 20817–MSC**

* Retain the letters MSC before adding the mail stop code number.
**Replace the letters MSC with the mail stop code number.

2. Program Overview

The National Heart Institute (NHI) was established in 1948 through the National Heart Act with a mission to support research and research training related to 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 prevent and treat 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, 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 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

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
Cardiometabolic Syndrome
Coronary Artery Disease
Diabetes
Inflammation and Atherothrombosis
Myocardial Infarction
Nutrition
Obesity
Revascularization
Stroke

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
Atrial Fibrillation
Heart Failure
Myocardial Protection From Ischemic Insult
Resuscitation Sciences

Vascular Biology and Hypertension
Aneurysms
Cerebrovascular Disease
Hypertension
Lymphatic Diseases

Cardiovascular Diseases (continued)

Peripheral Vascular Disease
Renal Vascular Disease
Vascular Biology
Vascular Development and Angiogenesis
Venous Disease

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 Vascular Biology

National Center on Sleep Disorders Research
Neurobiology and Sleep
Sleep Disorders Medicine

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

Blood Diseases and Resources (continued)

Hemostasis
Immunity and Inflammation
Thrombosis

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
Knowledge Exchange Networks
National Partnership Programs for Heart, Lung, and Blood Topics
Systematic Evidence Reviews and Clinical Guidelines for Heart, Lung, and Blood Topics

Enhanced Dissemination and Utilization Branch
Childhood Obesity Prevention
Community Health Promotion
Health Disparities Reduction

Intramural Research

Clinical Research
Cardiothoracic Surgery
Hematology
Pulmonary and Vascular Medicine
Sickle Cell Disease

Laboratory Research
Biochemistry and Biophysics
Cell Biology and Physiology
Genetics and Development Biology
Immunology
Molecular Medicine
Systems Biology

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 Specialized Center of Clinically Oriented Research (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 ways 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 research and research training and career development in vascular biology and hypertension, cardiovascular surgery, and development of advanced technologies to diagnose and treat CVD. The portfolio includes an integrated basic and clinical research program to study the biological basis for vascular diseases and hypertension and their diagnosis, treatment, and prevention. Research on cardiovascular surgery includes both basic and preclinical research on surgical approaches and clinical trials to establish evidence-based surgical therapies. The development of diagnostics encompasses research on biosensors, imaging technologies, and the application of "omic" methodologies. Therapeutic development includes drug and nucleic acid delivery technologies, regenerative and reparative medicine, gene therapy, and device development.

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 to diagnose and treat 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 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, translational, and clinical research on the etiology, pathogenesis, prevention, diagnosis, and treatment of vascular diseases and hypertension. Vascular biology focuses on angiogenesis; development and repair of arteries, veins, lymphatics, and microcirculation; and biology of the endothelium and other vascular wall components. Vascular disease research focuses on diseases affecting peripheral (non-coronary) arteries, including the aorta and cerebral, renal, and limb vessels; veins; and lymphatics. Hypertension research focuses on the study of blood pressure regulation—including central, renal, and vascular control—and end organ damage 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, 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 conducts and manages an integrated basic and clinical research program to study 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 investigation of congenital heart disease, from embryology through adulthood, and 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 pathogenesis and treatment of heart failure and cardiomyopathies, including 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 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 and research training related to 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 identify risk factors for disease; clinical trials of interventions to prevent disease; genetic, behavioral, sociocultural, and environmental influences on disease risk and outcomes; and application of prevention and treatment strategies to determine ways to improve clinical care and public health.

The Program is organized into the three branches and three offices described below.

Clinical Applications and Prevention Branch

The Clinical Applications and Prevention Branch supports, designs, and conducts research 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 are relevant to prevention and are supported. Clinical application research examines approaches to improve health care delivery and patient outcomes in clinical and community trials and observational studies.

Epidemiology Branch

The Epidemiology Branch supports, designs, and conducts research on 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 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 understanding of the causes and prevention of major diseases affecting the health of women. 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 tested promising but unproven interventions—such as hormone therapy, diet, and supplements—to prevent major diseases and evaluate overall effects on health. Currently, the program is determining the long-term effects of prior hormone therapy on the cohort that participated in the clinical trials of hormone therapy. The Branch has established an infrastructure to support 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 give objective, statistically sound, and medically relevant solutions to problems. The OBR is expected to develop a new and valid statistical solution when presented with a problem for which techniques are unavailable. 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 offers 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 in COPD and pulmonary vascular disease; and a Centers Program supports research on advanced diagnostics and experimental therapeutics in 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. Health education research and demonstration and education projects for management of asthma and COPD are additional areas of focus.

Asthma research investigates the origins, pathogenesis, and management of asthma, including the role of immunologic and nonimmunologic events and inflammation in its pathogenesis; genetics of asthma and atopy; airway remodeling and repair in asthma; mechanisms of severe asthma; and 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 development and progression of COPD, emphysema, and lung disease associated with alpha-1-antitrypsin deficiency; genetic determinants of lung disease; treatment of COPD; and health effects of air pollution.

Research on CF focuses on 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 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, lymphangioleiomyomatosis, and lung cell and vascular biology.

AIDS and tuberculosis research focuses on 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 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 regulation of lung development, growth, and repair; lung surfactant system; and 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 lymphangioleiomyomatosis.

Research on lung vascular biology investigates vascular cell biology and function and pulmonary vascular disease, including pulmonary arterial hypertension and pulmonary embolism diagnosis. Research focuses on biology and function of pulmonary vascular endothelial cells, regulation of barrier function and lung permeability, and right heart function in health and disease.

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, which 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 nonmalignant 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.

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. It also maintains communication with other Institute programs to facilitate early practical application of basic research findings. 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 six Centers and two 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.

Center for Molecular Medicine

The Center for Molecular Medicine conducts biomedical research directed at defining the fundamental molecular mechanism underlying human disease; develops a range of animal- and cell-based models of human diseases, including development of patient-specific induced pluripotent stem cells to test novel hypotheses and develop novel therapeutics; and implements mechanism-guided clinical studies designed to test proof-of-principle therapeutic approaches or to provide fundamental insight regarding disease mechanisms.

Genetics and Development Biology Center

The Genetics and Development Biology Center develops a global view of 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 intracellular and signaling processes involved in activation of lymphocytes and mast cells, investigates 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.

Systems Biology Center

The Systems Biology Center investigates physiological and pathophysiological mechanisms by integrating biological, chemical, and physical information from diverse sources. It develops advanced methodologies for large-scale data acquisition in biological systems. It also develops computational tools needed for interpreting studies using large-scale data acquisition techniques and mathematical modeling approaches to discover emergent properties of biological systems that are not explainable solely from knowledge of the properties of the parts.

Cardiovascular and Pulmonary Branch

The Cardiovascular and Pulmonary Branch conducts research on diseases that affect the heart, blood, blood vessels, and lungs. Specific projects seek to answer clinically relevant issues using methods ranging from a molecular level to clinical projects in diagnostics, therapeutics, and interventions. The Branch emphasizes the creation of an environment in which scientists and physician scientists collaborate on disease-specific issues using the most appropriate approaches in the spectrum between the bench and the bedside.

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.

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, blood, and sleep diseases and conditions 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 and 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 National Sickle Cell Disease 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 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 Therapy (PEACE) trial 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 worldwide 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.*

October 20, 2010. Follow-up findings from the WHI study of hormone therapy in postmenopausal women show that, in addition to having a higher incidence of breast cancer, the group treated with estrogen plus progestin had nearly double the rate of mortality from breast cancer than the placebo group 5 years after the study drug was discontinued.

April 7, 2011. Results from the STICH study show that adding bypass surgery to medical therapy for selected patients with chronic heart failure reduced the combination of deaths and heart-related hospital stays compared with medical therapy alone.

May 12, 2011. Results from the Pediatric Hydroxyurea Phase III Clinical Trial (Baby HUG) show that hydroxyurea appears to be safe for treating SCD in children aged 8–19 months, and can reduce their pain episodes and improve key blood measurements.

August 24, 2011. Results from the COPD Clinical Research Network show that adding a common antibiotic to the usual daily treatment regimen for COPD reduced the occurrence of acute exacerbations and improved the quality of life of patients.

September 26, 2011. Results from a genome-wide association study (GWAS) show that asthma patients who have two copies of a specific gene variant responded only one-third as well to steroid inhalers used to treat asthma as those with two copies of the normal gene.

October 2011. Research supported in part by the NHLBI demonstrates that silencing the gene that produces the protein BCL11A can reactivate fetal hemoglobin production in adult mice bred to have SCD. The discovery presents a new target for future therapies for people with SCD.

October 17, 2011. The NHLBI launches the National Program to Reduce Cardiovascular Risk, a public-private partnership to improve control of CVD risk factors.

November 2011. Results from the AIM HIGH: Niacin Plus Statin To Prevent Vascular Events study show that adding high dose, extended-release niacin to statin treatment in people with heart and vascular disease does not reduce the risk of cardiovascular events.

November 9, 2011. The NCSDR releases the 2011 NIH Sleep Disorders Research Plan that identifies research opportunities to be pursued over the next 3 to 5 years in order to spur new approaches to prevent and treat sleep disorders and sleep deficiency.

December 2011. Research supported in part by the NHLBI shows that gene therapy can boost the production

of a vital blood clotting factor in a small group of people with hemophilia B. Results from the study represent a promising step toward making gene therapy a viable treatment option for people with hemophilia B.

December 2011. The NHLBI releases *Integrated Guidelines for Cardiovascular Risk Reduction in Children and Adolescents: The Report of the Expert Panel.*

March 2012. An NHLBI comparative effectiveness study shows that older patients with stable CHD who undergo bypass surgery have better long-term survival rates than those who undergo a nonsurgical procedure known as percutaneous coronary intervention to improve blood flow to the heart muscle.

April 5, 2012. Dr. Gary Gibbons is appointed Director of the NHLBI. He succeeds Dr. Elizabeth Nabel.

June 18, 2012. The NHLBI launches the National Blood Disorders Program, a public-private partnership to improve the management of SCD.

July 2012. Results of the Rule Out Myocardial Infarction Using Computed Assisted Tomography study show that, in an emergency department setting and among patients with symptoms suggestive of acute coronary syndromes, incorporating computed tomography scans to standard screening procedures allows hospitals to send home sooner many patients with chest pain (often directly from an emergency department) without compromising their safety.

August 2012. Research based on work from the Framingham Heart Study shows that individuals with elevated levels of galectin 3, a marker of cardiac fibrosis, have an increased risk for heart failure and mortality.

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 2010, cardiovascular, lung, and blood diseases accounted for 1,017,000 deaths and 41 percent of all deaths in the United States (p. 35). The estimated economic cost in 2009 for these diseases was $424 billion—23 percent of the total economic costs of illness, injuries, and death (p. 51). Of all diseases, heart disease is the leading cause of death; chronic lower respiratory diseases (CLRD), which includes COPD and asthma, ranks third (behind cancer); and cerebrovascular disease is 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, asthma, CHD, 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 mid-20th century, 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 57,757 deaths in 2010 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 2010, CVD caused 788,000 deaths—32 percent of all deaths (p. 35).
- Heart disease is the leading cause of death; the main form, CHD, caused 380,000 deaths in 2010 (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 2010, the rate was below the all-time low in 1900 (p. 37).
- Cerebrovascular disease, the fourth leading cause of death, accounted for 129,000 deaths in 2010 (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, but second to cancer in Hispanics, Asians, and American Indians. Stroke ranks as the third or fourth leading cause of death in the minority groups, except in American Indians or Alaska Natives, 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 2010 (p. 39).
- From 1999 to 2010, death rates for CHD and stroke declined in non-Hispanic whites and non-Hispanic blacks; CHD and stroke death rates decreased among Hispanics, Asians, and American Indians from 1999 to 2008 but remained stable or increased in 2009 to 2010. CHD and 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 1,223,000 fewer deaths from CHD in 2010 than would have occurred if there had been no decline (p. 41).

- Substantial improvements have been made in the treatment of CVD. Since 1990, the percent of hospitalizations for AMI, stroke, and heart failure that were discharged dead declined appreciably (p. 41).
- From 1990 to 2010, CHD mortality declined in the United States, but remained higher than in many other countries, particularly among females (only selected countries are shown) (p. 42).
- From 2001 to 2010, the percentage decline in death rates for CHD and stroke was fairly similar for whites and blacks (p. 43).
- A 2007–2010 national survey showed that an estimated 83.6 million persons in the United States had CVD, including 77.9 million with hypertension and 15.4 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. During that time, the prevalence of overweight adults has consistently increased (p. 48).
- From 1976–1980 to 2007–2010, 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 2007–2010 national survey showed only about 52 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 2010. Rates for those aged 65 years and older increased from 1971 to 1998 and remained relatively stable until 2005; rates then declined through 2010 (p. 50).
- The estimated economic cost of CVD for 2009 was $313 billion:
  - $192 billion in direct health expenditures
  - $121 billion in indirect cost of mortality (p. 51).

Lung Diseases

- Lung diseases, excluding lung cancer, caused an estimated 235,000 deaths in 2010 (p. 35).
- CLRD caused 138,000 deaths in 2010 and is the third leading cause of death (pp. 36, 38).
- From 2001 to 2010, death rates for asthma declined in both black and white males and females; death rates for COPD declined in both black and white males but rose in both black and white females (p. 43).
- From 1980 to 2010, infant death rates for various lung diseases declined markedly (p. 43).
- In 2010, of the 10 leading causes of infant mortality, 4 were lung diseases or had a lung disease component (p. 44). From 2000 to 2010, changes in mortality for the causes were:
  - Congenital malformations (-10 percent)
  - Disorders of short gestation (-4 percent)
  - Sudden infant death syndrome (-17 percent)
  - Respiratory distress syndrome (-48 percent).
- In 2010, approximately one in six deaths in children under 1 year of age was due to a lung disease (p. 44).
- From 1990 to 2010, the CLRD death rate for females in the United States and Finland increased appreciably compared with the rates in several other countries (p. 45).
- From 1999 to 2010, death rates for CLRD in males decreased in all racial/ethnic groups except American Indians; their death rates fluctuated. In females, death rates for CLRD increased slightly in non-Hispanic whites and remained stable in non-Hispanic blacks, Hispanics, American Indians, and Asians during the period (p. 46).
- Among the sleep disorders from 2000 to 2010, physician office visits for sleep apnea increased from 2.0 to 2.7 million and for insomnia increased from 2.4 to 5.8 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 $106 billion in 2009:
  - $81 billion in direct health expenditures
  - $25 billion in indirect cost of mortality (p. 51).

Blood Diseases

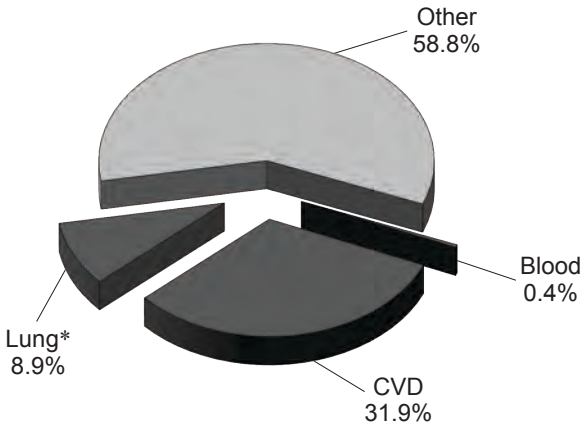
- Approximately 10,000 deaths were attributed to blood diseases in 2010 (p. 35). These include the following:
  - 4,900 due to anemias
  - 1,900 due to coagulation defects
  - 800 due to purpura
  - 2,400 due to other blood diseases.
- A large proportion of deaths from AMI, cerebrovascular disease, and peripheral artery disease involve blood-clotting problems (no estimate available).
- In 2009, anemias cost the Nation's economy $6 billion:
  - $5 billion in direct health expenditures
  - $1 billion in indirect cost of mortality (p. 51).

Deaths From All Causes and Deaths From Cardiovascular, Lung, and Blood Diseases, U.S., 1990 and 2010

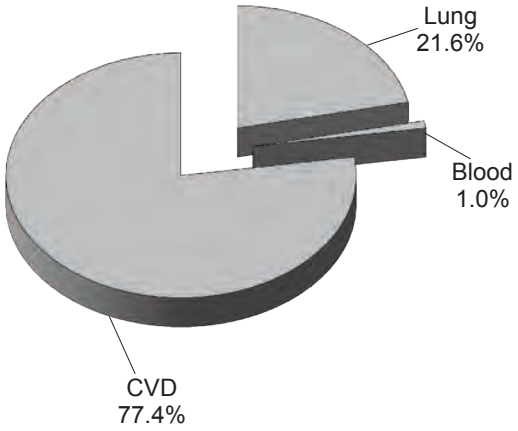
	1990		2010	
Cause of Death	**Number of Deaths**	**Percent of Total**	**Number of Deaths**	**Percent of Total**
All Causes	2,148,463	100	2,468,435	100
All Cardiovascular, Lung, and Blood Diseases	1,132,068	53	1,017,381	41
Cardiovascular	926,079	43	787,650	32
Blood	9,365	<1	9,953	<1
Lung	208,947*	10	234,533**	9
All Other Causes	1,016,395	47	1,451,054	59

* Includes 11,838 CVD deaths due to pulmonary heart disease and 485 deaths due to sarcoidosis.
** Includes 13,808 CVD deaths involving pulmonary heart disease and 947 deaths due to sarcoidosis.
Source: Vital Statistics of the United States, National Center for Health Statistics (NCHS).

Deaths by Major Causes, U.S., 2010



Deaths From Cardiovascular, Lung, and Blood Diseases, U.S., 2010



Total Cardiovascular, Lung, and Blood Diseases 41.2%

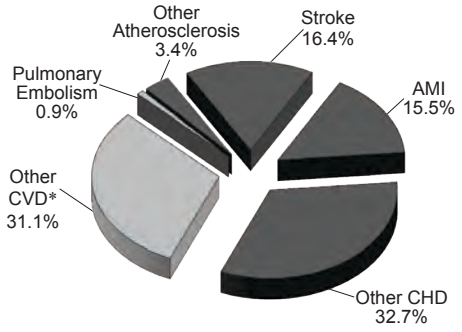
* Excludes 13,808 deaths from pulmonary heart disease and 947 deaths due to sarcoidosis.
Source: Vital Statistics of the United States, NCHS.

Deaths From Specific Cardiovascular, Lung, and Blood Diseases, U.S., 2010

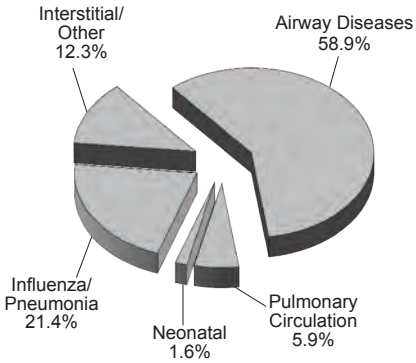
	Deaths (Thousands)		
Cause of Death	**Cardiovascular**	**Lung**	**Blood**
Acute Myocardial Infarction	122	—	—*
Other Coronary Heart Disease	257	—	—
Cerebrovascular Diseases (Stroke)	129	—	—*
Other Atherosclerosis	26	—	—
Pulmonary Embolism	7	7**	—*
Deep Vein Thrombosis	3	—	—*
Other Cardiovascular Diseases	243	7**	—
Bleeding and Red Blood Cell Diseases†	—	—	10†
Chronic Obstructive Pulmonary Disease	—	135	—
Asthma	—	3	—
Influenza and Pneumonia	—	50	—
Neonatal Pulmonary Disorders	—	4	—
Interstitial Lung Diseases	—	8	—
Lung Diseases Due to External Agents	—	18	—
Other Lung Diseases	—	3	—
Total	**788‡**	**235**	**10**

* Deaths from pulmonary disorders also included as CVD.
** 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.
† Most deaths from this cardiovascular disease can be classified as a blood-clotting disease. No good estimate is available.
‡ Numbers do not sum to the total due to rounding.
Note: Total, excluding overlap, is 1,017,381.
Source: Vital Statistics of the United States, NCHS.

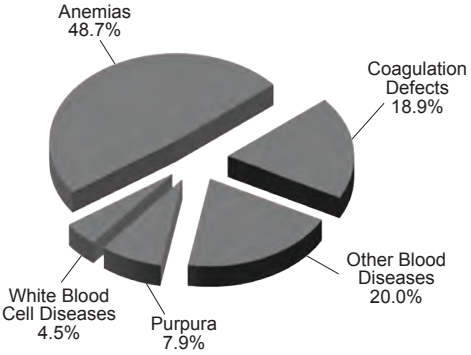
Deaths From Cardiovascular Diseases, U.S., 2010



Deaths From Lung Diseases, U.S., 2010



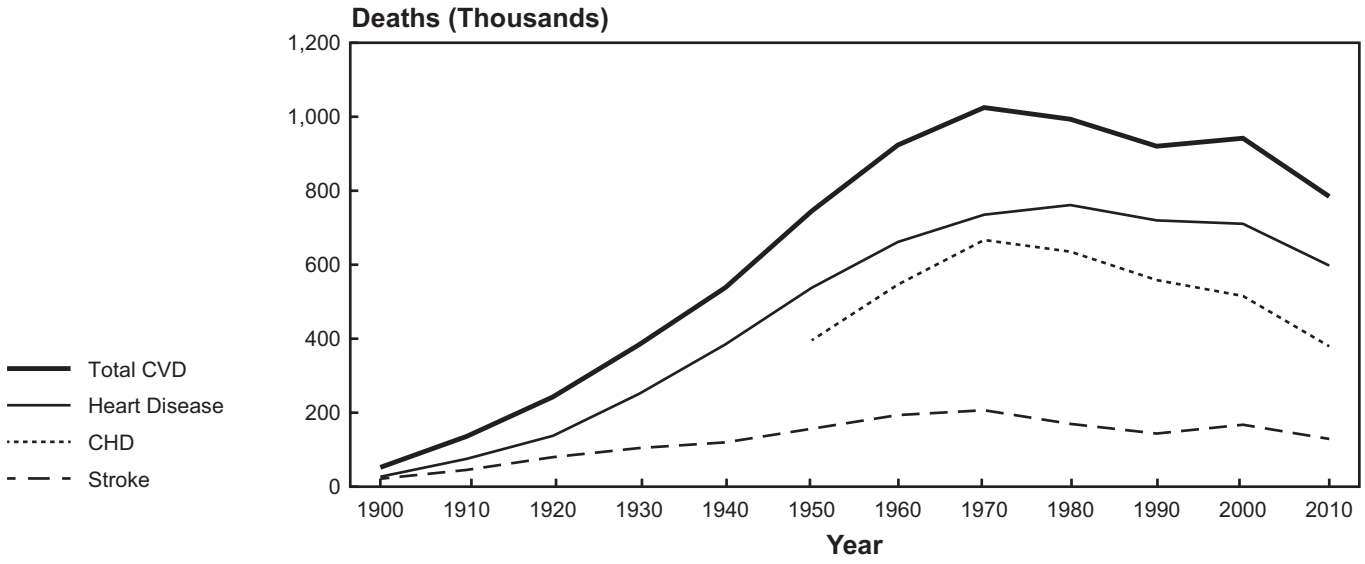
Deaths From Blood Diseases, U.S., 2010



Atherosclerosis-related disease 68.0%

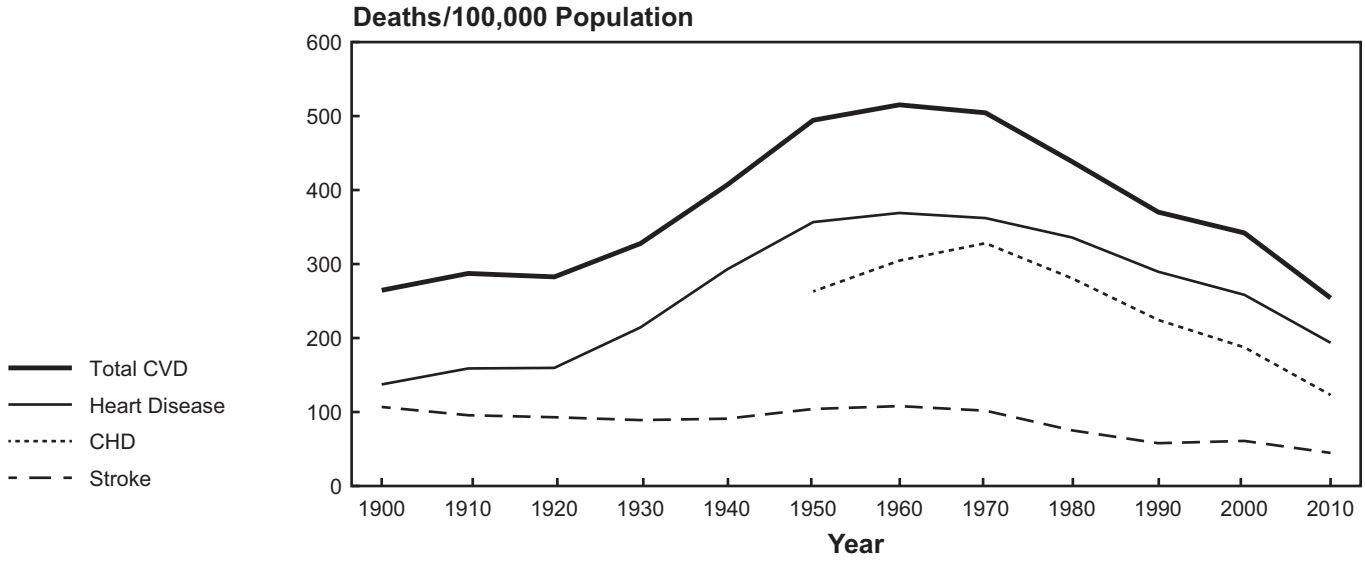
* Includes heart failure, cardiac dysrhythmias, hypertensive disease, deep vein thrombosis, and other heart and blood vessel diseases.
Note: Numbers may not sum to 100 percent due to rounding.
Source: Vital Statistics of the United States, NCHS.

Deaths From Cardiovascular Diseases, U.S., 1900–2010



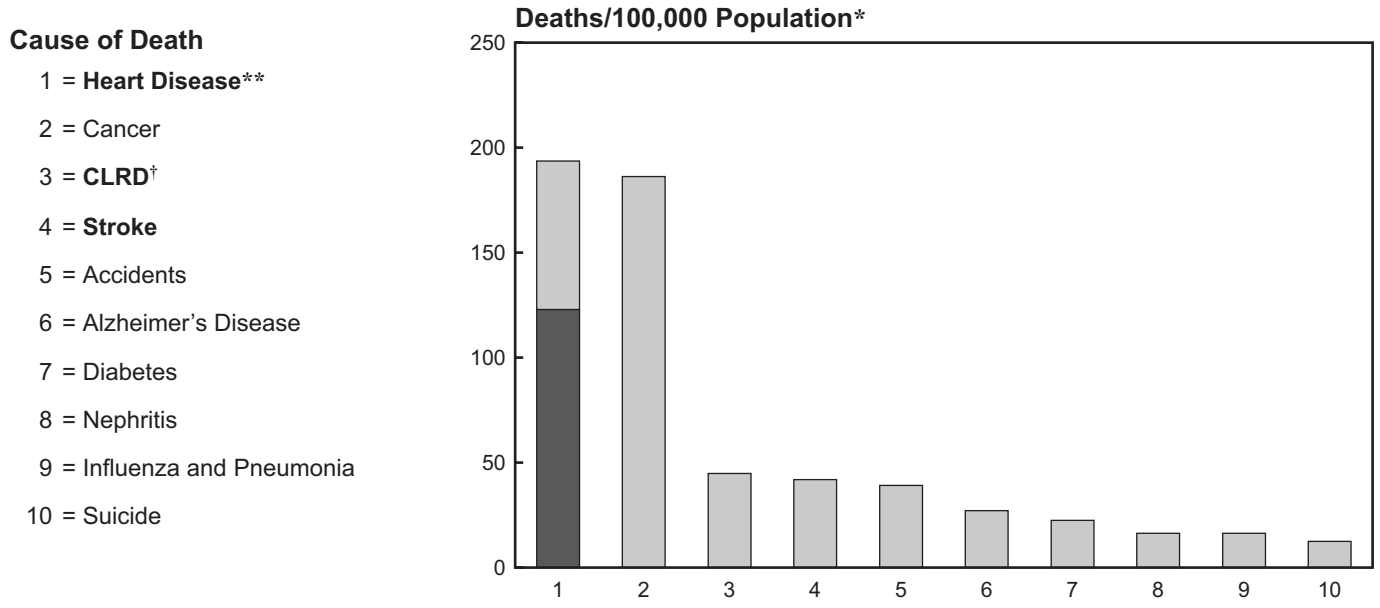
Source: Vital Statistics of the United States, NCHS.

Death Rates* for Cardiovascular Diseases, U.S., 1900–2010



* Not age-adjusted.
Source: Vital Statistics of the United States, NCHS.

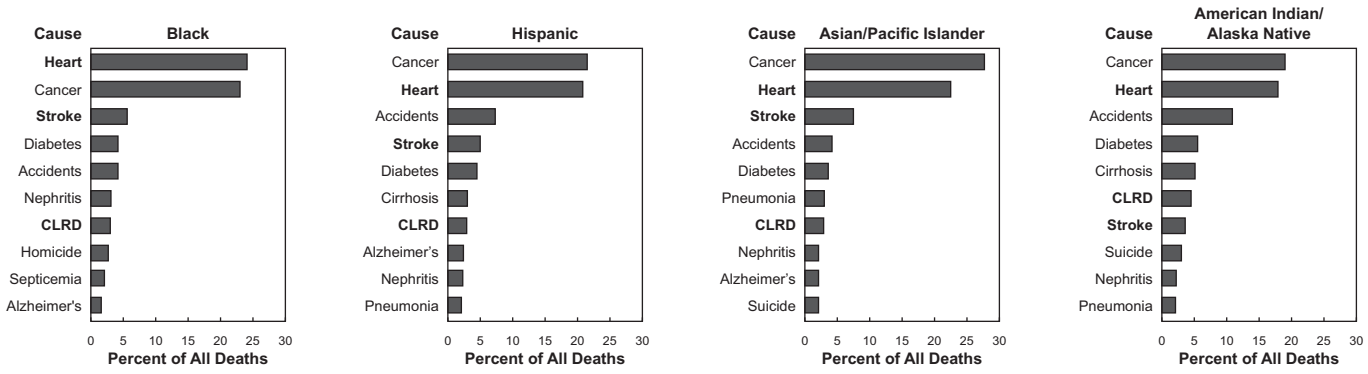
Ten Leading Causes of Death: Death Rates, U.S., 2010



	1	2	3	4	5	6	7	8	9	10
Years of potential life lost (millions)‡	3.8	5.6	0.7	0.7	3.2	<0.1	0.6	0.3	0.3	1.2

* Not age-adjusted.
** Includes 122.9 deaths per 100,000 population from CHD (dark bar).
† CLRD is the term used in the ICD/10 for COPD and asthma.
‡ Based on the average remaining years of life up to age 78.7 years (life expectancy at birth in 2010).
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., 2010



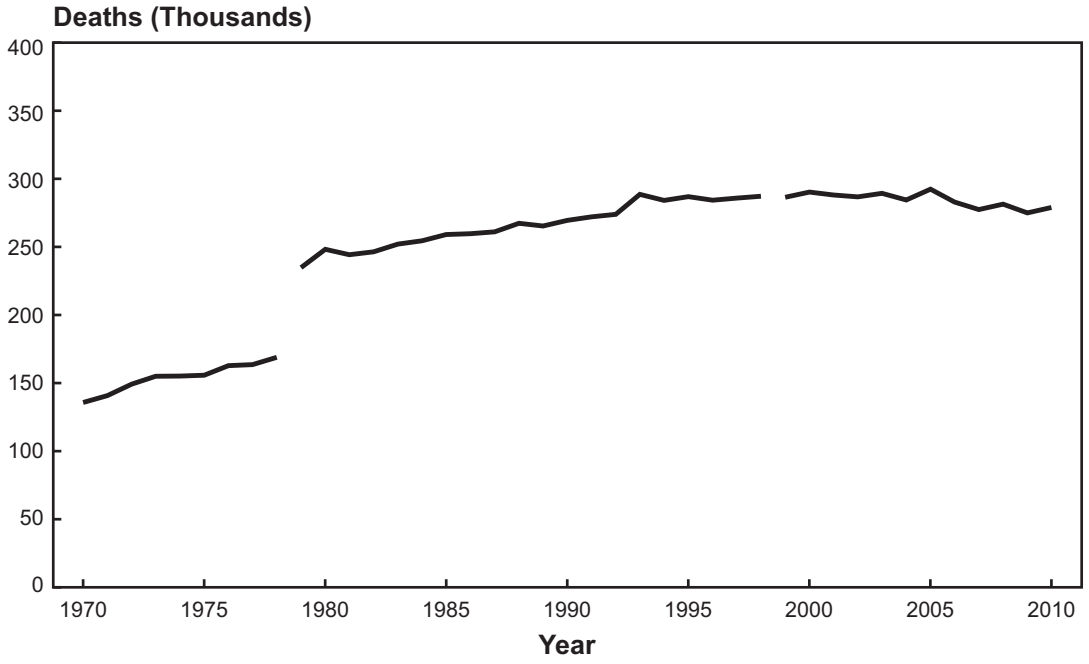
Note: Causes of death shown in bold are those addressed in Institute programs.
Source: Vital Statistics of the United States, NCHS.

Age-Adjusted Death Rates for Cardiovascular and Noncardiovascular Diseases, U.S., 1963, 1990, and 2010

Cause of Death	Deaths/100,000 Population*			Percent Change 1963–2010	Percent Change 1990–2010
	1963	1990	2010		
All Causes	1,346	938	747	-45	-20
Cardiovascular Diseases	805	413	236	-71	-43
Coronary Heart Disease	478	218	114	-76	-48
Stroke	174	69**	39	-78	-43
Other	153	125	83	-46	-34
Noncardiovascular Diseases	541	526	512	-5	-3
COPD and Asthma	16	39†	42	156	9
Other	524	487	469	-11	-4

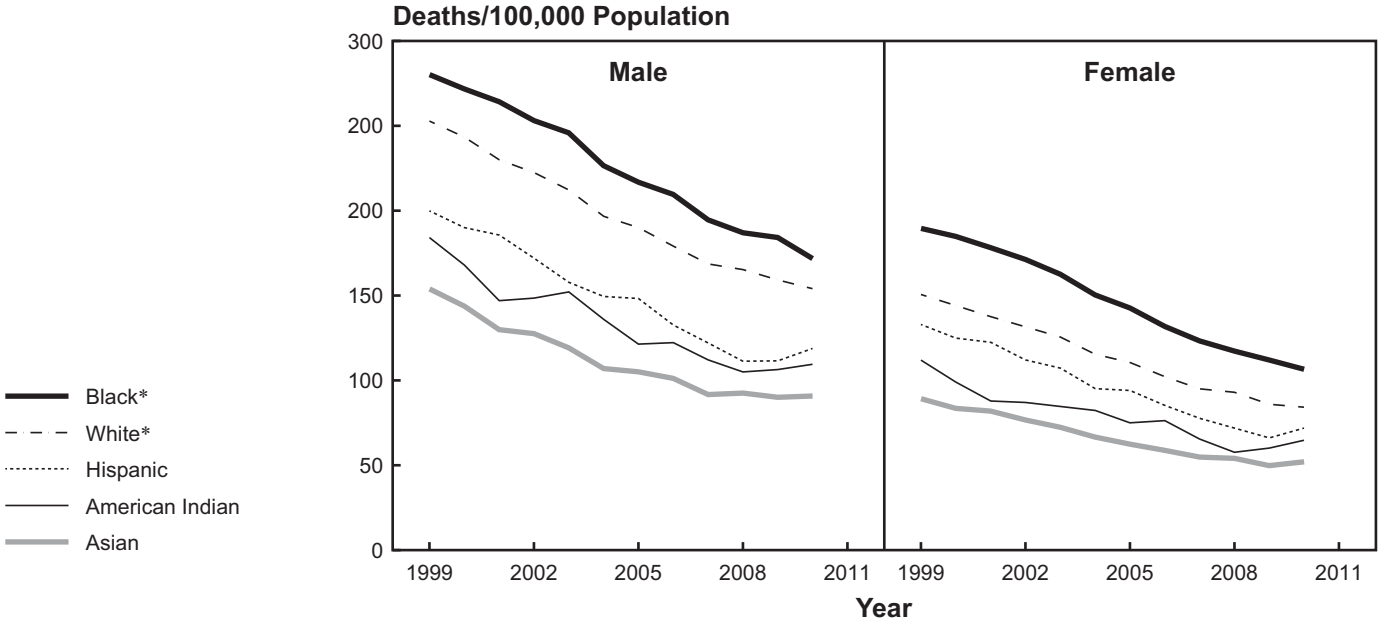
* Age-adjusted.
** ICD 10/9 comparability ratio (1.0502) applied.
† ICD 10/9 comparability ratio (1.0411) applied.
Source: Vital Statistics of the United States, NCHS.

Deaths Attributed to Heart Failure,* U.S., 1970–2010



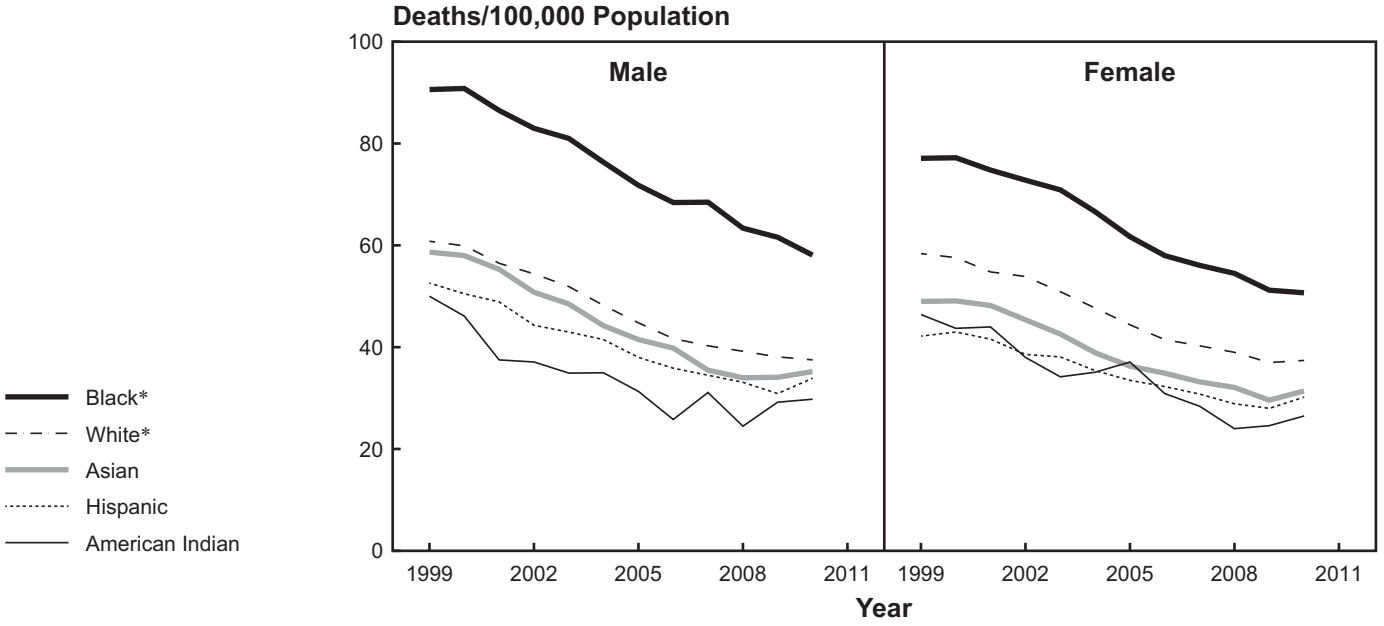
* Heart failure as the underlying cause of death or otherwise mentioned on the death certificate.
Note: Breaks in trend line indicate change in ICD codes.
Source: Vital Statistics of the United States, NCHS.

Age-Adjusted Death Rates for Coronary Heart Disease by Race/Ethnicity and Sex, U.S., 1999–2010



* Non-Hispanic.
Source: Vital Statistics of the United States, NCHS.

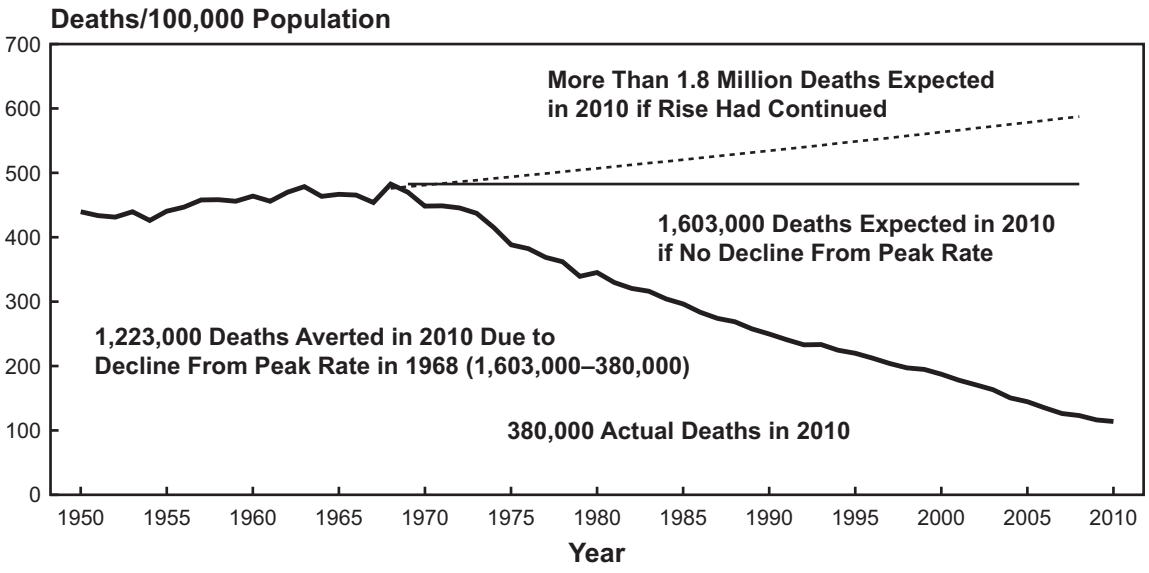
Age-Adjusted Death Rates for Stroke by Race/Ethnicity and Sex, U.S., 1999–2010



* Non-Hispanic.
Source: Vital Statistics of the United States, NCHS.

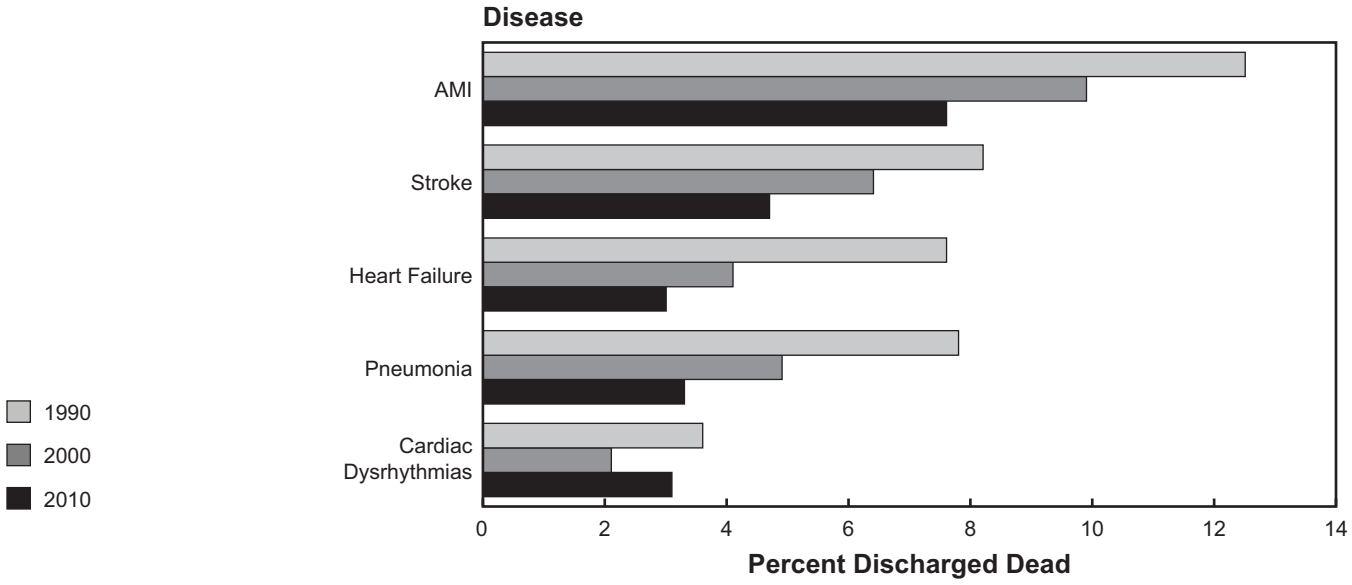
Age-Adjusted Death Rates for Coronary Heart Disease, U.S., 1950–2010

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



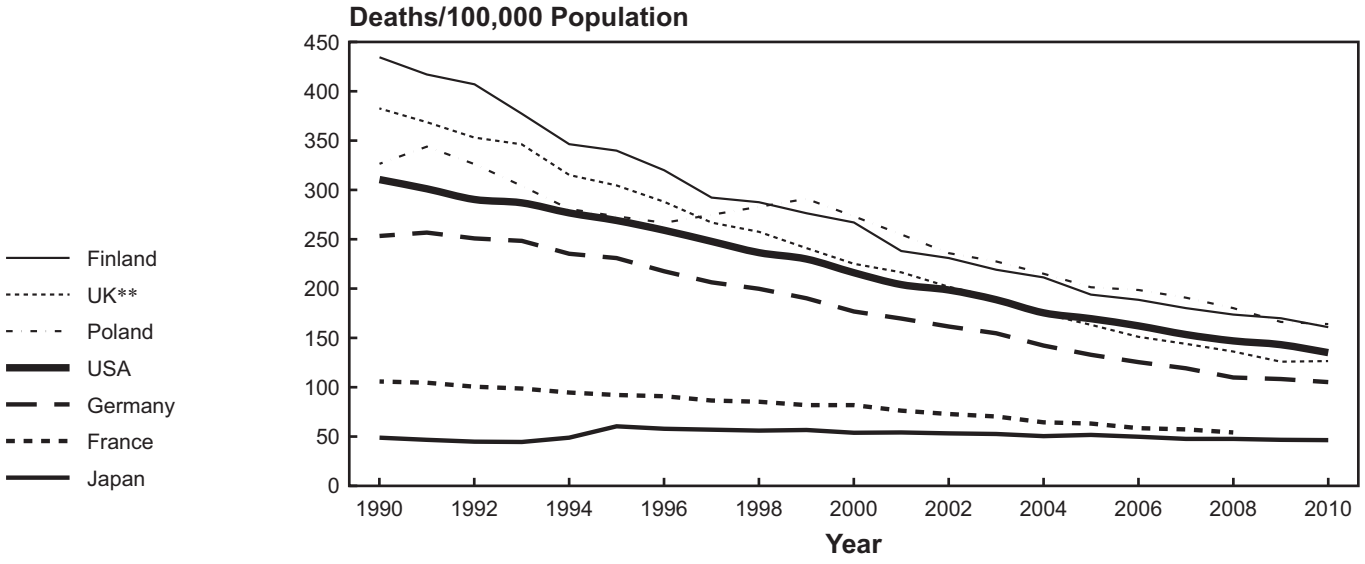
Source: Vital Statistics of the United States, NCHS.

Common Cardiovascular and Lung Diseases With High Percentage Discharged Dead From Hospitals, U.S., 1990, 2000, and 2010



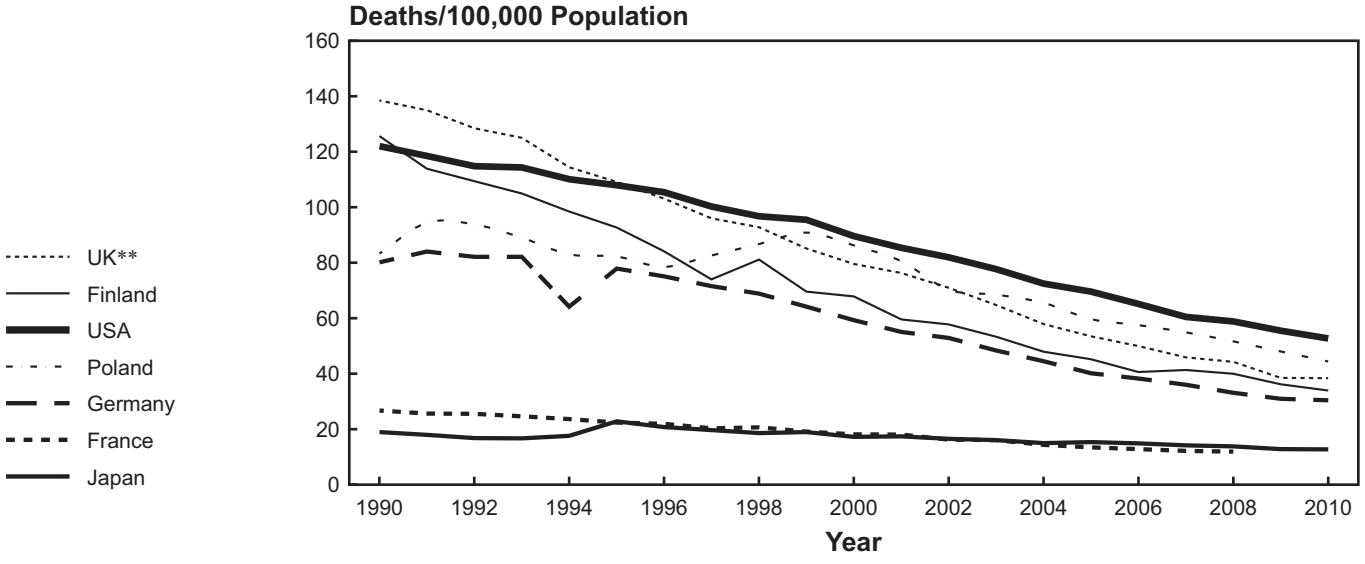
Source: National Hospital Discharge Survey (NHDS), NCHS.

Death Rates* for Coronary Heart Disease in Males, Ages 35–74 Years, in Selected Countries, 1990–2010



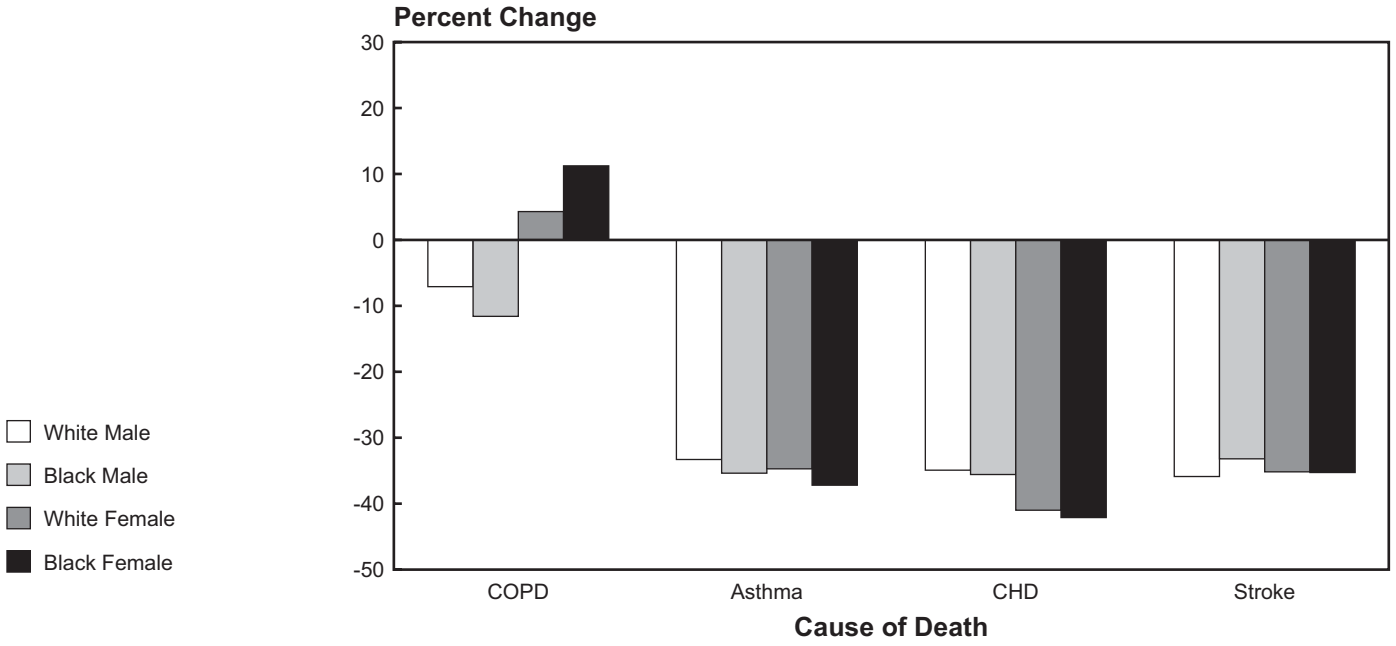
* Age adjusted to the European Standard Population.
** United Kingdom for 2008–2010; England and Wales for 1990–2007.
Source: World Health Organization (WHO) Mortality Database.

Death Rates* for Coronary Heart Disease in Females, Ages 35–74 Years, in Selected Countries, 1990–2010



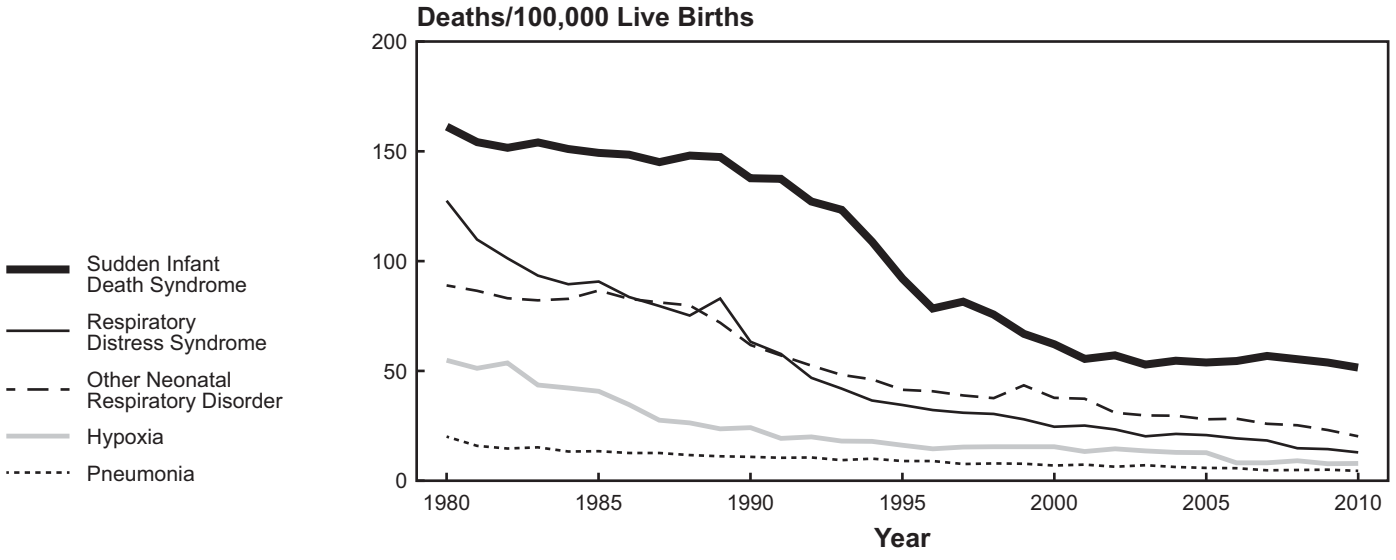
* Age adjusted to the European Standard Population.
** United Kingdom for 2008–2010; England and Wales for 1990–2007.
Source: WHO Mortality Database.

Percent Change in Age-Adjusted Death Rates for Selected Causes by Race and Sex, U.S., 2001–2010



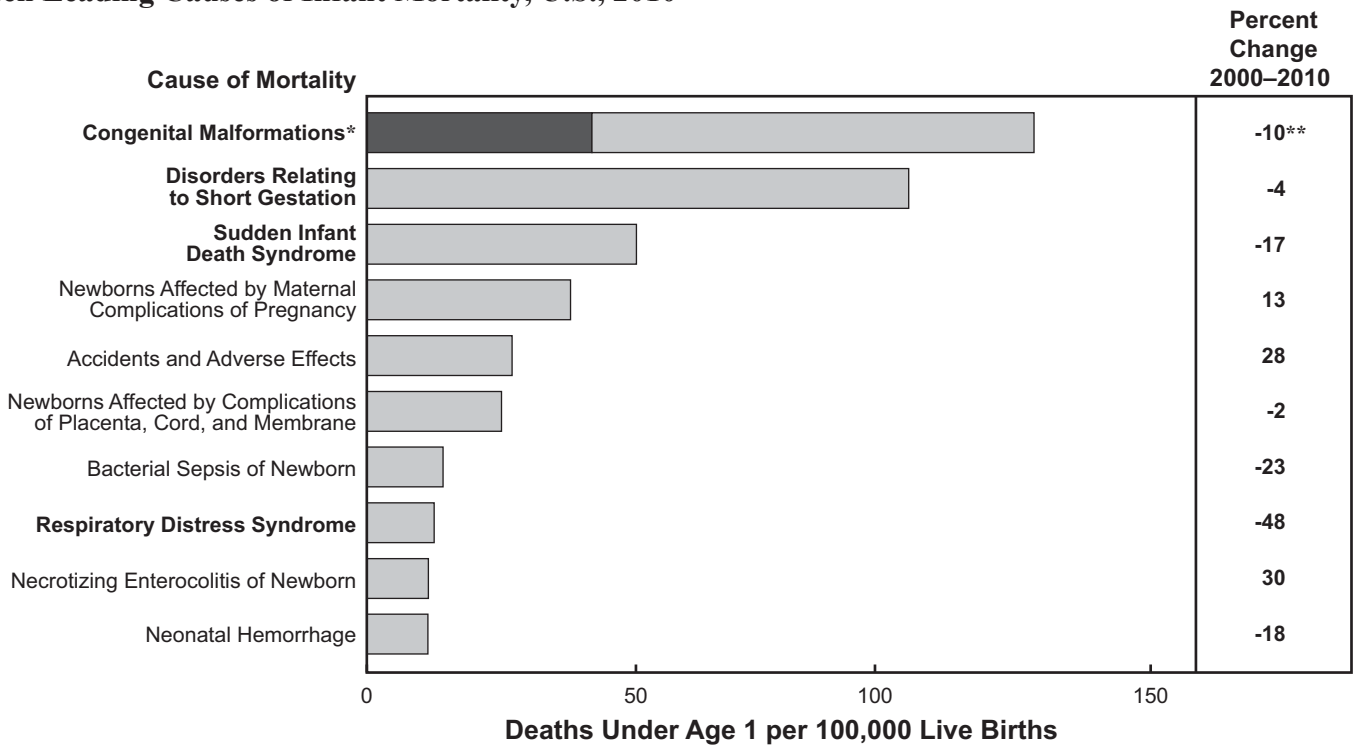
Source: Vital Statistics of the United States, NCHS.

Death Rates for Lung Diseases in Infants, U.S., 1980–2010



Source: Vital Statistics of the United States, NCHS.

Ten Leading Causes of Infant Mortality, U.S., 2010



* Congenital CVD and congenital respiratory diseases accounted for 43.1 deaths under age 1 per 100,000 live births (black bar), which is 34 percent of infant deaths due to all congenital malformations.

** From 2000 to 2010, congenital CVD declined 27 percent; congenital malformations of the respiratory system declined 41 percent; other congenital malformations increased 7 percent.

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

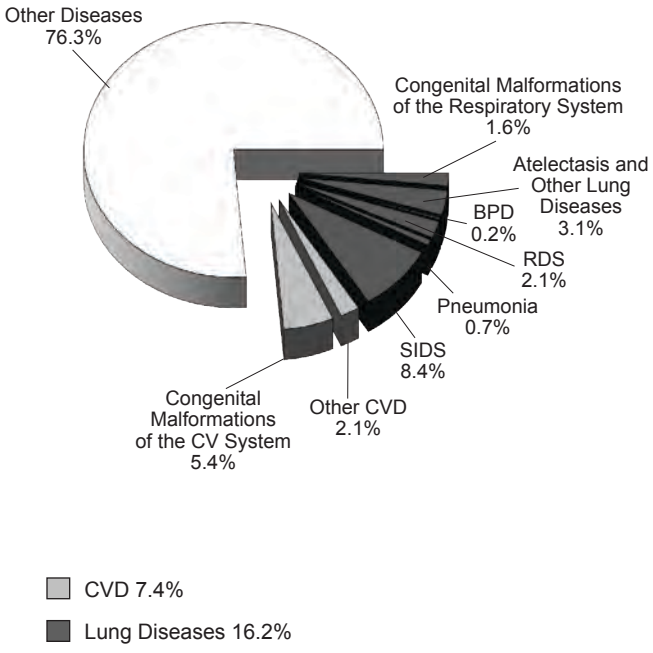
Source: Vital Statistics of the United States, NCHS.

Deaths Under Age 1 Year Due to Cardiovascular and Lung Diseases, U.S., 2010

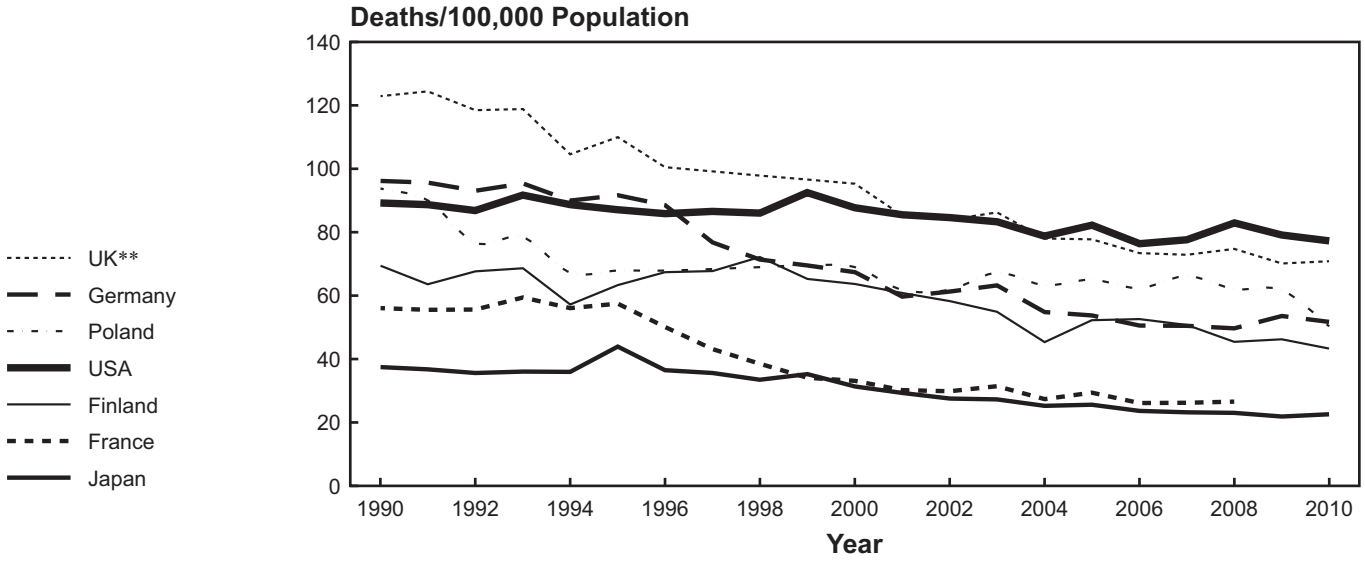
Cause of Death	Deaths Under Age 1
All Causes	24,586
Cardiovascular Diseases	**1,831**
Congenital Malformations	**1,324**
Other	507
Lung Diseases	**3,985**
Sudden Infant Death Syndrome	**2,063**
Respiratory Distress Syndrome	**514**
Pneumonia	179
Bronchopulmonary Dysplasia (BPD)	**56**
Atelectasis	248
Congenital Malformations	**399**
Other Lung Diseases	526
Other Diseases	18,770

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

Source: Vital Statistics of the United States, NCHS.

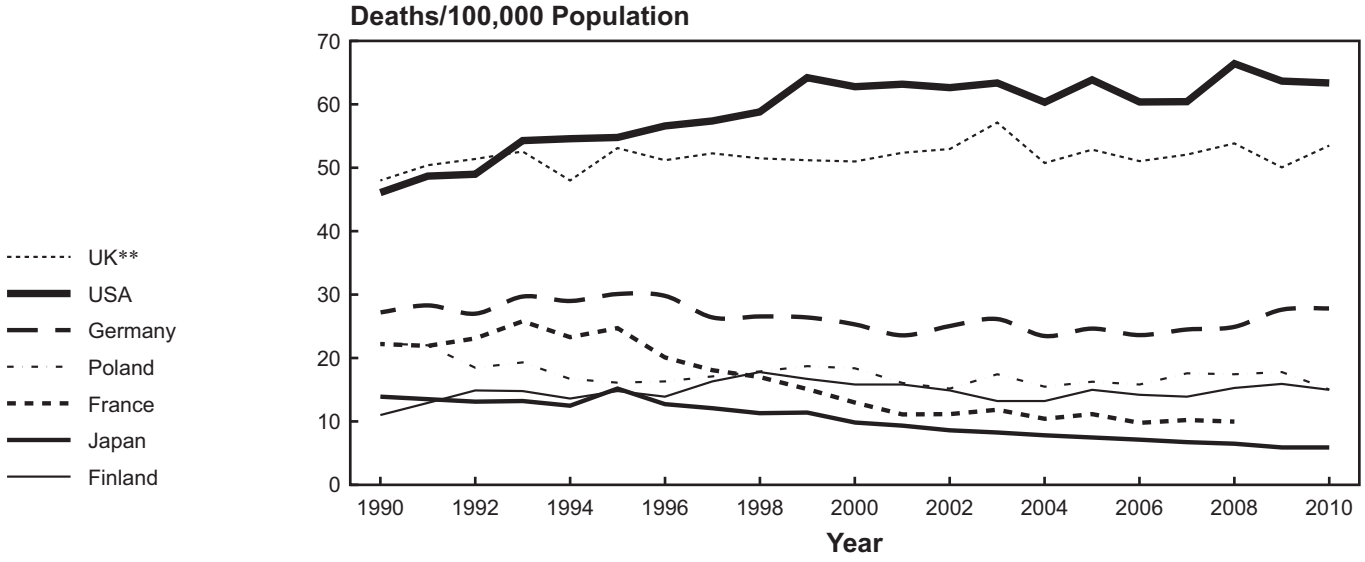


Death Rates* for Chronic Lower Respiratory Diseases in Males, Ages 35 Years and Older, in Selected Countries, 1990–2010



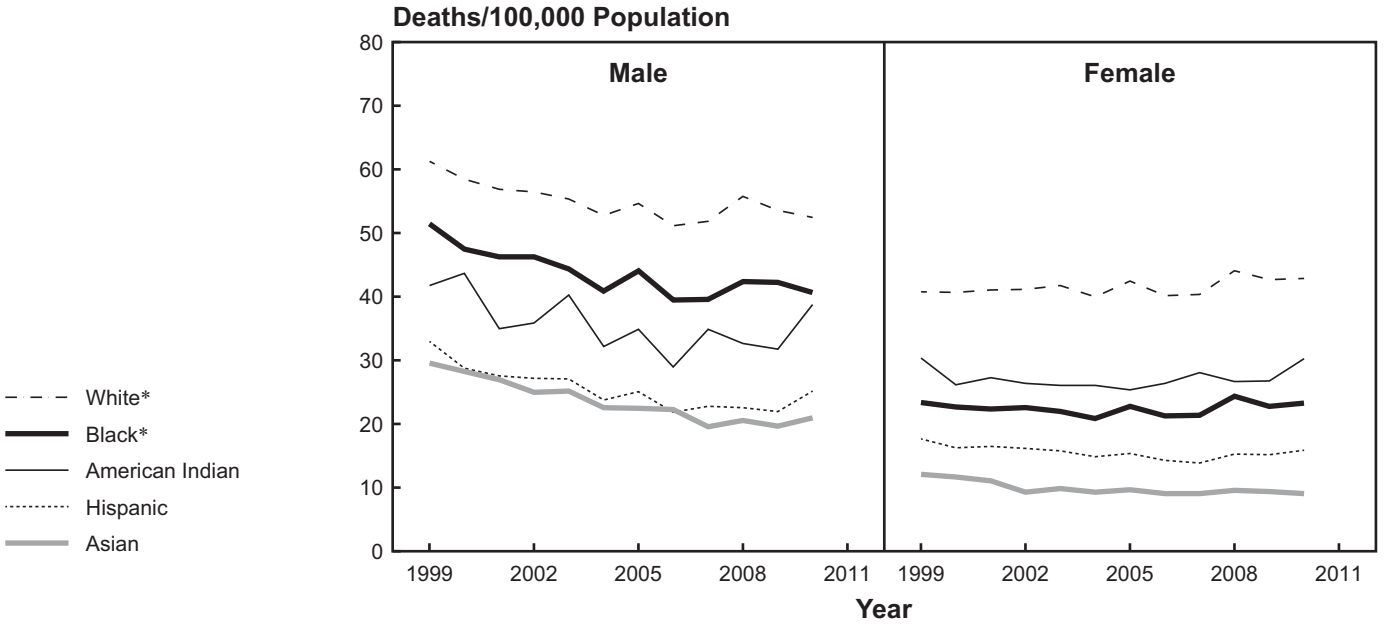
* Age adjusted to the European Standard Population.
** United Kingdom for 2008–2010; England and Wales for 1990–2007.
Source: WHO Mortality Database.

Death Rates* for Chronic Lower Respiratory Diseases in Females, Ages 35 Years and Older, in Selected Countries, 1990–2010



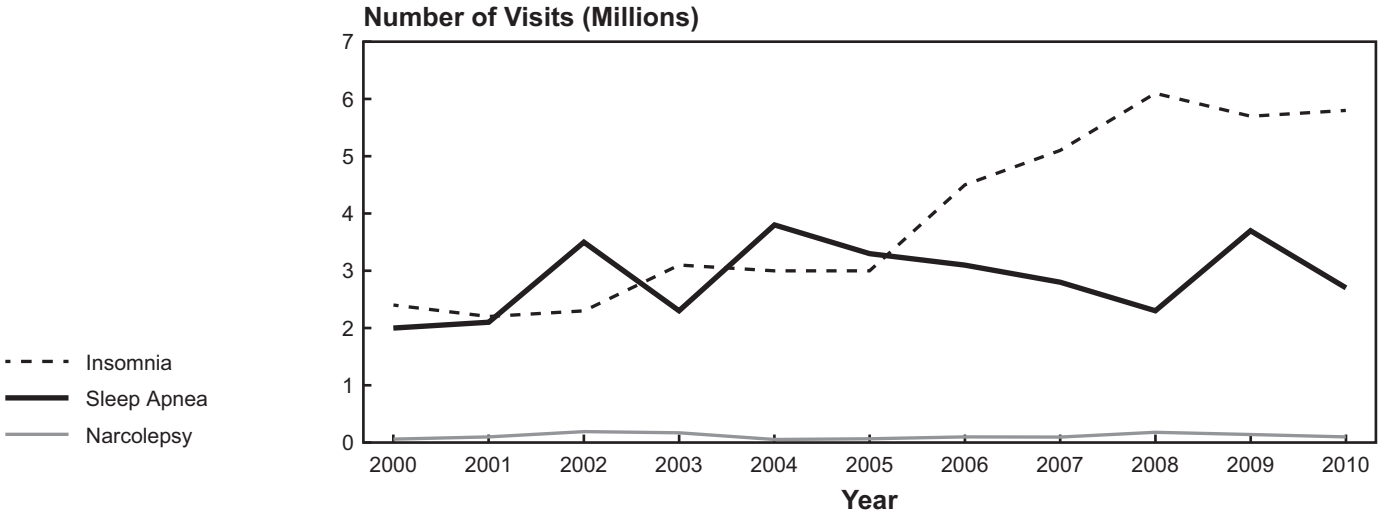
* Age adjusted to the European Standard Population.
** United Kingdom for 2008–2010; England and Wales for 1990–2007.
Source: WHO Mortality Database.

Age-Adjusted Death Rates for Chronic Lower Respiratory Diseases by Race/Ethnicity and Sex, U.S., 1999–2010



* Non-Hispanic.
Source: Vital Statistics of the United States, NCHS.

Physician Office Visits for Sleep Disorders, U.S., 2000–2010



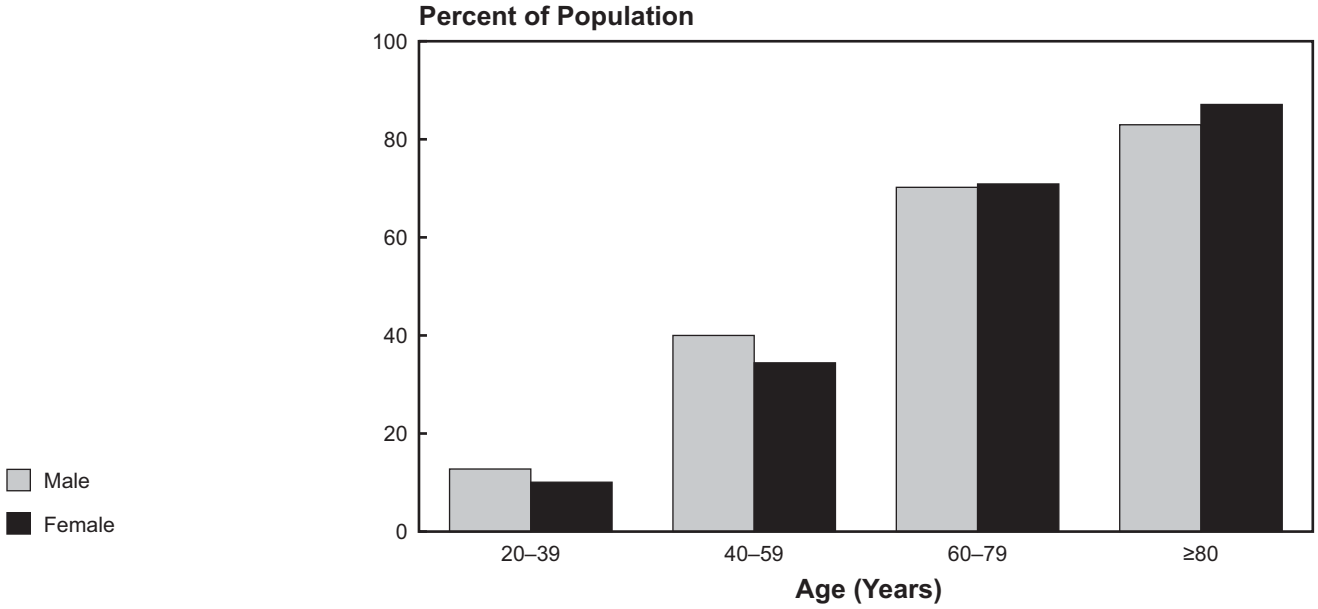
Note: Primary and secondary diagnoses.
Source: National Ambulatory Medical Care Survey, NCHS.

Prevalence of Common Cardiovascular and Lung Diseases, U.S., 2007–2011

Disease	Number of Persons
Cardiovascular Diseases*	83,600,000
Hypertension**	77,900,000
Coronary Heart Disease	15,400,000
Heart Failure	5,100,000
Stroke	6,800,000
Congenital Heart Disease†	1,000,000
Asthma‡	39,500,000
COPD§	12,700,000

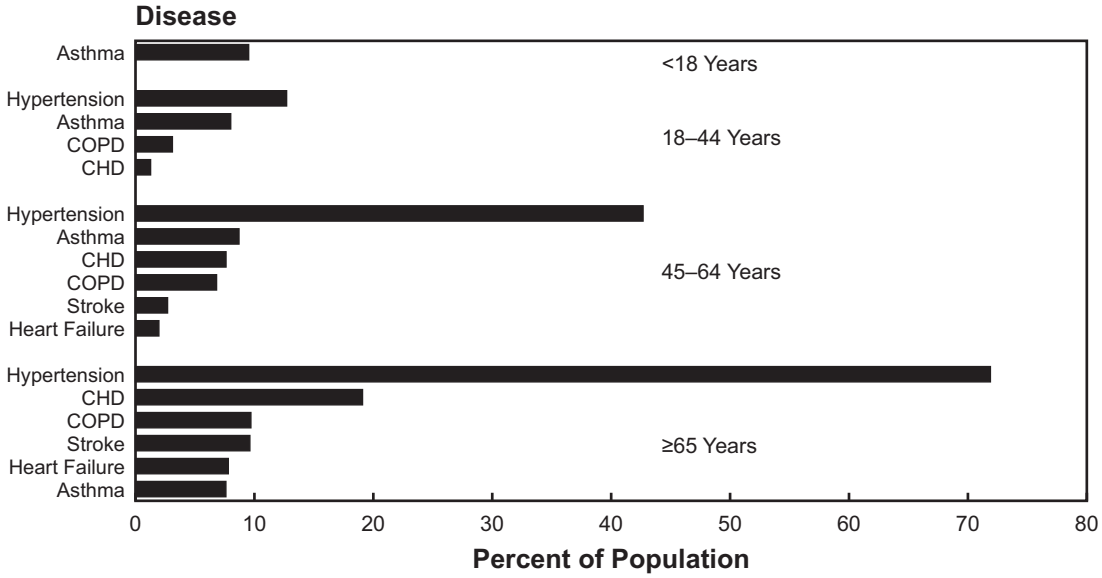
* Includes hypertension, CHD, stroke, or heart failure for ages 20 years and older.
** Hypertension is defined as systolic blood pressure ≥140 mmHg, or diastolic blood pressure ≥90 mmHg, or being on antihypertensive medication, or being told twice of having hypertension.
† Range from 650,000 to 1,300,000 for ages 18 years and older (Am Heart J 2004;147:425–439).
‡ 25,900,000 still have asthma and of those, 13,200,000 have had an attack in the past 12 months, for all ages.
§ An estimated 12,700,000 diagnosed (2011) and 12,000,000 undiagnosed (2006), for ages 18 years and older.
Sources: National Health and Nutrition Examination Survey (NHANES) 2007–2010, NCHS and National Health Interview Survey (NHIS) 2011, NCHS.

Prevalence of Cardiovascular Diseases* in Adults by Age and Sex, U.S., 2007–2010



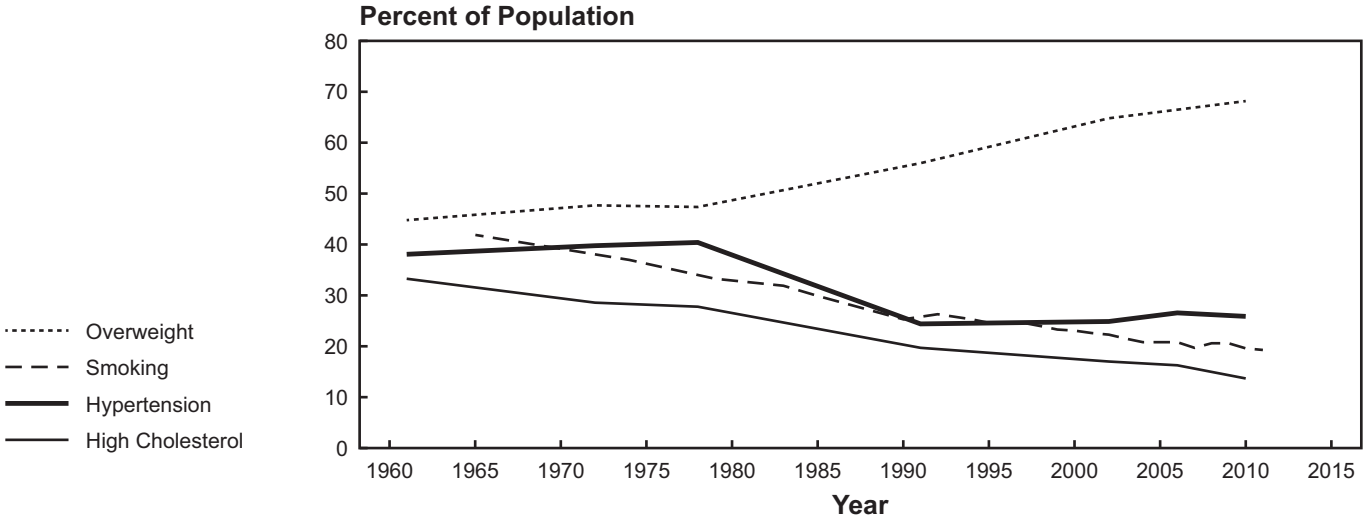
* Hypertension, CHD, stroke, or heart failure. Hypertension is defined as systolic blood pressure ≥140 mmHg, or diastolic blood pressure ≥90 mmHg, or being on antihypertensive medication.
Source: NHANES, 2007–2010, NCHS.

Prevalence of Common Cardiovascular and Lung Diseases by Age, U.S., 2007–2011



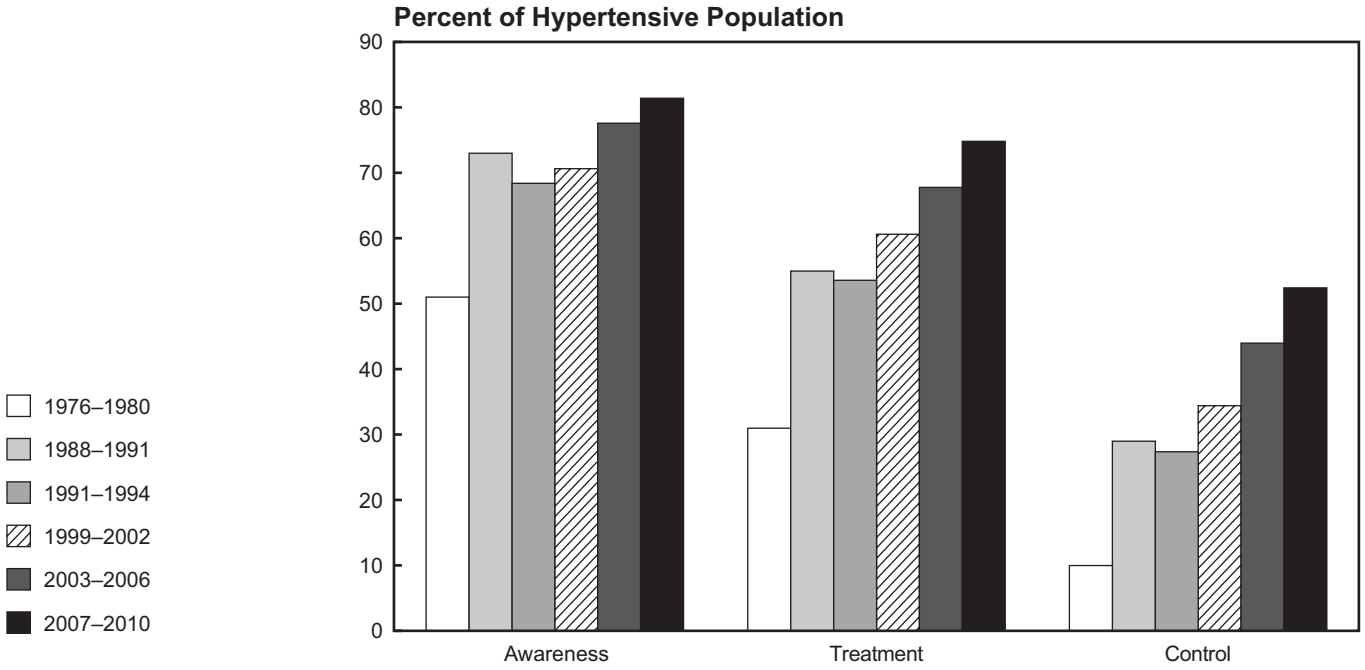
Sources: NHIS and NHANES, NCHS.

Age-Adjusted Prevalence of Cardiovascular Disease Risk Factors in Adults, U.S., 1961–2011



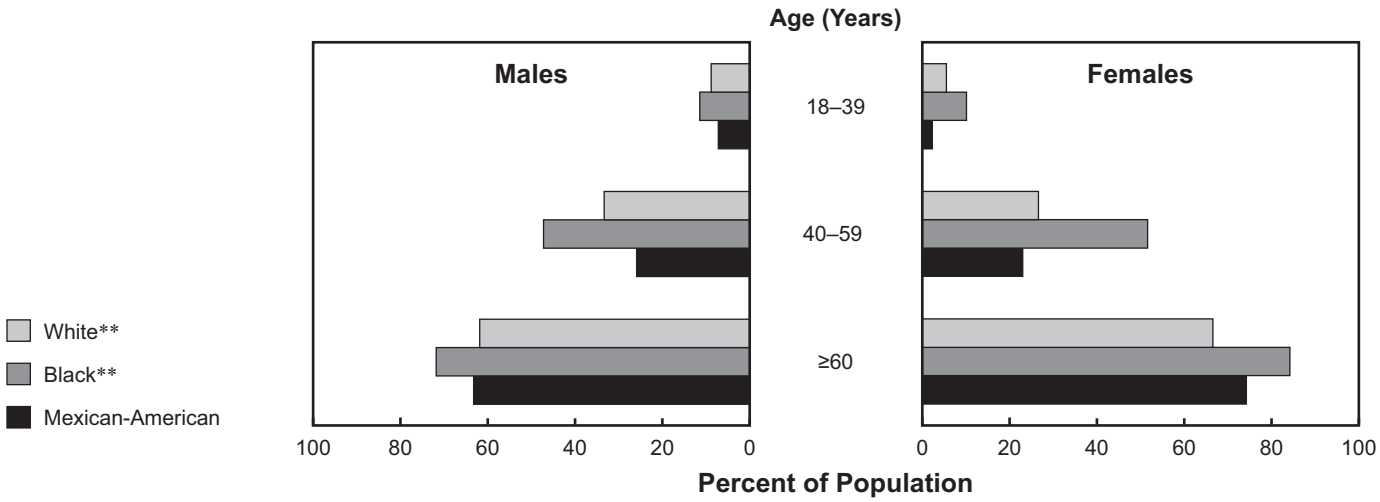
Notes: Hypertension is defined as systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥90 mmHg, or being on antihypertensive medication. High cholesterol is ≥240 mg/dL. Overweight is BMI ≥25 kg/m^2. Data were collected at six time periods: 1960–1961 (plotted at 1961), 1971–1974 (plotted at 1972), 1976–1980 (plotted at 1978), 1988–1994 (plotted at 1991), 1999–2002 (plotted at 2002), 2003–2006 (plotted at 2006), and 2007–2010 (plotted at 2010).
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 Years and Older, U.S., 1976–1980 to 2007–2010



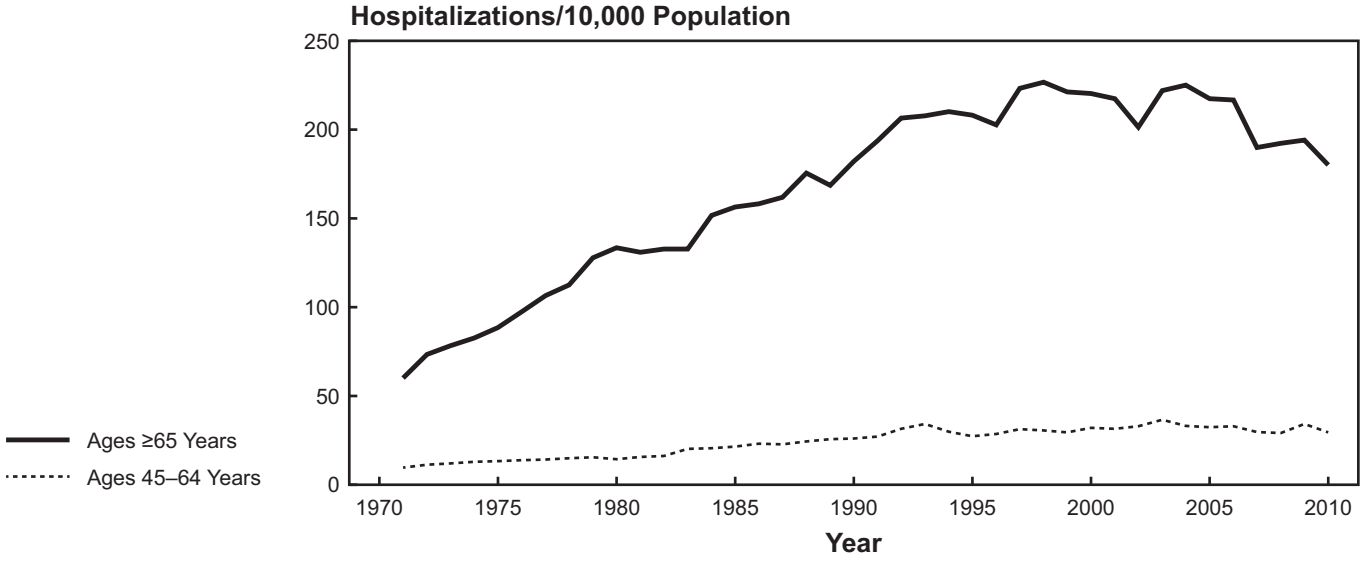
* Hypertension is defined as systolic blood pressure ≥140 mmHg, or diastolic blood pressure ≥90 mmHg, or being on antihypertensive medication.
Source: NHANES, NCHS.

Adult Population With Hypertension* by Age, Race/Ethnicity, and Sex, U.S., 2007–2010



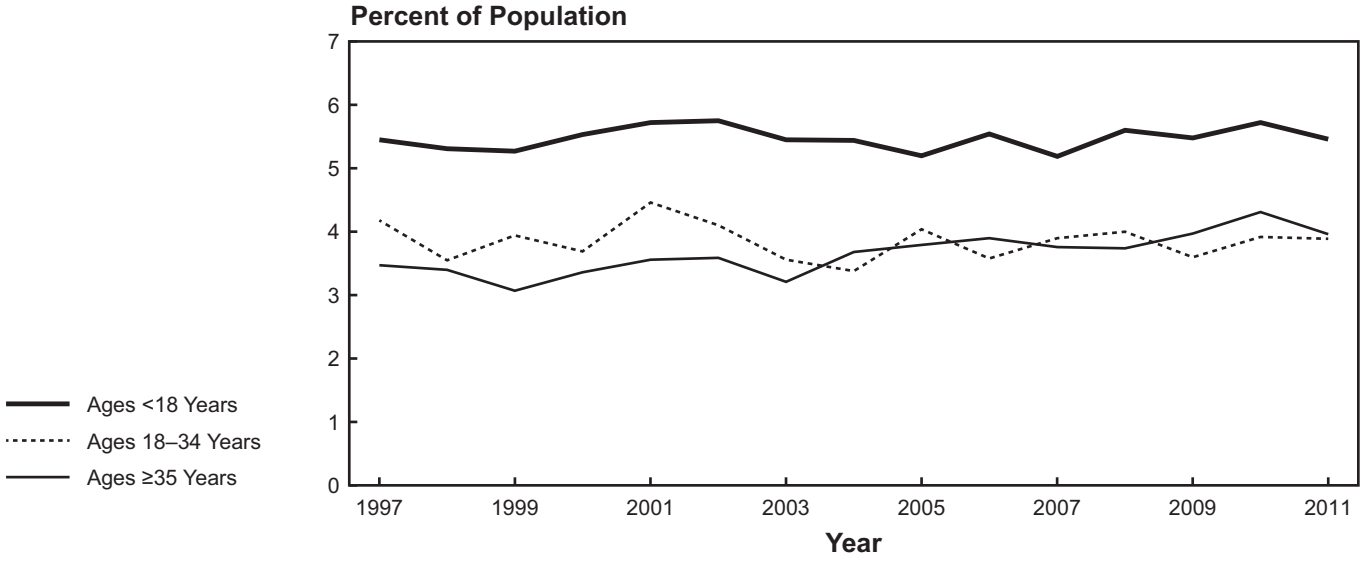
* Hypertension is systolic blood pressure ≥140mm Hg, diastolic blood pressure ≥90 mmHg, or being on antihypertensive medication.
** Non-Hispanic.
Source: NHANES, NCHS.

Hospitalization Rates for Heart Failure, Ages 45–64 Years and 65 Years and Older, U.S., 1971–2010



Source: NHDS, NCHS.

Prevalence of Asthma Episodes in Previous 12 Months by Age, U.S., 1997–2011



Source: NHIS, NCHS.

Direct and Indirect Economic Costs of Illness by Major Diagnosis, U.S., 2009

	Amount (Dollars in Billions)			Percent Distribution		
Diagnosis	**Direct Cost***	**Indirect Cost of Mortality****	**Total**	**Direct Cost**	**Indirect Cost of Mortality**	**Total**
Cardiovascular Diseases	$192.1	$120.5	$312.6	15.2%	20.0%	16.8%
COPD, Asthma, Pneumonia	81.5	24.6	106.1	6.5	4.1	5.7
Anemias	4.7	1.2	5.8	0.4	0.2	0.3
Subtotal	278.2	146.2	424.4	22.1	24.3	22.8
Neoplasms	86.6	130.0	216.6	6.9	21.6	11.6
Injury and Poisoning	83.2	95.9	179.1	6.6	15.9	9.6
Endocrine, Nutritional, and Metabolic Diseases	110.9	23.5	134.4	8.8	3.9	7.2
Diseases of the Digestive System	85.2	29.2	114.5	6.8	4.9	6.1
Diseases of the Respiratory System†	97.7	31.7	129.4	7.8	5.3	6.9
Diseases of the Musculoskeletal System	125.0	3.1	128.1	9.9	0.5	6.9
Diseases of the Nervous System	78.3	16.0	94.3	6.2	2.6	5.1
Mental Disorders	79.8	8.1	87.9	6.3	1.3	4.7
Diseases of the Genitourinary System	66.6	8.2	74.8	5.3	1.4	4.0
Infectious and Parasitic Diseases	22.3	23.9	46.2	1.8	4.0	2.5
Normal Live Birth	33.4	—	33.4	2.7	—	1.8
Diseases of the Skin	22.7	0.8	23.5	1.8	0.1	1.3
Other and Not Linked to Specific Condition	171.5	110.7	282.1	13.6	18.4	15.1
Total	**$1,260.0**	**$602.8**	**$1,862.8**	**100%**	**100%**	**100%**

* Direct costs are personal health care expenditures for hospital and professional services care, prescribed medications, and home care reported by the Medical Expenditure Panel Survey (MEPS), Agency for Healthcare Research and Quality (AHRQ), by diagnosis, excluding nursing home care costs and costs due to comorbidities.

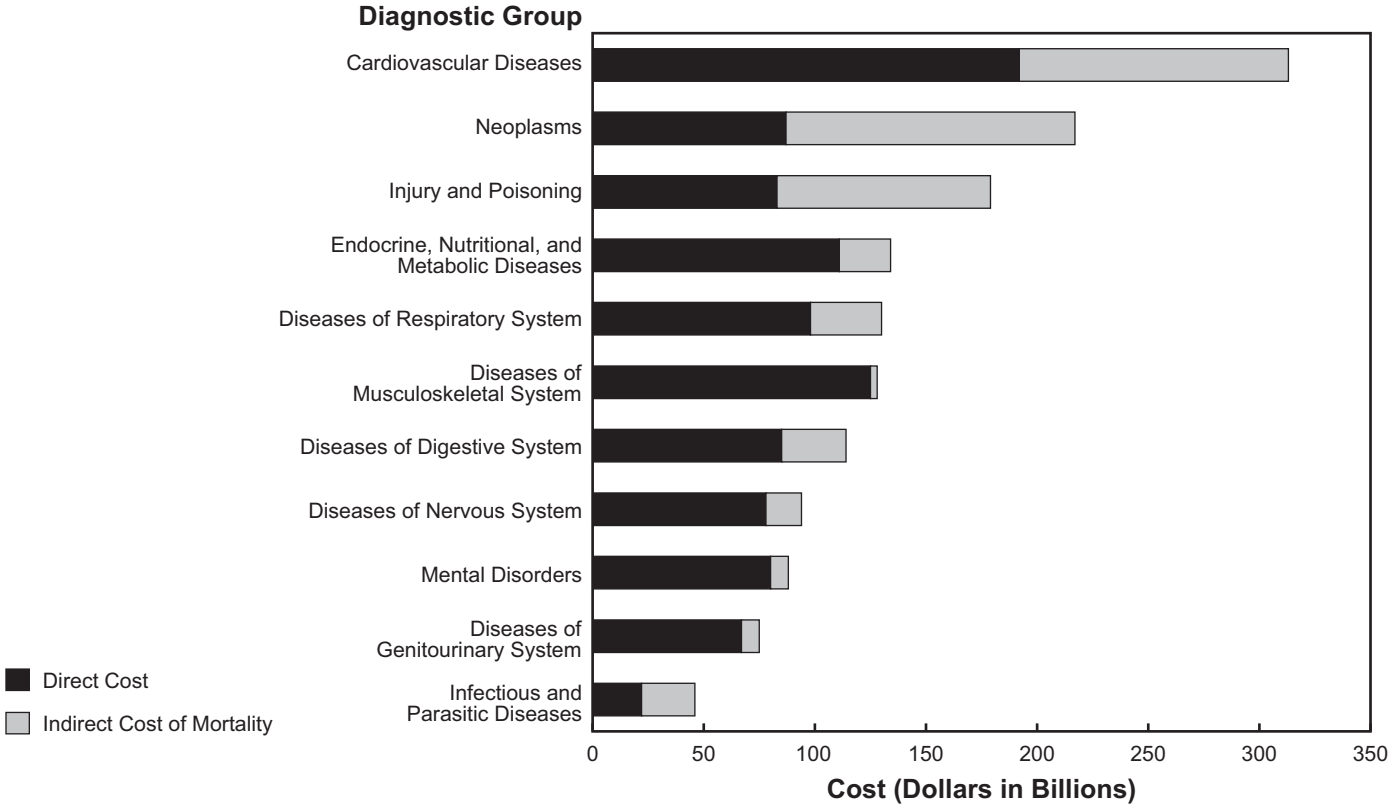
** The mortality cost for each disease group was estimated for 2009 by multiplying the number of deaths by age, sex, and cause of death in 2009 by the 2009 present value of lifetime earnings discounted at 3 percent.

† 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 Vital Statistics of the United States, NCHS; present value of lifetime earnings from the Institute for Health and Aging, University of California. Total direct cost obtained from MEP Statistical Brief #355, National Health Care Expenses in the U.S. Civilian Noninstitutionalized Population, 2009.

Total Economic Cost of the Leading Diagnostic Groups, U.S., 2009



Source: MEPS, AHRQ.

Direct Economic Cost and Percent Distribution for Selected Conditions by Type of Service, U.S., 2009

		Percent Distribution by Type of Service				
Condition	Total Direct Cost (in Billions)	Hospital Outpatient or Office-Based Provider Visits	Hospital Inpatient Stays	Emergency Room Visits	Prescribed Medicines	Home Health
Heart Disease	$99.2	21.6%	56.8%	5.6%	8.6%	7.4%
COPD, Asthma	64.2	28.0	26.1	4.9	34.1	6.9
Hypertension	47.5	29.6	12.4	2.7	45.1	10.2
Hyperlipidemia	37.3	28.8	1.9	0.3	66.5	2.4
Stroke	22.8	19.4	47.1	2.5	4.5	26.4
Other Circulatory Conditions	22.6	29.4	58.5	3.5	4.1	4.5
Pneumonia	17.3	6.4	82.0	6.7	1.9	2.9
Anemias	4.7	29.4	57.1	0.3	9.3	3.9

Source: Medical Expenditure Panel Survey, Household Component Summary Data Tables.

5. Institute-Initiated Programs Starting in FY 2012

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) or Program Announcements with special receipt, referral, or review considerations (PARs). Applications and proposals submitted in response to RFAs and RFPs compete among themselves for specific "set-aside" funds. Applications submitted in response to PAs or PARs 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, PAs, and PARs are announced in the *NIH Guide to Grants and Contracts*.

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

Descriptions of new or competitively renewed Institute-initiated programs that began (i.e., Type 1 or Type 2) in FY 2012 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

Cardiovascular Cell Therapy Research Network: Regional Clinical Centers and Data Coordinating Center

The purpose of these renewals is to maintain an infrastructure to develop, coordinate, conduct, and evaluate multiple collaborative clinical trials designed to improve the management of CVD. Investigators will be evaluating innovative stem cell-based therapies.

Heart Failure Clinical Research Network: Regional Clinical Centers and Data Coordinating Center

The purpose of these renewals is to maintain an infrastructure to develop, coordinate, and conduct multiple collaborative clinical trials to improve heart failure outcomes. The clinical centers initiative is structured to support concurrent, small- to intermediate-sized randomized clinical trials that can be completed within 2 to 5 years; it is not designed to fund large, Phase III studies.

New Initiatives

Basic Research in Calcific Aortic Valve Disease

The purpose of this RFA is to encourage innovative molecular and physiological research that could

lead to early diagnosis or effective medical therapy for calcific aortic valve disease through new diagnostic biomarkers or new therapeutic targets.

Pilot Studies To Develop and Test Novel, Low-Cost Methods for the Conduct of Clinical Trials

The purpose of this RFA is to develop and test low-cost methods to conduct clinical trials. This effort encourages new and innovative designs that have not been tested in previous studies and hold potential to increase the efficiency and reduce the cost of conducting clinical trials.

Toward an Improved Understanding of HDL Function

The purpose of this PA is to develop, validate, and standardize assays to measure HDL function and biomarkers for HDL function and to identify new pathways and potential therapeutic targets related to HDL function.

Lung Diseases Program

Initiative Being Renewed

Novel Therapies for Lung Diseases—Phase II Clinical Trials

The purpose of this renewal is to conduct proof-of-concept Phase II clinical trials that test an innovative intervention for a lung disease or a cardiopulmonary disorder from sleep that has the potential to cause a significant change in clinical management.

New Initiatives

Development and Testing of a Case-Finding Methodology in COPD

The purpose of this RFA is to design and test tools for identifying individuals who are likely to have undiagnosed COPD.

Early Cystic Fibrosis Lung Disease Studies in Humans

The purpose of this RFA is to characterize the origins of CF lung disease in infants and young children, elucidate mechanisms of disease development and progression, and identify targets and strategies for early interventions.

Genomic Research in AAT-Deficiency and Sarcoidosis Study (GRADS): Clinical Centers and Genomics and Informatics Center

The purpose of this program is to conduct genomic, microbiomic, and phenotypic studies in patients with alpha-1 antitrypsin deficiency or sarcoidosis to elucidate pathogenetic mechanisms or identify predictors of disease development and progression.

Getting From Genes to Function in Lung Disease

The purpose of this PA is to characterize the function of genes and their associated variants that have been identified by GWAS or other genetic approaches. Investigators will use integrated approaches across scientific disciplines to determine the pathobiological function of the genes.

Lung Repair and Regeneration Consortium: Research Centers and Administrative Coordinating Centers

The purpose of these RFAs is to establish multidisciplinary teams of investigators who will develop cutting-edge technologies, innovative strategies, and new ideas to accelerate research progress on lung regeneration and repair.

Molecular Imaging of the Lung—Phase 1

The purposes of this RFA are to identify molecular targets that are relevant to lung health and diseases for probe development in combination with innovative imaging approaches and to validate the developed probes in cells and *in vivo* animal models. The eventual goal is to generate sufficient preclinical data to support an investigational new drug submission with the U.S. Food and Drug Administration for initial testing in humans.

Pulmonary Vascular-Right Ventricular Axis Research Program

The purpose of this RFA is to acquire disease-defining knowledge of the pulmonary vascular-right ventricular axis in humans leading to improved and targeted diagnostics and therapeutics for right ventricular failure.

Blood Diseases and Resources Program

Initiative Being Renewed

Clinical Hematology and Transfusion Medicine Research Career Development Program

The purpose of this renewal is to develop and evaluate multidisciplinary career development programs in nonmalignant hematology and transfusion medicine that will equip new investigators with the knowledge and skills to address complex problems in blood diseases and transfusion medicine.

New Initiatives

Clinical Trials Development Resource for Hematologic Disorders

The purpose of this RFA is to provide a resource of expert consultants to assist investigators in the development of multisite clinical trials for hematologic disorders. This RFA is linked to two NHLBI RFAs: the Clinical Trials Planning Studies for Rare Thrombotic and Hemostatic Disorders and the NHLBI Clinical Trial Pilot Studies.

Clinical Trials Planning Studies for Rare Thrombotic and Hemostatic Disorders

The purpose of this RFA is to support the planning phase of Phase III multicenter investigator-initiated clinical trials focused on either rare hemostatic and thrombotic disorders or more common hemostatic and thrombotic disorders that occur rarely in special patient populations (e.g., neonates, children, pregnant women).

Early-Phase Clinical Trials for Blood Cell Therapies

The purpose of this PAR is to conduct early-phase clinical trials to evaluate innovative cell therapies to treat blood diseases and to improve the outcome of hematopoietic stem cell transplantations.

Sickle Cell Disease: Inflammation, Thrombosis, and Vascular Dysfunction

The purpose of this PA is to identify new pathways and regulatory mechanisms that may be as important in the pathophysiology of SCD as red blood cell sickling. Researchers will study the role of the immune and coagulation systems in the vaso-occlusive pathologies that are associated with SCD.

Translational Research Centers in Thrombotic and Hemostatic Disorders

The purpose of this RFA is to enhance the translation of basic research discoveries that could lead to improved prevention, diagnosis, and treatment for thrombotic and hemostatic disorders. Investigators will advance early stage translational research, integrating applied and basic science to move research discoveries toward clinical application.

Understanding Mechanisms of Terminal Erythroid Maturation

The purpose of this RFA is to study the development of erythroid precursors into mature red blood to improve understanding of the molecular mechanisms that regulate late stages of erythroid maturation.

Trans-NHLBI

Initiatives Being Renewed

NHLBI Investigator-Initiated Resource-Related Research Projects

The purpose of this renewal is to enhance the capabilities of ongoing basic, translational, and clinical research by developing resources or infrastructures that are available to the scientific community for furthering research relevant to the NHLBI mission.

Research Dissemination and Implementation Grants

The purposes of this renewal are to develop and test innovative approaches to translating efficacious treatments and effective prevention strategies for heart, lung, and blood diseases and sleep disorders to clinics, communities, and other settings; and to examine the effectiveness of interventions as they are disseminated and implemented in real-world settings.

New Initiatives

Anchoring Metabolomic Changes to Phenotype

The purpose of this RFA is to facilitate metabolomic phenotyping of existing cohorts and improve understanding about the role of metabolites in the functional pathways and molecular mechanisms that contribute to an observed phenotype.

Management of HIV-Related Lung Disease and Cardiovascular Comorbidity

The purpose of this RFA is to develop optimal intervention strategies for HIV-related lung disease, with or without comorbid CVD, to reduce morbidity and mortality associated with these conditions.

Maximizing the Scientific Value of the NHLBI Biologic Specimen Repository: Scientific Opportunities

The purpose of this RFA is to conduct exploratory research in heart, lung, and blood diseases and blood resources using biospecimens stored in the NHLBI Biologic Specimen Repository.

NHLBI Translational Research Implementation Program (TRIP)—Limited Competition

The purpose of this RFA is to accelerate the translation of new therapeutic interventions derived from

fundamental research discoveries for treatment and prevention of cardiovascular, lung, and blood diseases through planning and execution of well-designed clinical trials that demonstrate safety and efficacy. Only successful Stage 1 investigators can apply for Stage 2 studies to conduct the clinical trials planned and developed during Stage 1.

Short-Term Institutional Training Grant for Clinician Scientists in Pediatric Respiratory, Sleep, and Hematology/Transfusion Medicine

The purpose of this RFA is to develop and enhance research training opportunities in basic or clinical research in pediatric respiratory, sleep, and hematology and transfusion medicine for medical and health professional students.

Trans-NIH

Initiatives Being Renewed

Improving Diet and Physical Activity Assessment

The purpose of this renewal is to stimulate innovative research that will enhance the quality of measurements of dietary intake and physical activity.

Midcareer Investigator Award in Patient-Oriented Research

The purpose of this renewal is to support midcareer health-professional doctorates or equivalents by providing them with "protected time" to devote to patient-oriented research and to act as research mentors primarily for clinical residents, clinical fellows, and junior clinical faculty.

Nanoscience and Nanotechnology in Biology and Medicine

The purpose of this renewal is to study basic biological phenomena and engineer nanotechnology solutions that will enable biomedical breakthroughs in the diagnosis, treatment, and management of diseases and traumatic injuries.

Nutrition and Diet in the Causation, Prevention, and Management of Heart Failure

The purpose of this renewal is to develop a satisfactory science base for rational nutritional management of patients in various stages of heart failure and for preventive approaches in high-risk individuals.

Reducing Health Disparities Among Minority and Underserved Children

The purpose of this renewal is to conduct research that can be used to reduce health disparities among children. Specific targeted research includes biobehavioral studies that incorporate multiple factors that affect child health disparities (e.g., biological, lifestyle, environmental, social, economic, institutional, and cultural and family influences); studies that focus on the specific health promotion needs of children with a known illness and disability; and studies that test and evaluate the comparative effectiveness of health promotion interventions that are conducted in traditional and nontraditional settings.

New Initiatives

Life After Linkage: The Future of Family Studies

The purpose of this RFA is to integrate novel molecular data with existing genotype and phenotype data in families to identify and characterize genes that influence complex disorders.

Methods and Approaches for Detection of Gene–Environment Interactions in Human Disease

The purpose of this PAR is to develop and test innovative statistical, analytical, and bioinformatic approaches for identifying gene–environment interactions of complex human diseases.

Reducing the Impact of Hypertension in Low- and Middle-Income Countries

The purpose of this RFA is to establish a highly interactive consortium of investigators who will develop effective interventions for expanding sustainable hypertension prevention and control programs at the local, regional, and national levels in low- and middle-income countries.

Trans-PHS

Initiatives Being Renewed

Community Participation in Research

The purpose of this renewal is to support intervention research on health promotion, disease prevention, and health disparities that communities and researchers jointly conduct.

Predictive Multiscale Models for Biomedical, Biological, Behavioral, Environmental, and Clinical Research

The purpose of this renewal is to develop multiscale models of biological and behavioral systems that can be used as tools to address a range of biomedical, biological, behavioral, environmental, and clinical problems.

Interagency

New Initiative

Virtual Reality Technologies for Research and Education in Obesity and Diabetes

The purpose of this RFA is to encourage investigators from academic, small business, and technology transfer communities to explore the potential of virtual reality technologies for addressing obesity and diabetes through behavioral science research and through the development of practical tools that can be used at the clinical and public health levels to prevent and manage these conditions.

6. Institute Public Advisory Committees

National Heart, Lung, and Blood Advisory Council

Structure

Chair: Gary H. Gibbons, M.D., 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; 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*

Gary H. Gibbons, M.D.
Chair
National Heart, Lung, and Blood Institute

Jonathan R. Alger, J.D. (2014)
James Madison University

Coletta C. Barrett, R.N. (2014)
Mission for Our Lady of the Lake Regional Medical Center

Ivor J. Benjamin, M.D. (2014)
University of Utah School of Medicine

Ingrid B. Borecki, Ph.D. (2012)
Washington University in St. Louis

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

Pamela S. Douglas, M.D. (2015)
Duke University School of Medicine

Jack A. Elias, M.D. (2012)
Yale University School of Medicine

Beverly W. Hogan (2012)
Tougaloo College

Lanetta B. Jordan, M.D. (2013)
University of Miami, Miller School of Medicine

Ronald G. King, M.B.A., Ph.D. (2015)
BioAccel

Talmadge E. King, M.D. (2013)
University of California, San Francisco

Barbara A. Konkle, M.D. (2015)
Puget Sound Blood Center

Naomi L.C. Luban, M.D. (2014)
The George Washington University School of Medicine

Michael S. Parmacek, M.D. (2012)
University of Pennsylvania School of Medicine

Polly E. Parsons, M.D. (2014)
University of Vermont

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

Gilbert C. White II, M.D. (2014)
Blood Center of Wisconsin

Ex Officio Members

Francis S. Collins, M.D., Ph.D.
National Institutes of Health

Robert L. Jesse, M.D., Ph.D.
Veterans Health Administration

Kathleen Sebelius, M.P.A.
Department of Health and Human Services

* Current as of October 2012. 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 Directors of the NIH, the NHLBI, and the DBDR on matters related to planning, executing, conducting, supporting, and evaluating research in SCD.

Membership*

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

Kalpna Gupta, Ph.D. (2015)
University of Minnesota

Cheryl A. Hillery, M.D. (2015)
Medical College of Wisconsin

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

Ex Officio Members
Francis S. Collins, M.D., Ph.D.
National Institutes of Health

William Hannon, Ph.D.
Centers for Disease Control and Prevention

Marie Y. Mann, M.D.
Health Resources and Services Administration

Sleep Disorders Research Advisory Board

Chair: Sairam Parthasarathy, M.D., University of Arizona

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 planning, executing, conducting, supporting, and evaluating research in sleep disorders.

Membership*

Mercedes R. Carnethon, Ph.D., M.P.H. (2013)
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Restless Legs Syndrome Foundation

Ila Jeanne Sensenich, J.D. (2015)
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Gagandeep Walia, M.B.A. (2013)
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Veterans Administration, North Texas Medical Center

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NINDS, National Institutes of Health

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

* Current as of October 2012.

Heart, Lung, and Blood Initial Review Group

Scientific Review Officer: Jeffery H. Hurst, Ph.D., Scientific Review Officer, 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: Catherine S. Manno, M.D., New York University

Scientific Review Officer: Jeffery H. Hurst, Ph.D., Scientific Review Officer, 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*

Peter M. Buttrick, M.D. (2014)
University of Colorado

Jennifer L. Hall, Ph.D. (2015)
University of Minnesota

Stanley L. Hazen, M.D., Ph.D. (2016)
Center for Cardiovascular Diagnostics and Prevention

Thomas H. Hintze, Ph.D. (2014)
New York Medical College

Kenneth A. Jamerson, M.D. (2016)
University of Michigan Health System

Pedro A. Jose, M.D., Ph.D. (2015)
Children's National Medical Center

Jay K. Kolls, M.D. (2014)
University of Pittsburgh School of Medicine

Monica Kraft, M.D. (2014)
Duke University Medical Center

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

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Nationwide Children's Hospital

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

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University of Arizona

Steven W. Mifflin, Ph.D. (2016)
University of North Texas Health Science Center

Karen Reue, Ph.D. (2016)
University of California, Los Angeles

Frank C. Sciurba, M.D. (2013)
University of Pittsburgh

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

James C. Zimring, M.D., Ph.D. (2015)
Emory University School of Medicine

Clinical Trials Review Committee

Chair: Stanley J. Szefler, M.D., National Jewish Health

Scientific Review Officer: Keary A. Cope, Ph.D., Scientific Review Officer, 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, NHLBI on clinical trial applications for the support of studies to evaluate preventive or therapeutic measures of blood, cardiovascular, and lung diseases.

* Current as of October 2012.

Membership*

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

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

Elizabeth N. Brondolo, Ph.D. (2016)
St. John's University

Jeffrey L. Carson, M.D. (2014)
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Mina K. Chung, M.D. (2014)
Case Western Reserve University

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

Jerry A. Krishnan, M.D., Ph.D. (2016)
University of Illinois Hospital and Health Sciences System

Luann L. Minich, M.D. (2016)
University of Utah

Lori J. Mosca, M.D., Ph.D. (2013)
Columbia University Medical Center

Shawna D. Nesbitt, M.D. (2016)
University of Texas Southwestern Medical Center

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Cedars-Sinai Medical Center

Arshed A. Quyyumi, M.D. (2013)
Emory University School of Medicine

Gary E. Raskob, Ph.D. (2015)
University of Oklahoma Health Sciences Center

Margaret M. Redfield, M.D. (2013)
Mayo Clinic

Madeline M. Rice, Ph.D. (2013)
The George Washington University

Barbara C. Tilley, Ph.D. (2015)
University of Texas

O. Dale Williams, Ph.D. (2015)
Florida International University

* Current as of October 2012.

NHLBI Institutional Training Mechanism Review Committee

Chair: David M. Guidot, M.D., Emory University

Scientific Review Officer: Charles Joyce, Ph.D., Scientific Review Officer, 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*

Judy L. Aschner, M.D. (2016)
Vanderbilt University School of Medicine

Jennifer K. Barton, Ph.D. (2015)
University of Arizona

Pamela S. Becker, M.D., Ph.D. (2016)
University of Washington

Neil Blumberg, M.D. (2015)
University of Rochester

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

Kathleen B. Brosnihan, Ph.D. (2015)
Wake Forest University

David M. Center, M.D. (2013)
Boston University School of Medicine

Nipavan Chiamvimonvat, M.D. (2016)
University of California, Davis

Martha L. Daviglus, M.D., Ph.D. (2016)
Northwestern University

Mark W. Geraci, M.D. (2015)
University of Colorado

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

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

Robert J. Levy, M.D. (2014)
The Children's Hospital of Philadelphia

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

Fernando J. Martinez, M.D. (2014)
University of Michigan

Donald R. Menick, Ph.D. (2016)
Medical University of South Carolina

William H. Pearce, M.D. (2014)
Northwestern University

Michael I. Phillips, Ph.D., D.Sc. (2014)
Keck Graduate Institute

Lynne D. Richardson, M.D. (2016)
Mount Sinai School of Medicine

Kingman P. Strohl, M.D. (2015)
University Hospitals of Cleveland

Carolyn F. Whitsett, M.D. (2015)
Kings County Hospital

National Heart, Lung, and Blood Institute Special Emphasis Panel

The Institute established the NHLBI Special Emphasis Panel (SEP) to carry out the 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: Michael I. Kotlikoff, V.M.D., Ph.D., Cornell University

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

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*

Grover C. Bagby, M.D. (2015)
Oregon Health Sciences University

Serpil C. Erzurum, M.D. (2015)
Cleveland Clinic Foundation

James F. Greenleaf, Ph.D. (2015)
Mayo Clinic College of Medicine

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University of California, Los Angeles

Coleen A. McNamara, M.D. (2016)
University of Virginia

Alfonso Mondragon, Ph.D. (2016)
Northwestern University

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

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

David S. Wilkes, M.D. (2016)
Indiana University

* Current as of October 2012.

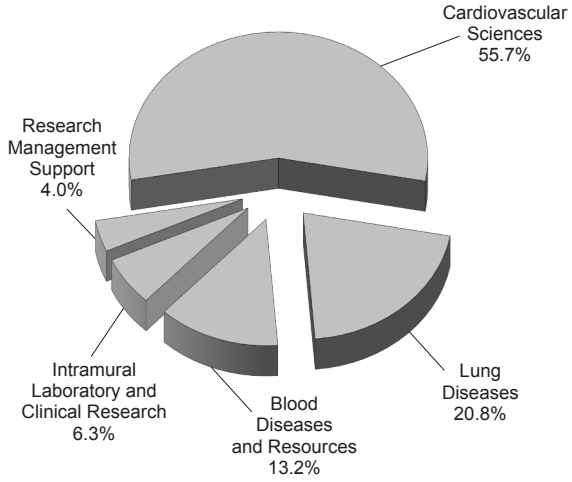
7. Fiscal Year 2012 Budget Overview

NHLBI Obligations by Funding Mechanism: Fiscal Year 2012

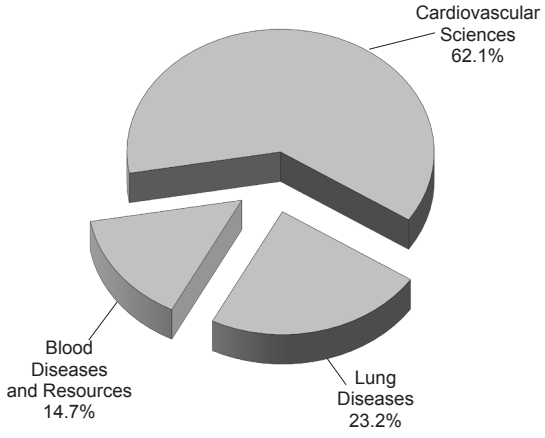
Funding Mechanism	Obligated Dollars* (Thousands)	Percent of Total NHLBI Budget
Research Project Grants**	$2,092,482	68.6%
SCCORs and P50 Centers	34,162	1.1
Centers for AIDS Research	3,428	0.1
Other Research Centers Grants	25,940	0.9
Other Research Grants	156,359	5.1
Research Careers Programs†	*80,177*	*2.6*
Training Programs	93,317	3.1
Research and Development Contracts	332,403	10.9
Intramural Laboratory and Clinical Research	191,795	6.1
Research Management and Support‡	121,167	4.0
Total Obligations	**$3,051,053**	**100.0%**

* Excludes funds provided by other Agencies by means of a reimbursable agreement.
** Includes $75,973 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 2012:

- 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 2012

Program	Obligated Dollars (Thousands)	Percent of NHLBI Extramural Budget
Cardiovascular Sciences	$1,699,972	62.1%
Lung Diseases	635,390	23.2
Blood Diseases and Resources	402,636	14.7
Total, Extramural Obligations	**$2,737,998**	**100%**

NHLBI Cardiovascular Sciences Program
Obligations by Funding Mechanism: Fiscal Year 2012

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Program Budget
Research Project Grants	$1,269,913	74.7%
SCCORs and P50 Centers	14,105	0.8
Other Research Centers Grants	11,515	0.7
Other Research Grants	77,978	4.6
*Research Career Programs**	*39,171*	*2.3*
Training Programs	56,493	3.3
Research and Development Contracts	269,968	15.9
Total, Cardiovascular Sciences	**$1,699,972**	**100%**

NHLBI Lung Diseases Program
Obligations by Funding Mechanism: Fiscal Year 2012

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Program Budget
Research Project Grants	$516,804	81.3%
SCCORs and P50 Centers	12,944	2.0
Other Research Centers Grants	2,888	0.5
Other Research Grants	56,727	8.9
*Research Career Programs**	*27,155*	*4.3*
Training Programs	23,381	3.7
Research and Development Contracts	22,646	3.6
Total, Lung Diseases	**$635,390**	**100%**

NHLBI Blood Diseases and Resources Program
Obligations by Funding Mechanism: Fiscal Year 2012

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Program Budget
Research Project Grants	$305,766	75.9%
Other Research Center Grants	18,555	4.6
Centers for AIDS Research	3,428	0.9
Other Research Grants	21,654	5.4
*Research Career Programs**	*13,851*	*3.4*
Training Programs	13,444	3.3
Research and Development Contracts	39,789	9.9
Total, Blood Diseases and Resources	**$402,636**	**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 1950–2012

	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 1950–2012 (Continued)

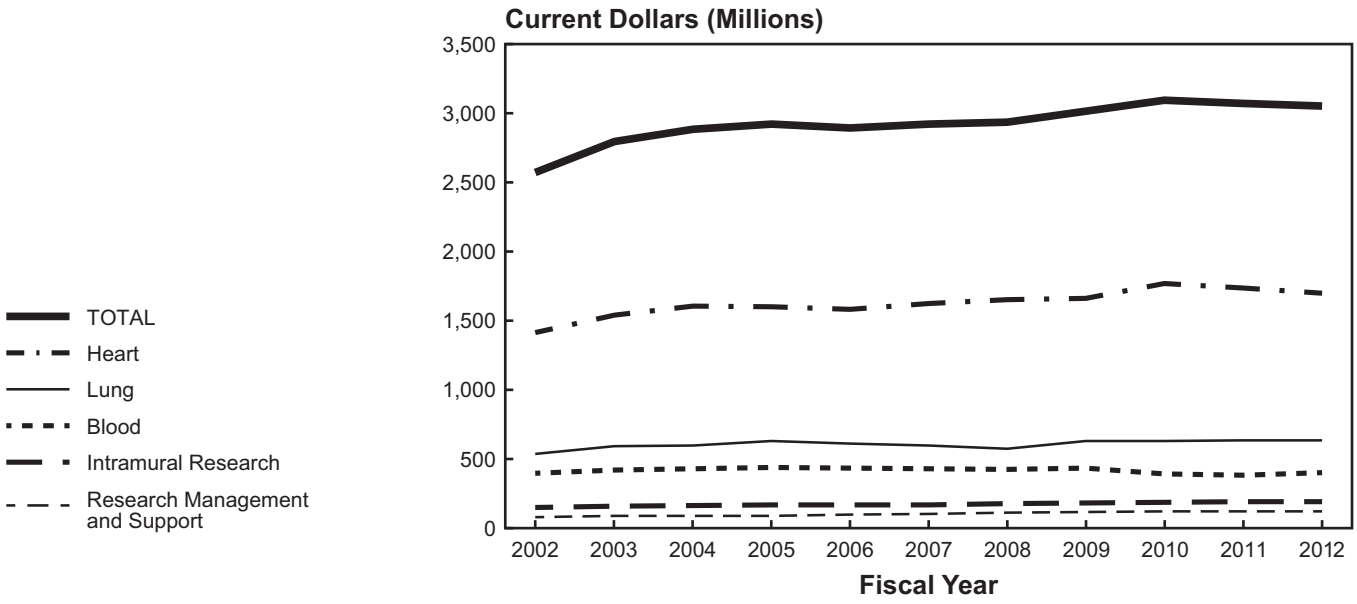
Dollars (Thousands)

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
2011	3,187,516	—[M]	3,182,524	3,069,723[M]	3,069,550	58,992,790
2012	3,147,992	—[M]	3,036,189	3,076,115[M]	3,050,959	62,043,749

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.
M House allowance not provided.

NHLBI Total Obligations by Budget Category: Fiscal Years 2002–2012

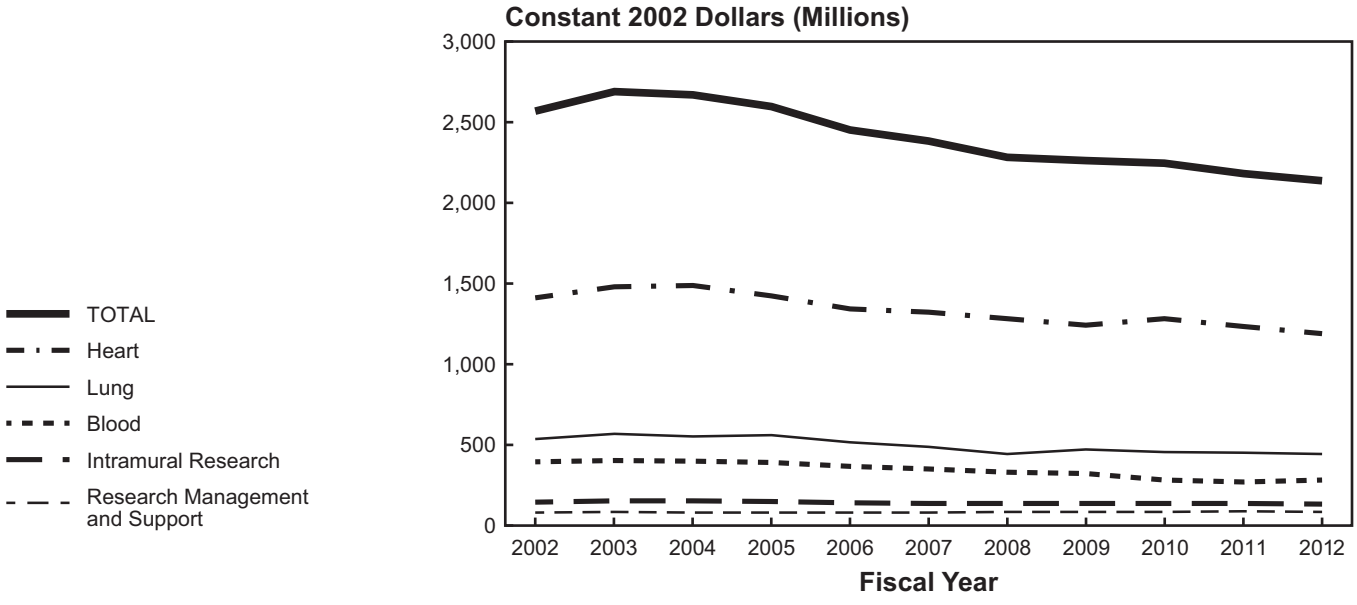
Current Dollars



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 2002–2012*

Constant 2002 Dollars



* This chart is based on the Biomedical Research & Development Price Index through 2012.
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 2002–2012

Current Dollars (Millions)

	Fiscal Year										
Budget Category	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Extramural Research											
Heart	$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	$1,736.2	$1,700.0
Lung	535.2	590.5	596.0	628.2	610.3	597.6	572.2	627.8	629.9	635.5	635.4
Blood	396.0	419.3	429.2	439.5	434.9	429.7	426.2	431.7	389.2	383.2	402.6
Intramural Research	146.7	157.8	164.2	166.3	168.3	169.5	177.5	181.7	186.2	192.1	191.8
Research Management and Support	79.4	87.3	88.5	89.0	97.2	100.6	109.2	114.1	119.1	122.6	121.2
Total	**$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**	**$3,069.6**	**$3,051.0**

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 2002–2012

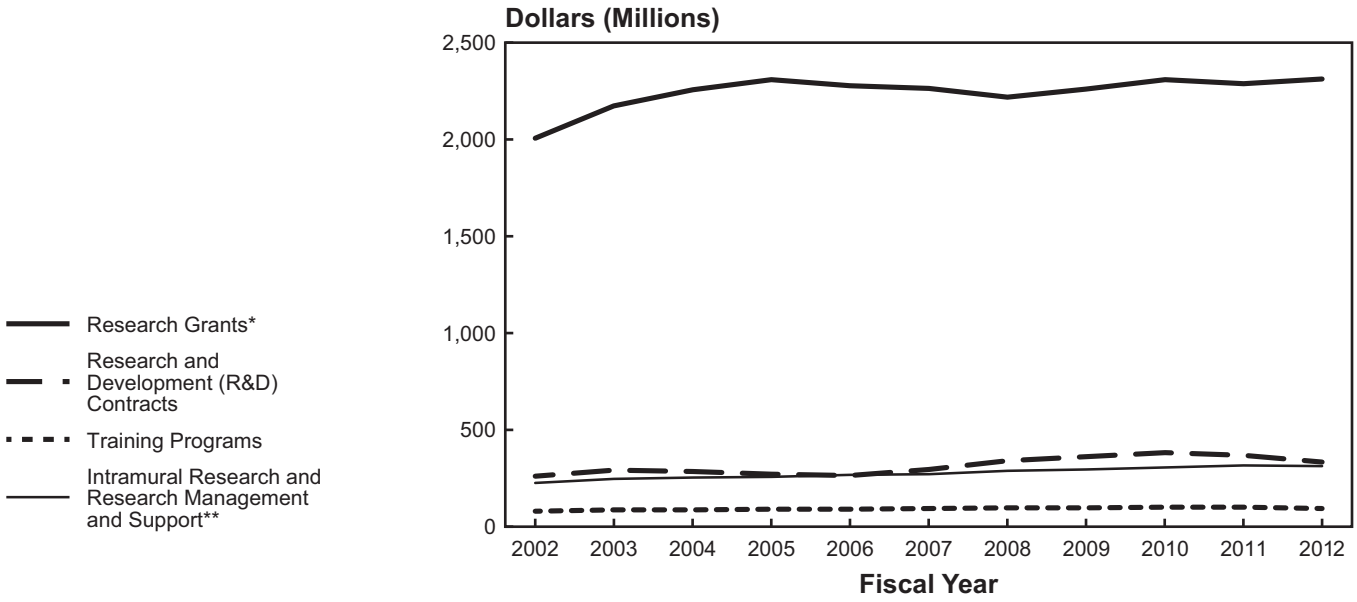
Constant 2002 Dollars (Millions)

	Fiscal Year										
Budget Category	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Extramural Research											
Heart	$1,412.4	$1,482.5	$1,487.2	$1,423.1	$1,342.4	$1,325.4	$1,283.8	$1,244.7	$1,284.7	$1,234.4	$1,190.5
Lung	535.2	568.9	552.4	558.9	517.6	487.4	444.6	471.0	457.4	452.0	445.0
Blood	396.0	403.9	397.8	391.0	368.9	350.5	331.2	323.9	282.6	272.3	281.9
Intramural Research	146.7	152.0	152.2	148.0	142.7	138.3	137.9	136.3	135.2	136.6	134.3
Research Management and Support	79.4	84.1	82.0	79.2	82.4	82.1	84.8	85.6	86.5	87.2	84.9
Total	**$2,569.7**	**$2,691.4**	**$2,671.5**	**$2,600.2**	**$2,454.1**	**$2,383.6**	**$2,282.3**	**$2,261.5**	**$2,246.6**	**$2,182.6**	**$2,136.6**

***** This chart is based on the Biomedical Research & Development Price Index through 2012.

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 2002–2012



* 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 2002–2012

Dollars (Millions)

	Fiscal Year										
Funding Mechanism	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Research Grants*	$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	$2,288.6	$2,312.3
Research and Development (R&D) Contracts	258.3	290.5	285.5	268.6	262.8	295.8	338.8	361.1	379.9	368.3	332.4
Training Programs	79.2	85.8	87.1	88.4	89.2	93.3	94.9	96.6	98.0	98.0	93.3
Intramural Research and Research Management and Support**	226.1	245.1	252.7	255.4	265.6	270.1	286.7	295.8	305.3	314.6	313.0
Total	**$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**	**$3,069.5**	**$3,051.0**

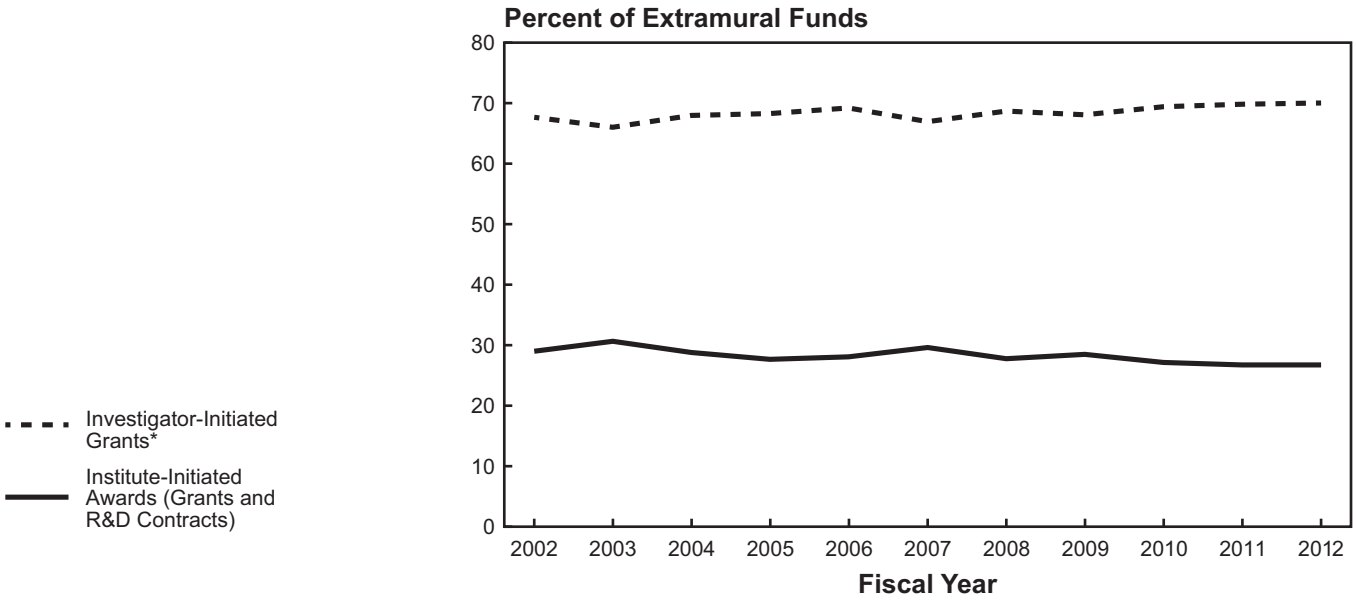
* Includes Research Career Programs.
** Excludes Office of the Director and DIR research contracts, which are included in R&D contracts.

NHLBI Employment: Fiscal Years 2002–2012

	Fiscal Year										
Staff	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
FTEs*	880	880	861	796	797	814	846	856	876	876	886

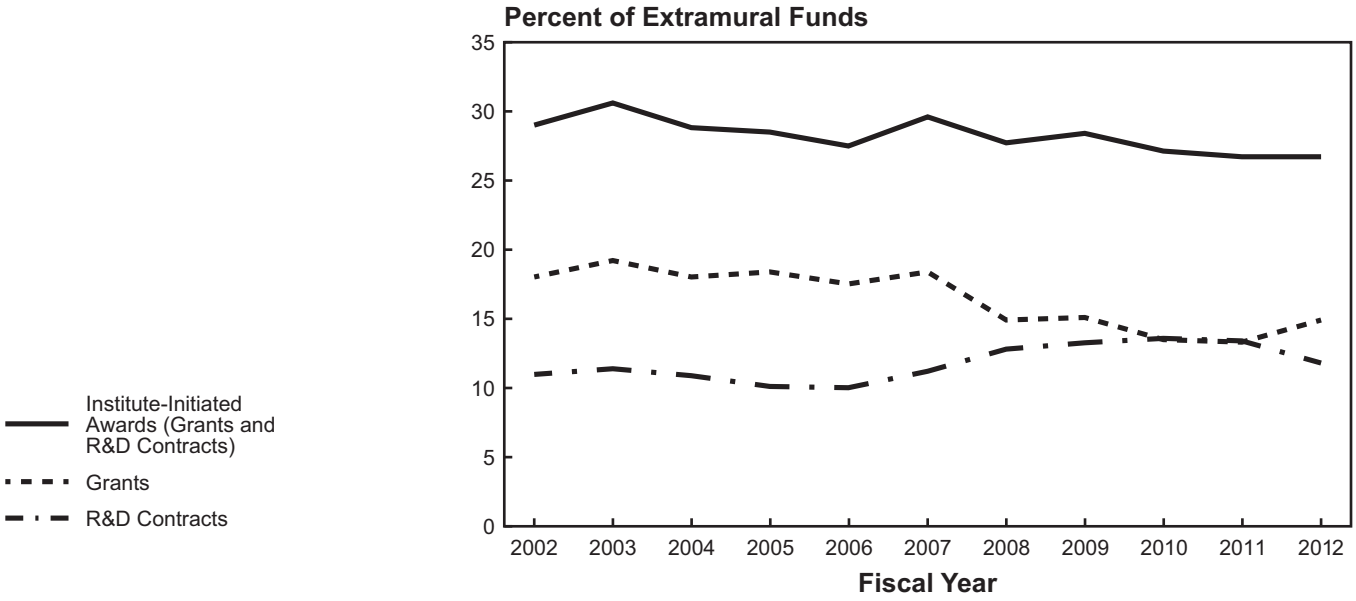
* Full-time equivalents.

NHLBI Institute-Initiated and Investigator-Initiated Awards: Fiscal Years 2002–2012



* Includes Research Career Programs.

NHLBI Grants and Research and Development Contracts as Subsets of Institute-Initiated Awards: Fiscal Years 2002–2012



NHLBI Extramural Programs: Fiscal Years 2002–2012

Dollars (Millions)

	Fiscal Year										
Funding Mechanism	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Investigator-Initiated Awards											
Investigator-Initiated Grants*	$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	$1,842.8	$1,892.2
Research Career Programs	63.5	65.8	67.8	71.0	70.4	55.4	78.7	84.6	68.0	79.1	80.2
Subtotal, Investigator-Initiated Awards	1,584.9	1,681.9	1,784.6	1,818.2	1,817.3	1,774.7	1,820.8	1,850.1	1,933.9	1,921.9	1,972.4
Institute-Initiated Awards											
Institute-Initiated Grants (RFA)	421.3	490.4	472.5	492.1	458.6	488.2	396.1	410.9	376.4	366.7	419.3
*Centers***	*128.2*	*138.9*	*140.6*	*151.5*	*141.1*	*141.0*	*107.3*	*90.1*	*72.6*	*55.9*	*63.4*
R&D Contracts (RFP)	258.3	290.5	285.5	268.6	262.9	295.8	338.8	361.1	379.9	368.3	332.4
Subtotal, Institute-Initiated Awards	679.6	780.9	758.0	760.7	721.4	784.0	734.9	772.0	756.3	735.0	751.7
Training											
Individual Awards	9.5	8.6	8.8	9.7	10.0	8.2	9.0	10.3	11.7	10.6	9.6
Institutional Awards	69.7	77.2	78.4	78.7	79.1	85.1	85.8	86.2	86.3	87.4	83.7
Subtotal, Training	79.2	85.8	87.2	88.4	89.2	93.3	94.8	96.5	98.0	98.0	93.3
Total, Extramural	**$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**	**$2,754.9**	**$2,817.4**

* 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.

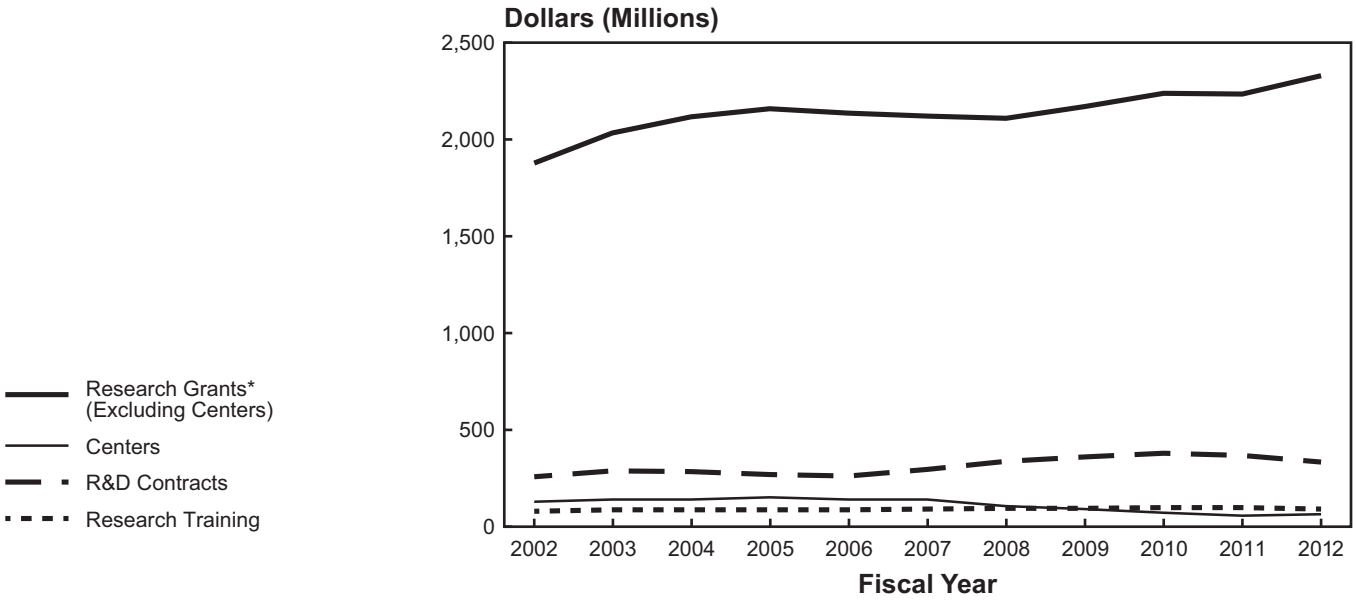
NHLBI Extramural Programs: Fiscal Years 2002–2012

Percent of Total Extramural Budget

	Fiscal Year										
Funding Mechanism	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Investigator-Initiated Awards											
Investigator-Initiated Grants*	64.9%	63.4%	65.3%	65.5%	66.5%	64.8%	65.7%	64.9%	66.9%	66.9%	67.2%
Research Career Programs (K04, K06)	2.7	2.6	2.6	2.7	2.7	2.1	3.0	3.1	2.4	2.9	2.8
Subtotal, Investigator-Initiated Awards	67.6	66.0	67.9	68.2	69.2	66.9	68.7	68.1	69.4	69.8	70.0
Institute-Initiated Awards											
Institute-Initiated Grants (RFA)	18.0	19.2	18.0	18.4	17.5	18.4	14.9	15.1	13.5	13.3	14.9
*Centers***	*5.5*	*5.5*	*5.3*	*5.7*	*5.4*	*5.3*	*4.0*	*3.3*	*2.6*	*2.0*	*2.3*
R&D Contracts (RFP)	11.0	11.4	10.9	10.1	10.0	11.2	12.8	13.3	13.6	13.4	11.8
Subtotal, Institute-Initiated Awards	29.0	30.6	28.8	28.5	27.5	29.6	27.7	28.4	27.1	26.7	26.7
Training											
Individual Awards	0.4	0.3	0.3	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.3
Institutional Awards	3.0	3.0	3.0	3.0	3.0	3.2	3.2	3.2	3.1	3.2	3.0
Subtotal, Training	3.4	3.4	3.3	3.3	3.4	3.5	3.6	3.5	3.5	3.6	3.3
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 2002–2012



* Includes Research Career Programs; does not include Centers.

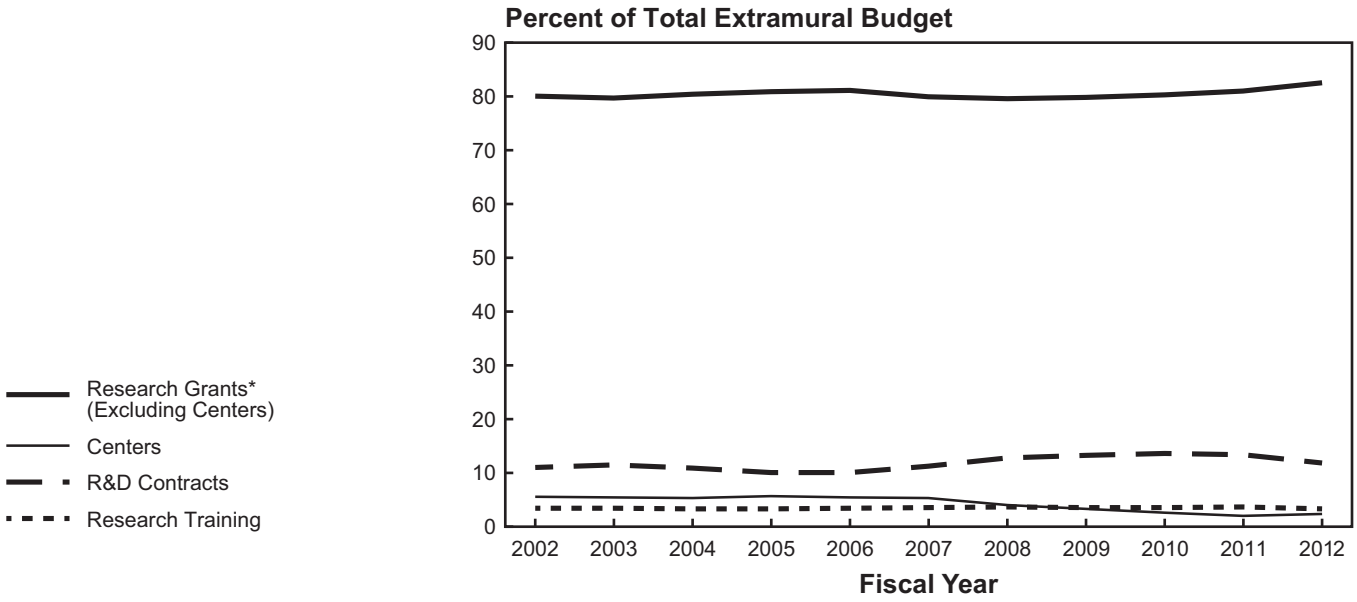
NHLBI Extramural Research Funding Mechanism: Fiscal Years 2002–2012

Dollars (Millions)

	Fiscal Year										
Funding Mechanism	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Research Grants*	$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	$2,232.7	$2,328.3
Centers	128.2	138.9	140.6	151.5	141.1	141.0	107.3	90.1	72.6	55.9	63.4
R&D Contracts	258.3	290.5	285.5	268.6	262.9	295.8	338.8	361.1	379.9	368.3	332.4
Research Training	79.2	85.8	87.2	88.4	89.2	93.3	94.8	96.5	98.0	98.0	93.3
Total, Extramural	**$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**	**$2,754.9**	**$2,817.4**

* Includes Research Career Programs; does not include Centers.

NHLBI Extramural Research Funding Mechanism: Fiscal Years 2002–2012



* Includes Research Career Programs; does not include Centers.

NHLBI Extramural Research Funding Mechanism: Fiscal Years 2002–2012

Percent of Total Extramural Budget

	Fiscal Year										
Funding Mechanism	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Research Grants*	80.1%	79.8%	80.5%	80.9%	81.2%	80.0%	79.6%	79.9%	80.3%	81.0%	82.6%
Centers	5.5	5.5	5.3	5.7	5.4	5.3	4.0	3.3	2.6	2.0	2.3
R&D Contracts (RFP)	11.0	11.4	10.9	10.1	10.0	11.2	12.8	13.3	13.6	13.4	11.8
Research Training	3.4	3.4	3.3	3.3	3.4	3.5	3.6	3.5	3.5	3.6	3.3
Total, Extramural	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

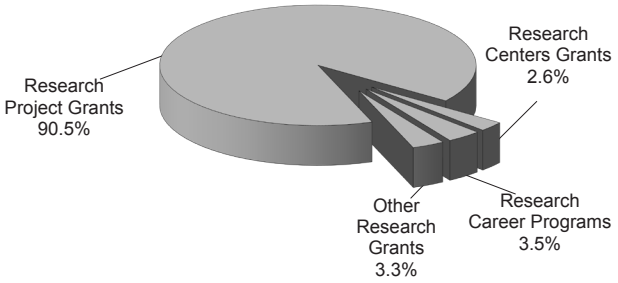
* Includes Research Career Programs; does not include Centers.
Note: Numbers may not add to total due to rounding.

9. Research Grants

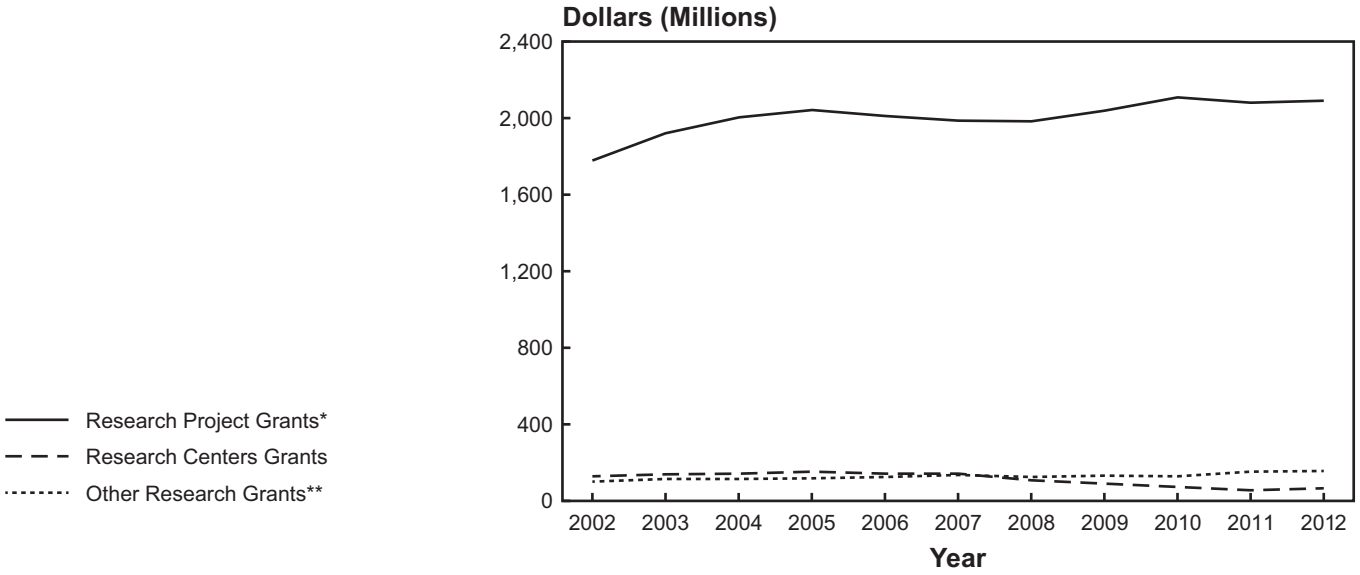
NHLBI Research Grants by Funding Mechanism: Fiscal Year 2012

	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)	2,773	$1,323,519	57.26%
Program Project Grants (P01)	149	313,862	13.58
Cooperative Agreements (U01)	191	222,452	9.62
Explorative Developmental Grant (R21)	304	63,479	2.75
Method to Extend Research in Time (R37)	70	30,973	1.34
Exploratory/Developmental Grants Phase II (R33)	4	2,843	0.12
Clinical Trial Planning Grant (R34)	27	8,883	0.38
Clinical Planning Grant Cooperative Agreement (U34)	4	2,101	0.09
Academic Research Enhancement Award (R15)	12	4,821	0.21
Research Transition Award (R00)	83	20,404	0.88
Cooperative Agreements (U19)	2	5,218	0.23
Small Research Grants (R03)	19	1,486	0.06
NIH Director's Pioneer Award (DP1)	3	2,252	0.10
Exploratory/Developmental Cooperative Agreements Phase I (UH2)	2	957	0.04
Multi-Component Research Project Cooperative Agreements (UM1)	10	13,259	0.57
Subtotal, Research Project Grants (Excluding Small Business RPGs)	3,653	2,016,509	87.23
Small Business Research Project Grants			
Small Business Technology Transfer (STTR Phase I) (R41)	15	5,095	0.22
Small Business Technology Transfer (STTR Phase II) (R42)	10	4,574	0.20
Small Business Innovation Research (SBIR Phase I) (R43)	75	18,942	0.82
Small Business Innovation Research (SBIR Phase II) (R44)	67	47,362	2.05
Subtotal, Small Business Research Project Grants	167	75,973	3.29
Subtotal, Research Project Grants	3,820	2,092,482	90.52
Research Centers Grants			
Centers of Research Programs (P50)	30	34,162	1.48
Specialized Centers (Cooperative Agreements) (U54)	2	8,142	0.35
Translational Research Centers in Thrombotic and Hemostatis Disorders (U54)	5	11,442	0.49
National Swine Research and Resource Center (U42)	—	1,440	0.06
Animal Model and Biological Material Resource Grants (U40)	1	903	0.04
Anchoring Metabolomic Changes to Phenotype (P20)	4	2,899	0.13
Center for AIDS Research (P30)	—	3,428	0.15
Center Core Grants (P30)	5	1,019	0.04
Subtotal, Research Centers Grants	47	63,435	2.55
Research Career Programs			
Mentored Career Development Award to Promote Faculty Diversity in Biomedical Research (K01)	46	5,891	0.25
Mentored Career Award for Faculty at Minority Serving Institutions (K01)	4	546	0.02
Mentored Scientist Development Award in Research Ethics (K01)	—	67	—
Independent Scientist Award (K02)	17	1,653	0.07
Innovators in Hemoglobinopathies Care Career Development Award (K07)	2	533	0.02
Clinical Investigator Scientist Award (K08)	189	24,514	1.06
Clinical Hematology Research Career Development Program (K12)	6	2,325	0.10
Genetics and Genomics of Lung Disease Career Development Program (K12)	8	2,244	0.10
Career Development in Vascular Medicine Research Program (K12)	6	959	0.04
Clinical Research Career Development Programs in Emergency Medicine (K12)	6	3,065	0.13
Career Enhancement Award for Stem Cell Research (K18)	3	392	0.02
Career Transition Award (K22)	3	700	0.03
Mentored Patient-Oriented Research Career Development Award (K23)	164	23,027	1.00
Midcareer Investigator Award in Patient-Oriented Research (K24)	36	6,079	0.26
Mentored Quantitative Research Career Development Award (K25)	16	2,304	0.10
Career Transition Award (K99)	56	5,877	0.25
Subtotal, Research Career Programs	562	80,176	3.47
Other Research Grants			
Cooperative Clinical Research (U10, R10)	59	46,075	1.99
Minority Biomedical Research Support (S06, SC1, SC2)	10	2,199	0.10
Other (D43, R13, R18, R24, R25, T15, U24, UH1)	110	27,161	1.18
Subtotal, Other Research Grants	179	75,435	3.26
Total, NHLBI Research Grants	**4,608**	**$2,311,529**	**100%**

NHLBI Total Research Grants by Category



NHLBI Research Project Grants, Research Centers Grants, and Other Research Grant Obligations: Fiscal Years 2002–2012



* Includes R01, U01, P01, R03, R15, R21, R29, R33, R37, R41, R42, R43, and R44; DP2 and U19 beginning in 2007; DP1 and R00 beginning in 2008; R34 and U34 beginning in 2010; and UH2 and UM1 beginning in 2011.

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

NHLBI Research Project Grants, Research Centers Grants, and Other Research Grant Obligations: Fiscal Years 2002–2012

Dollars (Thousands)

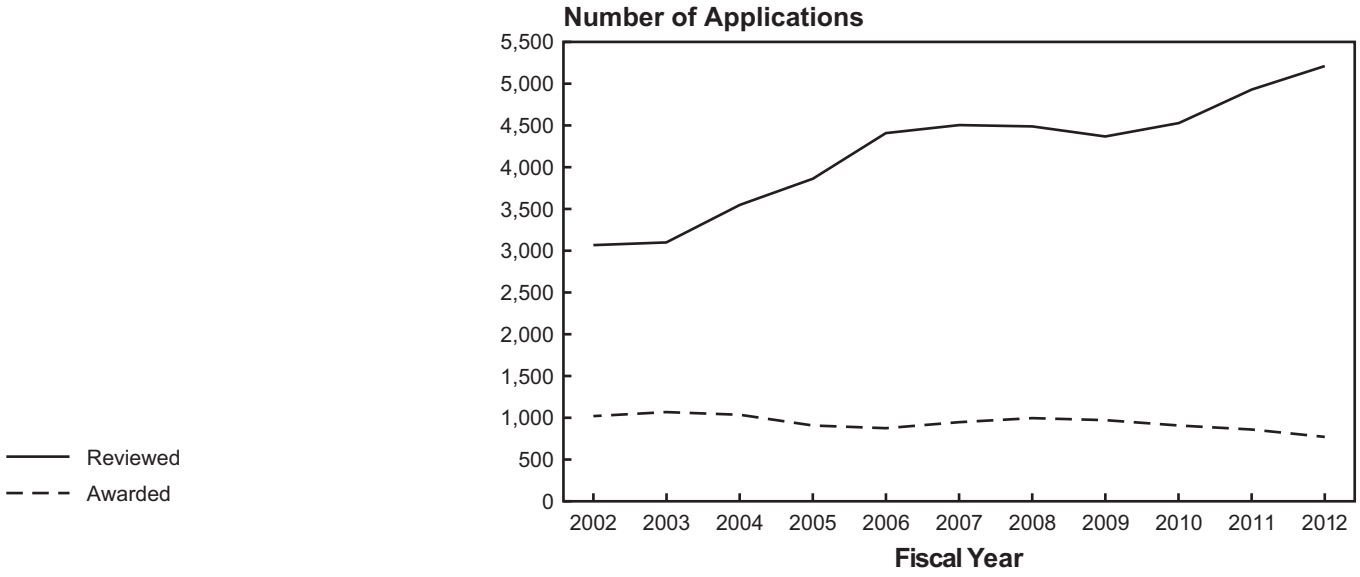
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Research Project Grants*	$1,779,573	$1,920,201	$2,003,769	$2,042,050	$2,011,049	$1,986,692	$1,983,633	$2,039,861	$2,108,524	$2,079,920	$2,092,482
Research Centers Grants	128,161	138,941	140,600	151,495	141,086	141,034	107,393	90,152	72,566	55,931	63,436
Other Research Grants**	98,460	113,172	112,785	116,713	123,802	135,284	125,942	131,001	129,245	152,772	155,661
Total	**$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**	**$2,288,623**	**$2,311,529**

* Includes R01, U01, P01, R03, R15, R21, R29, R33, R37, R41, R42, R43, and R44; DP2 and U19 beginning in 2007; DP1 and R00 beginning in 2008; R34 and U34 beginning in 2010; and UH2 and UM1 beginning in 2011.

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

NHLBI Competing Research Project Grant Applications:* Fiscal Years 2002–2012

Number Reviewed and Awarded

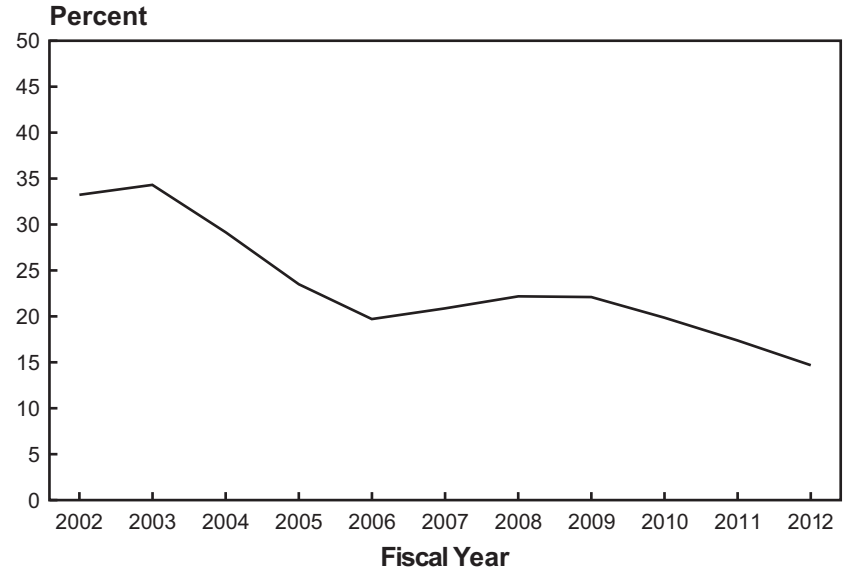


Number Reviewed and Awarded and Percent Funded

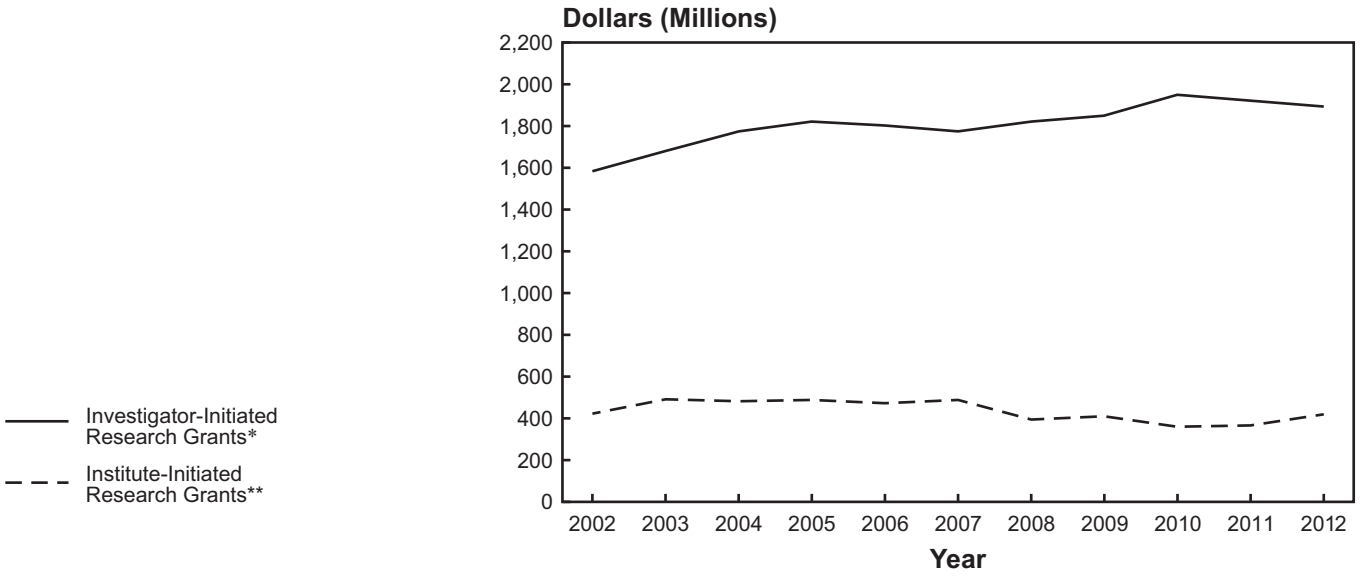
	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Applications Reviewed	3,064	3,098	3,548	3,865	4,412	4,504	4,492	4,373	4,528	4,931	5,211
Applications Awarded	1,018	1,064	1,034	909	871	943	997	968	903	856	768
Percent Funded (Success Rate)	33.2	34.3	29.1	23.5	19.7	20.9	22.2	22.1	19.9	17.4	14.7

* Includes R01, U01, P01, R03, R15, R21, R29, R33, and R37; DP2 and U19 beginning in 2007; DP1 and R00 beginning in 2008; R34 and U34 beginning in 2010; and UH2 and UM1 beginning in 2011.

Percent of Reviewed Applications Funded (Success Rate)



NHLBI Investigator-Initiated and Institute-Initiated Grant Obligations: Fiscal Years 2002–2012



* 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 2002–2012

Dollars (Millions)

	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Investigator-Initiated*	$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	$1,921.9	$1,892.2
Institute-Initiated**	421.3	490.4	483.8	487.3	473.8	488.2	396.1	410.9	359.5	366.7	419.3
Total	**$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**	**$2,288.6**	**$2,311.5**

* 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 2002–2012

Dollars (Millions)

	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Competing											
New Competing	$ 291.2	$ 285.5	$ 290.5	$ 270.0	$ 242.9	$ 330.9	$ 314.2	$ 340.2	$ 330.5	$ 353.1	$ 314.8
Renewal Competing	143.9	177.2	185.5	176.1	168.3	169.4	196.9	172.6	171.0	131.6	111.4
Competing Supplements	2.3	1.0	1.3	1.7	0.4	—	1.7	0.3	0.3	—	0.2
Subtotal, Competing	437.4	463.7	477.3	447.8	411.6	500.3	512.8	513.1	501.8	484.7	426.4
Noncompeting											
Subtotal, Noncompeting	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	1,595.2	2,092.4
Total, Competing and Noncompeting	**$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**	**$2,079.9**	**$2,518.8**

* Includes R01, U01, P01, R03, R15, R21, R29, R33, R37, R41, R42, R43, and R44; DP2 and U19 beginning in 2007; DP1 and R00 beginning in 2008; R34 and U34 beginning in 2010; and UH2 and UM1 beginning in 2011.

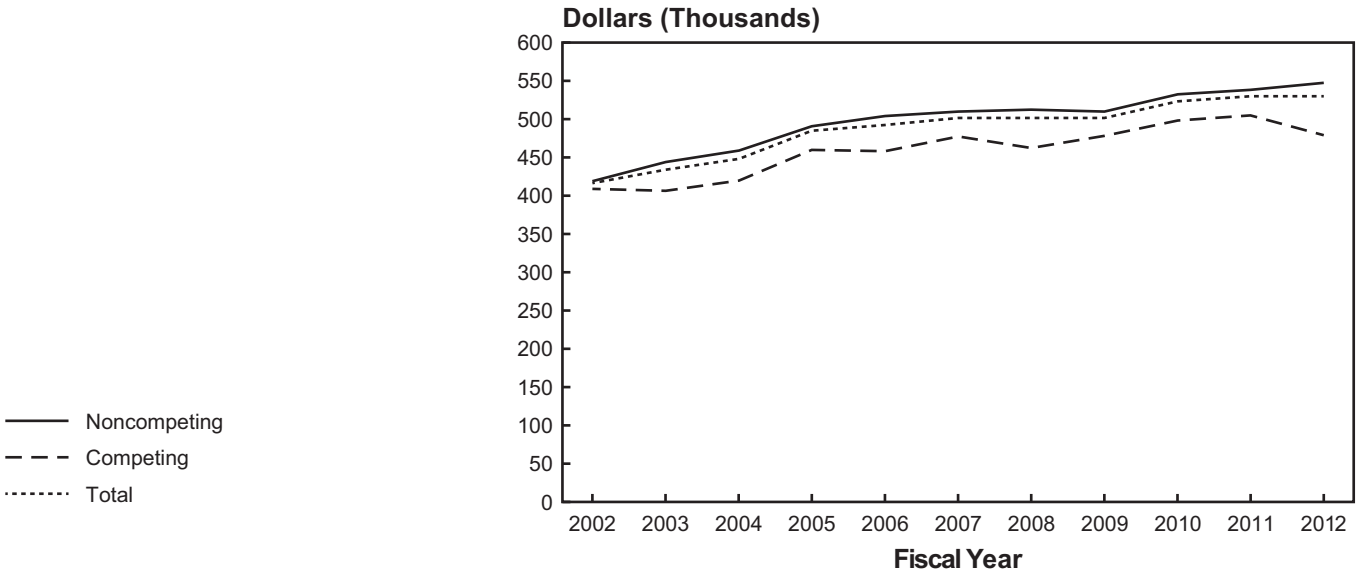
Facility and Administrative (F&A) Costs of NHLBI Research Project Grants:* Fiscal Years 2002–2012

Dollars (Thousands)

Fiscal Year	Direct Cost	F&A Cost	Total Cost	F&A Cost as a Percent of Direct Cost
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
2011	1,429,935	649,985	2,079,920	45.5
2012	1,450,958	641,524	2,092,482	44.2

* Includes R01, U01, P01, R03, R15, R21, R29, R33, R37, R41, R42, R43, and R44; DP2 and U19 beginning in 2007; DP1 and R00 beginning in 2008; R34 and U34 beginning in 2010; and UH2 and UM1 beginning in 2011.

NHLBI Research Project Grants:* Average Costs, Fiscal Years 2002–2012



* Includes R01, U01, P01, R03, R15, R21, R29, R33, R37, R41, R42, R43, and R44; DP2 and U19 beginning in 2007; DP1 and R00 beginning in 2008; R34 and U34 beginning in 2010; and UH2 and UM1 beginning in 2011.

NHLBI Research Project Grants:* Average Costs, Fiscal Years 2002–2012

Dollars (Thousands)

	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Noncompeting	$418.8	$444.4	$458.7	$490.6	$503.9	$510.3	$512.4	$509.8	$532.2	$538.6	$547.8
Competing	409.1	406.7	419.7	459.9	458.1	477.8	462.0	478.2	497.9	504.9	479.2
Total	**$416.2**	**$433.8**	**$447.9**	**$484.8**	**$492.8**	**$501.7**	**$501.8**	**$501.4**	**$523.6**	**$530.3**	**$530.3**

* Includes R01, U01, P01, R03, R15, R21, R29, R33, R37, R41, R42, R43, and R44; DP2 and U19 beginning in 2007; DP1 and R00 beginning in 2008; R34 and U34 beginning in 2010; and UH2 and UM1 beginning in 2011.

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 2012	Total FY 2012 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
ARIC Neurocognitive Study (ARIC-NCS)	$ 9,156,680	$ 783,518	$ 9,940,198
Cardiovascular Cell Therapy Research Network	28,219,327	8,061,825	36,281,152
Cardiovascular Inflammation Reduction Trial (CIRT)	1,375,726	9,607,234	10,982,960
Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL)	28,856,425	2,881,799	31,738,224
Catheter Ablation Versus Antiarrythmic Drug Therapy for Atrial Fibrillation (CABANA) Trial	9,018,518	3,015,483	12,034,001
Center for Cardiovascular Outcomes Research	10,168,525	3,542,609	13,711,134
Childhood Obesity Prevention and Treatment Research (COPTR)	8,044,862	7,527,535	15,572,397
Claudication Exercise Versus Endoluminal Revascularization (CLEVER)	9,018,723	542,213	9,560,936
Consortium of Hospitals Advancing Research on Tobacco (CHART)	6,826,745	4,579,884	11,406,629
Cross Organ Mechanism-Associated Phenotypes for Genetic Analysis of Heart, Lung, Blood, and Sleep Diseases (MAPGen for HLBS) Research Centers	4,275,465	4,193,398	8,468,863
Diabetes Prevention Program Outcomes Study—Phase II	3,300,000	2,425,500	5,725,500
Early Adult Reduction of Weight Through LifestYle Intervention (EARLY) Trials*	16,643,216	4,857,967	21,501,183
Heart Failure Clinical Research Network	44,760,674	6,460,152	51,220,826
ISCHEMIA (International Study of Comparative Health Effectiveness With Medical Invasive Approaches) Trial	6,671,629	17,444,758	24,116,387
Look AHEAD: Action for Health in Diabetes	12,000,000	4,000,000	16,000,000
Network for Cardiothoracic Surgical Investigation in Cardiovascular Medicine	31,438,403	7,097,239	38,535,642
Next Generation Genetic Association Studies	5,855,804	10,419,521	16,275,325
NHLBI Cardiac Development Consortium	15,276,752	6,978,522	22,255,274
NHLBI Pediatric Cardiac Genomics Consortium	8,957,755	3,977,556	12,935,311
NHLBI Pediatric Translational Consortium Administrative Coordinating Center	10,453,976	7,394,468	17,848,444
NHLBI Progenitor Cell Biology Consortium Research Hubs	69,302,980	26,196,688	95,499,668
Obesity Related Behavioral Intervention Trials (ORBIT)**	15,284,679	4,548,578	19,833,257
PDE5 Inhibition With Tadalafil Changes Outcomes in Heart Failure (PITCH-HF)	—	1,422,791	1,422,791
Pediatric Heart Network	76,176,050	12,249,798	88,425,848
Pharmacogenetics Research Network	80,953,760	6,498,845	87,452,605
Ranolazine in Implantable Defibrillators (RAID) Trial	2,279,794	2,287,927	4,567,721
Reducing the Impact of Hypertension in Low and Middle Income Countries	—	1,258,006	1,258,006
Resuscitation Outcomes Consortium (ROC)†	55,902,830	7,923,746	63,826,576
Rule Out Myocardial Infarction Using Computed Assisted Tomography (ROMICAT II)	4,785,713	1,105,318	5,891,031
Therapeutic Hypothermia After Pediatric Cardiac Arrest (THAPCA) Trials	10,395,495	4,370,676	14,766,171
Subtotal, Heart and Vascular Diseases	585,400,506	183,653,554	769,054,060
Lung Diseases			
Asthma Networks (AsthmaNet)	39,300,000	16,578,341	55,878,341
Genomic Research in AAT-Deficiency and Sarcoidosis Study (GRADS)	—	3,204,534	3,204,534
Heart and Lung Failure-Pediatric Insulin Titration Trial (HALF-PINT)	2,685,460	2,548,137	5,233,597
Lung Repair and Regeneration Consortium	—	4,910,973	4,910,973
Microbiome of the Lung and Respiratory Tract in HIV-Infected and in HIV-Uninfected Controls	16,067,661	5,289,811	21,357,472
Novel Therapies for Lung Diseases—Phase II	20,436,977	15,477,541	35,914,518
Pharmacogenetics of Asthma Treatment	30,955,719	1,958,575	32,914,294

	Total Obligations Prior to FY 2012	Total FY 2012 Obligations	Total Obligations to Date
Lung Diseases (continued)			
Prematurity and Respiratory Outcomes Program (PROP)	5,664,228	4,119,773	9,784,001
Preterm Birth in Nulliparous Women: An Understudied Population at Great Risk	3,798,000	668,815	4,466,815
Randomized Trial of Antenatal Late Preterm Steroids (ALPS)	4,271,361	556,659	4,828,020
Randomized Trial of Maternal Vitamin D Supplementation To Prevent Childhood Asthma	7,445,255	2,505,636	9,950,891
Sedation Management in Pediatric Patients With Acute Respiratory Failure	9,960,315	384,556	10,344,871
Severe Asthma Research Program	5,159,933	6,066,314	11,226,247
Study of Asthma and Nasal Steroids (STAN)	2,174,420	724,801	2,899,221
Study of Soy Isoflavones in Asthma (SOYA)	2,106,527	687,123	2,793,650
Trial of Late Surfactant (TOLSURF) To Prevent Bronchopulmonary Dysplasia (BPD)	5,572,999	1,653,180	7,226,179
Subtotal, Lung Diseases	155,598,855	67,334,769	222,933,624
Blood Diseases and Resources			
Acute Venous Thrombosis: Thrombus Removal With Adjunctive Catheter-Directed Thrombolysis (ATTRACT)‡	6,516,312	2,459,244	8,975,556
Blood and Marrow Transplant Clinical Research Network	64,390,805	4,051,982	68,442,787
Bridging Anticoagulation on Patients Requiring Temporary Interruption of Warfarin Therapy for an Elective Invasive Procedure or Surgery (BRIDGE) Trial	15,531,903	—	15,531,903
Transfusion-Associated Brain Improvement (TABI) Trial	—	1,729,189	1,729,189
Transfusion Medicine/Hemostasis Clinical Research Network	63,173,772	5,902,779	69,076,551
Subtotal, Blood Diseases and Resources	149,612,792	14,143,194	163,755,986
Total, NHLBI Cooperative Agreements	**$890,612,153**	**$265,131,517**	**$1,155,743,670**

* Formerly known as Targeted Approaches to Weight Control for Young Adults.
** Formerly known as Translating Basic Behavior and Social Science Discoveries Into Interventions to Reduce Obesity.
† Formerly known as Clinical Research Consortium To Improve Resuscitation Outcomes.
‡ Formerly known as Pharmacomechanical Catheter-Directed Thrombolysis for Acute DVT (ATTRACT) Trial.

Heart and Vascular Diseases Program

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 ARIC cohort.

Obligations

Funding History:
Fiscal Year 2012—$783,518
Fiscal Years 2010–2011—$9,156,680
Total Funding to Date—$9,940,198

Current Active Organizations and Grant Numbers

1. Johns Hopkins University
Baltimore, Maryland —HL-096812
2. University of North Carolina, Chapel Hill
Chapel Hill, North Carolina —HL-096814
3. University of North Carolina, Chapel Hill
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 Inflammation Reduction Trial (CIRT), Initiated in Fiscal Year 2011

The purpose of this trial is to test the inflammatory hypothesis of atherothrombosis by evaluating whether low-dose methotrexate will reduce rates of recurrent myocardial infarction, stroke, and cardiovascular death among stable post-myocardial infarction patients with type 2 diabetes or metabolic syndrome—conditions with enhanced pro-inflammatory response.

Obligations

Funding History:
Fiscal Year 2012—$9,607,234
Fiscal Year 2011—$1,375,726
Total Funding to Date—$10,982,960

Current Active Organizations and Grant Numbers

1. Brigham and Women's Hospital
Boston, Massachusetts —HL-101389
2. Brigham and Women's Hospital
Boston, Massachusetts —HL-101422

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

The purpose of this trial is to determine whether renal artery stenting adds value to optimal medical therapy in terms of cardiovascular and renal outcomes in individuals with a history of resistant hypertension and/or chronic kidney disease and stenosis (>60%) of one or both renal arteries.

Obligations

Funding History:
Fiscal Year 2012—$2,881,799
Fiscal Years 2004–2011—$28,856,425
Total Funding to Date—$31,738,224

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

Catheter Ablation Versus Antiarrythmic Drug Therapy for Atrial Fibrillation (CABANA) Trial, 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 2012—$3,015,483
Fiscal Years 2009–2011—$9,018,518
Total Funding to Date—$12,034,001

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 research that focuses on patient- and clinician-relevant outcomes of health care and their determinants. The goal is to move clinical evidence into public policy and clinical practice.

Obligations

Funding History:
Fiscal Year 2012—$3,542,609
Fiscal Years 2010–2011—$10,168,525
Total Funding to Date—$13,711,134

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. 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 (CLEVER), Initiated in Fiscal Year 2005

The purpose of this study is to optimize physical functioning, increase activity levels, and reduce CVD risk in older individuals with peripheral artery disease. Investigators are determining whether aortoiliac stenting and pharmacotherapy improve maximum walking duration better than supervised rehabilitation, exercise, and pharmacotherapy for those with moderate to severe claudication due to aortoiliac insufficiency.

Obligations

Funding History:
Fiscal Year 2012—$542,213
Fiscal Years 2005–2011—$9,018,723
Total Funding to Date—$9,560,936

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

Consortium of Hospitals Advancing Research on Tobacco (CHART), Initiated in Fiscal Year 2010

See Chapter 11. Clinical Trials.

Cross Organ Mechanism-Associated Phenotypes for Genetic Analysis of Heart, Lung, Blood, and Sleep Diseases (MAPGen for HLBS) Research Centers, Initiated in Fiscal Year 2011

The purpose of this program is to establish a MAPGen consortium of research centers. The consortium seeks to define common mechanism-associated traits across organ systems and to redefine disease by pathogenetic mechanisms and phenotype individuals based on pathobiology, rather than clinical presentation. This approach will provide the basis for the development of mechanism-based strategies for prevention, diagnosis, and treatment in individual patients.

Obligations

Funding History:
Fiscal Year 2012—$4,193,398
Fiscal Year 2011—$4,275,465
Total Funding to Date—$8,468,863

Current Active Organizations and Grant Numbers

1. Brigham and Women's Hospital
   Boston, Massachusetts —HL-108630
2. University of Southern California
   Los Angeles, California —HL-108634
3. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-108636
4. Yale University
   New Haven, Connecticut —HL-108638
5. University of Pittsburgh
   Pittsburgh, Pennsylvania —HL-108642
6. Stanford University
   Menlo Park, California —HL-108647

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

See Chapter 11. Clinical Trials.

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

See Chapter 11. Clinical Trials.

Heart Failure Clinical Research Network, Initiated in Fiscal Year 2006

See Chapter 11. Clinical Trials.

ISCHEMIA (International Study of Comparative Health Effectiveness With Medical Invasive Approaches) Trial, Initiated in Fiscal Year 2011

The purpose of this trial is to determine whether optimal medical therapy plus cardiac catheterization followed by complete revascularization is superior to optimal medical therapy alone as the management strategy for patients with moderate-severe ischemia on stress imaging. Cost-effectiveness will also be assessed.

Obligations

Funding History:
Fiscal Year 2012—$17,444,758
Fiscal Year 2011—$6,671,629
Total Funding to Date—$24,116,387

Current Active Organizations and Grant Numbers

1. Duke University
   Durham, North Carolina —HL-105462
2. Emory University
   Atlanta, Georgia —HL-105561
3. Duke University
   Durham, North Carolina —HL-105565
4. New York University School of Medicine
   New York, New York —HL-105907

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

See Chapter 11. Clinical Trials.

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

See Chapter 11. Clinical Trials.

Next Generation Genetic Association Studies, Initiated in Fiscal Year 2011

The purpose of this study is to investigate functional aspects of genetic variation in humans by combining cellular reprogramming strategies with molecular profiling or cellular assays, and then integrating the information with existing genotypic and clinical phenotypic data to assess how naturally occurring human genetic variation influences the activities of biological networks in cell-based models of disease. Researchers are seeking to develop the technology needed for high-throughput iPS cell line generation and differentiation and will use the technology to follow up on genomic associations with additional mechanistic information gained from cellular models of disease.

Obligations

Funding History:
Fiscal Year 2012—$10,419,521
Fiscal Year 2011—$5,855,804
Total Funding to Date—$16,275,325

Current Active Organizations and Grant Numbers

1. Stanford University
   Stanford, California —HL-107388
2. Stanford University
   Stanford, California —HL-107393
3. Scripps Research Institute
   La Jolla, California —HL-107436
4. Medical College of Wisconsin
   Milwaukee, Wisconsin —HL-107437
5. Massachusetts General Hospital
   Boston, Massachusetts —HL-107440
6. University of California, San Diego
   La Jolla, California —HL-107442
7. Boston University Medical Campus
   Boston, Massachusetts —HL-107443
8. Johns Hopkins University
   Baltimore, Maryland —HL-107446

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

NHLBI Cardiac Development Consortium, Initiated in Fiscal Year 2009

The purpose of this study is to elucidate 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 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 2012—$6,978,522
Fiscal Years 2009–2011—$15,276,752
Total Funding to Date—$22,255,274

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 genetic causes of congenital heart disease and genetic contributions to outcomes in individuals with congenital heart disease.

Obligations

Funding History:
Fiscal Year 2012—$3,977,556
Fiscal Years 2009–2011—$8,957,755
Total Funding to Date—$12,935,311

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 2012—$7,394,468
Fiscal Years 2009–2010—$10,453,976
Total Funding to Date—$17,848,444

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 are seeking to identify and characterize progenitor cell lineages, direct differentiation of stem and progenitor cells to desired cell fates, and develop new strategies to address the unique challenges presented by the transplantation of progenitor cells.

Obligations

Funding History:
Fiscal Year 2012—$26,196,688
Fiscal Years 2009–2011—$69,302,980
Total Funding to Date—$95,499,668

Current Active Organizations and Grant Numbers

1. Children's Hospital of Philadelphia
   Philadelphia, Pennsylvania —HL-099656
2. Morgridge Institute for Research, Inc.
   Madison, Wisconsin —HL-099773
3. Johns Hopkins University
   Baltimore, Maryland —HL-099775
4. Stanford University
   Menlo Park, California —HL-099776
5. Fred Hutchinson Cancer Research Center
   Seattle, Washington —HL-099993
6. Stanford University
   Menlo Park, California —HL-099995
7. University of Maryland
   Baltimore, Maryland —HL-099997

8. Stanford University
Menlo Park, 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

Obesity Related Behavioral Intervention Trials (ORBIT),* Initiated in Fiscal Year 2009

The purpose of this study is 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. Investigators are seeking to develop innovative obesity-reducing strategies that are effective in small-scale trials, acceptable to target populations of interest, and are ready for testing 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 2012—$4,548,578
Fiscal Years 2009–2011—$15,284,679
Total Funding to Date—$19,833,257

Current Active Organizations and Grant Numbers

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

PDE5 Inhibition With Tadalafil Changes Outcomes in Heart Failure (PITCH-HF)), Initiated in Fiscal Year 2012

The purpose of this study is to test the safety and efficacy of tadalafil, a pulmonary vasodilator and phosphodiesterase Type 5 (PDE5) inhibitor, in patients with heart failure and reduced left ventricular ejection fraction (LVEF), specifically an LVEF less than 40%, and secondary pulmonary hypertension.

Obligations

Funding History:
Fiscal Year 2012—$1,422,791
Total Funding to Date—$1,422,791

Current Active Organizations and Grant Numbers

1. Massachusetts General Hospital
Boston, Massachusetts —HL-105562
2. New England Research Institute, Inc.
Watertown, Massachusetts —HL-105563

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 program is to establish a network of multidisciplinary, collaborative research groups to study how genetic variation contributes to interindividual differences in responses to medications. Four studies under this initiative are investigating the pharmacogenetics of heart, lung, and blood diseases. One of the projects has 38 percent minority participation. The Pharmacogenetics Knowledgebase (PharmGKB) has been established to integrate information obtained from pharmacogenomics, phenotypes, and genotypes.

* Formerly known as Translating Basic Behavioral and Social Sciences Discoveries Into Interventions To Reduce Obesity.

Obligations

Funding History:
Fiscal Year 2012—$6,498,845
Fiscal Years 2001–2011—$80,953,760
Total Funding to Date—$87,452,605

Current Active Organizations and Grant Numbers

1. Brigham and Women's Hospital
Boston, Massachusetts —HL-065899
2. Vanderbilt University
Nashville, Tennessee —HL-065962
3. Children's Hospital and Research Center
Oakland, California —HL-069757
4. University of Maryland
Baltimore, Maryland —HL-105198

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, 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.

Obligations

Funding History:
Fiscal Year 2012—$2,287,927
Fiscal Years 2010–2011—$2,279,794
Total Funding to Date—$4,567,721

Current Active Organizations and Grant Numbers

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

Reducing the Impact of Hypertension in Low and Middle Income Countries, Initiated in Fiscal Year 2012

The purpose of this study is to support effective interventions that will provide sound scientific evidence for expanding sustainable blood pressure prevention and control programs in low- and middle-income countries at the local, regional, and national levels.

Obligations

Funding History:
Fiscal Year 2012—$1,258,006
Total Funding to Date—$1,258,006

Current Active Organizations and Grant Numbers

1. Johns Hopkins University
Baltimore, Maryland —HL-114180
2. Tulane University of Louisiana
New Orleans, Louisiana —HL-114197
3. New York University School of Medicine
New York, New York —HL-114198
4. Mount Sinai School of Medicine
New York, New York — HL-114200

Resuscitation Outcomes Consortium (ROC),* Initiated in Fiscal Year 2004

See Chapter 11. Clinical Trials.

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 will enable immediate and safe discharge without further testing of a significant number of patients with acute chest pain.

Obligations

Funding History:
Fiscal Year 2012—$1,105,318
Fiscal Years 2009–2011—$4,785,713
Total Funding to Date—$5,891,031

Current Active Organizations and Grant Numbers

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

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

* Formerly known as Clinical Research Consortium To Improve Resuscitation Outcomes.

are expected to come from racial and ethnic minority populations.

Obligations

Funding History:
Fiscal Year 2012—$4,370,676
Fiscal Years 2009–2011—$10,395,495
Total Funding to Date—$14,766,171

Current Active Organizations and Grant Numbers

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

Lung Diseases Program

Asthma Networks (AsthmaNet), Initiated in Fiscal Year 2009

See Chapter 11. Clinical Trials.

Genomic Research in ATT-Deficiency and Sarcoidosis Study (GRADS), Initiated in Fiscal Year 2012

The purposes of this study are to identify molecular abnormalities in patients with alpha-1-antitrypsin deficiency (ATT) or sarcoidosis through genomic and microbiomic analyses and to determine the relationship of these abnormalities to the clinical characteristics of patients. Clinical studies will be conducted to elucidate pathogenetic mechanisms or to identify predictors of disease development and progression. Many of the projects will have at least 50-percent participation from minority populations.

Obligations

Funding History:
Fiscal Year 2012—$3,204,534
Total Funding to Date—$3,204,534

Current Active Organizations and Grant Numbers

1. Vanderbilt University
   Nashville, Tennessee —HL-112694
2. National Jewish Health
   Denver, Colorado —HL-112695
3. University of California, San Francisco
   San Francisco, California —HL-112696
4. Yale University
   New Haven, Connecticut —HL-112702
5. University of Pittsburgh at Pittsburgh
   Pittsburgh, Pennsylvania —HL-112707
6. Johns Hopkins University
   Baltimore, Maryland —HL-112708
7. University of Pittsburgh at Pittsburgh
   Pittsburgh, Pennsylvania —HL-112711
8. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-112712

Heart and Lung Failure-Pediatric Insulin Titration Trial (HALF-PINT), Initiated in Fiscal Year 2011

The purpose of this study is to determine whether safe and effective tight glycemic control can sufficiently reduce morbidity and mortality in children with heart and lung failure to justify a low risk of hypoglycemia.

Obligations

Funding History:
Fiscal Year 2012—$2,548,137
Fiscal Year 2011—$2,685,460
Total Funding to Date—$5,233,597

Current Active Organizations and Grant Numbers

1. Children's Hospital Boston
   Boston, Massachusetts —HL-107681
2. Children's Hospital Boston
   Boston, Massachusetts —HL-108028

Lung Repair and Regeneration Consortium, Initiated in Fiscal Year 2012

The purpose of this consortium is to establish multidisciplinary teams of investigators, cutting edge technologies, innovative strategies, and new ideas to investigate novel hypotheses that are relevant to lung repair and regeneration in order to move the field of lung regeneration forward toward the development of new therapies for human diseases.

Obligations

Funding History:
Fiscal Year 2012—$4,910,973
Total Funding to Date—$4,910,973

Current Active Organizations and Grant Numbers

1. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-110942
2. Children's Hospital Center Cincinnati
   Cincinnati, Ohio —HL-110964
3. Duke University
   Durham, North Carolina —HL-110967

4. Yale University
   New Haven, Connecticut —HL-111016
5. Duke University
   Durham, North Carolina —HL-111018
6. University of California, San Francisco
   San Francisco, California —HL-111054
7. University of Texas Southwestern Medical Center
   Dallas, Texas —HL-111146

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 are using 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 2012—$5,289,811
Fiscal Years 2009–2011—$16,067,661
Total Funding to Date—$21,357,472

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, Indianapolis
   Indianapolis, Indiana —HL-098960
4. University of Michigan
   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 2012—$1,958,575
Fiscal Years 2000–2011—$30,955,719
Total Funding to Date—$32,914,294

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 2012—$4,119,773
Fiscal Years 2010–2011—$5,664,228
Total Funding to Date—$9,784,001

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 the cardiovascular health of women in their first pregnancy and assess the significance of disordered breathing.

Obligations

Funding History:
Fiscal Year 2012—$668,815
Fiscal Years 2010–2011—$3,798,000
Total Funding to Date—$4,466,815

Current Active Organization and Grant Number

1. Research Triangle Institute
   Research Triangle, North Carolina —HD-063069

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). Previous studies have shown that steroids improve lung function in very premature infants. Fifty-five percent of the participants are expected to come from racial and ethnic minority populations.

Obligations

Funding History:
Fiscal Year 2012—$556,659
Fiscal Years 2010–2011—$4,271,361
Total Funding to Date—$4,828,020

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 and randomize them to one of two treatment arms of a 4-year clinical trial: one arm being treatment with 4,000 international units of vitamin D in addition to typical prenatal vitamins and the other being treatment with typical prenatal vitamins alone. Currently, 80 percent of the participants are from racial and ethnic minority populations.

Obligations

Funding History:
Fiscal Year 2012—$2,505,636
Fiscal Years 2009–2011—$7,445,255
Total Funding to Date—$9,950,891

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 have randomized 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 2012—$384,556
Fiscal Years 2008–2011—$9,960,315
Total Funding to Date—$10,344,871

Current Active Organization and Grant Number

1. Children's Hospital Boston
   Boston, Massachusetts —HL-086649

Severe Asthma Research Program,* Initiated in Fiscal Year 2011

The purpose of this study is to define severe asthma at the molecular and cellular levels longitudinally to understand its evolution. Research findings will serve as a rational basis for designing mechanism-based diagnostic, prognostic, and treatment strategies for severe asthma.

Obligations

Funding History:
Fiscal Year 2012—$6,066,314
Fiscal Year 2011—$5,159,933
Total Funding to Date—$11,226,247

Current Active Organizations and Grant Numbers

1. Pennsylvania State University, Hershey Medical Center, Hershey, Pennsylvania —HL-109086
2. University of California, San Francisco, San Francisco, California —HL-109146
3. University of Pittsburgh, Pittsburgh, Pennsylvania —HL-109152
4. Wake Forest University Health Sciences, Winston-Salem, North Carolina —HL-109164
5. University of Wisconsin, Madison, Madison, Wisconsin —HL-109168
6. Brigham and Women's Hospital, Boston, Massachusetts —HL-109172
7. University of Virginia, Charlottesville, Charlottesville, Virginia —HL-109250
8. Washington University, St. Louis, Missouri —HL-109257

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

The purpose of this clinical trial is to determine whether treatment of chronic rhinitis and sinusitis with a nasal steroid improves asthma control. Investigators have randomized 380 patients with poorly controlled asthma and chronic rhinitis and 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 2012—$724,801
Fiscal Years 2009–2011—$2,174,420
Total Funding to Date—$2,899,221

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 determine whether genistein supplements (soy isoflavone) improves lung function in patients with poorly controlled asthma. The study includes 380 patients with low dietary soy intake, ages 12 years and older, who are taking either inhaled corticosteroids or leukotriene modifiers or both and have poorly controlled asthma. Participants are being 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 2012—$687,123
Fiscal Years 2009–2011—$2,106,527
Total Funding to Date—$2,793,650

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 2012—$1,653,180
Fiscal Years 2009–2011—$5,572,999
Total Funding to Date—$7,226,179

* The Severe Asthma Research Program began in FY 2001 and was funded under the R01 mechanism.

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 (PCDT), which includes intrathrombus administration of recombinant tissue plasminogen activator, can prevent post-thrombotic syndrome in patients with symptomatic proximal deep vein thrombosis (DVT). Investigators are comparing the addition of PCDT to optimal standard DVT therapy with optimal standard DVT therapy alone.

Obligations

Funding History:
Fiscal Year 2012—$2,459,244
Fiscal Years 2008–2011—$6,516,312
Total Funding to Date—$8,975,556

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.

Bridging Anticoagulation on Patients Requiring Temporary Interruption of Warfarin Therapy for an Elective Invasive Procedure or Surgery (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 randomly allocated 3,282 patients with atrial fibrillation to either LMWH or placebo before and after surgery. Investigators hypothesize that simply withholding warfarin in a perioperative 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 2012—$0
Fiscal Years 2008–2011—$15,531,903
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-Associated Brain Improvement (TABI) Trial, Initiated in Fiscal Year 2012

The purpose of this study is to determine whether higher hemoglobin thresholds for transfusing extremely low birth weight babies born at less than 1,000 grams increases survival and improves long-term neurodevelopment at 18–22 months of age. The TABI trial is partnering with the NICHD Neonatal Research network and its 18 clinical centers.

Obligations

Funding History:
Fiscal Year 2012—$1,729,189
Total Funding to Date—$1,729,189

Current Active Organizations and Grant Numbers

1. Research Triangle Institute
   Research Triangle, North Carolina —HL-112748
2. Children's Hospital of Philadelphia
   Philadelphia, Pennsylvania —HL-112776

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

See Chapter 11. Clinical Trials.

* Formerly known as Pharmacomechanical Catheter-Directed Thrombolysis for Acute DVT (ATTRACT) 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	Period of Operation	Obligations (Dollars in Thousands) Prior to FY 2012	FY 2012	Total to Date
NIH Centers for Population Health and Health Disparities (CPHHD)	2010–	$ 20,067	$ 6,711	$ 26,778
Subtotal, CPHHD		20,067	6,711	26,778
Specialized Centers of Clinically Oriented Research (P50)				
Heart and Vascular Diseases Program				
Vascular Injury, Repair, and Remodeling (SCCOR)	2006–	71,403	2,831	74,234
Subtotal, Heart and Vascular Diseases Program		71,403	2,831	74,234
Lung Diseases Program				
Chronic Obstructive Pulmonary Disease (SCCOR)	2007–	53,556	2,578	56,134
Pulmonary Vascular Disease (SCCOR)	2007–	30,218	1,516	31,734
Subtotal, Lung Diseases Program		83,774	4,094	87,868
Subtotal, SCCORs (P50)		155,177	6,925	162,102
Centers for Advanced Diagnostics and Experimental Therapeutics in Lung Diseases (CADET) Phase I	2011–	9,001	8,850	17,851
Subtotal, CADET Phase I		9,001	8,850	17,851
NHLBI Translational Research Implementation Program (TRIP)	2012–	—	11,676	11,676
Subtotal, TRIP		—	11,676	11,676
Total, Centers of Research Program (P50)		**$184,245**	**$34,162**	**$218,407**

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 2012—$6,711,003

Current Active Organizations and Grant Numbers

1. University of North Carolina, Chapel Hill
   Chapel Hill, North Carolina —HL-105184
2. Northeastern University
   Boston, Massachusetts —HL-105185
3. Johns Hopkins University
   Baltimore, Maryland —HL-105187
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 FY 2002, the NHLBI revised its 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 also requires at least 50 percent of the projects to be clinical. The SCOR program ended in FY 2008.

A description of the SCCORs supported by the Institute follows.

Heart Diseases Program

Vascular Injury, Repair, and Remodeling

The purpose of this SCCOR is 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 2012—$2,830,751

Current Active Organization and Grant Number

1. Beth Israel Deaconess Medical Center
   Boston, Massachusetts —HL-083813

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.

Obligations

Fiscal Year 2012—$2,578,270

Current Active Organization and Grant Number

1. University of Pittsburgh
   Pittsburgh, Pennsylvania —HL-084948

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 2012—$1,515,534

Current Active Organization and Grant Number

1. University of Colorado at Denver
   Denver, Colorado —HL-084923

Centers for Advanced Diagnostics and Experimental Therapeutics in Lung Diseases (CADET) (P50)

The purpose of this program is to accelerate the development of novel agents for the diagnosis and treatment of lung diseases and sleep disordered breathing through the use of rational strategies based on fundamental pathobiologic processes. CADET I provides opportunities to explore potential targets for validation to determine which are amenable for development of mechanism-based modalities for direct clinical application in the prevention, diagnosis, and treatment of pulmonary diseases and sleep disordered breathing.

Obligations

Fiscal Year 2012—$8,850,080

Current Active Organizations and Grant Numbers

1. Children's Hospital Medical Center Cincinnati
   Cincinnati, Ohio —HL-107159
2. University of Chicago
   Chicago, Illinois —HL-107160
3. Brigham and Women's Hospital
   Boston, Massachusetts —HL-107165
4. Brigham and Women's Hospital
   Boston, Massachusetts —HL-107166
5. University of North Carolina, Chapel Hill
   Chapel Hill, North Carolina —HL-107168
6. Johns Hopkins University
   Baltimore, Maryland —HL-107169
7. University of Chicago
   Chicago, Illinois —HL-107171
8. University of Pittsburgh
   Pittsburgh, Pennsylvania —HL-107172
9. University of Michigan
   Ann Arbor, Michigan —HL-107177
10. Duke University
    Durham, North Carolina —HL-107180
11. University of Alabama, Birmingham
    Birmingham, Alabama —HL-107181
12. Johns Hopkins University
    Baltimore, Maryland —HL-107182
13. Washington University
    Saint Louis, Missouri —HL-107183
14. Johns Hopkins University
    Baltimore, Maryland —HL-107185
15. University of Texas Health Center at Tyler
    Tyler, Texas —HL-107186
16. University of Arizona
    Tucson, Arizona —HL-107188
17. Johns Hopkins University
    Baltimore, Maryland —HL-107190
18. University of California, San Francisco
    San Francisco, California —HL-107191
19. Brigham and Women's Hospital
    Boston, Massachusetts —HL-107192

NHLBI Translational Research Implementation Program (C-TRIP) (P50)

The C-TRIP program 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. The program consists of two stages. Stage 1 focused 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 TRIP studies are supported by the P50 mechanism.

Obligation

Fiscal Year 2012—$11,676,397

Current Active Organizations and Grant Numbers

1. Fred Hutchinson Cancer Research Center
   Seattle, Washington —HL-110787
2. Tufts Medical Center
   Boston, Massachusetts —HL-110789
3. Dana-Farber Cancer Institute
   Boston, Massachusetts —HL-110790
4. Mount Sinai School of Medicine
   New York, New York —HL-112324
5. Brigham and Women's Hospital
   Boston, Massachusetts —HL-112349

Translational Research Centers in Thrombotic and Hemostatic Disorders (TRC-THD) (U54)

The purpose of this program is to enhance the translation of basic research discoveries that have the potential to improve the prevention, diagnosis, and treatment of thrombotic and hemostatic disorders. Investigators will advance early stage translational research, integrating applied and basic science, to move research discoveries toward clinical application.

Obligations

Fiscal Year 2012—$11,442,192

Current Active Organizations and Grant Numbers

1. Beth Israel Deaconess Medical Center
   Boston, Massachusetts —HL112302
2. Washington University
   St. Louis, Missouri —HL112303
3. Duke University
   Durham, North Carolina —HL112307
4. Emory University
   Atlanta, Georgia —HL112309
5. University of Utah
   Salt Lake City, Utah —HL112311

Centers for AIDS Research (P30) Program

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 2012—$3,428,458

Current Active Organizations and Grant Numbers

1. University of Washington
   Seattle, Washington —AI-027757
2. University of California, San Francisco
   San Francisco, California —AI-027763
3. University of Alabama, Birmingham
   Birmingham, Alabama —AI-027767
4. University of California, Los Angeles
   Los Angeles, California —AI-028697
5. Baylor University
   Houston, Texas —AI-036211
6. University of California, La Jolla
   La Jolla, California —AI-036214
7. Case Western Reserve University
   Cleveland, Ohio —AI-036219
8. University of Massachusetts, Worcester
   Worcester, Massachusetts —AI-042845
9. Miriam Hospital
   Providence, Rhode Island —AI-042853
10. University of Pennsylvania
    Philadelphia, Pennsylvania —AI-045008
11. Emory University
    Atlanta, Georgia —AI-050409
12. University of North Carolina, Chapel Hill
    Chapel Hill, North Carolina —AI-050410
13. Yeshiva University
    New York, New York —AI-051519
14. Vanderbilt University
    Nashville, Tennessee —AI-054999
15. Harvard Medical School
    Boston, Massachusetts —AI-060354
16. Duke University
    Durham, North Carolina —AI-064518
17. University of Miami
    School of Medicine
    Coral Gables, Florida —AI-073961
18. University of Rochester
    Rochester, New York —AI-078498
19. Rush University Medical Center
    Chicago, Illinois —AI-082151
20. George Washington University
    Washington, DC —AI-087714

Anchoring Metabolomic Changes to Phenotype Program (P20)

The purpose of this program is to gain mechanistic understanding of the molecular determinants that contribute to cardiovascular and lung disease phenotypes through metabolomic phenotyping of existing cohorts to help in predicting disease susceptibility, diagnosis, and risk stratification; assessing response to therapy; and assessing prognosis. The program will consist of two interacting components, a metabolomic component and a mechanistic component, each informing the other in an iterative manner.

Obligations

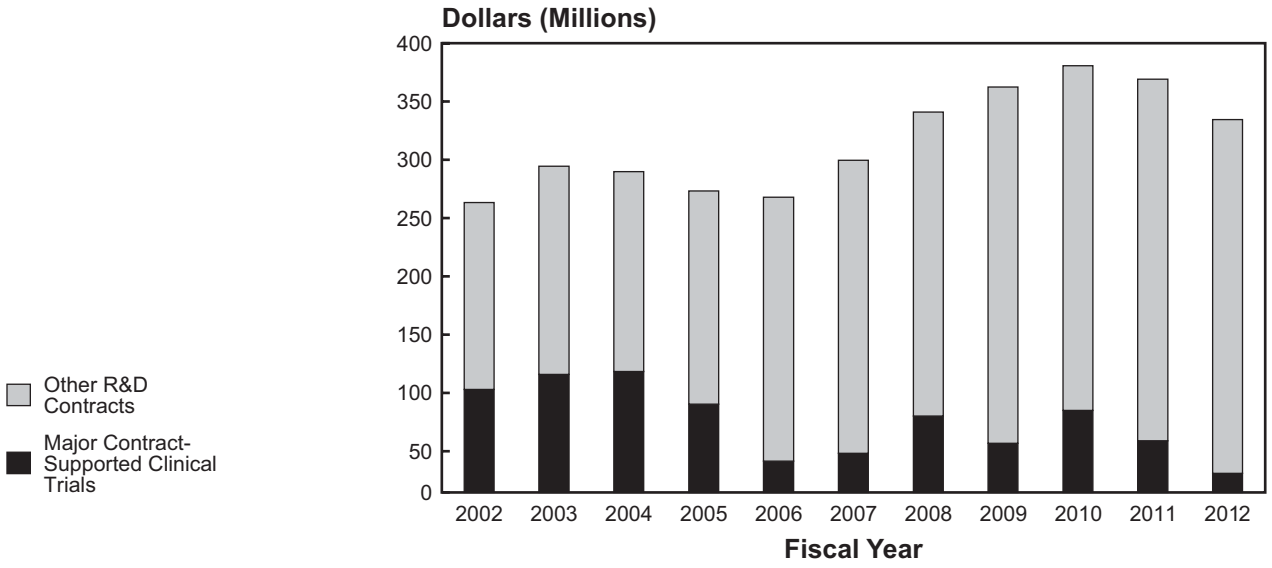
Fiscal Year 2012—$2,899,225

Current Active Organizations and Grant Numbers

1. Weill Medical College of Cornell University
   New York, New York —HL-113443
2. Washington University
   St. Louis, Missouri —HL-113444
3. National Jewish Health
   Denver, Colorado —HL-113445
4. Emory University
   Atlanta, Georgia —HL-113451
5. Case Western Reserve University
   Cleveland, Ohio —HL-113452

10. Research and Development Contracts

NHLBI Total Research and Development Contract Obligations:* Fiscal Years 2002–2012



* For detailed data on contract-supported clinical trials, see Chapter 11.

NHLBI Total Research and Development Contract Obligations: Fiscal Years 2002–2012

Dollars (Thousands)

	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Heart	$214,971	$258,647	$245,881	$219,796	$213,320	$260,205	$296,445	$321,223	$303,251	$299,201	$269,968
Lung	16,578	11,745	14,131	20,946	25,902	15,191	20,249	17,710	47,777	25,338	22,646
Blood	26,751	20,082	25,460	27,831	23,629	20,446	22,093	22,164	28,864	43,752	39,789
Total	**$258,300[A]**	**$290,474[B]**	**$285,472[C]**	**$268,573[D]**	**$262,851[E]**	**$295,842[F]**	**$338,787[G]**	**$361,097[H]**	**$379,892[I]**	**$368,291[J]**	**$332,403[K]**

A Includes Program Evaluation and IMPAC II Assessments of $35,827,000.
B Includes Program Evaluation and IMPAC II Assessments of $54,550,000.
C Includes Program Evaluation and IMPAC II Assessments of $57,545,722.
D Includes Program Evaluation and IMPAC II Assessments of $64,399,000.
E Includes Program Evaluation and IMPAC II Assessments of $67,795,000.
F Includes Program Evaluation and IMPAC II Assessments of $68,405,000.
G Includes Program Evaluation and IMPAC II Assessments of $77,487,000.
H Includes Program Evaluation and IMPAC II Assessments of $79,693,000.
I Includes Program Evaluation and IMPAC II Assessments of $83,834,100.
J Includes Program Evaluation and IMPAC II Assessments of $88,024,222.
K Includes Program Evaluation and IMPAC II Assessments of $86,618,720.
Note: From 2002 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 2012	Total FY 2012 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
Action to Control Cardiovascular Risk in Diabetes Follow-On Study (ACCORDION)	$ 13,250,149	$ 5,360,712	$ 18,610,861
Atherosclerosis Risk in Communities (ARIC)	172,181,383	16,608,970	188,790,353
Cardiovascular Health Study (CHS)	80,132,513	1,114,188	81,246,701
Coronary Artery Risk Development in Young Adults (CARDIA)	109,040,284	5,149,537	114,189,821
DNA Resequencing and Genotyping	38,483,962	6,465,315	44,949,277
Framingham Heart Study (FHS)	132,373,786	8,097,951	140,471,737
Genetically Triggered Thoracic Aortic Aneurysms and Other Cardiovascular Conditions (GenTAC): National Registry	14,878,123	3,608,732	18,486,855
Global Health Centers of Excellence	17,007,036	2,664,485	19,671,521
Hispanic Community Health Study—Study of Latinos (HCHS-SOL)	56,644,388	318,346	56,962,734
Interagency Registry for Mechanical Circulatory Support (INTERMACS)	13,126,195	3,941,360	17,067,555
Jackson Heart Study (JHS)	43,376,798	5,185,422	48,562,220
Multi-Ethnic Study of Atherosclerosis (MESA)	108,794,927	11,969,995	120,764,922
NHLBI Gene Therapy Resource Program (GTRP)	29,188,977	9,823,650	39,012,627
Proteomics Initiative	191,642,369	17,263,177	208,905,546
Pumps for Kids, Infants, and Neonates (PumpKIN)*	18,551,904	6,643,880	25,195,784
Science Moving TowArds Research Translation and Therapy Program (SMARTT)	4,145,344	5,573,693	9,719,037
Lung Diseases			
Lung Tissue Research Consortium	37,852,716	3,905,131	41,757,847
Subpopulations and Intermediate Outcome Measures in COPD Study (SPIROMICS)	32,697,717	2,235,206	34,932,923
Blood Diseases and Resources			
Maintenance of NHLBI Biological Specimen Repository	22,542,077	3,217,643	25,759,720
NHLBI–CDC Registry and Surveillance System in Hemoglobinopathies (RuSH)	10,628,679	631,637	11,260,316
Production Assistance for Cellular Therapies (PACT)	22,298,545	11,940,967	34,239,512
Recipient Epidemiology and Donor Study III (REDS-III)**	19,910,527	2,178,536	22,089,063

* See Chapter 11 for PumpKIN clinical trial.

** Formerly known as Retrovirus Epidemiology Donor Study.

Heart and Vascular Diseases

Action To Control Cardiovascular Risk in Diabetes Follow-On Study (ACCORDION), Initiated in Fiscal Year 2011

The purpose of the follow-up observational study (ACCORDION) is to obtain long-term (10 year average) data on the ACCORD* participants. Investigators are seeking to determine whether differences in mortality, CVD events, and microvascular diseases identified during the ACCORD trial persist or change over time and whether other differences will emerge. They will monitor long-term vascular outcomes from diabetes and the effects of glucose, blood pressure lowering, and lipid treatment on those outcomes.

The ACCORD was a randomized clinical trial 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 CVD events in patients with type 2 diabetes who were at high risk of CVD.

After a mean 3.5 years of treatment, the intensive glycemic portion of the trial was stopped because patients in the intensive glycemic treatment group had an increased risk of all-cause mortality compared with patients in the standard treatment group even though they had a non-statistically significant 10 percent reduction in the composite primary outcome of nonfatal MI, nonfatal stroke, or CVD death. Participants in the intensive group were then transitioned to the standard treatment strategy. Initial follow-up found no overall benefit of intensive treatment (intensive blood pressure control or fibrate and statin) over standard treatment (normal blood pressure or statin).

Obligations

Funding History:
Fiscal Year 2012—$5,360,712
Fiscal Year 2011—$13,250,149
Total Funding to Date—$18,610,861

Current Active Organization and Contract Number

1. Wake Forest University
   Winston-Salem, North Carolina —26820110027C

* Total funding for ACCORD was $142,587,546 from 1999 to 2010.

Atherosclerosis Risk in Communities (ARIC), Initiated in Fiscal Year 1985

The ARIC is an epidemiology study comprising a prospective cohort component and a community surveillance component. The cohort component investigates the etiology of CHD and stroke in 15,792 participants, aged 46–64 years at baseline, by race and gender in four U.S. communities. The community surveillance component monitors trends in hospitalized myocardial infarction, fatal CHD, and heart failure (2005–2009) from the same communities.

In 2011, the study began to reexamine the cohort participants with a focus on heart failure—a major epidemic in the rapidly aging U.S. population. Three of the cohort components represent the racial mix of their respective communities, and the fourth is exclusively black.

Obligations

Funding History:
Fiscal Year 2012—$16,608,970
Fiscal Years 1985–2011—$172,181,383
Total Funding to Date—$188,790,353

Current Active Organizations and Contract Numbers

1. University of North Carolina, Chapel Hill
   Chapel Hill, North Carolina —268201100005C
2. Baylor College of Medicine
   Houston, Texas —268201100006C
3. University of North Carolina, Chapel Hill
   Chapel Hill, North Carolina —268201100007C
4. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —268201100008C
5. Johns Hopkins University
   Baltimore, Maryland —268201100009C
6. Mississippi Medical Center
   Jackson, Mississippi —268201100010C
7. Brigham and Women's Hospital
   Boston, Massachusetts —268201100011C
8. University of North Carolina, Chapel Hill
   Chapel Hill, North Carolina —268201100012C

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 CHD and stroke in the elderly, 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: Core Support 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 2012—$1,114,188
Fiscal Years 1988–2011—$80,132,513
Total Funding to Date—$81,246,701

Current Active Organization and Contract Number

1. University of Washington
   Seattle, Washington —268200800007C

Coronary Artery Risk Development in Young Adults (CARDIA), Initiated in Fiscal Year 1984

The CARDIA is a long-term study that examines the evolution of CVD risk factors, subclinical atherosclerosis, and early clinical events in persons aged 18–30 years in 1985–1986. The study collects information on body mass index, diet, physical activity, genetics, cognitive functioning, serologic and metabolic components, inflammatory markers, and other subclinical measures of heart disease, pulmonary function, and behavioral and environmental factors. Fifty percent of the participants are black.

Obligations

Funding History:
Fiscal Year 2012—$5,149,537
Fiscal Years 1984–2011—$109,040,284
Total Funding to Date—$114,189,821

Current Active Organizations and Contract Numbers

1. Johns Hopkins University
   Baltimore, Maryland —268200900041C
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 Program, Initiated in Fiscal Year 2004

The purpose of this program is to provide high-quality, high-volume resequencing and genotyping of candidate genomic regions potentially important in the disease pathways of heart, lung, and blood diseases and sleep disorders. The information obtained will enable ongoing investigations to elucidate the specific genetic components involved in the causes for, variable outcomes of, and progression of the diseases and disorders.

Obligations

Funding History:
Fiscal Year 2012—$6,465,315
Fiscal Years 2004–2011—$38,483,962
Total Funding to Date—$44,949,277

Current Active Organization and Contract Number

1. University of Washington
   Seattle, Washington —268201100037C

Framingham Heart Study (FHS), Initiated in Fiscal Year 1948

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 CVD symptoms at the outset. Of the original 5,209 participants, about 104 are still 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. In 2002, a third-generation cohort consisting of approximately 4,000 grandchildren was added 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. The Omni cohorts consist of minority residents of Framingham, Massachusetts (about 500 and

400 participants in Omni Group 1 and Omni Group 2, respectively), and were previously identified, recruited, and examined through NHLBI investigator-initiated grants. They were added to the FHS to reflect the growing diversity of the community.

Obligations

Funding History:
Fiscal Year 2012—$8,097,951
Fiscal Years 1983–2011—$132,373,786
Total Funding to Date—$140,471,737

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 registry of patients with genetic conditions that may be related to thoracic aortic aneurysms and to collect medical data and biologic specimens. The specimens and database are available to qualified investigators for research to advance the clinical management of genetically induced thoracic aortic aneurysms and other cardiovascular complications. Individuals with 1 of 12 conditions—including connective tissue diseases, such as Marfan, Loeys-Dietz, and Ehlers Danlos (vascular type) Syndromes, Turner Syndrome, and bicuspid aortic valve—are eligible to enroll in GenTAC. To date, 3,100 individuals are enrolled in the registry.

Obligations

Funding History:
Fiscal Year 2012—$3,608,732
Fiscal Years 2006–2011—$14,878,123
Total Funding to Date—$18,486,855

Current Active Organization and Contract Number

1. RTI International
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 cardiovascular and pulmonary diseases in developing countries. 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 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 2012—$2,664,485
Fiscal Years 2009–2011—$17,007,036
Total Funding to Date—$19,671,521

Current Active Organizations and Contract Numbers

1. Public Health Foundation of India
New Delhi, India —268200900026C
2. The George Institute for International Health
Beijing, China —268200900027C
3. Instituto de Nutrición de Centro América y Panamá
Guatemala City, Guatemala —268200900028C
4. Institute for Clinical Effectiveness and Health Policy
Buenos Aires, Argentina —268200900029C
5. University of Cape Town
Cape Town, South Africa —268200900030C
6. Moi University School of Medicine
Eldoret, Kenya —268200900031C
7. International Centre for Diarrhoeal Disease Research, Bangladesh
Dhaka, Bangladesh —268200900032C
8. Universidad Peruana Cayetano Heredia
Lima, Peru —268200900033C
9. Westat
Rockville, Maryland —268200900034C

Hispanic Community Health Study—Study of Latinos (HCHS-SOL), 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 more than 16,400 Hispanics, aged 18–74 years, who self-identify as being of

Mexican, Puerto Rican, Cuban, Dominican, or Central or South American heritage.

Obligations

Funding History:
Fiscal Year 2012—$318,346
Fiscal Years 2006–2011—$56,644,388
Total Funding to Date—$56,962,734

Current Active Organizations and Contract Numbers

1. University of Miami
   Miami, Florida —HC-65234
2. Northwestern University
   Chicago, Illinois —HC-65236
3. San Diego State University
   San Diego, California —HC-65237

Interagency Registry for Mechanical Circulatory Support (INTERMACS), Initiated in Fiscal Year 2005

The INTERMACS is a national registry for patients who are receiving mechanical circulatory support device (MCSD) therapy to treat advanced heart failure. The registry collects and analyzes clinical and laboratory data and tissue samples from patients who receive MCSDs as destination therapy for end-stage heart failure at 119 participating sites.

Obligations

Funding History:
Fiscal Year 2012—$3,941,360
Fiscal Years 2005–2011—$13,126,195
Total Funding to Date—$17,067,555

Current Active Organization and Contract Number

1. University of Alabama
   Birmingham, Alabama —268201100025C

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 goal of the study is to identify factors related to the development and progression of CVD in blacks. The JHS conducts a variety of community education and outreach activities to promote healthy lifestyles to reduce disease burden. 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 2012—$5,185,422
Fiscal Years 1998–2011—$43,376,798
Total Funding to Date—$48,562,220

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). The cohort of 6,814 participants is 38 percent white, 28 percent black, 22 percent Hispanic, and 12 percent Asian. A fifth examination, completed in February 2012, included a repeat measurement of cardiac function with MRI to assess changes over time. Periodic monitoring of participants to identify recent hospitalizations and other clinical events will continue.

Obligations

Funding History:
Fiscal Year 2012—$11,969,995
Fiscal Years 1999–2011—$108,794,927
Total Funding to Date—$120,764,922

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 School of Medicine
   Winston-Salem, North Carolina —HC-95165
8. University of Vermont
   Colchester, Vermont —HC-95166
9. Johns Hopkins University
   Baltimore, Maryland —HC-95168

NHLBI Gene Therapy Resource Program (GTRP), Initiated in Fiscal Year 2007

The purpose of this program is to promote the translation of basic gene therapy research into clinical intervention for heart, lung, and blood diseases. The program provides resources in the form of preclinical- and clinical-grade vector production; pharmacology and toxicology testing on animals; immunology testing; clinical trials funding assistance; and regulatory support for gene therapy research primarily in heart, lung, and blood diseases.

Obligations

Funding History:
Fiscal Year 2012—$9,823,650
Fiscal Years 2007–2011—$29,188,977
Total Funding to Date—$39,012,627

Current Active Organizations and Contract Numbers

1. Social and Scientific Systems, Inc.
   Silver Spring, Maryland —268201200002I
2. Lovelace Biomedical Research and Education Institute
   Albuquerque, New Mexico —268201200003I
3. University of Pennsylvania
   Philadelphia, Pennsylvania —2682012000041C
4. Children's Hospital of Philadelphia
   Philadelphia, Pennsylvania —268201200004I
5. Indiana University
   Indianapolis, Indiana —268201200005I

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 2012—$17,263,177
Fiscal Years 2002–2011—$191,642,369
Total Funding to Date—$208,905,546

Current Active Organizations and Contract Numbers

1. Boston University
   Boston, Massachusetts —268201000031C
2. Johns Hopkins University
   Baltimore, Maryland —268201000032C
3. Massachusetts General Hospital
   Boston, Massachusetts —268201000033C
4. Stanford University
   Stanford, California —268201000034C
5. University of California, Los Angeles
   Los Angeles, California —268201000035C
6. University of Texas
   San Antonio, Texas —268201000036C
7. University of Texas
   Galveston, Texas —268201000037C

Pumps for Kids, Infants, and Neonates (PumpKIN), Initiated in Fiscal Year 2010

The purpose of this program is to support technologies that will expand life-saving options for infants and children who are born with congenital heart defects or those who develop heart failure. Investigators are seeking to complete animal studies and other preclinical tests for the most promising devices in order to gain approval from the FDA to begin clinical testing.

Obligations

Funding History:
Fiscal Year 2012—$6,643,880
Fiscal Years 2010–2011—$18,551,904
Total Funding to Date—$25,195,784

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

Science Moving TowArds Research Translation and Therapy Program (SMARTT), Initiated in Fiscal Year 2011

The purpose of this program is to support the transition of potential new therapies for heart, lung, and blood diseases from discovery in the lab to the testing needed to establish their safety and effectiveness in people. The

SMARTT program provides tailored pharmacology and toxicology testing, manufacturing services, and regulatory support to investigators to expedite the transition of their discoveries to the clinic.

Obligations

Funding History:
Fiscal Year 2012—$5,573,693
Fiscal Year 2011—$4,145,344
Total Funding to Date—$9,719,037

Current Active Organizations and Contract Numbers

1. Advanced BioScience Laboratories, Inc.
   Rockville, Maryland —268201100014C
2. SRI International
   Menlo Park, California —268201100015C
3. RTI International
   Research Triangle Park, North Carolina —268201100016C
4. SRI International
   Menlo Park, California —268201000017C

Lung Diseases

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 are seeking to improve management of lung diseases by increasing understanding of the pathogenetic mechanisms of lung diseases through molecular histopathological studies of tissues with and without disease. Primary emphases are on COPD and idiopathic pulmonary fibrosis.

Obligations

Funding History:
Fiscal Year 2012—$3,905,131
Fiscal Years 2004–2011—$37,852,716
Total Funding to Date—$41,757,847

Current Active Organizations and Contract Numbers

1. University of Michigan
   Ann Arbor, Michigan —268201100018C
2. University of Pittsburgh
   Pittsburgh, Pennsylvania —268201100019C
3. Mayo Clinic College of Medicine
   Rochester, New York —268201100020C
4. Temple University
   Philadelphia, Pennsylvania —268201100021C
5. National Jewish Health
   Denver, Colorado —268201100023C

Subpopulations and Intermediate Outcome Measures in COPD Study (SPIROMICS), Initiated in Fiscal Year 2009

The objectives of this study are to define pathogenetically homogeneous subgroups of COPD subjects on the basis of biomarkers, genotypes, and computed tomography images and to 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 2012—$2,235,206
Fiscal Years 2009–2011—$32,697,717
Total Funding to Date—$34,932,923

Current Active Organizations and Contract Numbers

1. University of California, Los Angeles
   Los Angeles, California —268200900015C
2. University of Michigan
   Ann Arbor, Michigan —268200900016C
3. Columbia University
   New York, New York —268200900017C
4. University of Utah
   Salt Lake City, Utah —268200900018C
5. Wake Forest University
   Winston-Salem, North Carolina —268200900019C
6. University of North Carolina, Chapel Hill
   Chapel Hill, North Carolina —268200900020C

Blood Diseases and Resources

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, and

administers safe shipment of precise sample aliquots to approved investigators for future studies.

Obligations

Funding History:
Fiscal Year 2012—$3,217,643
Fiscal Years 1998–2011—$22,542,077
Total Funding to Date—$25,759,720

Current Active Organization and Contract Number

1. SeraCare Life Sciences, Inc.
Rockville, Maryland —268201100031C

NHLBI–CDC Registry and Surveillance System in Hemoglobinopathies (RuSH), Initiated in Fiscal Year 2009

The purpose of this pilot program is to test the feasibility of developing a national data system that will enable investigators to estimate the number of people who have SCD, thalassemias, and hemoglobinopathies and to describe their sociodemographic characteristics. The Institute, along with the CDC, has created newborn screening programs with State health departments in California, Florida, Georgia, Michigan, New York, North Carolina, and Pennsylvania.

Obligations

Funding History:
Fiscal Year 2012—$631,637
Fiscal Years 2009–2011—$10,628,679
Total Funding to Date—$11,260,316

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 facilitate the transfer of innovative cellular therapies from the bench to the bedside. The PACT offers assistance to investigators in areas ranging from translational development to production of a product for use in human clinical trials.

Obligations

Funding History:
Fiscal Year 2012—$11,940,967
Fiscal Years 2010–2011—$22,298,545
Total Funding to Date—$34,239,512

Current Active Organizations and Contract Numbers

1. EMMES Corporation
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

Recipient Epidemiology and Donor Study-III (REDS-III),* Initiated in Fiscal Year 2011

The purpose of this program is to conduct research to improve transfusion practices and the safety and adequacy of the blood supply in the United States and in countries affected by the AIDS epidemic. The domestic component consists of four research hubs, and the international component consists of collaborators from blood centers in Brazil, China, and South Africa.

Building on the findings of previous REDS and REDS II programs, the REDS-III international program focuses on identifying ways to reduce and prevent the transmission of HIV/AIDS and other known and emerging infectious agents through transmission.

Obligations

Funding History:
Fiscal Year 2012—$2,178,536
Fiscal Year 2011—$19,910,527
Total Funding to Date—$22,089,063

* Formerly known as Retrovirus Epidemiology Donor Study. REDS: Total funding for FY 1989–2004, $73,774,125. REDS II: Total funding for FY 2005–2010, $53,016,894.

Current Active Organizations and Contract Numbers

1. Blood System Research, Inc.
   San Francisco, California —268201100001
2. RTI International
   Research Triangle Park,
   North Carolina —268201100002
3. Blood Center of Southeastern
   Wisconsin
   Milwaukee, Wisconsin —268201100003
4. Institute for Transfusion Medicine
   Pittsburgh, Pennsylvania —268201100004
5. University of California,
   San Francisco
   San Francisco, California —268201100005
6. Yale University
   New Haven, Connecticut —268201100006
7. Blood System Research, Inc. (Brazil)
   San Francisco, California —268201100007
8. Johns Hopkins University (China)
   Baltimore, Maryland —268201100008
9. University of California,
   San Francisco (South Africa)
   San Francisco, California —268201100009

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 2002–2012

Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Heart and Vascular Diseases											
Women's Health Study (WHS)	$ —	$ —	$ —	$ 889	$ —	$ 868	$ 875	$ 919	$ 927	$ —	$ —
Women's Antioxidant and Cardiovascular Study (WACS)	598	592	599	670	—	—	—	—	—	—	—
Stress Reduction and Atherosclerotic CVD in Blacks	376	394	—	—	—	—	—	—	—	—	—
Shock Trial: Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock?	298	291	296	—	—	—	—	—	—	—	—
Dietary Patterns, Sodium Intake, and Blood Pressure (DASH Sodium)* **	387	376	395	—	—	—	—	—	—	—	—
Sudden Cardiac Death in Heart Failure Trial (SCD-HeFT)*	1,412	1,930	—	—	—	—	—	—	—	—	—
CVD Risk and Health in Post-Menopausal Phytoestrogen Users	304	152	—	—	—	—	—	—	—	—	—
Prevention of Recurrent Venous Thromboembolism (PREVENT)	1,272	—	—	—	—	—	—	—	—	—	—
PREMIER: Lifestyle Interventions for Blood Pressure Control*	1,505	—	—	—	—	—	—	—	—	—	—
Azithromycin and Coronary Events Study (ACES)*	1,254	1,137	—	—	—	—	—	—	—	—	—
Antiarrhythmic Effects of N-3 Fatty Acids	647	—	—	—	—	—	—	—	—	—	—
Occluded Artery Trial (OAT)*	1,724	1,963	—	—	963	1,452	1,277	1,270	1,033	—	—
Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics (BARI 2D)*	9,342	8,189	8,265	8,304	8,592	2,647	1,971	1,130	—	—	—
Hematocrit Strategy in Infant Heart Surgery*	596	590	492	—	—	—	—	—	—	—	—
Angiotensin-II Blockade in Mitral Regurgitation	610	629	500	—	—	—	—	—	—	—	—
Heart Failure Adherence and Retention Trial (HART)	1,617	1,453	1,174	862	740	304	—	—	—	—	—
Reduction of Triglycerides in Women on HRT	746	555	544	721	—	625	501	—	—	—	—
Women's Ischemia Syndrome Evaluation (WISE)* **	1,506	1,306	1,303	996	—	—	—	—	—	—	—
ACE Inhibition and Novel Cardiovascular Risk Factors	694	656	602	—	—	—	—	—	—	—	—

* Paid by U01/U10.
** Previously an Institute-Initiated Clinical Trial.

NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 2002–2012 (continued)

Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Heart and Vascular Diseases (continued)											
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	6,542	1,613	6,082	5,583	9,396	3,639	727	1,233	352	—
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	3,029	2,882
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	2,755	—
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	1,089	1,384
Claudication: Exercise Versus Endoluminal Revascularization (CLEVER)*	—	—	—	1,368	1,478	1,898	—	1,822	1,080	1,371	542
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	—	723	737
Vest Prevention of Early Sudden Death Trial (VEST) and PREDiction of ICD Therapies Studies (PREDICTS)*	—	—	—	—	—	1,390	1,356	1,391	1,404	—	—
Randomized Trial of Interventions To Improve Warfarin Adherence	—	—	—	—	—	—	801	787	771	763	—
Planned Care for Obesity and Risk Reduction (Planned CORR)	—	—	—	—	—	—	784	770	769	768	642
Effects of Niacin on Lp(a), Oxidized LDL, and Inflammation on the AIM-HIGH Trial	—	—	—	—	—	—	302	312	383	—	428
Women's Ischemia Syndrome Evaluation (WISE) Coronary Vascular Dysfunction	—	—	—	—	—	—	776	742	745	761	—

* Paid by U01/U10.

NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 2002–2012 (continued)

Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Heart and Vascular Diseases (continued)											
Rule-Out Myocardial Infarction Using Computer Assisted Tomography (ROMICAT II)*	—	—	—	—	—	—	—	2,112	2,307	367	1,105
Collaborative Model To Improve BP Control and Minimize Racial Disparities	—	—	—	—	—	—	—	1,963	1,938	1,852	1,689
Multiscale Model of the Human Heart for Imaging Research	—	—	—	—	—	—	—	566	503	498	498
Catheter Ablation Versus Antiarrythmic Drug Therapy for Atrial Fibrillation (CABANA)*	—	—	—	—	—	—	—	2,941	3,045	3,033	3,015
Therapeutic Hypothermia After Pediatric Cardiac Arrest (THAPCA)*	—	—	—	—	—	—	—	3,648	2,285	4,402	4,371
Vitamin D and Omega 3 Trial (VITAL)*	—	—	—	—	—	—	—	1,260	1,248	1,210	1,210
Late Sodium Blockade in High-Risk ICD Patients*	—	—	—	—	—	—	—	—	2,280	—	2,288
Cardiovascular Inflammation Reduction Trial (CIRT)*	—	—	—	—	—	—	—	—	—	1,376	9,607
Impact of Vitamin D Supplementation on Cardiometabolic Risk in School Children	—	—	—	—	—	—	—	—	—	552	650
Lifestyle, CVD Risk, and Cognitive Impairment	—	—	—	—	—	—	—	—	—	785	753
ISCHEMIA Trial (International Study of Comparative Effectiveness With Medical Invasive Approaches)	—	—	—	—	—	—	—	—	—	6,672	17,445
Guiding Evidence-Based Therapy Using Biomarker Intensified Treatment	—	—	—	—	—	—	—	—	—	—	3,893
Heart Camp: Promoting Adherence to Exercise in Patients With Heart Failure	—	—	—	—	—	—	—	—	—	—	749
Impact of Vitamin D Supplementation on Cardiac Structure and Function	—	—	—	—	—	—	—	—	—	—	307
PDE5 Inhibition With Tadalafil Changes Outcome in Heart Failure (PITCH-HF)*	—	—	—	—	—	—	—	—	—	—	1,423
Subtotal, Heart and Vascular Diseases	45,253	52,210	52,377	56,681	58,312	45,091	22,538	27,909	37,309	32,358	55,618
Lung Diseases											
Lung Health Study III* **	927	—	—	—	—	—	—	—	—	—	—
Asthma Clinical Research Network (ACRN)* **	5,863	—	—	—	—	—	—	—	—	—	—
Scleroderma Lung Study*	1,501	1,055	—	—	71	—	—	—	—	—	—
Inhaled Nitric Oxide for Prevention of Chronic Lung Disease*	1,764	1,442	1,245	—	—	—	—	—	—	—	—
Inhaled Nitric Oxide in Prevention of Chronic Lung Disease*	1,839	1,604	903	—	—	—	—	—	—	—	—
Prospective Investigation of Pulmonary Embolism Diagnosis II (PIOPED II)*	3,388	472	—	—	—	—	—	—	—	—	—
Randomized Trial To Reduce ETS in Children With Asthma	468	277	—	—	—	—	—	—	—	—	—
Apnea Positive Pressure Long-Term Efficacy Study (APPLES)*	3,224	3,021	3,110	3,188	—	1,532	—	—	—	—	—

* Paid by U01/U10.
** Previously an Institute-Initiated Clinical Trial.

NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 2002–2012 (continued)

Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Lung Diseases (continued)											
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	386	—
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	628	—
Scleroderma Lung Study II	—	—	—	—	—	—	2,281	2,297	2,252	2,268	1,950
Sedation Management in Pediatric Patients With Acute Respiratory Failure*	—	—	—	—	—	—	568	3,885	3,327	2,181	385
Study of Asthma and Nasal Steroids (STAN)*	—	—	—	—	—	—	—	725	725	725	725
Outpatient Treatment of Low-Risk Patients With Pulmonary Embolism	—	—	—	—	—	—	—	755	349	—	—
Translating COPD Guidelines Into Primary Care Practice	—	—	—	—	—	—	—	733	719	663	680
Family Intervention for Pediatric Asthma Self-Management in Puerto Ricans	—	—	—	—	—	—	—	225	187	—	—
Physical Activity Self-Management in Patients With COPD	—	—	—	—	—	—	—	663	660	655	622
Study of Soy Isoflavones in Asthma (SOYA)*	—	—	—	—	—	—	—	775	697	689	687
Trial of Late Surfactant To Prevent Bronchopulmonary Dysplasia (TOLSURF)*	—	—	—	—	—	—	—	1,987	1,779	1,807	1,653
Randomized Trial of Maternal Vitamin D Supplementation To Prevent Childhood Asthma*	—	—	—	—	—	—	—	2,510	2,466	2,469	2,506
Effects of HIV Antiretroviral Therapy on Pulmonary Function	—	—	—	—	—	—	—	614	516	552	—
Randomized Trial of Antenatal Late Preterm Steroids (ALPS)*	—	—	—	—	—	—	—	—	2,134	2,137	557

* Paid by U01/U10.

** Previously an Institute-Initiated Clinical Trial.

NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 2002–2012 (continued)

Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Lung Diseases (continued)											
Vitamin D Supplementation in Pregnancy: Impact on Neonatal Immune Phenotype	—	—	—	—	—	—	—	—	323	311	309
Role of Beta-Catenin in Epithelial Repair in Acute Lung Injury	—	—	—	—	—	—	—	—	125	125	125
Mechanisms of Familial Pulmonary Fibrosis	—	—	—	—	—	—	—	—	2,330	2,252	2,207
Multicomponent Intervention To Decrease COPD-Related Hospitalizations	—	—	—	—	—	—	—	—	412	470	490
Heart and Lung Failure-Pediatric Insulin Titration (HALF-PINT)*	—	—	—	—	—	—	—	—	—	2,685	2,548
Subtotal, Lung Diseases	18,974	15,639	14,289	10,056	9,294	9,398	7,347	20,017	23,934	21,003	15,444
Blood Diseases and Resources											
Stroke Prevention in Sickle Cell Anemia (STOP 2)*	3,168	2,320	2,366	—	—	—	—	—	—	—	—
Induction of Stable Chimerism for Sickle Cell Anemia*	525	527	551	—	—	—	—	—	—	—	—
Sibling Donor Cord Blood Banking and Transplantation*	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	—	—
Bridging Anticoagulation on Patients Requiring Temporary Interruption of Warfarin Therapy for an Elective Procedure or Surgery (BRIDGE) Trial*	—	—	—	—	—	—	4,632	5,673	5,227	—	—
Acute Venous Thrombosis: Thrombus Removal With Adjunctive Catheter-Directed Thrombolysis (ATTRACT)* **	—	—	—	—	—	—	2,071	2,108	2,094	244	2,459
Transcranial Doppler With Transfusions Changing to Hydroxyurea (TWiTCH)	—	—	—	—	—	—	—	4,176	4,177	4,391	4,746
Impact of Blood Storage Duration on Physiologic Measures: RECESS Ancillary Study	—	—	—	—	—	—	—	—	387	389	416
Transfusion-Associated Brain Improvement (TABI)*	—	—	—	—	—	—	—	—	—	—	1,729
Subtotal, Blood Diseases and Resources	4,917	5,772	6,066	6,268	6,378	5,505	10,531	15,173	13,663	5,024	9,350
Total, NHLBI	**$69,144**	**$73,621**	**$72,732**	**$73,005**	**$73,984**	**$59,994**	**$40,416**	**$63,099**	**$74,906**	**$58,385**	**$80,412**

* Paid by U01/U10.

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

NHLBI Investigator-Initiated Clinical Trials, Fiscal Year 2012: Summary by Program

	Total Obligations Prior to 2012	FY 2012 Obligations	Total Obligation to Date
Heart and Vascular Diseases			
AIM HIGH: Niacin Plus Statin To Prevent Vascular Events*	$24,726,019	$1,383,800	$26,109,819
Cardiovascular Inflammation Reduction Trial (CIRT)*	1,375,726	9,607,234	10,982,960
Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL)*	28,856,425	2,881,799	31,738,224
Catheter Ablation Versus Antiarrythmic Drug Therapy for Atrial Fibrillation Trial (CABANA)*	9,018,518	3,015,483	12,034,001
Claudication: Exercise Versus Endoluminal Revascularization (CLEVER)*	9,018,723	542,213	9,560,936
Collaborative Model To Improve BP Control and Minimize Racial Disparities	5,753,286	1,689,074	7,442,360
Effects of Niacin on Lp(a), Oxidized LDL, and Inflammation on the AIM-HIGH Trial	997,247	428,498	1,425,745
Efficacy of Smoking Quit Line in the Military	2,912,899	737,487	3,650,386
Guiding Evidence-Based Therapy Using Biomarker Intensified Treatment	—	3,892,783	3,892,783
Heart Camp: Promoting Adherence to Exercise in Patients With Heart Failure	—	749,122	749,122
Impact of Vitamin D Supplementation on Cardiac Structure and Function	—	307,048	307,048
Impact of Vitamin D Supplementation on Cardiometabolic Risk in School Children	552,019	649,893	1,201,912
ISCHEMIA Trial (International Study of Comparative Effectiveness With Medical Invasive Approaches)*	6,671,629	17,444,758	24,116,387
Late Sodium Blockade in High-Risk ICD Patients*	2,279,794	2,287,927	4,567,721
Lifestyle, CVD Risk, and Cognitive Impairment	784,998	753,104	1,538,102
Multiscale Model of the Human Heart for Imaging Research	1,566,866	498,049	2,064,915
PDE5 Inhibition with Tadalafil Changes Outcomes in Heart Failure (PITCH-HF)	—	1,422,791	1,422,791
Planned Care for Obesity and Risk Reduction (Planned CORR)	3,090,886	642,148	3,733,034
Rule-Out Myocardial Infarction Using Computer Assisted Tomography (ROMICAT II)*	4,785,713	1,105,318	5,891,031
Therapeutic Hypothermia After Pediatric Cardiac Arrest (THAPCA)*	10,335,495	4,370,676	14,706,171
Vitamin D and Omega 3 Trial (VITAL)*	3,718,123	1,210,345	4,928,468
Subtotal, Heart and Vascular Diseases	116,444,366	55,619,550	172,063,916
Lung Diseases			
Heart and Lung Failure-Pediatric Insulin Trial (HALF-PINT)*	2,685,460	2,548,137	5,233,597
Mechanisms of Familial Pulmonary Fibrosis	4,582,218	2,206,692	6,788,910
Multicomponent Intervention To Decrease COPD-Related Hospitalizations	881,687	489,881	1,371,568
Physical Activity Self-Management in Patients With COPD	1,977,708	622,213	2,599,921
Randomized Trial of Antenatal Late Preterm Steroids (ALPS)*	4,271,361	556,659	4,828,020
Randomized Trial of Maternal Vitamin D Supplementation to Prevent Childhood Asthma*	7,445,255	2,505,636	9,950,891
Role of Beta-Catenin in Epithelial Repair in Acute Lung Injury	250,344	125,172	375,516
Scleroderma Lung Study II	9,096,593	1,950,312	11,046,905

* Paid by U01/U10.

NHLBI Investigator-Initiated Clinical Trials, Fiscal Year 2012: Summary by Program (continued)

	Total Obligations Prior to 2012	FY 2012 Obligations	Total Obligation to Date
Lung Diseases (continued)			
Sedation Management in Pediatric Patients With Acute Respiratory Failure*	9,960,315	384,556	10,344,871
Study of Asthma and Nasal Steroids (STAN)*	2,174,420	724,801	2,899,221
Study of Soy Isoflavones in Asthma (SOYA)*	2,160,527	687,123	2,847,650
Translating COPD Guidelines Into Primary Care Practice	2,114,902	680,329	2,795,231
Trial of Late Surfactant To Prevent Bronchopulmonary Dysplasia (TOLSURF)*	5,572,999	1,653,180	7,226,179
Vitamin D Supplementation in Pregnancy: Impact on Neonatal Immune Phenotype	634,550	308,582	943,132
Subtotal, Lung Diseases	53,808,339	15,443,273	69,251,612
Blood Diseases and Resources			
Acute Venous Thrombosis: Thrombus Removal With Adjunctive Catheter-Directed Thrombolysis (ATTRACT)* **	6,516,312	2,459,244	8,975,556
Impact of Blood Storage Duration on Physiologic Measures: RECESS Ancillary Study	775,928	416,355	1,192,283
Transcranial Doppler With Transfusions Changing to Hydroxyurea (TWiTCH)	12,744,317	4,746,356	17,490,673
Transfusion-Associated Brain Improvement (TABI)*	—	1,729,189	1,729,189
Subtotal, Blood Diseases and Resources	20,036,557	9,351,144	29,387,701
TOTAL, NHLBI	**$190,289,262**	**$80,413,967**	**$270,703,229**

* Paid by U01/U10.
** Formerly known as Pharmacomechanical Catheter-Directed Thrombolysis for Acute DVT (ATTRACT) Trial.

Institute-Initiated Clinical Trials: Fiscal Years 2002–2012

Contracts

	Dollars (Thousands)										
	Fiscal Year										
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Heart and Vascular Diseases											
Antihypertensive and Lipid-Lowering Treatment To Prevent Heart Attack Trial (ALLHAT)	$ 3,980	$ 2,761	$ 3,346	$ —	$ —	$ —	$ —	$ —	$ 1,235	$ 971	$ 974
Enhancing Recovery in Coronary Heart Disease Patients (ENRICHD)	425	70	—	—	—	—	—	—	—	—	—
Atrial Fibrillation Follow-Up: Investigation in Rhythm Management (AFFIRM)	802	—	—	—	—	—	—	—	—	—	—
Women's Angiographic Vitamin and Estrogen Trial (WAVE)	—	32	—	—	—	—	—	—	—	—	—
Women's Ischemia Syndrome Evaluation (WISE)	50	—	—	—	—	—	—	—	—	—	—
Prevention of Events With Angiotensin Converting Enzyme Inhibitor Therapy (PEACE)	2,849	558	—	—	—	—	—	—	—	—	—
Magnesium in Coronaries (MAGIC)	238	—	—	—	—	—	—	—	—	—	—
Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness (ESCAPE)	1,129	—	—	—	311	—	—	—	—	—	—
Action To Control Cardiovascular Risk in Diabetes (ACCORD)	1,750	18,521	33,779	26,126	—	19,484	16,343	15,461	403	—	—
Public Access Defibrillation (PAD) Community Trial	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	—	2,825
Women's Health Initiative	59,010	63,222	57,483	37,826	12,124	14,873	22,609	30,615	2,409	22,766	21,910
Systolic Blood Pressure Intervention Trial (SPRINT)	—	—	—	—	—	—	—	7,508	29,374	—	—
Clarification of Optimal Anticoagulation Through Genetics (COAG)*	—	—	—	—	—	—	2,637	3,530	—	6,760	—
Randomized Evaluation of VAD InterVEntion before Inotropic Therapy (REVIVE-IT)	—	—	—	—	—	—	—	—	—	4,953	—
Pumps for Kids, Infants, and Neonates (PumpKIN)**	—	—	—	—	—	—	—	—	—	—	1,808
Subtotal, Heart and Vascular Diseases	71,334	85,164	95,445	69,114	17,915	36,575	49,501	61,522	34,319	35,450	27,517
Lung Diseases											
Pediatric Pulmonary and Cardiac Complications of HIV Infection (P2C2)	113	—	—	—	—	—	—	—	—	—	—
Childhood Asthma Management Program (CAMP)	2,786	2,287	1,475	599	—	—	—	—	—	—	—

* Formerly known as Randomized Trial of Genotype-Guided Dosing of Warfarin Therapy.

** See Chapter 10 for preclinical PumpKIN R&D.

Institute-Initiated Clinical Trials: Fiscal Years 2002–2012 (continued)

Contracts (continued)

	Dollars (Thousands)										
	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Lung Diseases (continued)											
Acute Respiratory Distress Syndrome Clinical Network (ARDSNet)	1,502	4,402	5,517	4,707	7,396	5,037	1,992	6,195	7,208	5,096	4,886
National Emphysema Treatment Trial (NETT)	7,910	1,630	1,648	357	—	—	—	285	—	—	—
Feasibility of Retinoid Treatment in Emphysema (FORTE)	2,429	725	507	185	—	—	—	—	—	—	—
Long-Term Oxygen Treatment Trial (LOTT)	—	—	—	—	—	6,208	10,042	202	4,335	4,378	7,562
Subtotal, Lung Diseases	14,740	9,044	9,147	5,848	7,396	11,245	12,034	6,682	11,543	9,474	12,448
Blood Diseases and Resources											
T-Cell Depletion in Unrelated Donor Marrow Transplantation	557	774	164	—	—	—	—	—	—	—	—
Cord Blood Stem Cell Transplantation Study (COBLT)	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)	3,100	1,112	1,964	1,526	891	3,966	5,573	1,704	—	853	8,501
Sildenafil for Sickle Cell Disease-Associated Pulmonary Hypertension (walk PHaSST)	—	—	—	—	1,867	2,801	3,702	963	320	212	—
Subtotal, Blood Diseases and Resources	6,411	3,468	3,971	3,688	2,758	6,767	9,275	2,667	320	1,065	8,501
Total, NHLBI Clinical Trials Contracts	**$92,485**	**$97,676**	**$108,563**	**$78,650**	**$28,069**	**$54,587**	**$70,810**	**$70,871**	**$46,182**	**$45,989**	**$48,466**

Institute-Initiated Clinical Trials: Fiscal Years 2002–2012 (continued)

Cooperative Agreements

Dollars (Thousands)

	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Heart and Vascular Diseases											
Bypass Angioplasty Revascularization Investigation (BARI)	$ 1,456	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —
Girls Health Enrichment Multisite Studies (GEMS)	2,713	—	—	—	—	—	—	—	—	—	—
Trial of Activity for Adolescent Girls (TAAG)	5,919	5,828	6,350	5,103	905	—	—	—	—	—	—
Pediatric Heart Network	4,822	5,381	4,948	3,992	6,988	6,607	12,255	7,637	7,471	12,827	12,020
Resuscitation Outcomes Consortium (ROC)*	—	—	6,886	9,339	9,728	8,972	5,279	—	6,244	9,455	9,374
Dynamic Assessment of Patient-Reported Chronic Disease Outcomes	—	—	1,010	—	—	—	—	—	—	—	—
Heart Failure Clinical Research Network	—	—	—	—	5,642	7,801	7,813	7,939	7,914**	7,652	6,460
Pediatric HIV/AIDS Cohort Study (PHACS)—Data and Operations Center	—	—	—	—	1,000	500	490	500	769**	600	1,716
Cardiovascular Cell Therapy Research Network	—	—	—	—	—	4,424	7,568	6,227	6,200	3,800	5,783
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	5,460	7,097
EDTA Chelation Therapy for Coronary Artery Disease	—	—	—	—	—	—	—	2,109	—	—	908
Practice-Based Opportunity for Weight Reduction (POWER) Trials†	—	—	—	—	2,567	3,714	3,656	3,729	2,329	—	—
Look AHEAD: Action for Health in Diabetes	—	—	—	—	—	—	—	4,000	4,000	4,000	4,000
Diabetes Prevention Program Outcomes Study—Phase II	—	—	—	—	—	—	—	1,100	1,100	1,100	2,426
Early Adult Reduction of Weight Through LifestYle Intervention (EARLY) Trials‡	—	—	—	—	—	—	—	4,656	5,864	6,124	4,858
Childhood Obesity Prevention and Treatment Research (COPTR)	—	—	—	—	—	—	—	—	4,058	3,986	7,528

* Formerly known as Clinical Research Consortium To Improve Resuscitation Outcome.
** Correction to figure that was reported in the *FY 2010 Fact Book*.
† 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 2002–2012 (continued)

Cooperative Agreements (continued)

	Dollars (Thousands)										
	Fiscal Year										
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Heart and Vascular Diseases (continued)											
Consortium of Hospitals Advancing Research on Tobacco (CHART)*	—	—	—	—	—	—	—	—	3,322	3,505	4,933
Subtotal, Heart and Vascular Diseases	14,910	11,209	19,194	18,434	28,249	40,341	48,893	43,106	59,421**	58,509	67,103
Lung Diseases											
Asthma Clinical Research Network (ACRN)**	—	8,181	8,424	8,667	7,839	8,918	872	—	—	—	114
Childhood Asthma Research and Education (CARE) Network	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	2,600	—
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	15,500	16,465
Novel Therapies for Lung Diseases—Phase II	—	—	—	—	—	—	—	—	7,594	12,843	15,478
Subtotal, Lung Diseases	6,005	20,634	20,564	26,295	29,923	29,124	16,340	18,775	26,244	30,943	32,057
Blood Diseases and Resources											
Thalassemia (Cooley's Anemia) Clinical Research Network	2,269	2,320	2,375	2,730	2,682	2,618	2,600	658	—	—	—
Blood and Marrow Transplant Clinical Research Network	5,899	5,950	5,972	6,460	6,845	6,709	6,952	6,351	2,507	5,319	4,052
Transfusion Medicine/ Hemostasis Clinical Research Network	6,053	6,241	6,093	6,221	6,521	6,407	6,374	6,541	6,590	6,314	5,903
Sickle Cell Disease Clinical Research Network	—	—	—	—	3,761	7,498	7,173	—	—	—	—
Subtotal, Blood Diseases and Resources	14,221	14,511	14,440	15,411	19,809	23,232	23,099	13,550	9,097	11,453	9,955
Total, NHLBI-Initiated Clinical Trials, Cooperative Agreements	**$35,136**	**$46,354**	**$54,198**	**$60,140**	**$77,981**	**$92,697**	**$88,332**	**$75,431**	**$94,762****	**$100,905**	**$109,114**
Total, NHLBI-Initiated Clinical Trials	**$127,621**	**$144,030**	**$162,761**	**$138,790**	**$106,050**	**$147,284**	**$159,142**	**$146,302**	**$140,944****	**$146,594**	**$157,580**

* Formerly known as Effective Research on Smoking Cessation in Hospitalized Patients.

** Investigator-Initiated from 1998 to 2002.

Note: The line labeled "Other Clinical Trials" ($78.8 million) that appeared in the *FY 2010 Fact Book* has been removed.

Institute-Initiated Clinical Trials, Fiscal Year 2012: Summary by Program

Contracts

	Total Obligations Prior to FY 2012	Total FY 2012 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
Antihypertensive and Lipid-Lowering Treatment To Prevent Heart Attack Trial (ALLHAT)	$ 85,376,672	$ 973,725	$ 86,350,397
Clarification of Optimal Anticoagulation Through Genetics (COAG)*	12,927,382	—	12,927,382
Pumps for Kids, Infants, and Neonates (PumpKIN)**	—	1,808,165	1,808,165
Randomized Evaluation of VAD InterVEntion before Inotropic Therapy (REVIVE-IT)	4,952,781	—	4,952,781
Systolic Blood Pressure Intervention Trial (SPRINT)	36,882,407	—	36,882,407
Trial of Aldosterone Antagonists Therapy in Adults With Preserved Ejection Fraction Congestive Heart Failure (TOPCAT)	26,914,315	2,824,999	29,739,314
Women's Health Initiative (WHI)	815,836,245	21,909,919	837,746,164
Subtotal, Heart and Vascular Diseases	982,889,802	27,516,808	1,010,406,610
Lung Diseases			
Acute Respiratory Distress Syndrome Clinical Network (ARDSNet)	83,838,739	4,886,159	88,724,898
Long-Term Oxygen Treatment Trial (LOTT)	25,165,226	7,562,054	32,727,280
Subtotal, Lung Diseases	109,003,965	12,448,213	121,452,178
Blood Diseases and Resources			
Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG)	22,700,173	8,501,196	31,201,369
Subtotal, Blood Diseases and Resources	22,700,173	8,501,196	31,201,369
Total, NHLBI-Initiated Clinical Trials, Contracts	**$1,114,593,940**	**$48,466,217**	**$1,163,060,157**

* Formerly known as Randomized Trial of Genotype-Guided Dosing of Warfarin Therapy.
** See Chapter 10 for preclinical PumpKIN R&D.

Cooperative Agreements

	Total Obligations Prior to FY 2012	Total FY 2012 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
Cardiovascular Cell Therapy Research Network	$ 28,219,327	$ 5,783,413	$ 34,002,740
Childhood Obesity Prevention and Treatment Research (COPTR)	8,044,862	7,527,535	15,572,397
Consortium of Hospitals Advancing Research (CHART)*	6,826,745	4,933,114	11,759,859
Diabetes Prevention Program Outcomes Study—Phase II	3,300,000	2,425,500	5,725,500
Early Adult Reduction of Weight Through LifestYle Intervention (EARLY) Trials**	16,643,216	4,857,967	21,501,183
EDTA Chelation Therapy for Coronary Artery Disease	2,109,044	908,302	3,017,346
Heart Failure Clinical Research Network	44,760,674	6,460,152	51,220,826
Look AHEAD: Action for Health in Diabetes	12,000,000	4,000,000	16,000,000
Network for Cardiothoracic Surgical Investigations in Cardiovascular Medicine	31,438,403	7,097,239	38,535,642
Pediatric Heart Network	76,176,050	12,020,076	88,196,126
Pediatric HIV/AIDS Cohort Study (PHACS): Data and Operations Center	3,859,021	1,716,153	5,575,174
Resuscitation Outcomes Consortium (ROC)†	55,902,830	9,373,746	65,276,576
Subtotal, Heart and Vascular Diseases	233,377,342	57,729,451	291,106,793
Lung Diseases			
Asthma Clinical Research Network (ACRN)	42,901,101	113,804	43,014,905
Asthma Network (AsthmaNet)	39,300,000	16,464,537	55,764,537
Novel Therapies for Lung Diseases—Phase II	20,436,977	15,477,541	35,914,518
Subtotal, Lung Diseases	59,736,977	31,942,078	91,679,055
Blood Diseases and Resources			
Blood and Marrow Transplant Clinical Research Network	64,390,805	4,051,982	68,442,787
Transfusion Medicine/Hemostasis Clinical Research Network	63,173,772	5,902,779	69,076,551
Subtotal, Blood Diseases and Resources	127,564,577	9,954,761	137,519,338
Total, NHLBI-Initiated Clinical Trials, Cooperative Agreements	**$420,678,896**	**$99,626,290**	**$520,305,186**
Total, NHLBI-Initiated Clinical Trials	**$1,535,272,836**	**$148,092,507**	**$1,683,365,343**

* Formerly known as Effectiveness Research on Smoking Cessation in Hospitalized Patients.
** Formerly known as Targeted Approaches to Weight Control for Young Adults.
† Formerly known as Clinical Research Consortium To Improve Resuscitation Outcomes.

Heart and Vascular Diseases

Antihypertensive and Lipid-Lowering Treatment To Prevent Heart Attack Trial (ALLHAT), Initiated in Fiscal Year 1993

The purpose of this study was 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 non-fatal 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.

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. In 2002, results 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.

Researchers are analyzing a post-trial follow-up (9–10 years) of participants 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, and for the lipid component, to assess long-term effects of pravastatin compared with usual care. Fifty-five percent of the participants are black.

Obligations

Funding History:
Fiscal Year 2012—$973,725
Fiscal Years 1993–2011—$85,376,672
Total Funding to Date—$86,350,397

Current Active Organization and Contract Number

1. University of Texas Health Science Center, Houston, Texas —26820110036C

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 is providing 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 2012—$5,783,413
Fiscal Years 2007–2011—$28,219,327
Total Funding to Date—$34,002,740

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
7. Stanford University, Menlo Park, California —HL-113456
8. Indiana University, Indianapolis, Indiana —HL-113457
9. University of Miami, Miami, Florida —HL-113460
10. University of Louisville, Louisville, Kentucky —HL-113530

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 children and to reduce weight in obese children. Two obesity prevention trials are developing and testing approaches that target home, community, and primary care settings for preschool children living in low-income and ethnically diverse neighborhoods. Two obesity treatment trials are examining 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 2012—$7,527,535
Fiscal Years 2010–2011—$8,044,862
Total Funding to Date—$15,572,397

Current Active Organizations and Grant Numbers

1. University of North Carolina, 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 uses clinical information and an individual's genotype based on the genes known to influence warfarin response ("genotype-guided dosing"), and the other uses only clinical information ("clinical-guided dosing"). The trial is assessing 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 2012—$0
Fiscal Years 2008–2011—$12,927,382
Total Funding to Date—$12,927,382

Current Active Organization and Contract Number

1. University of Pennsylvania
   Philadelphia, Pennsylvania —268200800003C

Consortium of Hospitals Advancing Research on Tobacco (CHART),** Initiated in Fiscal Year 2010

The purpose of this study is to evaluate the effectiveness of smoking cessation interventions in hospitalized patients. A network of six projects is assessing the effectiveness and cost effectiveness of smoking cessation interventions that are initiated during hospitalization and continued post-discharge. Participation from minority populations is strong in some of the projects.

Obligations

Funding History:
Fiscal Year 2012—$4,933,114
Fiscal Years 2010–2011—$6,826,745
Total Funding to Date—$11,759,859

Current Active Organizations and Grant Numbers

1. University of Michigan
   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
5. Kaiser Foundation Research Institute
   Oakland, California —HL-105233
6. University of Alabama at Birmingham
   Birmingham, Alabama —DA-031515

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 is following 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 2012—$2,425,500
Fiscal Years 2009–2011—$3,300,000
Total Funding to Date—$5,725,500

* Formerly known as Randomized Trial of Genotype-Guided Dosing of Warfarin Therapy.
** Formerly known as Effective Research on Smoking Cessation in Hospitalized Patients.

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 Health 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, Maryland —DK-048485
14. George Washington University
    Washington, DC —DK-048489
15. University of Texas
    Health Science Center
    San Antonio, Texas —DK-048514
16. University of California, San Diego
    La Jolla, California —DK-048339
17. Albert Einstein College of Medicine
    Bronx, New York —DK-048349
18. Massachusetts General Hospital
    Boston, Massachusetts —DK-048397
19. Washington University
    St. Louis, Missouri —DK-048400
20. University of Pittsburgh
    Pittsburgh, Pennsylvania —DK-048412
21. University of Miami
    Coral Gables, Florida —DK-048434
22. Joslin Diabetes Center
    Boston, Massachusetts —DK-048437

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. Phase I involves refining proposed intervention, recruitment, retention, and adherence strategies. Phase II deals with testing the efficacy of the interventions that 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 2012—$4,857,967
Fiscal Years 2009–2011—$16,643,216
Total Funding to Date—$21,501,183

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

EDTA Chelation Therapy for Coronary Artery Disease, Initiated in Fiscal Year 2009

The purpose of this multi-site, randomized trial is to determine the efficacy and safety of EDTA (ethylene diamine tetra-acetic acid) chelation therapy in individuals suffering from coronary artery disease.

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

Obligations

Funding History
Fiscal Year 2012—$908,30
Fiscal Years 2009–2011—$2,109,044
Total Funding to Date—$3,017,346

Current Active Organization and Grant Number

1. Mount Sinai Medical Center
   Miami Beach, Florida —HL-092607

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 to improve outcomes. The network is developing, coordinating, and conducting multiple collaborative clinical protocols to facilitate application of emerging basic science discoveries into clinical investigations.

Obligations

Funding History:
Fiscal Year 2012—$6,460,152
Fiscal Years 2006–2011—$44,760,674
Total Funding to Date—$51,220,826

Current Active Organizations and Grant Numbers

1. Duke University
   Durham, North Carolina —HL-084904
2. Mayo Clinic College of Medicine
   Rochester, Minnesota —HL-110262
3. Thomas Jefferson University
   Philadelphia, Pennsylvania —HL-110297
4. Emory University
   Atlanta, Georgia —HL-110302
5. Washington University
   St. Louis, Missouri —HL-110309
6. Duke University
   Durham, North Carolina —HL-110312
7. Cleveland Clinic
   Cleveland, Ohio —HL-110336
8. Massachusetts General Hospital
   Boston, Massachusetts —HL-110337
9. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-110338
10. University of Vermont
    Burlington, Vermont —HL-110342

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

The purpose of this multicenter randomized clinical trial is to determine the long-term effects 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. The lifestyle intervention group is being compared to a control group that is receiving diabetes support and education. One of the 16 clinical centers is targeting American Indians.

Obligations

Funding History:
Fiscal Year 2012—$4,000,000
Fiscal Years 2009–2011—$12,000,000
Total Funding to Date—$16,000,000

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. The Network conducts randomized clinical trials and clinical studies that provide a strong evidence base to inform surgical practice and disseminates its findings to the broader scientific community. The Network also serves as a clinical trials training ground for fellows and junior faculty.

Obligations

Funding History:
Fiscal Year 2012—$7,097,239
Fiscal Years 2007–2011—$31,438,403
Total Funding to Date—$38,535,642

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 innovative treatment and management strategies for children with structural congenital heart disease, inflammatory heart disease, heart muscle disease, or arrhythmias.

Obligations

Funding History:
Fiscal Year 2012—$12,020,076
Fiscal Years 2001–2011—$76,176,050
Total Funding to Date—$88,196,126

Current Active Organizations and Grant Numbers

1. New England Research Institute, Inc.
   Watertown, Massachusetts —HL-068270
2. Children's Hospital Medical Center
   Cincinnati, Ohio —HL-109673
3. University of Michigan
   Ann Arbor, Michigan —HL-109737
4. Baylor College of Medicine
   Houston, Texas —HL-109741
5. University of Utah
   Salt Lake City, Utah —HL-109743
6. Hospital for Sick Children
   Toronto, Ontario —HL-109777
7. Medical University of South Carolina
   Charleston, South Carolina —HL-109778
8. Emory University
   Atlanta, Georgia —HL-109781
9. Children's Hospital
   Boston, Massachusetts —HL-109816
10. Children's Hospital of Philadelphia
    Philadelphia, Pennsylvania —HL-109818

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 that will enable researchers to understand more fully the effects of HIV on sexual maturation, pubertal development, and socialization of perinatally HIV-infected preadolescents and adolescents and to acquire more definitive information about the long-term safety of antiretroviral agents when used during pregnancy and in newborns.

Obligations

Funding History:
Fiscal Year 2012—$1,716,153
Fiscal Years 2006–2011—$3,859,021
Total Funding to Date—$5,575,174

Current Active Organization and Grant Number

1. Harvard University
   Boston, Massachusetts —HD-052102

Pumps for Kids, Infants, and Neonates (PumpKIN), Initiated in Fiscal Year 2012

The purpose of this program is to explore the potential benefit of therapy offered by four novel pediatric circulatory support devices in infants, neonates, and young children (<25 kg) with congenital and acquired CVD who experience cardiopulmonary failure and circulatory collapse. The trials are intended to provide clinical evidence to be used in Humanitarian Device Exemption applications to the FDA for regulatory approval of the devices.

Obligations

Funding History:
Fiscal Year 2012—$1,808,165
Total Funding to Date —$1,808,165

Current Active Organization and Contract Number

1. University of Pittsburgh
   Pittsburgh, PA —268201000013C

Randomized Evaluation of VAD InterVEntion before Inotropic Therapy (REVIVE-IT), Initiated in Fiscal Year 2011

The purpose of this clinical feasibility study 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 study will serve to inform a pivotal trial directed at a large and growing patient population for whom VADs could offer substantial benefit beyond current medical therapies.

Obligations

Funding History:
Fiscal Year 2012—$0
Fiscal Year 2011—$4,952,781
Total Funding to Date—$4,952,781

Current Active Organization and Contract Number

1. University of Michigan
   Ann Arbor, Michigan —268201100026C

Resuscitation Outcomes Consortium (ROC),* 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 target primarily out-of-hospital severe trauma.

Obligations

Funding History:
Fiscal Year 2012—$9,373,746
Fiscal Years 2004–2011—$55,902,830
Total Funding to Date—$65,276,576

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

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 reduces the risk of cardiovascular and kidney diseases or dementia. The MIND substudy is focusing on the effectiveness of lowering systolic blood pressure on reducing the decline in cognitive function.

Obligations

Funding History:
Fiscal Year 2012—$0
Fiscal Years 2009–2011—$36,882,407
Total Funding to Date—$36,882,407

Current Active Organizations and Contract Numbers

1. Wake Forest University Health
   Science Center
   Winston-Salem, North Carolina —268200900040C
2. Case Western Reserve University
   Cleveland, Ohio —268200900046C
3. University of Alabama at Birmingham
   Birmingham, Alabama —268200900047C
4. Wake Forest University Health
   Science Center
   Winston-Salem, North Carolina —268200900048C
5. University of Utah
   Salt Lake City, Utah —268200900049C
6. Department of Veterans Affairs, Memphis
   Memphis, Tennessee —HV-0514

* Formerly known as Clinical Research Consortium To Improve Resuscitation Outcomes.

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 ≥45 percent). Recruitment ended in 2012, with 3,445 patients from Argentina, Brazil, Canada, Republic of Georgia, Russia, and the United States.

Obligations

Funding History:
Fiscal Year 2012—$2,824,999
Fiscal Years 2004–2011—$26,914,315
Total Funding to Date—$29,739,314

Current Active Organizations and Contract Numbers

1. HHS Program Support Center, Supply Service Center
   Perry Point, Maryland —HL-12025
2. New England Research Institutes, Inc.
   Watertown, Massachusetts —HC-45207

Women's Health Initiative (WHI), Initiated in Fiscal Year 1992

The WHI was established to elucidate the etiology and prevention of CVD, cancers, and osteoporosis in women aged 50–79 years. The program consisted of three primary components: randomized controlled clinical trials of hormone therapy, 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. Total participation included 161,808 women, 17 percent of whom were from minority populations.

Currently, investigators are determining the long-term effects of prior hormone therapy on the cohort that participated in the clinical trials of hormone therapy. Minority participants are being followed to improve statistical power for genetic association. Self-reported outcome data are being collected and will be available for ancillary studies and a new generation of clinical trials. The rich resources of data and specimens are available to the scientific community and for training young investigators.

Obligations

Funding History:
Fiscal Year 2012—$21,909,919
Fiscal Years 1992–2011*—$815,836,945
Total Funding to Date—$837,746,164

Current Active Organizations and Contract Numbers

1. State University of New York, Buffalo
   Buffalo, New York —268201100001
2. Ohio State University Research Foundation
   Columbus, Ohio —268201100002
3. Stanford University
   Stanford, California —268201100003
4. Wake Forest University Health Sciences
   Winston-Salem, North Carolina —268201100004
5. Fred Hutchinson Cancer Research Center
   Seattle, Washington —268201100046
6. Wake Forest University Health Sciences
   Winston-Salem, North Carolina —268200464221

Lung Diseases

Asthma Clinical Research Network (ACRN), Phase II, Initiated in Fiscal Year 2003

The purpose of this network was to evaluate current and novel therapies and management strategies for adult asthma and to ensure that findings are rapidly disseminated to the medical community. The study has ended.

Obligations

Funding History:
Fiscal Year 2012—$113,804
Fiscal Years 2003–2011—$42,901,101
Total Funding to Date—$43,014,905

Current Active Organization and Grant Number

1. University of California, San Diego
   La Jolla, California —HL-074218

* 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.

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 and treat acute lung injury, ARDS, and other related critical illnesses and improve the outcome of patients with them.

Obligations

Funding History:
Fiscal Year 2012—$4,886,159
Fiscal Years 1994–2011—$83,838,739
Total Funding to Date—$88,724,898

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 of asthma management in pediatric and adult populations to identify optimal therapies for a variety of asthma phenotypes, genotypes, and racial and ethnic backgrounds. Investigators are also conducting 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 2012—$16,464,537
Fiscal Years 2009–2011—$39,300,000
Total Funding to Date—$55,764,537

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

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 are being enrolled to determine whether supplemental oxygen can improve their quality of life and extend their lifespan.

Obligations

Funding History:
Fiscal Year 2012—$7,562,054
Fiscal Years 2007–2011—$25,165,226
Total Funding to Date—$32,727,280

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. Los Angeles Biomedical Institute/Harbor-UCLA
   Los Angeles, California —HR-76188
6. Ohio State University
   Columbus, Ohio —HR-76189
7. Temple University
   Philadelphia, Pennsylvania —HR-76190
8. University of Alabama at Birmingham
   Birmingham, Alabama —HR-76191
9. University of Michigan
   Ann Arbor, Michigan —HR-76192
10. University of Pittsburgh
    Pittsburgh, Pennsylvania —HR-76193
11. University of Utah
    Salt Lake City, Utah —HR-76194
12. University of Washington
    Seattle, Washington —HR-76195
13. Washington University
    St. Louis, Missouri —HR-76196
14. 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 of innovative interventions for a sleep-associated lung disease or a cardiopulmonary disorder. Investigators are seeking to identify interventions that will have the potential to improve clinical management.

Obligations

Funding History:
Fiscal Year 2012—$15,477,541
Fiscal Years 2010–2011—$20,436,977
Total Funding to Date—$35,914,518

Current Active Organizations and Grant Numbers

1. Brigham and Women's Hospital
   Boston, Massachusetts —HL-102225
2. University of Iowa
   Iowa City, Iowa —HL-102288
3. Fred Hutchinson Cancer Research Center
   Seattle, Washington —HL-102547
4. University of Wisconsin
   Madison, Wisconsin —HL-105365
5. Brigham and Women's Hospital
   Boston, Massachusetts —HL-105371
6. Johns Hopkins University
   Baltimore, Maryland —HL-105569
7. Mayo Clinic
   Rochester, Minnesota —HL-108712
8. Johns Hopkins University
   Baltimore, Maryland —HL-108730

Blood Diseases and Resources

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

The purpose of this network is to compare innovative treatment methods and management strategies of potential benefit for patients undergoing blood or marrow transplantation.

Obligations

Funding History:
Fiscal Year 2012—$4,051,982
Fiscal Years 2001–2011—$64,390,805
Total Funding to Date—$68,442,787

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. Duke University
   Durham, North Carolina —HL-069274
6. City of Hope Medical Center
   Duarte, California —HL-069278
7. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-069286
8. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HL-069290
9. Stanford University
   Stanford, California —HL-069291
10. Medical College of Wisconsin
    Milwaukee, Wisconsin —HL-069294
11. University of Florida
    Gainesville, Florida —HL-069301

12. Johns Hopkins University
Baltimore, Maryland —HL-069310
13. Sloan Kettering Institute
for Cancer Research
New York, New York —HL-069315
14. University of Michigan
Ann Arbor, Michigan —HL-069330
15. University of Texas
MD Anderson Cancer Center
Houston, Texas —HL-069334
16. Case Western Reserve University
Cleveland, Ohio —HL-069348
17. Baylor College of Medicine
Houston, Texas —HL-108945
18. H. Lee Moffitt Cancer Center
Tampa, Florida —HL-108987
19. Washington University
St. Louis, Missouri —HL-109137
20. Ohio State University
Columbus, Ohio —HL-109322
21. Northside Hospital Atlanta
Atlanta, Georgia —HL-109526

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 SCD.

Obligations

Funding History:
Fiscal Year 2012—$8,501,196
Fiscal Years 2000–2011—$22,700,173
Total Funding to Date—$31,201,369

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

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

The purpose of this network is to compare 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 2012—$5,902,779
Fiscal Years 2002–2011—$63,173,772
Total Funding to Date—$69,076,551

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
5. Weill Medical College of
Cornell University
New York, New York —HL-072196
6. Emory University
Atlanta, Georgia —HL-072248
7. New England Research Institutes, Inc.
Watertown, Massachusetts —HL-072268
8. Tulane University of Louisiana
New Orleans, Louisiana —HL-072274
9. University of Oklahoma
Health Sciences Center
Oklahoma City, Oklahoma —HL-072283
10. Duke University
Durham, North Carolina —HL-072289
11. Blood Center of Southeastern Wisconsin
Milwaukee, Wisconsin —HL-072290
12. Massachusetts General Hospital
Boston, Massachusetts —HL-072299

13. Puget Sound Blood Center
    Seattle, Washington —HL-072305
14. University of Pittsburgh
    Pittsburgh, Pennsylvania —HL-072331
15. University of Pennsylvania
    Philadelphia, Pennsylvania —HL-072346
16. University of North Carolina, Chapel Hill
    Chapel Hill, North Carolina —HL-072355
17. University of Maryland
    Baltimore Professional School
    Baltimore, Maryland —HL-072359

12. Activities To Promote Diversity and Address Health Disparities

Throughout its history, the NHLBI has been a leader in conducting and supporting research and programs to eliminate health disparities that exist between various segments of the U.S. population. The Institute has not only initiated research projects with significant racial and ethnic minority participation to compare health status between various populations, but 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 can 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 2012 activities addressing this goal include the following:

- NHLBI Research Centers at Minority Serving Institutions: Supports establishment of research centers at minority serving institutions to strengthen research capabilities and resources related to heart, lung, and blood diseases and disorders, with the goal of enabling the institutions and their investigators to become fully competitive.
- Biomedical Research Training Program for Individuals from Underrepresented Groups (BRTPUG): Supports research training for individuals from health disparities groups who are underrepresented in health-related research. Participants work closely with research scientists in NHLBI laboratories or in the DCVS's Prevention and Population Sciences Program where they receive training in epidemiology, clinical trials, and biostatistics related to the prevalence, etiology, prevention, and treatment of heart, vascular, pulmonary, and blood diseases.
- 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 junior 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 to increase their competitiveness for external research funding 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.
- Mentored Career Award for Faculty at Institutions That Promote Diversity: Encourages eligible faculty members at institutions that promote diversity to undertake special studies and supervised research under a mentor who is an accomplished investigator in the research area proposed and who is experienced in developing independent investigators.
- T32 Training Program for Institutions That Promote Diversity: Supports the training of pre- and postdoctoral students and certain health professional students at non-research intensive

institutions that have a mission of serving minority and other health disparity populations. The institution that promotes diversity must identify and collaborate with a research center (e.g., medical school or comparable institution) that has strong, well-established research and research training in cardiovascular, lung, or blood diseases.

- Support of Competitive Research (SCORE) Program: Fosters the development of faculty at minority serving institutions to increase their research competitiveness in the areas of heart, lung, and blood diseases and sleep disorders and to promote their transition to non-SCORE external sources of funding; and supports pilot awards for individuals at the beginning stages of a research career who are interested in testing a new idea or generating preliminary data, and for more experienced investigators who are interested in switching to a different field of research.

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, individuals from disadvantaged backgrounds, and individuals with disabilities in NHLBI research and research training and career development programs. Selected FY 2012 activities include the following:

- Issuing four training and career development RFAs to increase the number of highly trained individuals from diverse backgrounds, including individuals from underrepresented racial and ethnic groups, individuals from disadvantaged backgrounds, and individuals with disabilities
- Participating in HHS-Endorsed Minority Health and Health Disparities Diversity Internship Programs by supporting positions in NHLBI extramural 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 Project: Out of the Box, an activity in collaboration with the Cherokee and Smokey 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 diverse groups by encouraging an interest in health-related careers; and empower children to take responsibility for their health
- Providing undergraduate students from the Tougaloo College Scholars program in the Jackson Heart Study with an opportunity to visit the NIH for 3 days to learn about biomedical research and research training opportunities at the NHLBI/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 health professional degree students and post-baccalaureate individuals 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, 10, and 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 and subclinical disease prior to middle age. Fifty percent of participants are black.
- ARIC (see Chapter 10): To investigate the etiology of atherosclerosis and its clinical sequelae and variation in cardiovascular risk factors, medical care, and disease by race, sex, place, and time. Approximately 30 percent of participants are black.
- JHS (see Chapter 10): To identify biological, environmental, psychosocial, 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 persons of Asian ethnic background. Sixty-two percent of participants are from minority populations.
- HCHS-SOL (see Chapter 10): To identify risk factors for cardiovascular and lung disease in Hispanic 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 health disparities in heart, lung, and blood diseases and sleep disorders and on risk factors and genetic contributors to their development. Many of them are ancillary studies to NHLBI-initiated cohort studies.

Risk Factors

Investigator-initiated studies on cardiovascular risk factors in underrepresented racial and ethnic groups range in focus from biological to environmental, psychosocial, and cultural factors. One study among blacks in the JHS is characterizing the relationships between vascular function and CVD risk factors and indicators of subclinical CVD, and detecting gene variants that influence vascular function. A second study is investigating the effects of low vitamin D levels and CVD risk in blacks in the biethnic ARIC cohort. A third study is using echocardiographic examinations of a subsample of adult participants in the HCHS to determine a population-based estimate of the prevalence of abnormal systolic and diastolic cardiac function in Hispanic adults and the degree of heterogeneity in cardiac function between Hispanic subgroups and to establish the relationship of determinants particularly relevant to the Hispanic population (diabetes biomarkers and psychosocial/socioeconomic factors) to cardiac structure and function.

Other studies are determining geographic and ethnic variations in the prevalence of CHD risk factors, assessing the role of the neighborhood environment on the development of CVD and its risk factors in MESA participants, and investigating risk factors linked to atherosclerosis and disease progression in individuals of South Asian descent who are living in America.

Genetic Epidemiology

Genetic epidemiology is concerned with the role of genetic factors in the etiology of disease within groups of relatives and the interplay of genetic factors with environmental factors. NHLBI-supported studies include those focusing on gene discovery through both linkage studies in family-based samples and GWASs in population-based samples; the effects of gene–environment interactions on risk factors and health; and genotypic characterization in relationship to intermediate phenotypes, such as biomarkers. An Institute-initiated study is investigating functional aspects of genetic variation in humans.

- Next Generation Genetic Association Studies (see Chapter 9): To add a functional dimension to genomic studies by combining cellular reprogramming strategies with molecular profiling or cellular assays followed by integration of this information with existing genotypic and clinical phenotypic data to assess how naturally occurring human genetic variation influences the activities of biological networks in cell-based models of disease. One study is investigating the molecular mechanisms and pathways that underlie the genetic

basis of left ventricular hypertrophy, leveraging the epidemiological and genetic work of the Hypertension Genetic Epidemiology Network: Echo study. Fifty-five percent of participants are black.

Genetic epidemiologic research is also beginning a transition to predicting and assessing genetic risk and reporting genetic results to participants of research studies. 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; genetic variation that underlies obesity and obesity-related phenotypes among Samoan adults; and rare variants for hypertension in Taiwan Chinese.

Health Disparities

The NHLBI is committed to supporting research that will contribute to reducing health disparities among racial and ethnic minorities. Relevant Institute-initiated programs include:

- CPHHD (see Chapter 9): To promote transdisciplinary research in health disparities in order to improve health outcomes and quality of life for populations at high risk for CVD. The population will consist primarily of blacks and Hispanics.
- NHLBI Center for Cardiovascular Outcomes Research (see Chapter 9): To conduct research that focuses on measuring, evaluating, and improving outcomes of cardiovascular care. Approximately 30 percent of participants will be from racial and ethnic minority populations.
- Cardiovascular Research Network (CVRN): To leverage integrated data systems to increase scientific knowledge of CVD, including epidemiology, risk and risk factors, prevention, detection and diagnosis, treatment, and prognosis in the context of the delivery of community-based health care. Approximately 35 percent of patients in the CVRN cohorts, such as its hypertension registry of more than 1.5 million individuals with controlled and uncontrolled hypertension and its cohort of more than 33,000 patients with incident atrial fibrillation, are from minority populations.

Compared with white men, black men are disproportionately affected by premature mortality and CVD, perhaps in part due to their greater exposure to social and economic adversity across the lifespan. One study is seeking to understand the developmental antecedents of poor sleep and cardiovascular risk in black and white men who have been followed since they were enrolled in the first grade. Data obtained include health behaviors and academic and social competence; parental health behaviors; parenting practices; household SES; and neighborhood characteristics, including census tract SES, exposure to violence, and community cohesiveness and involvement. Research results will facilitate the design of interventions to prevent adverse health consequences of early life experiences, thereby reducing health disparities.

Education

The NHLBI hosts *Children and Clinical Studies* (see http://www.ChildrenAndClinicalStudies.nhlbi.nih.gov), an educational Web site for children and their families and health care providers to improve their understanding of pediatric research. The site offers information in English and Spanish about the importance of research on children, safety measures in clinical trials, and potential effects on a family when a child is enrolled in a study. The site also has a section about minority interests and concerns.

The NHLBI, through the DARD, translates research findings into practice by facilitating the development of 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.

In 2011, the Institute initiated the National Program to Reduce Cardiovascular Risk (NPRCR) aimed at reducing the risk of CVD by focusing on implementing evidence-based clinical practice guidelines and interventions to reduce cardiovascular risk factors throughout the lifespan. Topics include cholesterol, blood pressure, and obesity, among others. NPRCR also includes efforts to reduce health disparities in CVD risk.

The Institute supports the following activities to improve cardiovascular health in racial and cultural/ethnic groups:

- The Community Health Worker Health Disparities Initiative: To improve cardiovascular health among black, Hispanic, American Indian, Alaska Native,

and Filipino-American communities using the community health worker model to promote evidence-based programs to improve, heart health knowledge, attitudes, and behaviors.

- 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 and partnerships to disseminate information and strategies and to train *promotores* or community health workers about evidence-based CVD prevention and control, in order to promote heart healthy knowledge, attitudes, and behaviors in Hispanic communities.
- Honoring the Gift of Heart Health: To train community health workers, community health representatives, dieticians, and other health education providers to deliver culturally and linguistically appropriate, evidence-based curricula to prevent and control CVD risk factors in American Indian tribal communities; and to analyze, summarize, and disseminate findings from completed pilot projects that developed and evaluated community-based interventions to prevent and control CVD risk factors among American Indian tribal communities.
- Healthy Heart, Healthy Family: To train community health workers to deliver culturally and linguistically appropriate, evidence-based curricula and to conduct outreach activities that increase community awareness of heart disease and its associated risk factors and that promote heart healthy lifestyles among the growing population of Filipino heritage in the United States; to analyze, summarize, and disseminate findings from completed pilot projects to increase community awareness of heart disease and its associated risk factors; and to promote heart healthy lifestyles among the Filipino population in the United States.
- With Every Heartbeat is Life: To train community health workers to deliver culturally and linguistically appropriate, evidence-based curricula to prevent and control CVD risk factors in black communities.
- The Heart Truth® Campaign: To raise awareness of heart disease in women through community-based interventions and social marketing media. Special populations are particularly 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 organizations. Special attention is directed to black, Hispanic, and American Indian/Alaska Native populations.

In addition to the activities mentioned above, the Institute has prepared and distributed publications on CVD prevention for racial and ethnic minority populations. They include the following:

- *With Every Heartbeat Is Life: A Community Health Worker's Manual for African Americans*
- *Heart Healthy Home Cooking African American Style*
- *On the Move to Better Heart Health for African Americans*
- *The Heart Truth for African American Women: An Action Plan*
- *Honoring the Gift of Heart Health: A Heart Health Educator's Manual for American Indians*
- *Your Choice for Change: Honoring the Gift of Heart Health for American Indians*
- *Healthy Heart, Healthy Family: A Community Health Worker's Manual for the Filipino Community* in English and Tagalog
- *Healthy Heart, Healthy Family Series* in English and Tagalog
- *Vietnamese Aspire for Healthy Hearts*
- *Your Heart, Your Life: A Health Educator's Manual for the Latino Community* in English and Spanish
- *Delicious Heart Healthy Latino Recipes*
- *Healthy Hearts, Healthy Homes Series* in English and Spanish
- *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.

Heart Failure

Heart failure (heart muscle dysfunction) affects approximately 5 million Americans and is a growing public health concern. It is frequently the end result of other conditions, such as hypertension, diabetes, and prior heart attacks.

Findings from the CARDIA study showed that heart failure before age 50 is substantially more common in blacks than in whites. Among black participants, risk factors such as high blood pressure, obesity, and chronic kidney disease often preceded heart failure by 10 to 20 years.

The Institute supports a clinical trials network to facilitate the translation of basic science discoveries into clinical applications and a drug trial in patients with heart failure and preserved ejection fraction equal to or greater than 45 percent:

- Heart Failure Clinical Research Network (see Chapter 11): To develop, coordinate, and conduct multiple collaborative proof-of-concept clinical protocols to improve heart failure outcomes. The Network will make a concerted effort to recruit minority patients according to established NHLBI policy.
- TOPCAT (see Chapter 11): To evaluate the effectiveness of spironolactone to reduce mortality and hospitalizations for heart failure in patients with heart failure and preserved systolic function. Heart failure with preserved systolic function is a condition that occurs with greater frequency in women and blacks, and is associated with hypertension, a common comorbidity among blacks.

An investigator-initiated study is assessing the effect of a phosphodiesterase type 5 inhibitor in patients with heart failure due to systolic dysfunction. In this study, concerted efforts are being made to recruit black patients who do not tolerate hydralazine and nitrates, which are guideline-based therapies for this population and which are contraindicated with phosphodiesterase type 5 inhibitors.

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, persons of Asian ethnic background, and whites to determine whether 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.

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.

Researchers are also seeking to understand the role of obesity in the development of high blood pressure. One study is investigating the effect of natriuretic peptides (hormones produced by the heart) in blood pressure regulation and dietary salt sensitivity, and relating findings to previous findings that obese individuals have decreased numbers of circulating natriuretic peptides. Approximately 40 percent of study participants are expected to be from minority subgroups. Another study is determining the contributions of the sympathetic and nitric oxide systems to obesity-associated hypertension in black women.

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. To date, 43 percent of participants are from diverse racial and ethnic minority populations.
- Reducing the Impact of Hypertension in Low and Middle Income Countries (see Chapter 9): To improve high blood pressure prevention and control in low and middle income countries. Scientists will determine the barriers and facilitators to blood

pressure control and will develop strategies to improve hypertension control rates while reducing health disparities across population subgroups. All participants will be Hispanic or black.

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.

One study is testing a church-based lifestyle intervention to reduce blood pressure using group classes and motivational interviews to help participants make and maintain therapeutic lifestyle changes. Approximately 400 blacks with high blood pressure are expected to participate. Another study is determining whether overcoming "clinical inertia" by providing clinicians with patients' electronic adherence to medication records will lead to more intensive treatment and improved blood pressure control in patients with uncontrolled blood pressure. The majority of the patients are black. A third study is determining whether vitamin D and fish oil supplements can lower blood pressure and prevent hypertension in a multiracial and ethnic population.

Hypertension in adolescents is no longer a rare occurrence but is rising as a result of the obesity epidemic in the United States. An Institute-initiated study within the Childhood Obesity Prevention and Treatment Research Consortium is focusing on interventions to treat obesity and reduce blood pressure in urban youth:

- Targeting Obesity and Blood Pressure in Urban Youth: To assess three behavioral approaches that affect lifestyle change through child-family and school-community environments. Most participants are from various minority and ethnic populations.

An investigator-initiated study is comparing the effects of a behavioral intervention based on the DASH diet to routine nutrition care on changing diet quality, blood pressure, hypertension status, and vascular function in adolescents with elevated blood pressure. Thirty-five percent of participants are from various racial and ethnic populations.

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 and distributed for health professionals, patients, and the public. Some examples are:

- *Presión Arterial Alta: NHLBI Health Topics Index*
- *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
- *Your Choice for Change: Honoring the Gift of Heart Health for American Indians*

High Serum Cholesterol

Etiology

The Institute supports investigator-initiated studies to identify genes that influence lipoprotein profiles in various racial and ethnic groups. Research findings could offer an explanation for differences in susceptibility to CHD found among the groups. A 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 are seeking to identify genes for QTLs that are related to lipoproteins.

Treatment

Research has shown that patients with elevated LDL levels who have been advised to make lifestyle changes and to take statins often do not comply with the prescribed regimens. An investigator-initiated study is seeking to develop and evaluate an interactive virtual environment system to increase the initiation and maintenance of medication adherence and therapeutic lifestyle change in patients who are at risk for CHD. Patients will be able to access the system to seek advice from a virtual health care provider and get assistance in developing an effective care plan that is based on clinical guidelines.

Education

The Institute has prepared the following publications on blood cholesterol for minority audiences:

- *Healthy Hearts, Healthy Homes—Do You Know Your Cholesterol Levels?* in English and Spanish
- *Heart-Healthy Home Cooking African American Style*
- *Delicious Heart-Healthy Latino Recipes* in English and Spanish
- *Healthy Heart, Healthy Family—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 American Indians, blacks, and Mexican Americans—are especially at risk. Data from the 2007–2008 NHANES show that 34 percent of adults and 17 percent of children aged 2–19 years are obese. Understanding the causes of obesity could lead to effective strategies to combat it. A long-term investigator-initiated study is examining parental and extended family influences on the development of childhood obesity in Mexican American children. Another study is elucidating the 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 chromosome 4 in American Indians, on chromosome 9 in Mexican Americans, and on chromosomes 5 and 6 in blacks. In some cases, the results confirm those found in European Americans, and in other cases, the results 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. Eighty percent of participants are black. Another study with multi-ethnic participation is determining whether obese children with sleep apnea are at increased risk of cognitive impairment and vascular disease.

Treatment and Prevention

The NHLBI has initiated programs to test approaches for treating or preventing obesity:

- EARLY Trials (see Chapter 11): To develop and evaluate innovative approaches for weight control in young adults from ethnically and socioeconomically diverse populations who are at high risk for weight gain.
- ORBIT (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 11): To test interventions to prevent excess weight gain in non-overweight and overweight youth and to reduce weight in obese and severely obese youth. More than 50 percent of participants are expected to be from racial or ethnic minority populations.
- Translating Basic Behavioral 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. Most of the studies have strong participation from minority populations.

The Institute supports a number of studies on the effectiveness of obesity prevention and control interventions among diverse populations. Studies that focus on obese children and adolescents are evaluating the effect of adding environmental approaches to a standard family-based intervention to reduce overeating in obese children primarily from a minority population; exploring whether naturally occurring social support networks can help parents manage their children's weight in a population where 40 percent of the children are expected to be

from racial and ethnic minority populations; testing a community-based, multimodal, early childhood intervention to reduce obesity in American Indians; developing a culturally appropriate intervention for teen mothers, many of whom are from racial and ethnic and low socioeconomic backgrounds, to prevent obesity in their children; evaluating an intensive school-based intervention that involves physical activity and diet to reduce the prevalence of obesity among a diverse racial and ethnic population of high school students; and testing an intervention, delivered by a handheld computer, for improving diet and exercise in obese adolescents, half of whom are black.

Studies of obese adults are determining whether supplementing nurse and dietitian case management care with structured environmental support, provided by community health workers, improves weight loss and maintenance relative to usual care in a mostly obese Hispanic population of low SES; determining the effectiveness of various financial incentives to get obese individuals from mostly diverse minority populations to sustain weight loss; assessing the efficacy of Web-based pregnancy and postpartum behavioral intervention to prevent weight retention after childbirth in black women compared with usual care; and evaluating an intervention that supports primary care treatment of obesity in adults with at least one other cardiovascular risk factor. One project has strong participation from Hispanics.

Many obese adults have difficulty breathing upon physical exertion and therefore are unable to exercise sufficiently. It is unclear whether this is because the individuals are in poor physical condition and could be helped with endurance exercise training, or whether obesity-related respiratory changes have occurred that necessitate weight loss before exercise training can be effective. Researchers are planning to investigate this question in obese individuals by assessing the effect of endurance exercise training (without weight loss) versus weight loss (without exercise training) on breathing difficulties after physical exertion. Approximately 40 percent of participants will be from minority populations.

Education

The NHLBI has prepared and distributed health information for minorities on losing excess weight:

- *Healthy Hearts, Healthy Homes—Do You Need To Lose Weight?* in English and Spanish
- *¿En Qué Consiste el Sobrepeso y la Obesidad? (What Are Overweight and Obesity?)* in the NHLBI Health Topics Index
- ***We Can!***®: 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 benefits 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 two Institute-initiated longitudinal cohort studies.

The transition from elementary school to middle school marks a critical stage in the development of young people and the period during which physical activity tends to decline dramatically. An investigator-initiated study is investigating factors that contribute to the decline and the potential moderating effects of gender, race, socioeconomic status, and neighborhood environment on factors that influence changes in physical activity. The majority of participants will be from racial and ethnic minority populations.

A comprehensive intervention involving in-school counseling sessions, interactive Internet-based sessions, and an after-school physical activity program is seeking to motivate middle school-aged girls from mostly Hispanic and black populations to achieve regular moderate-to-vigorous physical activity. Another study will collect data on aspects of neighborhood environments that are most often associated with physical activity in adolescents and determine whether this information can be used, via interventions offered in the offices of pediatricians, to help children increase their physical activity. A third study will develop and evaluate policies to increase physical activity and improve nutrition during summer and after-school programs sponsored by the YMCA. Approximately 50 percent of the children are expected to be black.

Regular physical activity is important for cardiovascular health throughout life. Investigators are designing and evaluating a long-term, multilevel physical activity intervention for sedentary residents who are living in retirement communities. The intervention uses a variety

of elements, including self-monitoring with a pedometer, group sessions and peer mentoring, and such environmental components as tailored walking maps. Approximately 25 percent of participants are expected to be from racial and ethnic minority populations.

Several investigator-initiated studies are evaluating culturally appropriate interventions to increase physical activity. Projects include those that use faith-based approaches involving church leaders and congregations to increase activity levels in blacks and those that test culturally targeted interventions in schools or among pregnant women and parents 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 new way to deliver convenient and sustainable adherence strategies. In one study, women are receiving prompts, video clips, and individualized feedback via their cell phones to help them increase their physical activity levels. Approximately 60 percent of the women are expected to be from racial and ethnic minority populations. In another study with large minority participation, researchers are assessing a program that is designed to improve diet and activity levels in sedentary people with poor quality diets; all participants use "smart phones" to monitor themselves and transmit information to a personal coach.

Education

The Institute has prepared and distributed the following publications for minorities on the importance of physical activity and ways to become more physically active:

- *On the Move to Better Health for African Americans*
- *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!***®: Many bilingual (English and Spanish) publications on physical activity and 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 smoking intervention programs in specialized groups:

- CHART (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 their cost-effectiveness. One of the projects will have approximately 75 percent participation from Hispanics, blacks, and persons of Asian ethnic background.
- Longitudinal Studies of HIV-Associated Lung Infections and Complications: To develop and evaluate a specialized smoking cessation intervention for the treatment of nicotine dependence in HIV-seropositive smokers who are at high risk of developing accelerated emphysema. Forty percent of participants are black.

The NHLBI supports a number of 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 comparing the efficacy of a hospital-initiated behavioral intervention to conventional care practices in reducing household secondhand smoke exposure in low-income, multi-ethnic parents of infants who were in neonatal intensive units. Two studies among military personnel are testing interventions that focus on smoking cessation and subsequent abstinence.

Approximately 35–40 percent of participants are expected to be from racial and ethnic minority populations.

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. One study is testing the hypothesis that physical inactivity mediates the relationship between depression and cardiac outcome risk. Sixty percent of participants are expected to be from racial and ethnic populations. Another study is seeking to increase understanding of the mechanisms that lead to death in depressed patients with heart disease by assessing the effects of stress on heart and brain function in heart disease patients with and without depression. Approximately 45 percent of participants are expected to be from minority groups. A third study is examining the potential epigenetic mechanisms that link depression and CVD. More than 50 percent of participants are expected to be black. A fourth study is identifying depression phenotypes and mechanisms that cause patients who have experienced an acute coronary event to have excess cardiac and mortality risk. Participants are from various racial and ethnic populations.

The Institute supports research on the interactions of psychosocial factors with race and ethnicity, environmental factors, and low SES in the development of CHD. One study is examining the contribution of social stressors and physical environments at the individual and neighborhood levels in the development of metabolic and cardiovascular risk profiles in adolescents with low SES. Most participants are from various racial and ethnic minority populations. Another study is 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. A third study is determining whether "everyday discrimination" (e.g., subtle, day-to-day forms of unfair treatment, such as minor insults experienced by black women as a function of their marginalized status) is an important risk factor in the development of CVD in black women.

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. A 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 during a 5-year period is related to a 2-year increase of subclinical CVD in a sample of women undergoing menopause. Fifty-five percent of participants will be black.

Treatment

The Institute supports several investigator-initiated studies to develop and evaluate interventions to improve cardiovascular outcomes. One study is seeking to determine the efficacy of a mindfulness-based personalized health plan intervention on reducing inflammation, a significant predictor of future CVD, via reductions in traditional risk factors, selected psychosocial attributes, and stress-reactivity among at-risk adults. Approximately 30 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

Obesity dramatically increases the risk of many diseases, such as CVD and type 2 diabetes. An investigator-initiated study is seeking to identify obesity-induced epigenetic changes in the immune and inflammatory response and evaluate whether these changes are associated with the risk of CVD and type 2 diabetes. Fifty percent of participants will be black.

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.

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:

- ACCORDION (see Chapter 10): To obtain long-term (10 years on average) data on ACCORD participants. More than 33 percent 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. Two of the sites have strong participation 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.

An investigator-initiated study is comparing the effectiveness of two strategies of coronary revascularization—coronary percutaneous stenting versus coronary artery bypass surgery—in patients with diabetes and multivessel coronary artery disease. Twenty-seven percent of participants are from minority populations.

Gestational diabetes during pregnancy is a risk factor for CVD. Research is underway that will design and test a behavioral intervention to improve postpartum CVD-preventive health behaviors and promote primary followup care in women with gestational diabetes, most of whom are black.

Education

The Institute has prepared the following publications on diabetes for minorities:

- *Healthy Hearts, Healthy Homes—Protect Your Heart Against Diabetes* in English and Spanish
- *Healthy Heart, Healthy Family—Protect Your Heart: Prevent and Control Diabetes* in Tagalog and English

HIV-Related Cardiovascular Diseases

Use of multidrug antiretroviral therapy has improved life expectancy of HIV-infected individuals to the point that HIV/AIDS is now a chronic condition for many patients. As a result, CVD is presently causing an increasing proportion of the deaths of HIV-infected individuals.

The Institute initiated research on the development of CVD in HIV-infected patients and potential management strategies:

- Mechanisms and Management of Cardiovascular and Metabolic Complications of HIV/AIDS: To elucidate the underlying mechanisms of metabolic and anthropometric abnormalities found in HIV-infected patients and relate the mechanisms to CVD risk; evaluate biomarkers and imaging methods for assessing coronary artery disease and risk in HIV patients; and identify strategies that reduce cardiovascular risk and optimize the medical management of HIV infection. Approximately 50 percent of participants are from ethnic and minority populations.

Lung Diseases

The NHLBI supports research on several lung diseases—such as asthma, sarcoidosis, TB, and HIV-related lung diseases—that 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 and most often starts in childhood. In the United States, more than 24 million people are known to have asthma, and more than 7 million of them are children. Asthma disproportionately affects racial and ethnic minorities, such as blacks and Puerto Ricans. These groups have higher rates of emergency department visits, hospitalizations, and deaths due to asthma than their white counterparts.

Etiology

The NHLBI has initiated additional studies to improve understanding of the etiology and pathophysiology of asthma:

- Severe Asthma Research Program (see Chapter 9): To define severe asthma at the molecular and cellular levels over time in order to gain an understanding of the pathogenesis of the disease and provide a basis for design of mechanism-based diagnostic, prognostic, and treatment strategies for children and adults with severe asthma. Several of the projects have strong participation from minority populations.
- 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 to identify innovative therapeutic targets. Two projects expect 30–50 percent of participants to be from minority populations.

The Institute also supports investigator-initiated projects on the etiology and pathophysiology of asthma. Several projects focus on the role of genetics in the development 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 subsequently determine their role in the development of asthma, airway hyperreactivity, and allergy. Forty percent of participants will be black. Another study will improve understanding of the etiology of asthma and the response to asthma drugs by performing GWASs to identify genetic factors that are associated with asthma, asthma severity, and bronchodilator response in two Latino subgroups. Additional studies will identify the genes and structural genetic variations that contribute to childhood asthma in the major racial and ethnic groups in the United States and in Hispanic and black populations outside the United States.

An investigator-initiated study is seeking to understand the contribution of social and physical environment factors across neighborhood, family, and individual levels to develop a more comprehensive understanding of the causes of asthma disparities in children.

Investigators are also interested in the role of stress in the development of asthma. One study is using a systems biology approach to determine multiple biologic pathways by which stress can contribute to asthma. Scientists are investigating whether maternal stress immediately before or after the birth of a child can adversely affect the child's risk for wheezing and impair lung function later in childhood. Scientists hypothesize that multiple stressors that are prevalent in disadvantaged populations can cumulatively influence immune system development and airway inflammation in early life, thus making the populations more susceptible to other environmental factors and genetic risk factors explaining, in part, the observed asthma disparities associated with SES and race and ethnicity. Another study is seeking to identify psychosocial factors associated with the incidence of adult asthma onset in black women. A third study is investigating whether risky family behavior—characterized by conflict, neglect, and a lack of emotional warmth and support—is associated with greater asthma morbidity. Most participants are from various ethnic and minority populations.

A group of scientists has speculated that vitamin D deficiency in pregnant mothers may lead to faulty immune system development in neonates, predisposing them to asthma and allergy. To test the hypothesis, scientists will 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. More than 50 percent of participants are from racial and ethnic minority populations.

Research findings suggest that obesity and asthma are complex disorders that may have shared genetic determinants. An investigator-initiated study is seeking to 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 diverse (Hispanic, black, and white) cohorts.

Treatment and Control

The Institute has initiated research to identify optimal 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 patients with 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. Approximately 60 percent of participants are from minority and ethnic 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. Approximately 60 percent of participants are from minority and ethnic populations.

Quality of life measures can assist health care providers in treating asthma. Based on recommendations by the Asthma Related Quality of Life Subcommittee of the Asthma Outcomes Workshop held in 2010, new instruments are being developed and tested to measure more comprehensively the effects of asthma on quality of life in a multi-ethnic and multi-racial population.

One way to reduce asthma health disparities is to begin treatment in early childhood. Studies have shown that asthma education programs can improve overall management of asthma in preschool children. A study in Baltimore, Maryland, is partnering with Head Start to compare the efficacy of early intervention plus asthma education versus asthma education alone in reducing asthma morbidity. Nearly all participants will be black. Another study, in a full-scale trial of an entire school district, is using a Web-based screening and communication tool and telemedicine asthma assessments to ensure appropriate follow-up care and optimal treatment of poor children with asthma. Most participants will be black or Hispanic. A third study is evaluating the ability of a school-based asthma stress management intervention for high risk, socioeconomically disadvantaged children living in an urban setting to reduce disparities in asthma morbidity. Fifty percent of participants will be black.

The Institute is supporting several investigator-initiated studies focusing on finding effective treatment for various populations. One study is seeking to improve health among urban black adolescents with asthma by using peer support—enhanced by a culturally sensitive, technology-based MP3 player platform—to increase adherence to daily controller medications. Another study is targeting inner city black adolescents who have moderate to severe persistent asthma to evaluate the ability of innovative home- and community-based psychotherapies to improve treatment adherence and outcomes. A third study is assessing the effects of heart rate variability biofeedback on airway reactivity and inflammation to determine whether biofeedback can be useful for treating asthma. Approximately 35 percent of participants will be from minority groups.

Recent studies have reported that substantial rates of youth exhibit asthma-like symptoms that are undiagnosed. A study targeting underserved inner-city, ethnic minority adolescents who meet criteria for persistent asthma, but who have yet to be diagnosed, is investigating whether a multicomponent intervention (student, caregivers, and medical providers) is effective in helping families obtain a diagnosis and then treat and reduce asthma-like symptoms.

For a subgroup of individuals with severe asthma, standard drug therapy does not control their symptoms. A study is underway in such patients to determine whether treatment with L-arginine can improve their asthma control. Approximately 50 percent of participants will be from various ethnic and racial minority populations.

Many individuals with asthma have poor disease management. An investigator-initiated study is determining whether an intervention designed to stimulate communication between caregivers and clinicians and to contain individualized guideline-based recommendations for care, administered in urban primary care offices, reduces morbidity among urban children with asthma. Fifty percent of participants are black. Another study is addressing asthma disparities that persist among high-risk children who live in rural, medically underserved areas by testing a school-based telemedicine approach that will deliver asthma education to rural children with asthma, their caregivers, and school nurses. The approach also prompts the children's primary care physicians with treatment recommendations. Approximately 75 percent of participants will be black. A third study is developing and testing a technology-based intervention to improve asthma medication adherence in urban blacks, aged 18 to 25 years.

A study in high-risk black adolescents with moderate to severe asthma is testing the effectiveness of an intensive home- and community-based psychotherapy intervention to improve asthma management and reduce the number of hospitalizations and visits to emergency departments. Black women will be the target of a study to improve asthma management by using a highly tailored telephone counseling approach to foster a partnership between women and a clinician. A study of obese adults will evaluate the efficacy of an evidence-based lifestyle weight loss intervention to control asthma. Approximately 40 percent of participants will be from minority populations.

Investigators are also interested in evaluating whether cultural competency training for primary care physicians who primarily serve black or Hispanic communities will improve the asthma outcomes of their patients.

Symptoms of depression are commonly found in patients with asthma. A pilot study using an antidepressant to treat outpatients with major depression and asthma showed that patients who received treatment experience greater sustained remission of depressive symptoms and require significantly less oral corticosteroids for asthma management than the group who received placebo. Based on these findings, scientists are implementing a definitive antidepressant study in patients with asthma and major depression. Most participants will be black or Hispanic.

Education

The Institute is supporting several education activities through the National Asthma Control Initiative (NACI), which was developed by the NAEPP and is coordinated by the NHLBI. The NACI works to accelerate the adoption of six priority action messages from the latest asthma guidelines to achieve change in asthma clinical practices and outcomes. NACI Demonstration Projects, Strategic Partner Projects, and Clinical Champions Projects are implementing intervention strategies in racial and ethnic communities to address asthma health disparities in diverse populations. The Institute has developed easy-to-read materials on asthma treatment and control that target English and Spanish audiences with low literacy:

- *Facts About Controlling Your Asthma*
- *El Asma: Cómo Controlar Esta Enfermedad (Facts About Controlling Your Asthma)*
- *¿Que´ Es el Asma? (What Is Asthma?)*

The Institute co-chairs an Asthma Disparities Working Group under the auspices of the President's Task Force on Environmental Health Risk and Safety Risks to Children. In 2012, the Task Force released the Coordinated Federal Action Plan to Reduce Racial and Ethnic Asthma Disparities, which was developed by the Working Group, to maximize the use of existing Federal resources to address asthma disparities. The Action Plan focuses on coordinating Federal activities to promote the adoption of clinical practice guidelines in racial and ethnic communities that are at high risk of poor asthma outcomes, and provides a forum for Federal agencies to collaborate on identifying innovative ways to treat and educate minority children who have asthma and their families and accelerating research on preventing the onset of the disease.

Chronic Obstructive Pulmonary Disease

COPD—a disease in which the lungs are damaged, making breathing difficult—is the third leading cause of death in the United States. It is responsible for more than 500,000 hospitalizations and more than 130,000 deaths in the United States each year.

Etiology

The NHLBI is supporting a study of genetic factors that determine the risk of developing COPD or influence the type and extent of damage done to the body by the

disease. The Institute is also supporting a targeted metabolomic phenotyping program in cohorts of individuals with COPD to gain a mechanistic understanding of the pathways operative in COPD.

- COPDGene™ study: To perform genome-wide genetic assays on a cohort of individuals who have a substantial history of cigarette smoking. Investigators have obtained extensive baseline clinical and phenotypic data regarding the individuals and have compared the severity and character of COPD in them. A third of the participants are black. A follow-up study is seeking to identify new genetic loci that influence the development of COPD and COPD-related phenotypes and to reclassify COPD into subtypes that can ultimately be used to develop effective subtype-specific therapies.
- Anchoring Metabolomic Changes to Phenotype: To gain mechanistic understanding of the molecular determinants that contribute to cardiovascular and lung disease phenotypes to help in predicting disease susceptibility, diagnosis, and risk stratification; assessing response to therapy; and assessing prognosis. One study is seeking to define biomarkers relevant to fundamental mechanisms that underlie COPD ciliopathy pathogenesis. Approximately 50 percent of participants will be black. Another study will focus on dysregulated metabolic pathways that can explain why some smokers get COPD and others do not. The study will use the COPDGene™ 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

In collaboration with the Centers for Medicare and Medicaid Services, the Institute is sponsoring a clinical trial of supplemental oxygen treatment in COPD patients:

- LOTT (see Chapter 11): To test whether long-term oxygen therapy can reduce disability and prolong life in COPD patients who have moderate resting hypoxemia or severe hypoxemia during exercise.

Education

The NHLBI has developed a number of outreach activities associated with COPD. Several publications and Web-based products have been developed and distributed for 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 supports research into the basic mechanisms of sarcoidosis and new and improved treatments for it.

- GRADS Program (see Chapter 9): To conduct genomic, microbiomic, and phenotypic studies in alpha-1 antitrypsin deficiency and sarcoidosis. Researchers will define the molecular, cellular, and clinical characteristics of recently diagnosed sarcoidosis patients with varying degrees of lung involvement. Many of the projects will have at least 50 percent participation from minorities.

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 its etiology and pathogenesis. Specifically, a new investigator-initiated study will use the next generation gene sequencing technology to detect rare, causal genetic variants of sarcoidosis in blacks. A mentored research project conducted within the Black Women's Health Study is investigating potential genetic and nongenetic risk factors for sarcoidosis.

Diagnostic tools and treatment approaches for sarcoidosis are lacking. A study supported by the Institute-initiated CADET Program (see Chapter 9) is seeking to develop a skin test for diagnosing sarcoidosis and to establish an approach for treating sarcoidosis with oral vaccines. Fifty percent of participants are black.

Another study, in a mostly black population, is seeking to identify a panel of antibodies that will recognize sarcoidosis granuloma antigens and thereby aid in the diagnosis of pulmonary sarcoidosis and identification of molecular targets for its treatment.

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. One study is testing associations between indices of sleep apnea and the quality, duration, and timing of sleep with indices of cardiovascular risk and disease to address the role of sleep disorders in CVD development. Approximately 60 percent of participants are expected to be from racial and ethnic minority groups. Another study is investigating sleep apnea in stroke patients, collecting and analyzing data on prevalence, relationship to ethnicity, and the association between stroke type and outcomes. Approximately 65 percent of participants are from racial and ethnic minority groups.

Scientists are also interested in the effect of sleep apnea on cardiovascular risk in individuals with diabetes. They are investigating the contributory effects of sleep apnea in vascular disease among persons with type 2 diabetes and identifying possible mechanisms through which treatment can reduce cardiovascular risk. Most participants are from racially and ethnically diverse populations.

The current obesity epidemic in the United States is resulting in an increasing prevalence of obstructive sleep apnea (OSA) in adolescents. One study is seeking to elucidate the pathophysiology of OSA in obese teenagers and determine the effect of weight loss on OSA. The majority of participants are black. Another study is determining the effect of sleep restriction on the neurobehavioral and brain function while adolescents are engaged in sustained attention tasks. Sixty percent of participants are from minority populations.

Shortened sleep duration (less than 6 hours) and its negative consequences have been investigated extensively in individuals with SDB. However, despite shortened sleep duration, many individuals do not suffer from SDB. A study in a racially and ethnically diverse population of individuals without SDB is identifying the association between sleep duration and markers of autonomic function, endothelial function, and inflammation.

In an ancillary study to the HCHS, investigators are collecting sleep pattern measures from several Hispanic subgroups. Investigators will analyze the prevalence of altered sleep patterns and define the importance of psychosocial factors (e.g., home- and work-related factors and mood, as well as cultural factors) in predicting abnormal sleep patterns. They will also evaluate associations between poor sleep and cardiovascular health outcomes, including obesity, hypertension, diabetes, and heart disease.

Treatment and Control

The Institute initiated a pilot study to guide design of phase III clinical trials to test whether treatment of OSA with continuous positive airway pressure (PAP) reduces CVD risk:

- Reducing Cardiovascular Disease Risk Through Treatment of Obstructive Sleep Apnea: To evaluate the treatment of OSA using PAP. The study will provide information about the feasibility of long-term (12 to 18 months) PAP treatment of OSA in patients who are at risk of CVD. The study will also provide data about the effects of PAP on surrogate markers of cardiovascular risk. Approximately 40 percent of participants will be from minority populations.
- CADET (see Chapter 9): To develop innovative agents for the diagnosis and treatment of lung diseases and SDB. One study is seeking to develop reliable urinary biomarker measures that can be used to screen and diagnose OSA in children, thereby facilitating timely treatment and prevention of OSA-associated morbidities. Approximately 80 percent of participants are expected to be from minority populations.

Investigator-initiated research will also assess treatment strategies in minorities. One study is developing in-home personalized sleep plans to improve nightly sleep duration, neurocognitive function, and behavioral disorders in lower income minority children (ages 5 and 6 years). Another study will measure effects of continuous compliance to PAP therapy on neurocognitive function (including academic achievement, attention, working memory, decision making, and mental flexibility) in children. Approximately 60 percent of participants will be from minority populations. Parental reports of child behaviors and sleep patterns will also be assessed. A third study will advance understanding of endothelial activation processes in OSA patients and may enable early identification of OSA patients who are at risk for vascular diseases. Approximately 90 percent of participants are expected to be from minority populations. Results may provide the basis for developing new therapeutic strategies for preventing or reversing vascular risk in OSA patients.

Insomnia is a frequently co-occurring sleep disorder that interferes with adherence to OSA treatment. A new study will determine the efficacy of a multidisciplinary treatment that combines cognitive behavior therapy and continuous PAP therapy for patients with OSA and comorbid insomnia in a mostly diverse minority population.

HIV-Related Lung Diseases

HIV infection disproportionately affects minority populations in the United States. Due to multidrug antiretroviral therapy, HIV 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 infected with HIV, many have serious or fatal lung complications, including TB and bacterial pneumonias, that have never been characterized well. Lung diseases and CVD, usually more prevalent in older populations, are having an increasing effect on HIV-infected populations in the United States and other industrialized nations where the average age of HIV-infected individuals has increased due to effective antiretroviral therapy. The effect is exacerbated because lung and cardiovascular complications are occurring in relatively young age groups in HIV-infected populations.

Etiology

The Institute has initiated research to understand the causes and impact of HIV-related lung diseases and to identify potential therapeutic targets and preventive strategies:

- 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.

Treatment and Control

The Institute seeks to support clinical trial planning grants in the management of HIV-related lung disease and cardiovascular comorbidity:

- Management of HIV-Related Lung Disease and Cardiovascular Comorbidity: To support the initial organization, protocol development, and necessary preliminary studies that are critical for the design of robust Phase II and III clinical trials in HIV-infected populations with lung disease alone or with cardiovascular comorbidity. One study will seek to determine whether dietary supplementation with zinc and S-adenosylmethionine can improve the overall lung health in patients who are infected with HIV and remain immunosuppressed despite achieving viral suppression on antiretroviral treatment. More than 50 percent of participants in these studies will be from racial and ethnic minority populations.

An ancillary randomized trial to the Strategic Timing of Antiretroviral Treatment trial is determining whether early antiretroviral treatment of HIV reduces the rate of decline of lung function in HIV-infected individuals.

Tuberculosis

TB is a common and often deadly infectious disease caused by *Mycobacterium tuberculosis*. In the United

States, an estimated 10–15 million people are infected with the TB bacterium. Although the majority of those infected remain healthy (latent TB infection), a small percentage develops active tuberculosis. The rates of both TB infection and active TB 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 2010, the Institute began a systems biology approach to identify 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 is integrating 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 under study 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 impact of TB on HIV disease. A genetics study will seek to fine-map chromosomal regions that have been linked to resistance to TB. The study also plans to 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 to understand the relationship between the immune system and TB. Most of the studies are being conducted in patients from minority populations. One study is seeking new approaches to diagnosing and treating active TB in sub-Saharan Africa and other parts of the world. The study may also identify new markers that can predict response to TB therapy. Another study is determining whether different strains of *Mycobacterium tuberculosis* cause different responses in individuals from various racial and ethnic groups. Results of this study may increase understanding about tailoring vaccines to specific populations. A third study is testing the efficacy of daily vitamin D supplementation, added to multidrug therapy, to improve antimicrobial immune response to TB infection in residents of Mongolia.

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 programs in transfusion medicine, blood banking and blood products safety, and such cellular therapies as bone marrow transplantation.

Sickle Cell Disease

Etiology

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 the neurobiology of pain in SCD:

- 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 to develop effective pharmacologic treatments. One study is seeking to demonstrate that individual differences in pain phenotypes occur in SCD,

inflammatory/immune responses to pain contribute to these phenotypes, and pain phenotypes predict important clinical outcomes in SCD.

Investigator-initiated studies are exploring new methods to reactivate fetal hemoglobin expression for the treatment of SCD and thalassemia.

Other investigator-initiated studies are seeking to identify new pathways and regulatory mechanisms that may be as important in the pathophysiology of SCD as red blood cell sickling is itself. One area of interest is the role of the immune and coagulation systems in the vaso-occlusive pathologies associated with SCD. Another area focuses on the role of inflammation and vascular perfusion in SCD. Researchers are using flow cytometry and contrast-enhanced ultrasound to identify new biomarkers of severity of tissue injury related to the state of inflammation and vascular perfusion in adults with SCD. Identifying such circulating biomarkers may help when evaluating the effectiveness of new therapies.

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.

Through the SBIR and the STTR programs, the NHLBI supports translational projects to develop therapeutics and tools that can be used to treat SCD and other hemoglobinopathies. Recent projects are evaluating the ability of retargeted drugs to increase fetal hemoglobin production; testing new agents to produce opioid-level analgesia without the opioid-related side effects for relief of SCD pain; conducting a clinical study of a humanized monoclonal antibody drug for treatment of vaso-occlusive crisis; and developing a Web interface tool that can be used to improve the quality of care received by SCD patients during hospital emergency room visits.

Clinical Research

The NHLBI is committed to finding improved treatments and ultimately a cure for SCD and other hemoglobinopathies. Institute-initiated studies, such as hematopoietic cell transplantation, have begun to yield therapies that will alleviate the symptoms of sickle cell anemia and procedures that should ultimately cure the disease.

- BABY HUG Follow-Up II (see Chapter 11): To characterize the long-term toxicities and unexpected risks (if any) and benefits associated with hydroxyurea treatment given at an early age.
- Planning Grants for Clinical Trials in Hemoglobinopathies: To support pilot studies to obtain data that are critical for the design of robust clinical trials, especially Phase II and III clinical trials in the major hemoglobinopathies, SCD, and the thalassemias.
- Ancillary Studies in Clinical Trials: To conduct time-sensitive ancillary studies in conjunction with ongoing clinical trials and other large clinical studies that are related to heart, lung, and blood diseases and sleep disorders. One study is assessing the treatment response of children who are experiencing acute sickle cell pain episodes to determine the effectiveness of magnesium therapy.
- NHLBI Translational Research Implementation Program (TRIP)—Stage 2 (see Chapter 9): To accelerate the translation of promising new therapeutic interventions that are derived from fundamental research discoveries for treatment and prevention of cardiovascular, lung, and blood diseases through planning and execution of well-designed clinical trials to demonstrate safety and efficacy. One study is determining whether regadenoson is an effective treatment for pain or acute chest syndrome episodes in patients with SCD.

Often individuals with SCD experience barriers that prevent them from getting appropriate treatment for their disorder or have difficulties adhering to care. One study is employing specially trained SCD patient navigators who address barriers to care and to the use of hydroxyurea. Phase 1 of the study will focus on increasing the percentage of adults with SCD who are in SCD specialty care, and Phase 2 will focus on increasing the percentage of patients who are adhering to hydroxyurea therapy. Another study is developing a patient navigator program for parents of children with SCD to improve adherence to preventive care and overall retention in care.

The Institute supports research to assist hematologists in their ability to assess clinical outcomes. The Adult Sickle Cell Quality of Life Measurement Information System is a useful instrument to assess health-related

quality of life among adults with SCD. The instrument has been integrated into an NIH Roadmap Patient-Reported Outcomes Measurement Information System.

Pain is the most common cause of acute morbidity in children and adults with SCD. The Institute has identified acute pain management and prevention as a high-priority area for research in children. One study is developing and evaluating the efficacy of using an individualized pain plan in children at home and in hospital emergency departments. A functional assessment tool is being developed to assess pain and functionality in hospitalized children with SCD.

The Institute is supporting investigator-initiated clinical trials for children with SCD. One trial in children with abnormal transcranial Doppler (TCD) velocities is comparing standard therapy (transfusions) with alternative therapy (hydroxyurea) for maintenance of TCD velocities and reducing the risk of primary stroke. Another 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 the Sickle Cell Disease Information Center (http://www.nhlbi.nih.gov/new/sicklecell.htm), a Web site that contains information for the public and health professionals.

In 2012, the Institute initiated the National Blood Disorders Program (NBDP), whose mission is to improve the management of SCD and other blood disorders through collaborations among Federal partners and other stakeholders. Building on the evidence-based *Sickle Cell Disease Guidelines* (planned to be released by the NHLBI in 2013), the NBDP seeks to improve the health and quality of life in persons who are living with SCD. The Guidelines contain recommendations for youth and adults living with SCD. Topics include health maintenance and care of acute and chronic complications.

Thalassemia

Thalassemia is an inherited disorder in which red blood cells with 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.

Institute-initiated activities include:

- RuSH (see Chapter 10): To determine the feasibility and appropriate design of a data system that can be used to generate accurate prevalence and incidence statistics on hemoglobin disorders in the United States.
- Understanding Mechanisms of Terminal Erythroid Maturation: To define molecular mechanisms that regulate the late stages of erythropoiesis and identify new targets that will improve the therapeutic options for erythropoietin-resistant anemias. Anemia due to defects in the terminal stages of erythropoiesis is a common feature of thalassemia.
- Innovators in Hemoglobinopathies Academic Career Development Award: To advance the development of clinician scientists who have implemented innovative programs for patients with SCD or thalassemia but who have not been on a research track.
- Clinical Hematology and Transfusion Medicine Research Career Development Program: To develop and evaluate multidisciplinary career development programs in nonmalignant hematology and transfusion medicine.

An investigator-initiated study is examining hematopoietic transplantation and gene therapy approaches to cure thalassemia.

Transfusion Medicine and Cellular Therapeutics

The NHLBI supports studies on the use, safety, and availability of blood and blood components for transfusion and cellular therapies that are seeking to reach minority populations:

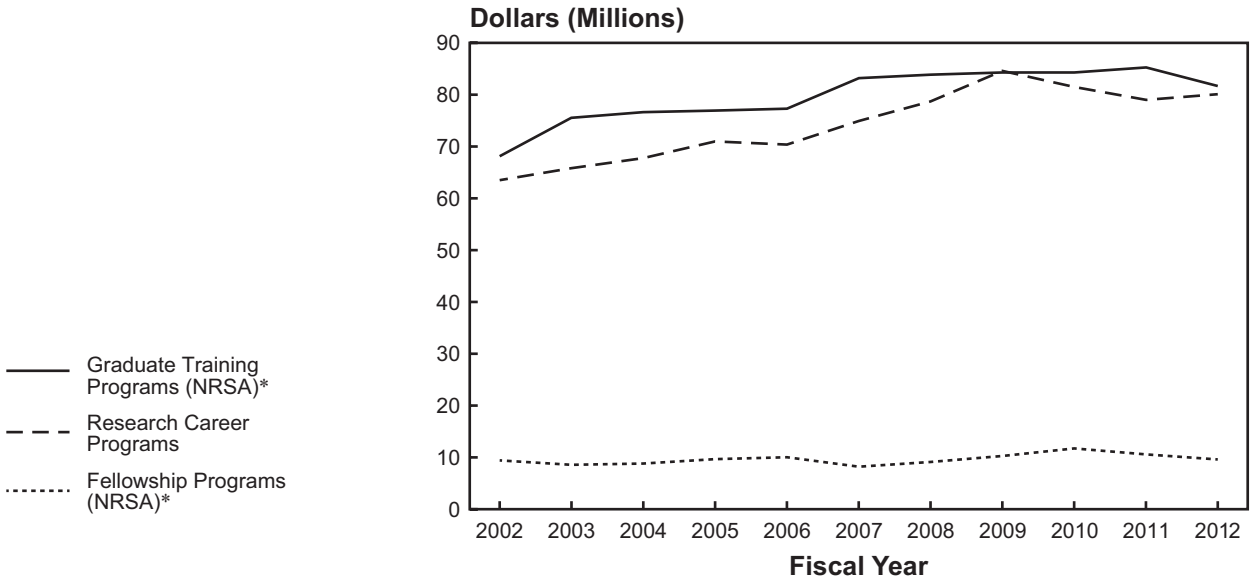
- Blood and Marrow Transplant Clinical Trials Network (BMT CTN) (see Chapter 11): In collaboration with the NCI, to perform clinical trials that advance hematopoietic stem cell transplantation. To reach various minority populations, the BMT CTN supports bilingual transplant center personnel and provides public Web pages and educational materials in several languages. 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.
- Sickle Cell Unrelated Transplant Trial: To assess unrelated donor marrow and umbilical cord blood

transplantation for severe SCD. The trial, supported by the BMT CTN 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.

Investigator-initiated studies seek to generate a concise description of erythropoiesis that unifies genetics, molecular processes, and cytokine determinants in the erythroid lineages so that new therapeutics can be developed to measure and combat anemia. One study is elucidating the mechanism for developmental regulation of globin gene expression with the goal of developing therapies for SCD and beta-thalassemia.

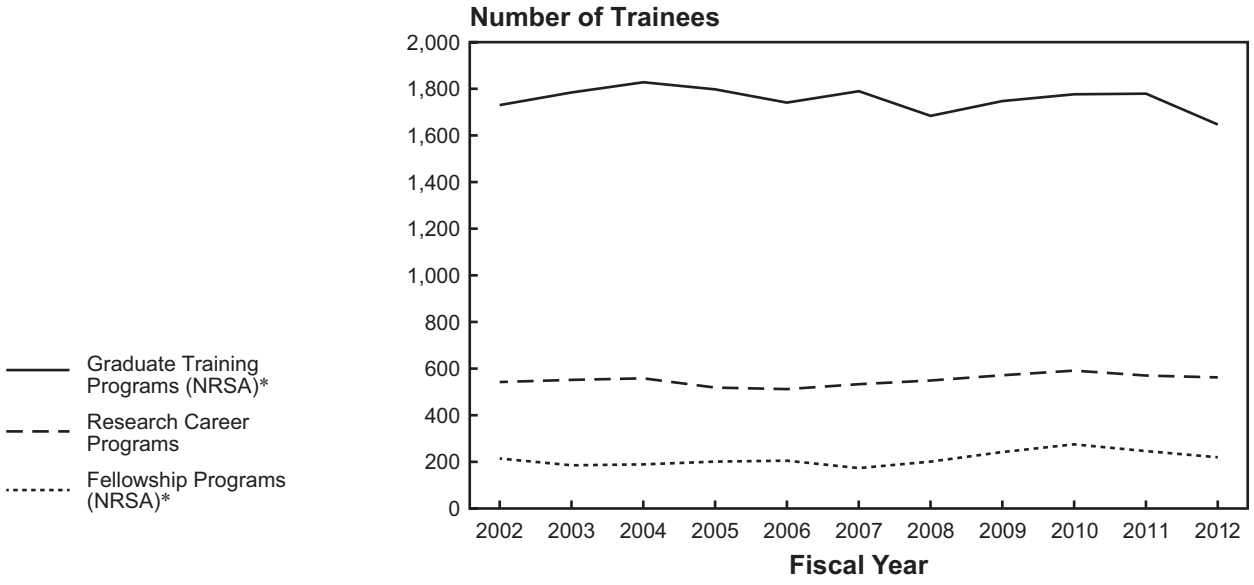
13. Research Training and Career Development Programs

NHLBI Research Training and Career Development Obligations: Fiscal Years 2002–2012



* National Research Service Awards (NRSA).

NHLBI Full-Time Training Positions: Fiscal Years 2002–2012



* 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 2012

	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)	80	80	$ 2,963,467	$ —	$ 2,963,467	3.2%
Predoctoral Individual NRSA (F31)	39	39	1,295,231	—	1,295,231	1.4
Postdoctoral Individual NRSA (F32)	101	101	5,368,753	—	5,368,753	5.9
Subtotal, Fellowships	220	220	9,627,451	—	9,627,451	7.3
Graduate Training Programs						
Institutional NRSA (T32)	223	1,531	72,748,190	6,028,080	78,776,270*	87.3
Minority Institutional NRSA (T32)	4	24	769,678	59,660	829,338	0.9
Off-Quarter Professional Student Training NRSA (T34, T35)	18	92	1,985,459	168,914	2,154,373	2.4
Subtotal, Graduate Training Programs	245	1,647	75,503,327	6,256,654	81,759,981	90.6
Total, Training Programs	**465**	**1,867**	**$85,130,778**	**$6,256,654**	**$91,387,432***	**100.0%**

* Excludes assessment of $1,930,000.

History of Training Obligations by Activity: Fiscal Years 2002–2012

	Dollars (Thousands)										
	Fiscal Year										
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Fellowship Programs											
Individual Predoctoral NRSA for M.D./Ph.D. (F30)	$ —	$ —	$ —	$ —	$ —	$ —	$ 641	$ 2,191	$ 3,024	$ 3,297	$ 2,963
Predoctoral Individual NRSA (F31)	478	563	549	794	1,202	1,509	1,888	2,009	2,094	1,562	1,295
Postdoctoral Individual NRSA (F32)	8,887	7,868	8,128	8,813	8,790	6,684	6,487	6,012	6,559	5,767	5,369
Senior Fellowships NRSA (F33)	84	112	144	58	53	—	59	118	—	—	—
Subtotal, Fellowships	9,449	8,543	8,821	9,665	10,045	8,193	9,075	10,330	11,677	10,626	9,627
Graduate Training Programs											
Institutional NRSA (T32)	62,999[A]	69,951[B]	71,229[C]	70,524[D]	71,831[E]	78,343[F]	80,373[G]	81,453[H]	81,319[I]	82,536[J]	78,776[K]
Minority Institutional NRSA (T32)	1,092	1,006	734	1,184	743	780	688	349	1,050	949	829
Off-Quarter Professional Student Training NRSA (T34, T35)	1,987	1,975	1,993	2,233	2,215	2,411	2,021	2,202	1,941	1,904	2,154
Short-Term Training for Minority Students (T35M)	2,057	2,594	2,671	2,976	2,527	1,673	804	283	—	—	—
Subtotal, Training Grants	68,135	75,526	76,627	76,917	77,316	83,207	83,886	84,287	84,310	85,389	81,759
Total, Training Programs	**$77,584[A]**	**$84,069[B]**	**$85,448[C]**	**$86,582[D]**	**$87,361[E]**	**$91,400[F]**	**$92,961[G]**	**$94,617[H]**	**$95,987[I]**	**$96,015[J]**	**$91,386[K]**

A Excludes Assessment of $1,584,000.
B Excludes Assessment of $1,716,000.
C Excludes Assessment of $1,744,000.
D Excludes Assessment of $1,764,000.
E Excludes Assessment of $1,818,000.
F Excludes Assessment of $1,916,000.
G Excludes Assessment of $1,912,000.
H Excludes Assessment of $1,960,000.
I Excludes Assessment of $1,976,000.
J Excludes Assessment of $1,982,000.
K Excludes Assessment of $1,930,000.

Full-Time Training Positions by Activity: Fiscal Years 2002–2012

	Number of Positions										
	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Fellowship Programs											
Individual Predoctoral NRSA for M.D./Ph.D. (F30)	—	—	—	—	—	—	20	63	85	88	80
Predoctoral Individual NRSA (F31)	18	19	18	25	32	44	56	59	62	46	39
Postdoctoral Individual NRSA (F32)	194	164	168	176	171	130	125	118	128	112	101
Senior Fellowships NRSA (F33)	2	2	3	1	2	—	1	2	—	—	—
Subtotal, Fellowships	214	185	189	202	205	174	202	242	275	246	220
Graduate Training Programs											
Institutional NRSA (T32)	1,482	1,542	1,578	1,540	1,512	1,585	1,525	1,602	1,660	1,667	1,531
Minority Institutional NRSA (T32)	39	42	32	35	26	23	18	19	26	27	24
Off-Quarter Professional Student Training NRSA (T34, T35)	179	93	99	95	104	105	93	102	91	86	92
Short-Term Training for Minority Students (T35M)	30	107	119	128	99	77	48	24	—	—	—
Subtotal, Training Grants	1,730	1,784	1,828	1,798	1,741	1,790	1,684	1,747	1,777	1,780	1,647
Total, Training Positions	**1,944**	**1,969**	**2,017**	**2,000**	**1,946**	**1,964**	**1,886**	**1,989**	**2,052**	**2,026**	**1,867**

NHLBI Research Career Programs: Fiscal Years 2002–2012

	Number of Awards										
	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Mentored Career Development Award To Promote Faculty Diversity in Biomedical Research* (K01)	54	47	46	45	40	35	35	37	47	45	46
Mentored Career Award for Faculty at Minority-Serving Institutions** (K01)	2	7	6	4	4	5	7	5	6	5	4
Mentored Scientist Development Award in Research Ethics (K01)	—	2	2	3	3	3	1	1	—	—	—
Independent Scientist Award (K02)	33	32	31	32	24	25	22	19	19	21	17
Research Career Award (K06)	2	2	1	1	1	—	—	—	—	—	—
Sleep Academic Award (K07)	8	—	—	—	—	—	—	—	—	—	—
Nutrition Academic Award (K07)	19	9	9	—	—	—	—	—	—	—	—
Pediatric Transfusion Medicine Academic Award (K07)	—	—	—	—	—	4	4	4	4	4	—
Cultural Competence and Health Disparities Academic Award (K07)	—	—	8	14	18	18	18	9	4	—	—
Innovators in Hemoglobinopathies Care Career Development Award (K07)	—	—	—	—	—	—	—	—	—	2	2
Clinical Investigator Development Award (K08)	236	240	229	239	226	214	210	232	218	210	189
Career Development Program in Vascular Medicine Research (K12)	—	—	—	—	2	7	7	7	—	3	6
Clinical Hematology and Transfusion Medicine Research Career Development Program (K12)†	—	—	—	—	6	6	6	6	6	—	6
Genetics and Genomics of Lung Diseases Career Development Program (K12)	—	—	—	—	—	8	8	8	8	—	8
Clinical Research Career Development Programs in Emergency Medicine (K12)	—	—	—	—	—	—	—	—	—	6	6
Career Enhancement Award for Stem Cell Research (K18)	—	1	5	3	2	4	6	3	4	5	3
NHLBI Career Transition Award (K22)	—	—	1	2	1	1	1	1	1	3	3
Mentored Patient-Oriented Research Career Development Award (K23)	90	110	122	127	122	120	133	149	160	170	164
Midcareer Investigator Award in Patient-Oriented Research (K24)	37	38	32	32	33	29	29	34	35	34	36
Mentored Quantitative Research Career Development Award (K25)	7	9	12	17	16	15	15	15	15	15	16
Clinical Research Curriculum Award (K30)	55	55	55	—‡	14	16	—	—	—	—	—
Career Transition Award (K99)	—	—	—	—	—	24	47	42	64	47	56
Total, Research Career Programs	**543**	**552**	**559**	**519**	**512**	**534**	**549**	**572**	**591**	**570**	**562**

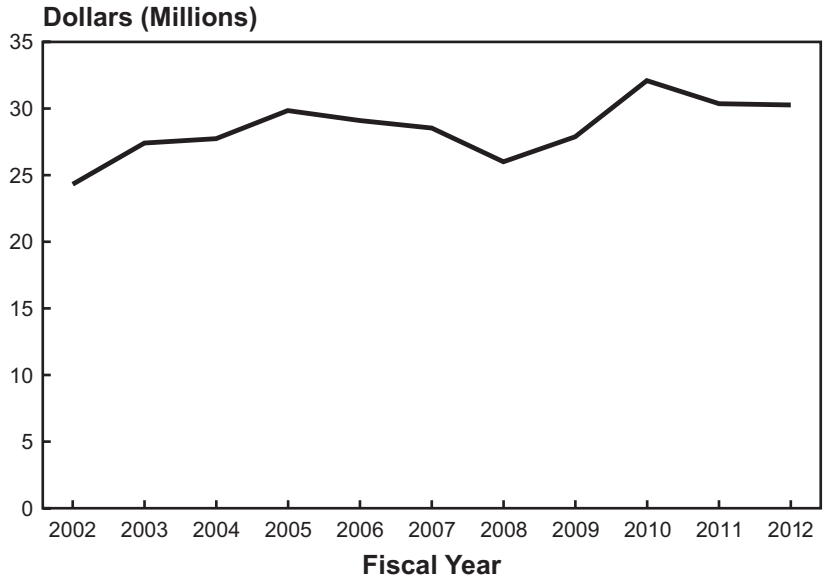
* Formerly known as Mentored Research Scientist Development Award for Minority Faculty.
** Formerly known as Minority Institution Faculty Mentored Research Scientist Development Award.
† Formerly known as Clinical Hematology Research Career Development Program.
‡ In FY 2005, NHLBI relinquished management of the K30 program and as a result did not receive the grant count.

NHLBI Research Career Program Obligations: Fiscal Years 2002–2012

	Dollars (Thousands)										
	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Mentored Career Development Award To Promote Faculty Diversity in Biomedical Research* (K01)	$ 5,711	$ 6,156	$ 6,150	$ 6,088	$ 5,453	$ 4,718	$ 4,574	$ 4,745	$ 6,089	$ 5,860	$ 5,891
Mentored Career Award for Faculty at Minority-Serving Institutions** (K01)	1,703	991	867	588	567	698	949	663	804	668	546
Mentored Scientist Development Award in Research Ethics (K01)	—	255	253	355	358	357	102	164	62	126	67
Independent Scientist Award (K02)	3,130	3,099	3,079	3,218	2,421	2,511	2,184	1,880	1,847	2,076	1,653
Research Career Award (K06)	69	69	34	34	34	—	—	—	—	—	—
Sleep Academic Award (K07)	722	—	—	—	—	—	—	—	—	—	—
Nutrition Academic Award (K07)	2,906	1,472	1,516	—	—	—	—	—	—	—	—
Pediatrics Transfusion Medicine Academic Award (K07)	—	—	—	—	—	486	486	486	486	486	—
Cultural Competence and Health Disparities Academic Award (K07)	—	—	925	1,620	2,109	2,232	2,197	1,138	562	—	—
Innovators in Hemoglobinopathies Care Career Development Award (K07)	—	—	—	—	—	—	—	—	—	574	533
Clinical Investigator Development Award (K08)	29,295	30,288	29,037	30,429	28,973	27,286	27,005	29,706	28,165	27,166	24,514
Research Career Development Program in Vascular Medicine (K12)	—	—	—	—	772	3,206	5,499	7,325	—	2,499	959
Clinical Hematology and Transfusion Medicine Research Career Development Program (K12)†	—	—	—	—	2,360	2,367	2,364	2,375	2,371	—	2,325
Genetics and Genomics of Lung Diseases Career Development Program (K12)	—	—	—	—	—	3,154	3,190	3,190	3,194	—	2,244
Clinical Research Career Development Programs in Emergency Medicine (K12)	—	—	—	—	—	—	—	—	—	1,186	3,065
Career Enhancement Award for Stem Cell Research (K18)	—	243	980	512	213	652	1,014	477	706	789	392
NHLBI Career Transition Award (K22)	—	—	185	364	178	160	162	162	162	699	700
Mentored Patient-Oriented Research Career Development Award (K23)	11,909	14,571	16,216	17,086	16,720	16,419	18,556	20,831	22,368	23,871	23,027
Midcareer Investigator Award in Patient-Oriented Research (K24)	4,058	4,368	3,815	3,929	4,315	4,037	4,161	5,078	5,942	5,851	6,079
Mentored Quantitative Research Career Development Award (K25)	921	1,195	1,622	2,206	2,184	2,077	2,082	1,996	2,134	2,110	2,304
Clinical Research Curriculum Award (K30)	3,090	3,110	3,115	4,589	3,708	2,520	—	—	—	—	—
Career Transition Award (K99)	—	—	—	—	—	2,074	4,190	4,430	6,652	5,129	5,877
Total, Research Career Program Obligations	**$63,514**	**$65,817**	**$67,794**	**$71,018**	**$70,365**	**$74,954**	**$78,715**	**$84,646**	**$81,544**	**$79,090**	**$80,176**

* Formerly known as Mentored Research Scientist Development Award for Minority Faculty.
** Formerly known as Minority Institution Faculty Mentored Research Scientist Development Award.
† Formerly known as Clinical Hematology Research Career Development Program.

NHLBI Minority Biomedical Research Training, Career Development, and Research Supplements Program Obligations: Fiscal Years 2002–2012



NHLBI Minority Biomedical Research Training, Career Development, and Research Supplements Program Obligations: Fiscal Years 2002–2012

Dollars (Thousands)

	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
MARC Summer Research Training Program	$ 15	$ 4	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —	$ —
Mentored Career Development Award To Promote Faculty Diversity in Biomedical Research*	5,711	6,156	6,150	6,088	5,453	4,718	4,574	4,745	6,089	5,860	5,891
Minority Biomedical Research Support (MBRS)	2,793	3,600	2,806	2,846	2,403	2,475	1,527	2,167	2,540	3,228	2,947
Mentored Career Award for Faculty at Minority-Serving Institutions**	1,703	991	867	588	567	698	949	663	804	668	546
Minority Institution Research Training Program	1,092	1,006	734	1,184	743	780	688	349	1,050	949	829
Minority Predoctoral Fellowship	278	308	374	545	1,012	1,115	1,728	1,979	2,064	1,562	1,295
Diversity Research Supplements Program	9,822	9,323	10,938	11,214	10,680	10,834	10,303	10,412	11,198	10,260	10,901
Reentry Supplements	—	—	—	96	132	245	401	887	1,050	621	595
Short-Term Training for Minority Students	2,057	2,594	2,671	2,976	2,526	1,673	804	283	—	—	—
Short-Term Research Education Program To Increase Diversity in Health-Related Research	835	3,402	3,205	4,297	5,571	5,999	5,047	6,375	7,320	7,219	7,247
Total, Minority Programs	**$24,306**	**$27,384**	**$27,745**	**$29,834**	**$29,087**	**$28,537**	**$26,021**	**$27,860**	**$32,115**	**$30,367**	**$30,251**

* Formerly known as Mentored Research Scientist Development Award for Minority Faculty.

** Formerly known as Minority Institution Faculty Mentored Research Scientist Development Award.

NHLBI Research Supplements Program by Award Type on Grants: Fiscal Years 2002–2012

	Number of Awards										
	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Diversity Supplements											
Investigator	46	47	35	29	27	31	25	22	17	10	17
Postdoctoral	33	38	37	52	49	43	42	45	50	49	54
Graduate	45	57	61	80	74	73	69	71	71	66	64
Undergraduate	17	18	17	12	11	16	17	18	13	9	8
High School	3	4	3	7	3	3	3	2	7	10	12
Post-Master/Post-Baccalaureate	2	8	17	16	11	4	9	21	21	33	29
Reentry Supplements	—	—	3	2	1	1	3	9	8	5	4
Disability Supplements	5	4	3	2	2	4	1	—	2	2	2
Total, Research Supplements Program	**151**	**176**	**176**	**200**	**178**	**175**	**169**	**188**	**189**	**184**	**190**

NHLBI Research Supplements Program by Award Type on Contracts: Fiscal Years 2002–2012

	Number of Awards										
	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Diversity Supplements											
Investigator	—	—	1	2	1	2	2	4	3	3	1
Postdoctoral	—	2	1	2	1	1	0	1	4	4	5
Graduate	—	2	7	7	2	5	2	5	5	6	7
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**	**13**	**13**

NHLBI Research Supplements Program Obligations by Award Type on Grants: Fiscal Years 2002–2012

Dollars (Thousands)

	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Diversity Supplements											
Investigator	$ 5,046	$3,844	$ 4,256	$ 3,552	$ 3,343	$ 3,719	$ 3,285	$ 2,679	$ 2,183	$ 1,601	$ 2,209
Postdoctoral	2,554	2,655	2,713	3,432	3,542	3,284	3,074	3,284	3,928	3,595	4,173
Graduate	1,864	2,181	2,439	3,208	3,114	3,021	3,029	3,212	3,533	3,389	3,176
Undergraduate	260	301	282	179	178	350	424	386	240	151	139
High School	33	33	13	30	18	16	26	28	61	75	64
Post-Master/Post-Baccalaureate	65	309	597	618	352	156	367	823	1,076	1,284	1,140
Reentry Supplements	—	—	495	96	132	245	401	887	1,050	621	431
Disability Supplements	474	360	143	99	133	288	98	—	177	165	164
Total, Research Supplements Program	**$10,296**	**$9,683**	**$10,938**	**$11,214**	**$10,812**	**$11,079**	**$10,704**	**$11,299**	**$12,248**	**$10,881**	**$11,496**

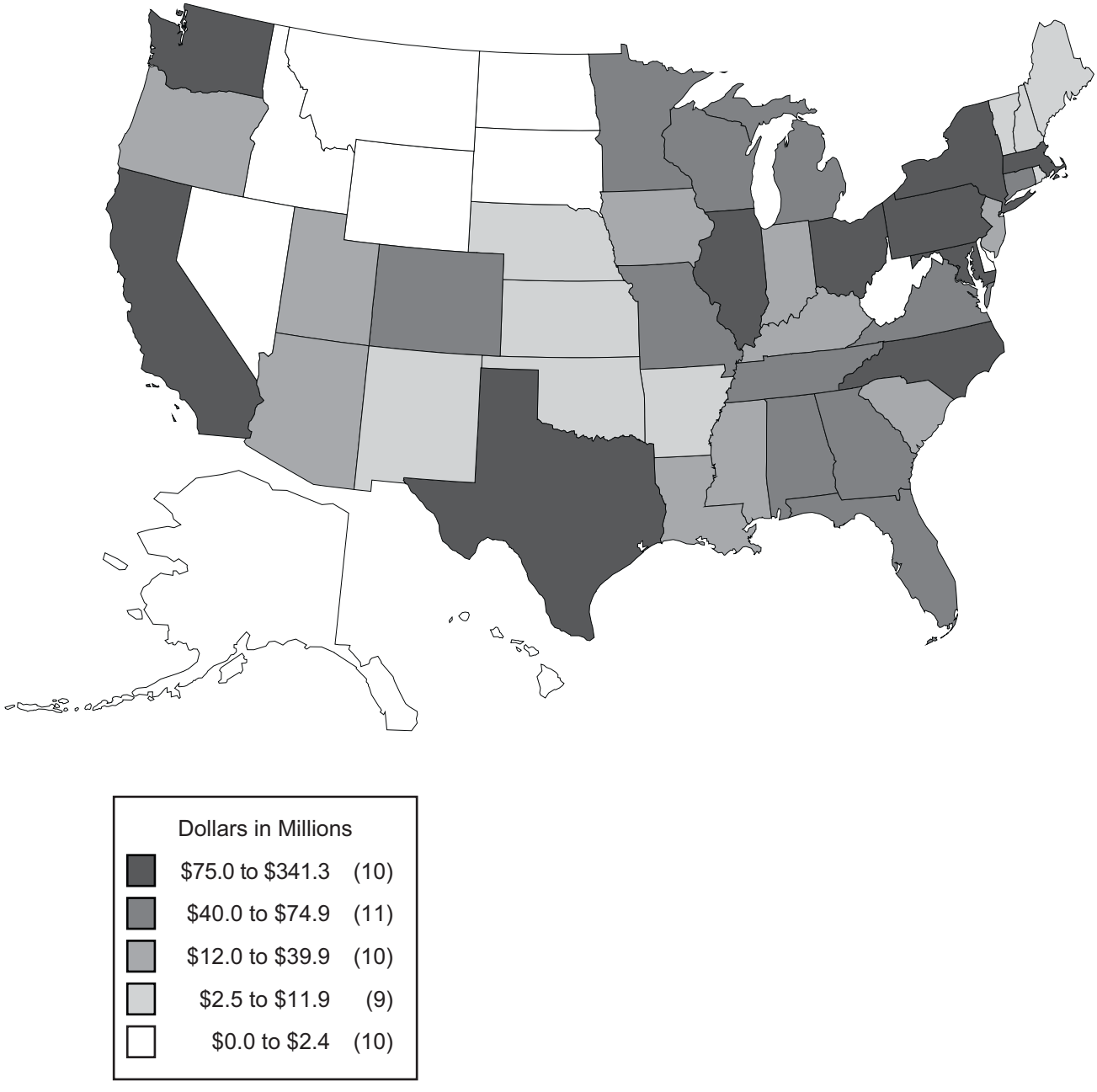
NHLBI Research Supplements Program Obligations by Award Type on Contracts: Fiscal Years 2002–2012

Dollars (Thousands)

	Fiscal Year										
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Diversity Supplements											
Investigator	$ —	$ —	$142	$296	$148	$261	$271	$541	$376	$420	$139
Postdoctoral	—	246	71	137	62	62	—	155	391	245	354
Graduate	—	108	323	229	101	294	79	155	143	215	226
Undergraduate	—	—	—	—	26	13	20	16	8	—	—
High School	—	7	—	—	—	—	—	—	—	—	—
Post-Master/Post-Baccalaureate	—	—	51	—	—	—	—	—	—	—	—
Total, Research Supplements Program	**$ —**	**$361**	**$587**	**$662**	**$337**	**$630**	**$370**	**$867**	**$918**	**$880**	**$719**

14. Geographic Distribution of Awards: Fiscal Year 2012

Geographic Distribution of Awards by State: Fiscal Year 2012



Geographic Distribution of Awards by State or Country: Fiscal Year 2012

	Totals		Grants		Research Training and Career Development		Contracts	
Institution	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**
Alabama								
Auburn University	2	$ 883,118	2	$ 883,118	—	$ —	—	$ —
Exscien Corporation	1	154,758	1	154,758	—	—	—	—
University of Alabama at Birmingham	69	33,537,236	59	24,447,307	7	1,768,223	3	7,321,706
University of South Alabama	16	5,708,649	13	5,428,811	3	279,838	—	—
Total Alabama	**88**	**40,283,761**	**75**	**30,913,994**	**10**	**2,048,061**	**3**	**7,321,706**
Arizona								
Arizona State University, Tempe	3	1,240,234	3	1,240,234	—	—	—	—
Carl T. Hayden Medical Research Foundation	1	603,004	1	603,004	—	—	—	—
Genomics USA, Inc.	1	105,000	1	105,000	—	—	—	—
Mayo Clinic in Arizona	2	792,000	2	792,000	—	—	—	—
Translational Genomics Research Institute	1	563,427	1	563,427	—	—	—	—
University of Arizona	27	10,409,905	24	9,449,455	3	960,450	—	—
Total Arizona	**35**	**13,713,570**	**32**	**12,753,120**	**3**	**960,450**	**—**	**—**
Arkansas								
Arkansas Children's Hospital Research Institute	2	521,564	2	521,564	—	—	—	—
Ocean NanoTech, LLC	1	199,770	1	199,770	—	—	—	—
University of Arkansas Medical Sciences, Little Rock	9	2,675,243	8	2,645,040	1	30,203	—	—
Total Arkansas	**12**	**3,396,577**	**11**	**3,366,374**	**1**	**30,203**	—	—
California								
23andme, Inc.	1	143,253	1	143,253	—	—	—	—
Allosteros Therapeutics, Inc.	1	257,362	1	257,362	—	—	—	—
American Stem Cell, Inc.	1	156,754	1	156,754	—	—	—	—
Astraea Therapeutics, LLC	1	256,893	1	256,893	—	—	—	—
AvantGen	1	990,779	—	—	—	—	1	990,779
Beckman Research Institutes	7	3,820,986	6	1,943,841	—	—	1	1,877,145
Blood System, Inc.	8	2,212,846	6	1,755,510	—	—	2	457,336
California Institute of Technology	3	183,834	1	89,370	2	94,464	—	—
California Pacific Medical Center Research Institute	2	2,592,815	2	2,592,815	—	—	—	—
California Polytechnic State University	1	694,954	1	694,954	—	—	—	—
California State University, Northridge	1	309,915	1	309,915	—	—	—	—
Capricor, Inc.	1	425,410	1	425,410	—	—	—	—
Cedars-Sinai Medical Center	11	4,381,418	10	4,319,388	1	62,030	—	—
Children's Hospital & Research Center Oakland	8	5,690,199	7	5,481,181	1	209,018	—	—
Children's Hospital Los Angeles	5	1,848,551	5	1,848,551	—	—	—	—

	Totals		Grants		Research Training and Career Development		Contracts	
Institution	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars
Cognionics	1	199,999	1	199,999	—	—	—	—
Cytograft Tissue Engineering, Inc.	1	705,170	1	705,170	—	—	—	—
HeartVista, Inc.	1	554,982	1	554,982	—	—	—	—
Hememics Biotechnologies, Inc.	1	185,480	1	185,480	—	—	—	—
J. David Gladstone Institutes	7	6,779,036	6	6,725,094	1	53,942	—	—
JMML Foundation	—	5,000	—	5,000	—	—	—	—
Kaiser Permanente Division of Research	4	4,487,105	3	3,807,001	—	—	1	680,104
LA BioMedical Research Institute at Harbor-ULCA Medical Center	3	1,027,683	2	288,770	—	—	1	738,913
La Jolla Bioengineering Institute	1	721,818	1	721,818	—	—	—	—
La Jolla Institute for Allergy & Immunology	8	6,156,228	7	6,122,996	1	33,232	—	—
Larta Institute of Los Angeles	—	2,082	—	—	—	—	—	2,082
Lawrence Berkeley National Laboratory	3	1,948,143	3	1,948,143	—	—	—	—
Loma Linda University	3	1,088,835	3	1,088,835	—	—	—	—
Maxwell Sensors, Inc.	1	497,892	1	497,892	—	—	—	—
Molecular Express, Inc.	1	953,604	1	953,604	—	—	—	—
Northern California Institute Research and Education	4	1,585,193	4	1,585,193	—	—	—	—
OrPro Therapeutics, Inc.	1	183,089	1	183,089	—	—	—	—
Palo Alto Institute for Research and Education, Inc.	5	1,758,998	5	1,758,998	—	—	—	—
Palo Alto Medical Foundation Research Institute	2	1,128,181	2	1,128,181	—	—	—	—
Planet Biotechnology, Inc.	1	282,629	1	282,629	—	—	—	—
Plasalus, LLC	1	178,706	1	178,706	—	—	—	—
Prolude Medical, Inc.	1	197,725	1	197,725	—	—	—	—
Pulsentry, Inc.	1	199,990	1	199,990	—	—	—	—
Rand Corporation	3	1,051,594	3	1,051,594	—	—	—	—
Salk Institute for Biological Studies	3	1,173,822	3	1,173,822	—	—	—	—
San Diego State University	9	4,358,344	9	4,258,392	—	—	—	99,952
San Francisco State University	1	145,007	1	145,007	—	—	—	—
Sanford-Burnham Medical Research Institute	11	5,724,374	11	5,724,374	—	—	—	—
Scripps Research Institute	21	10,344,372	20	10,292,182	1	52,190	—	—
Silicon BioDevices, Inc.	1	100,000	1	100,000	—	—	—	—
Sonoma State University	1	356,987	1	356,987	—	—	—	—
SRI International	3	3,514,676	1	595,303	—	—	2	2,919,373
Stanford University	72	36,761,092	60	30,856,354	10	1,787,508	2	4,117,230
Tristan Technologies, Inc.	1	327,086	1	327,086	—	—	—	—
University of California, Berkeley	7	2,249,425	6	2,218,084	1	31,341	—	—
University of California, Davis	38	15,091,471	35	14,338,523	3	752,948	—	—
University of California, Irvine	15	5,536,284	13	5,449,582	2	86,702	—	—
University of California, Los Angeles	70	40,599,586	57	33,319,369	10	1,408,702	3	5,871,515
University of California, Merced	3	762,828	3	762,828	—	—	—	—
University of California, Riverside	3	968,370	3	968,370	—	—	—	—

	Totals		Grants		Research Training and Career Development		Contracts	
Institution	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**
University of California, San Diego	85	46,936,206	74	44,973,969	11	1,962,237	—	—
University of California, San Francisco	117	46,867,768	99	43,783,568	14	2,055,834	4	1,028,366
University of Southern California	18	8,667,319	18	8,667,319	—	—	—	—
Vala Sciences, Inc.	1	221,765	1	221,765	—	—	—	—
Veterans Medical Research Foundation, San Diego	3	966,349	3	966,349	—	—	—	—
Virogenics, Inc.	1	699,475	1	699,475	—	—	—	—
Total California	**590**	**288,217,737**	**515**	**260,844,794**	**58**	**8,590,148**	**17**	**18,782,795**
Colorado								
Colorado State University, Fort Collins	3	1,128,187	3	1,128,187	—	—	—	—
Denver Health and Hospital Authority	1	354,328	—	—	—	—	1	354,328
Keystone Symposia	4	51,800	4	51,800	—	—	—	—
National Jewish Health	26	16,000,995	24	15,095,915	1	53,942	1	851,138
QuSpin	1	197,447	1	197,447	—	—	—	—
Sharklet Technologies, Inc.	1	203,004	1	203,004	—	—	—	—
University of Colorado, Boulder	6	1,919,036	5	1,666,095	1	252,941	—	—
University of Colorado, Denver	62	24,044,547	57	21,943,386	4	1,596,254	1	504,907
ValveXchange, Inc.	1	1,077,042	1	1,077,042	—	—	—	—
Total Colorado	**105**	**44,976,386**	**96**	**41,362,876**	**6**	**1,903,137**	**3**	**1,710,373**
Connecticut								
Connecticut Children's Medical Center	1	121,230	1	121,230	—	—	—	—
Hartford Hospital	1	342,540	1	342,540	—	—	—	—
John B. Pierce Laboratory, Inc.	1	207,612	1	207,612	—	—	—	—
University of Connecticut Health Center	4	2,825,678	4	2,825,678	—	—	—	—
University of Connecticut, Storrs	5	1,037,894	3	971,995	2	65,899	—	—
Yale University	88	38,948,528	78	36,972,772	9	1,960,879	1	14,877
Total Connecticut	**100**	**43,483,482**	**88**	**41,441,827**	**11**	**2,026,778**	**1**	**14,877**
Delaware								
University of Delaware	2	575,482	2	575,482	—	—	—	—
Total Delaware	**2**	**575,482**	**2**	**575,482**	**—**	**—**	**—**	**—**
District of Columbia								
American Institutes for Research	3	2,791,716	—	—	—	—	3	2,791,716
American Society of Hematology	1	38,470	1	38,470	—	—	—	—
Children's Research Institute	6	2,056,982	4	1,661,523	1	73,004	1	322,455
George Washington University	9	4,161,922	9	4,161,922	—	—	—	—
Georgetown University	2	721,834	2	721,834	—	—	—	—
Howard University	3	666,734	2	329,158	—	—	1	337,576
Ogilvy Public Relations	2	3,172,718	—	—	—	—	2	3,172,718

	Totals		Grants		Research Training and Career Development		Contracts	
Institution	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**
Porter Novelli Public Services	1	399,995	—	—	—	—	1	399,995
U.S. Census Bureau	1	548,000	—	—	—	—	1	548,000
Total District of Columbia	**28**	**14,558,371**	**18**	**6,912,907**	**1**	**73,004**	**9**	**7,572,460**
Florida								
Altor Bioscience Corporation	1	1,062,358	1	1,062,358	—	—	—	—
ArchieMD, Inc.	2	1,445,759	1	488,927	—	—	1	956,832
Florida Atlantic University	1	433,500	1	433,500	—	—	—	—
Florida State University	1	249,000	1	249,000	—	—	—	—
H. Lee Moffitt Cancer Center and Research Institute	1	172,845	1	172,845	—	—	—	—
Mount Sinai Medical Center (Miami Beach)	—	908,302	—	908,302	—	—	—	—
Nemours Children's Clinic	2	646,330	2	646,330	—	—	—	—
Nova Southeastern University	1	332,794	1	332,794	—	—	—	—
Torrey Pines Institute for Molecular Studies	1	608,277	1	608,277	—	—	—	—
University of Central Florida	4	1,515,264	4	1,515,264	—	—	—	—
University of Florida	31	16,979,556	30	16,932,442	1	47,114	—	—
University of Miami School of Medicine	26	14,161,022	24	13,517,280	1	354,473	1	289,269
University of South Florida	4	1,778,183	4	1,778,183	—	—	—	—
Total Florida	**75**	**40,293,190**	**71**	**38,645,502**	**2**	**401,587**	**2**	**1,246,101**
Georgia								
Emory University	61	27,337,403	56	26,472,413	5	864,990	—	—
Expression Therapeutics	2	674,776	2	674,776	—	—	—	—
Georgia Health Sciences University	26	14,438,751	23	14,201,625	3	237,126	—	—
Georgia Institute of Technology	4	1,611,640	4	1,611,640	—	—	—	—
Georgia State University	1	212,276	1	212,276	—	—	—	—
MedShape Solutions, Inc.	2	703,255	2	703,255	—	—	—	—
Morehouse School of Medicine	7	1,744,883	7	1,744,883	—	—	—	—
Northside Hospital, Atlanta	1	103,500	1	103,500	—	—	—	—
Syntermed, Inc.	1	1,030,238	1	1,030,238	—	—	—	—
U.S. Centers for Disease Control and Prevention	1	631,637	—	—	—	—	1	631,637
University of Georgia	5	1,791,931	5	1,791,931	—	—	—	—
Virtually Better, Inc.	1	225,465	1	225,465	—	—	—	—
Total Georgia	**112**	**50,505,755**	**103**	**48,772,002**	**8**	**1,102,116**	**1**	**631,637**
Hawaii								
University of Hawaii, Manoa	6	2,350,720	5	2,215,266	1	135,454	—	—
Total Hawaii	**6**	**2,350,720**	**5**	**2,215,266**	**1**	**135,454**	**—**	**—**
Idaho								
Idaho State University	1	346,342	1	346,342	—	—	—	—
Total Idaho	**1**	**346,342**	**1**	**346,342**	**—**	**—**	**—**	**—**

	Totals		Grants		Research Training and Career Development		Contracts	
Institution	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**
Illinois								
Aqualung Therapeutics, Corp.	1	310,267	1	310,267	—	—	—	—
Biomedical Acoustics Research Company	1	266,543	1	266,543	—	—	—	—
Coramed Technologies	1	968,613	1	968,613	—	—	—	—
Illinois Institute of Technology	2	565,325	2	565,325	—	—	—	—
International Society of Experimental Hematology	—	5,000	—	5,000	—	—	—	—
Loyola University, Chicago	12	3,627,446	10	3,526,272	2	101,174	—	—
Lurie Children's Hospital of Chicago	5	919,399	5	919,399	—	—	—	—
Northern Illinois University	1	354,358	1	354,358	—	—	—	—
Northshore University HealthSystem	1	483,586	1	483,586	—	—	—	—
Northwestern University	76	32,913,847	63	29,563,247	11	1,414,501	2	1,936,099
ROS Technologies, Inc.	1	269,803	1	269,803	—	—	—	—
Rosalind Franklin University of Medicine and Science	2	757,625	2	757,625	—	—	—	—
Rush University Medical Center	14	7,737,335	14	7,737,335	—	—	—	—
University of Chicago	40	15,259,758	36	14,132,223	4	1,127,535	—	—
University of Illinois, Chicago	60	32,779,073	54	30,781,155	6	1,997,918	—	—
University of Illinois, Urbana-Champaign	13	3,368,227	8	3,141,970	5	226,257	—	—
Total Illinois	**230**	**100,586,205**	**200**	**93,782,721**	**28**	**4,867,385**	**2**	**1,936,099**
Indiana								
Emphymab Biotech, LLC	1	166,473	1	166,473	—	—	—	—
Indiana University-Purdue University at Indianapolis	47	18,123,267	38	16,133,249	8	1,262,228	1	727,790
Purdue University, West Lafayette	3	896,778	3	896,778	—	—	—	—
University of Notre Dame	2	772,388	2	772,388	—	—	—	—
Total Indiana	**53**	**19,958,906**	**44**	**17,968,888**	**8**	**1,262,228**	**1**	**727,790**
Iowa								
Des Moines University-Osteopathic Medical Center	1	361,537	1	361,537	—	—	—	—
Exemplar Genetics, LLC	1	606,442	1	606,442	—	—	—	—
Medical Imaging Applications, LLC	1	124,454	1	124,454	—	—	—	—
University of Iowa	62	33,433,763	55	30,730,494	7	2,703,269	—	—
Vida Diagnostics, Inc.	1	263,879	1	263,879	—	—	—	—
Total Iowa	**66**	**34,790,075**	**59**	**32,086,806**	**7**	**2,703,269**	**—**	**—**
Kansas								
Kansas State University	—	13,116	—	—	—	13,116	—	—
Pinnacle Technology, Inc.	1	403,574	1	403,574	—	—	—	—
University of Kansas, Lawrence	1	700,071	1	700,071	—	—	—	—
University of Kansas Medical Center	5	1,669,572	5	1,669,572	—	—	—	—
Total Kansas	**7**	**2,786,333**	**7**	**2,773,217**	**—**	**13,116**	**—**	**—**

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars
Kentucky								
Noveratech, LLC	1	199,825	1	199,825	—	—	—	—
Pharmacogenetics Diagnostic Laboratories	1	1,005,004	1	1,005,004	—	—	—	—
SCR, Inc.	1	674,196	1	674,196	—	—	—	—
University of Kentucky	20	6,517,756	16	6,046,908	4	470,848	—	—
University of Louisville	20	10,676,942	19	10,310,420	1	366,522	—	—
W-Z Biotech, LLC	1	155,754	1	155,754	—	—	—	—
Total Kentucky	**44**	**19,229,477**	**39**	**18,392,107**	**5**	**837,370**	**—**	**—**
Louisiana								
Children's Hospital, New Orleans	1	237,837	1	237,837	—	—	—	—
Louisiana State University and A&M College	2	701,533	2	701,533	—	—	—	—
Louisiana State University Health Sciences Center, New Orleans	7	3,208,097	5	3,064,225	1	23,609	1	120,263
Louisiana State University Health Sciences Center, Shreveport	5	1,761,717	5	1,761,717	—	—	—	—
Louisiana State University Pennington Biomedical Research Center	1	814,990	1	814,990	—	—	—	—
Tulane University of Louisiana	14	5,798,711	13	5,658,231	1	140,480	—	—
Total Louisiana	**30**	**12,522,885**	**27**	**12,238,533**	**2**	**164,089**	**1**	**120,263**
Maine								
Jackson Laboratory	4	2,315,058	4	2,315,058	—	—	—	—
Maine Medical Center	3	1,207,751	3	1,207,751	—	—	—	—
University of Maine, Orono	1	532,376	1	532,376	—	—	—	—
Total Maine	**8**	**4,055,185**	**8**	**4,055,185**	**—**	**—**	**—**	**—**
Maryland								
Advance BioScience Laboratories, Inc.	1	1,615,237	—	—	—	—	1	1,615,237
American Institutes for Research	2	1,602,762	—	—	—	—	2	1,602,762
American Physiological Society	2	175,640	2	175,640	—	—	—	—
American Society for Biochemistry and Molecular Biology	1	8,000	1	8,000	—	—	—	—
Aplastic Anemia & MDS International Foundation	1	5,000	1	5,000	—	—	—	—
BIOQUAL, Inc.	1	1,119,326	—	—	—	—	1	1,119,326
CDM Group, Inc.	1	466,000	—	—	—	—	1	466,000
Clinical Trials & Surveys Corporation	1	4,770,339	—	—	—	—	1	4,770,339
Danya International	2	286,000	—	—	—	—	2	286,000
EMMES Corporation	1	1,186,648	—	—	—	—	1	1,186,648
Federation of American Society for Experimental Biology	3	30,000	3	30,000	—	—	—	—
Fisher BioServices, Inc.	1	5,546,674	—	—	—	—	1	5,546,674

	Totals		Grants		Research Training and Career Development		Contracts	
Institution	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**
Henry M. Jackson Foundation for the Advancement of Military Medicine	1	378,675	1	378,675	—	—	—	—
Intelligent Automation, Inc.	—	150,000	—	—	—	—	—	150,000
IQ Solutions, Inc.	1	2,079,184	—	—	—	—	1	2,079,184
Johns Hopkins University	177	92,457,424	150	80,038,589	18	3,375,213	9	9,043,622
Key Technologies, Inc.	1	161,051	1	161,051	—	—	—	—
Medical Decision Logic, Inc.	1	120,498	1	120,498	—	—	—	—
MedStar Health Research Institute	1	326,937	1	326,937	—	—	—	—
National Center for Health Statistics	2	2,799,000	—	—	—	—	2	2,799,000
National Human Genome Research Institute	1	185,000	—	—	—	—	1	185,000
National Institutes of Health	17	107,493,615	—	—	—	—	17	107,493,615
North American Vascular Biology Organization	1	15,000	1	15,000	—	—	—	—
Pulmonary Hypertension Association	1	10,000	1	10,000	—	—	—	—
Science Applications International Corporation	1	449,977	—	—	—	—	1	449,977
Scientific Consulting Group, Inc.	1	22,997	—	—	—	—	1	22,997
SeraCare BioServices	2	3,217,643	—	—	—	—	2	3,217,643
Social and Scientific Systems, Inc.	1	2,916,918	—	—	—	—	1	2,916,918
TAJ Technology	—	350,000	—	—	—	—	—	350,000
U.S. Department of Health and Human Services Supply Service Center	2	1,386,500	—	—	—	—	2	1,386,500
U.S. Food and Drug Administration	2	240,000	—	—	—	—	2	240,000
University of Maryland, College Park	3	598,555	3	598,555	—	—	—	—
University of Maryland, Baltimore	43	23,672,813	39	21,498,234	3	633,879	1	1,540,700
Westat	2	2,606,149	—	—	—	—	2	2,606,149
Total Maryland	**278**	**258,449,562**	**205**	**103,366,179**	**21**	**4,009,092**	**52**	**151,074,291**
Massachusetts								
Baystate Medical Center	2	630,975	1	293,599	—	—	1	337,376
Beth Israel Deaconess Medical Center	53	33,012,943	47	31,230,616	6	1,782,327	—	—
BioSurfaces	1	369,422	1	369,422	—	—	—	—
Boston Biomedical Research Institute	2	1,267,076	2	1,267,076	—	—	—	—
Boston Children's Hospital	47	25,797,846	42	23,904,635	5	1,893,211	—	—
Boston University Medical Campus	62	38,777,209	54	26,049,481	6	2,113,188	2	10,614,540
Brigham and Women's Hospital	176	108,799,022	164	103,713,598	10	3,559,700	2	1,525,724
Cardiovascular Engineering, Inc.	1	640,800	1	640,800	—	—	—	—
Charles Stark Draper Laboratory	1	305,777	1	305,777	—	—	—	—
Circadian Management, Inc.	1	144,887	1	144,887	—	—	—	—
Dana-Farber Cancer Institute	9	5,505,995	9	5,505,995	—	—	—	—
Dimagi, Inc.	1	247,729	—	—	—	—	1	247,729
DNA Medicine Institute	1	486,288	1	486,288	—	—	—	—
Factor Bioscience, Inc.	—	42,641	—	42,641	—	—	—	—
Giner, Inc.	1	299,667	1	149,983	—	—	—	149,684
Harvard Pilgrim Health Care, Inc.	2	679,059	2	679,059	—	—	—	—

	Totals		Grants		Research Training and Career Development		Contracts	
Institution	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**
Harvard University	28	16,197,228	24	15,030,275	4	1,166,953	—	—
Heartlander Surgical, Inc.	1	346,699	1	346,699	—	—	—	—
Immune Disease Institute, Inc.	7	7,460,434	5	4,494,057	1	52,190	1	2,914,187
Immunetics, Inc.	1	3,667,660	—	—	—	—	1	3,667,660
Infoscitex Corporation	2	950,899	2	950,899	—	—	—	—
Joslin Diabetes Center	3	2,365,749	3	2,365,749	—	—	—	—
Massachusetts General Hospital	79	38,984,710	73	34,987,890	4	896,755	2	3,100,065
Massachusetts Institute of Technology	4	1,052,449	2	949,293	2	103,156	—	—
Med-Conduit, Inc.	1	225,659	1	225,659	—	—	—	—
Mirtech, Inc.	1	249,943	1	249,943	—	—	—	—
National Bureau of Economic Research	1	336,704	1	336,704	—	—	—	—
New England Research Institutes, Inc.	6	25,758,354	4	20,193,199	—	—	2	5,565,155
Northeastern University	1	249,909	1	249,909	—	—	—	—
Phoenicia Biosciences, Inc.	1	491,254	1	491,254	—	—	—	—
Physical Sciences, Inc.	1	552,075	1	552,075	—	—	—	—
Radiation Monitoring Devices	1	299,844	—	—	—	—	1	299,844
Radikal Therapeutics, Inc.	4	1,172,209	4	1,172,209	—	—	—	—
SignaBlok, Inc.	1	221,829	1	221,829	—	—	—	—
Springfield College	—	23,186	—	23,186	—	—	—	—
Sterling Point Research, LLC	1	248,644	1	248,644	—	—	—	—
Steward Research and Specialty Projects Corporation	1	210,125	1	210,125	—	—	—	—
Tufts Medical Center	22	8,593,823	21	8,085,327	1	508,496	—	—
Tufts University, Boston	9	2,840,891	6	2,673,866	3	167,025	—	—
Tufts University, Medford	3	504,433	2	455,219	1	49,214	—	—
University of Massachusetts, Amherst	2	866,214	2	866,214	—	—	—	—
University of Massachusetts Medical School	26	10,395,848	25	10,340,178	1	55,670	—	—
Total Massachusetts	**567**	**341,274,108**	**510**	**300,504,259**	**44**	**12,347,885**	**13**	**28,421,964**
Michigan								
Arbor Ultrasound Technologies, LLC	1	237,534	1	237,534	—	—	—	—
Central Michigan University	1	351,478	1	351,478	—	—	—	—
Henry Ford Health System	7	4,607,522	7	4,607,522	—	—	—	—
Integrated Sensing Systems, Inc.	1	792,919	1	792,919	—	—	—	—
Magnetic Resonance Innovations, Inc.	1	80,077	1	80,077	—	—	—	—
MC3, Inc.	4	1,775,680	4	1,775,680	—	—	—	—
MedArray, Inc.	1	993,024	1	993,024	—	—	—	—
Michigan State University	10	4,687,897	9	4,648,336	1	39,561	—	—
Michigan Technological University	1	459,600	1	459,600	—	—	—	—
Phrixus Pharmaceuticals, Inc.	1	622,877	1	622,877	—	—	—	—
University of Michigan	103	47,227,360	95	44,456,961	5	1,586,916	3	1,183,483
Wayne State University	13	5,165,261	12	5,131,138	1	34,123	—	—
Total Michigan	**144**	**67,001,229**	**134**	**64,157,146**	**7**	**1,660,600**	**3**	**1,183,483**

	Totals		Grants		Research Training and Career Development		Contracts	
Institution	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**
Minnesota								
Advanced Circulatory Systems, Inc.	1	883,421	1	883,421	—	—	—	—
Advanced Medical Electronics Corporation	1	192,708	1	192,708	—	—	—	—
Discovery Genomics, Inc.	1	570,317	1	570,317	—	—	—	—
HealthPartners Research Foundation	4	2,575,456	4	2,575,456	—	—	—	—
Innovative Surface Technologies, Inc.	1	582,323	1	582,323	—	—	—	—
Koronis Biomedical Technologies Corporation	1	179,530	1	179,530	—	—	—	—
Mayo Clinic, Rochester	54	24,505,339	48	22,930,134	3	371,855	3	1,203,350
Minnesota HealthSolutions Corporation	1	175,843	1	175,843	—	—	—	—
Minnetronix, Inc.	3	3,394,296	3	3,394,296	—	—	—	—
ResQSystems, Inc.	2	627,784	2	627,784	—	—	—	—
University of Minnesota, Twin Cities	71	37,127,636	58	29,486,709	9	1,744,035	4	5,896,892
VivaQuant, LLC	1	196,613	1	196,613	—	—	—	—
Total Minnesota	**141**	**71,011,266**	**122**	**61,795,134**	**12**	**2,115,890**	**7**	**7,100,242**
Mississippi								
Jackson State University	1	3,923,109	—	—	—	—	1	3,923,109
Tougaloo College	1	1,248,238	—	—	—	—	1	1,248,238
University of Mississippi Medical Center	23	11,501,221	18	8,538,981	2	440,144	3	2,522,096
Total Mississippi	**25**	**16,672,568**	**18**	**8,538,981**	**2**	**440,144**	**5**	**7,693,443**
Missouri								
APT Therapeutics, Inc.	2	1,011,238	2	1,011,238	—	—	—	—
CardiaLen, Inc.	1	250,742	1	250,742	—	—	—	—
Children's Mercy Hospital, Kansas City	1	253,466	1	253,466	—	—	—	—
Evas Therapeutics, LLC	1	727,207	1	727,207	—	—	—	—
Nanova, Inc.	1	729,898	1	729,898	—	—	—	—
Saint Louis University	9	3,233,027	9	3,233,027	—	—	—	—
Saint Luke's Hospital	2	355,580	2	355,580	—	—	—	—
University of Missouri, Columbia	22	9,675,269	21	9,569,137	1	106,132	—	—
University of Missouri, Kansas City	2	387,140	1	225,000	1	162,140	—	—
Vasculox, Inc.	1	706,733	1	706,733	—	—	—	—
Washington University	125	49,012,275	104	44,805,493	20	3,903,195	1	303,587
Total Missouri	**167**	**66,342,575**	**144**	**61,867,521**	**22**	**4,171,467**	**1**	**303,587**
Montana								
Montana State University, Bozeman	3	1,068,750	3	1,068,750	—	—	—	—
University of Montana	1	409,954	1	409,954	—	—	—	—
Total Montana	**4**	**1,478,704**	**4**	**1,478,704**	**—**	**—**	**—**	**—**

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars
Nebraska								
Creighton University	5	2,610,150	5	2,610,150	—	—	—	—
University of Nebraska, Lincoln	1	257,813	1	257,813	—	—	—	—
University of Nebraska Medical Center	8	4,136,090	6	4,031,710	2	104,380	—	—
Total Nebraska	**14**	**7,004,053**	**12**	**6,899,673**	**2**	**104,380**	**—**	**—**
Nevada								
University of Nevada, Reno	4	1,201,030	4	1,201,030	—	—	—	—
Total Nevada	**4**	**1,201,030**	**4**	**1,201,030**	**—**	**—**	**—**	**—**
New Hampshire								
Celdara Medical, LLC	3	3,146,123	3	3,146,123	—	—	—	—
Dartmouth College	8	2,451,463	8	2,451,463	—	—	—	—
Xemed, LLC	4	1,716,884	4	1,716,884	—	—	—	—
Total New Hampshire	**15**	**7,314,470**	**15**	**7,314,470**	**—**	**—**	**—**	**—**
New Jersey								
3D Biotek, LLC	1	237,965	1	237,965	—	—	—	—
Allied Innovative Systems, LLC	1	148,988	1	148,988	—	—	—	—
Angel Medical Systems, Inc.	1	779,680	1	779,680	—	—	—	—
DVX, LLC	2	963,070	2	963,070	—	—	—	—
HDL Apomics, LLC	1	139,291	—	—	—	—	1	139,291
Menssana Research, Inc.	1	985,147	1	985,147	—	—	—	—
Newark Beth Israel Medical Center	1	97,881	1	97,881	—	—	—	—
Princeton University	1	201,250	1	201,250	—	—	—	—
Rutgers, The State University of New Jersey, New Brunswick	2	754,479	2	754,479	—	—	—	—
University of Medicine & Dentistry of New Jersey, New Jersey Medical School	19	8,508,636	18	8,298,802	1	209,834	—	—
Vasade Biosciences, Inc.	2	373,599	2	373,599	—	—	—	—
Total New Jersey	**32**	**13,189,986**	**30**	**12,840,861**	**1**	**209,834**	**1**	**139,291**
New Mexico								
Lovelace Biomedical & Environmental Research	4	4,689,666	2	974,765	—	—	2	3,714,901
University of New Mexico Health Sciences Center	8	2,220,865	7	1,951,084	1	269,781	—	—
VisionQuest Biomedical, LLC	1	141,595	1	141,595	—	—	—	—
Total New Mexico	**13**	**7,052,126**	**10**	**3,067,444**	**1**	**269,781**	**2**	**3,714,901**
New York								
Albany College of Pharmacy	1	347,369	1	347,369	—	—	—	—
Albany Medical College	9	3,221,404	8	3,162,382	1	59,022	—	—

	Totals		Grants		Research Training and Career Development		Contracts	
Institution	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**
Albert Einstein College of Medicine, Yeshiva University	23	11,409,636	21	11,191,818	2	217,818	—	—
Angion Biomedica Corporation	2	728,038	2	728,038	—	—	—	—
Barth Syndrome Foundation	1	10,000	1	10,000	—	—	—	—
Biomedica Management Corporation	1	965,052	1	965,052	—	—	—	—
Circulatory Technology, Inc.	1	881,425	1	881,425	—	—	—	—
City College of New York	3	1,132,521	3	1,132,521	—	—	—	—
Columbia University	79	33,323,888	71	30,514,294	6	1,445,115	2	1,364,479
Cornell University, Ithaca	9	4,040,811	9	4,040,811	—	—	—	—
Feinstein Institute for Medical Research	2	825,850	2	825,850	—	—	—	—
General Electric Global Research Center	1	840,483	1	840,483	—	—	—	—
Hospital for Special Surgery	1	167,016	1	167,016	—	—	—	—
Ithaca College	1	116,527	1	116,527	—	—	—	—
Jarvik Heart, Inc.	1	2,374,496	—	—	—	—	1	2,374,496
Kognito Solutions, LLC	1	149,747	1	149,747	—	—	—	—
Masonic Medical Research Laboratory, Inc.	2	491,442	1	437,500	1	53,942	—	—
Mount Sinai School of Medicine	31	17,660,774	28	17,190,018	3	470,756	—	—
New York Blood Center	4	1,054,465	4	1,054,465	—	—	—	—
New York Institute of Technology	1	356,079	1	356,079	—	—	—	—
New York Medical College	8	3,567,663	5	3,444,281	3	123,382	—	—
New York University School of Medicine	35	27,000,124	31	26,271,512	4	728,612	—	—
NOHMs Technologies	1	149,651	—	—	—	—	1	149,651
Pulmokine, Inc.	2	1,638,952	2	1,638,952	—	—	—	—
Queens College	1	193,750	1	193,750	—	—	—	—
Rensselaer Polytechnic Institute	1	787,839	1	787,839	—	—	—	—
Research Foundation for the State University of New York	1	244,953	—	—	—	—	1	244,953
Retia Medical, LLC	1	151,360	1	151,360	—	—	—	—
Rockefeller University	2	1,198,604	2	1,198,604	—	—	—	—
Roswell Park Cancer Institute Corporation	2	1,647,502	2	1,647,502	—	—	—	—
Sloan-Kettering Institute for Cancer Research	8	3,464,385	8	3,464,385	—	—	—	—
St. Luke's-Roosevelt Institute for Health Sciences	1	549,810	1	549,810	—	—	—	—
State University of New York, Buffalo	11	4,505,729	11	4,505,729	—	—	—	—
State University New York, Stony Brook	10	4,311,829	10	4,311,829	—	—	—	—
SUNY Downstate Medical Center	4	1,898,123	4	1,898,123	—	—	—	—
Transonic Systems, Inc.	1	225,000	1	225,000	—	—	—	—
University of Buffalo	1	1,540,989	—	—	—	—	1	1,540,989
University of Rochester	57	25,202,251	52	23,991,956	5	1,210,295	—	—
Upstate Medical University	6	1,985,093	6	1,985,093	—	—	—	—
Wadsworth Center	1	389,636	1	389,636	—	—	—	—
Weill Medical College of Cornell University	28	13,772,599	27	13,370,289	1	402,310	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars
Winifred Masterson Burke Medical Research Institute	1	470,206	1	470,206	—	—	—	—
Winthrop-University Hospital	1	249,000	1	249,000	—	—	—	—
Total New York	**358**	**175,242,071**	**326**	**164,856,251**	**26**	**4,711,252**	**6**	**5,674,568**
North Carolina								
BioLink Life Sciences, Inc.	1	94,935	1	94,935	—	—	—	—
Carolinas Medical Center	1	708,641	1	708,641	—	—	—	—
Cognosci, Inc.	1	261,824	1	261,824	—	—	—	—
Duke University	104	65,389,408	92	61,954,282	9	2,389,450	3	1,045,676
East Carolina University	3	651,660	3	651,660	—	—	—	—
Gramercy Research Group, LLC	1	826,802	1	826,802	—	—	—	—
Heart Imaging Technologies, LLC	1	1,000,000	1	1,000,000	—	—	—	—
KeraNetics, LLC	1	374,414	1	374,414	—	—	—	—
NanoCor Therapeutics, Inc.	1	640,383	1	640,383	—	—	—	—
North Carolina State University, Raleigh	4	1,306,956	3	1,122,928	1	184,028	—	—
RTI International	7	8,595,440	3	2,879,524	—	—	4	5,715,916
Rheomics, Inc.	1	241,147	1	241,147	—	—	—	—
TriboFilm Research, Inc.	1	697,580	1	697,580	—	—	—	—
University of North Carolina, Chapel Hill	97	49,200,898	80	38,806,616	12	1,854,623	5	8,539,659
Wake Forest University Health Sciences	37	27,642,338	27	17,792,732	4	1,044,595	6	8,805,011
Total North Carolina	**261**	**157,632,426**	**217**	**128,053,468**	**26**	**5,472,696**	**18**	**24,106,262**
Ohio								
Arteriocyte, Inc.	1	283,861	1	283,861	—	—	—	—
Case Western Reserve University	46	18,647,403	42	17,493,029	4	1,154,374	—	—
ChanTest, Inc.	1	631,859	1	631,859	—	—	—	—
Cincinnati Children's Hospital Medical Center	73	28,359,836	67	27,766,223	6	593,613	—	—
Cleveland Clinic Lerner College of Medicine	57	32,174,663	52	31,287,796	3	138,567	2	748,300
Cleveland State University	2	659,453	2	659,453	—	—	—	—
Faraday Technology, Inc.	1	493,482	1	493,482	—	—	—	—
Kent State University	2	1,324,681	2	1,324,681	—	—	—	—
Northeast Ohio Medical University	4	1,753,813	4	1,753,813	—	—	—	—
NovelMed Therapeutics, Inc.	2	1,324,690	2	1,324,690	—	—	—	—
Ohio State University	38	11,922,243	35	11,191,543	2	109,285	1	621,415
Orbital Research, Inc.	1	162,170	1	162,170	—	—	—	—
P2D, Inc.	1	390,255	1	390,255	—	—	—	—
Perfusion Solutions, Inc.	1	257,631	1	257,631	—	—	—	—
Research Institute Nationwide Children's Hospital	7	1,870,560	5	1,551,527	2	319,033	—	—
University of Akron	1	248,847	1	248,847	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars
University of Cincinnati	27	9,838,033	24	9,336,575	3	501,458	—	—
University of Ohio	1	1,398,356	—	—	—	—	1	1,398,356
University of Toledo Health Science Campus	12	7,640,446	12	7,640,446	—	—	—	—
Wright State University	3	1,047,659	3	1,047,659	—	—	—	—
Total Ohio	**281**	**120,429,941**	**257**	**114,845,540**	**20**	**2,816,330**	**4**	**2,768,071**
Oklahoma								
INTEGRIS Baptist Medical Center	1	225,615	1	225,615	—	—	—	—
Oklahoma Medical Research Foundation	7	4,597,192	7	4,597,192	—	—	—	—
Oklahoma State University, Stillwater	1	364,288	1	364,288	—	—	—	—
Selexys Pharmaceuticals Corporation	1	1,037,638	1	1,037,638	—	—	—	—
University of Oklahoma Health Sciences Center	9	3,782,231	9	3,782,231	—	—	—	—
Vadovations, Inc.	1	260,576	1	260,576	—	—	—	—
Total Oklahoma	**20**	**10,267,540**	**20**	**10,267,540**	**—**	**—**	**—**	**—**
Oregon								
Aronora, LLC	1	999,377	1	999,377	—	—	—	—
Cylerus, Inc.	1	224,765	1	224,765	—	—	—	—
Elex Biotech, LLC	1	349,774	1	349,774	—	—	—	—
Fanconi Anemia Research Fund, Inc.	—	5,000	—	5,000	—	—	—	—
Gamma Therapeutics, Inc.	1	520,320	1	520,320	—	—	—	—
Oregon Center for Applied Science, Inc.	2	1,040,653	2	1,040,653	—	—	—	—
Oregon Health and Science University	38	16,379,032	31	15,060,643	7	1,318,389	—	—
Oregon State University	1	347,804	1	347,804	—	—	—	—
Portland State University	1	361,350	1	361,350	—	—	—	—
University of Oregon	3	632,671	2	595,335	1	37,336	—	—
Total Oregon	**49**	**20,860,746**	**41**	**19,505,021**	**8**	**1,355,725**	**—**	**—**
Pennsylvania								
Accel Diagnostics	1	355,563	1	355,563	—	—	—	—
Carnegie Mellon University	3	1,295,250	3	1,295,250	—	—	—	—
Celsense, Inc.	1	379,160	1	379,160	—	—	—	—
Cereve, Inc.	1	869,234	1	869,234	—	—	—	—
Children's Hospital of Philadelphia	39	21,723,698	35	19,905,111	3	604,919	1	1,213,668
Convance Research Products	1	488,324	—	—	—	—	1	488,324
Drexel University	1	386,250	1	386,250	—	—	—	—
Ension, Inc.	1	1,973,534	—	—	—	—	1	1,973,534
Institute for Transfusion Medicine	1	19,520	—	—	—	—	1	19,520
Magee-Women's Research Institute and Foundation	1	320,903	1	320,903	—	—	—	—
NanoDynamics Life Sciences, Inc.	1	481,885	1	481,885	—	—	—	—
National Disease Research Interchange	—	149,047	—	149,047	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars
Pennsylvania State University Hershey Medical Center	14	15,574,223	13	15,522,033	1	52,190	—	—
Pennsylvania State University Park	3	961,945	3	961,945	—	—	—	—
PinMed, Inc.	2	336,287	1	186,501	—	—	1	149,786
Progenra, Inc.	1	282,804	1	282,804	—	—	—	—
Shifa Biomedical	2	1,132,861	2	1,132,861	—	—	—	—
Swarthmore College	1	280,103	1	280,103	—	—	—	—
Temple University	50	19,809,366	42	17,436,175	6	638,217	2	1,734,974
Thomas Jefferson University	15	5,481,092	14	5,433,860	1	47,232	—	—
U.S. Agricultural Research Service	1	129,186	1	129,186	—	—	—	—
University of Pennsylvania	141	71,987,778	124	66,190,323	16	4,547,082	1	1,250,373
University of Pittsburgh	118	54,691,114	103	50,906,901	12	2,104,675	3	1,679,538
Wistar Institute	4	2,969,768	4	2,969,768	—	—	—	—
Total Pennsylvania	**403**	**202,078,895**	**353**	**185,574,863**	**39**	**7,994,315**	**11**	**8,509,717**
Rhode Island								
Brown University	5	1,199,815	3	1,122,170	2	77,645	—	—
EpiVax, Inc.	1	381,361	1	381,361	—	—	—	—
Gordon Research Conferences	9	109,730	9	109,730	—	—	—	—
Memorial Hospital of Rhode Island	1	680,329	1	680,329	—	—	—	—
Miriam Hospital	4	1,499,383	3	1,208,103	1	291,280	—	—
Rhode Island Hospital	9	3,531,831	8	3,321,805	1	210,026	—	—
Roger Williams Hospital	1	416,962	1	416,962	—	—	—	—
University of Rhode Island	1	292,041	1	292,041	—	—	—	—
Total Rhode Island	**31**	**8,111,452**	**27**	**7,532,501**	**4**	**578,951**	**—**	**—**
South Carolina								
Acxend	1	161,463	1	161,463	—	—	—	—
Clemson University	2	520,660	2	520,660	—	—	—	—
Medical University of South Carolina	26	8,476,593	22	7,305,583	3	947,709	1	223,301
MicroVide, LLC	1	322,296	1	322,296	—	—	—	—
University of South Carolina, Columbia	13	5,263,744	12	5,231,942	1	31,802	—	—
Total South Carolina	**43**	**14,744,756**	**38**	**13,541,944**	**4**	**979,511**	**1**	**223,301**
South Dakota								
South Dakota State University	1	349,667	1	349,667	—	—	—	—
University of South Dakota	2	716,101	2	716,101	—	—	—	—
Total South Dakota	**3**	**1,065,768**	**3**	**1,065,768**	**—**	**—**	**—**	**—**
Tennessee								
East Tennessee State University	1	353,925	1	353,925	—	—	—	—
Meharry Medical College	4	919,273	2	495,170	2	424,103	—	—
St. Jude Children's Research Hospital	12	6,222,507	10	5,837,961	1	55,670	1	328,876

	Totals		Grants		Research Training and Career Development		Contracts	
Institution	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**
Translational Sciences, Inc.	1	784,036	1	784,036	—	—	—	—
University of Tennessee Health Science Center	23	10,445,601	22	10,396,387	1	49,214	—	—
University of Tennessee, Knoxville	1	365,000	1	365,000	—	—	—	—
Vanderbilt University Medical Center	102	47,191,978	91	44,486,953	10	2,405,082	1	299,943
Total Tennessee	**144**	**66,282,320**	**128**	**62,719,432**	**14**	**2,934,069**	**2**	**628,819**
Texas								
Baylor College of Medicine	42	19,276,821	30	13,355,300	10	1,875,234	2	4,046,287
Baylor Research Institute	1	763,813	1	763,813	—	—	—	—
Biomedical Development Corporation	1	411,415	1	411,415	—	—	—	—
CorInnova, Inc.	1	148,233	1	148,233	—	—	—	—
Dell Marketing L.P.	1	654,656	—	—	—	—	1	654,656
FGH Biotech, Inc.	1	324,473	1	324,473	—	—	—	—
Indus Instruments	1	1,329,814	—	—	—	—	1	1,329,814
Paragonix Technologies, Inc.	1	148,436	1	148,436	—	—	—	—
Pulmotect, Inc.	1	301,296	1	301,296	—	—	—	—
Rice University	3	804,560	3	804,560	—	—	—	—
Savara, Inc.	1	149,750	1	149,750	—	—	—	—
Texas A&M University Health Science Center	12	3,048,256	12	3,048,256	—	—	—	—
Texas Biomedical Research Institute	6	9,070,614	6	9,070,614	—	—	—	—
Texas Engineering Experiment Station	2	991,264	2	991,264	—	—	—	—
Texas Heart Institute	2	1,670,135	2	1,670,135	—	—	—	—
Texas Southern University	1	204,359	1	204,359	—	—	—	—
Texas Tech University Health Sciences Center	2	507,320	2	507,320	—	—	—	—
University of Houston	1	371,250	1	371,250	—	—	—	—
University of North Texas Health Science Center	6	3,192,116	6	3,192,116	—	—	—	—
University of Texas, Austin	4	1,721,480	4	1,721,480	—	—	—	—
University of Texas, El Paso	1	134,317	1	134,317	—	—	—	—
University of Texas, San Antonio	3	743,032	2	719,758	1	23,274	—	—
University of Texas Health Science Center, Houston	28	16,261,363	27	15,287,638	—	—	1	973,725
University of Texas Health Science Center, San Antonio	11	4,552,688	9	4,196,239	2	356,449	—	—
University of Texas Health Science Center, Tyler	7	4,434,361	6	1,862,153	—	—	1	2,572,208
University of Texas, MD Anderson Cancer Center	3	983,672	3	983,672	—	—	—	—
University of Texas Medical Branch, Galveston	3	2,685,941	2	488,668	—	—	1	2,197,273
University of Texas, Southwestern Medical Center	50	22,718,535	42	20,695,184	7	995,917	1	1,027,434
University of the Incarnate Word	1	125,356	1	125,356	—	—	—	—
Total Texas	**197**	**97,729,326**	**169**	**81,677,055**	**20**	**3,250,874**	**8**	**12,801,397**

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollars	No.	Dollars	No.	Dollars	No.	Dollars
Utah								
IHC Health Services, Inc.	1	344,429	—	—	—	—	1	344,429
Nanoshell Company, LLC	1	1,143,383	—	995,148	—	—	1	148,235
Proactive Memory Services, Inc.	—	99,011	—	99,011	—	—	—	—
University of Utah	48	19,958,203	41	18,675,856	5	983,501	2	298,846
Total Utah	**50**	**21,545,026**	**41**	**19,770,015**	**5**	**983,501**	**4**	**791,510**
Vermont								
University of Vermont	23	10,767,846	19	9,219,731	3	1,127,418	1	420,697
Total Vermont	**23**	**10,767,846**	**19**	**9,219,731**	**3**	**1,127,418**	**1**	**420,697**
Virginia								
American Psychosomatic Society	1	15,000	1	15,000	—	—	—	—
Booz Allen and Hamilton, Inc.	1	2,249,898	—	—	—	—	1	2,249,898
College of William and Mary	1	212,355	1	212,355	—	—	—	—
Eastern Virginia Medical School	2	725,000	2	725,000	—	—	—	—
GPB Scientific, LLC	1	241,299	1	241,299	—	—	—	—
INDUS Corporation	1	67,418	—	—	—	—	1	67,418
ISA Associates, Inc.	2	296,604	1	147,589	—	—	1	149,015
Old Dominion University	1	689,793	1	689,793	—	—	—	—
Paragon Technology Group	1	285,954	—	—	—	—	1	285,954
ThunderCat Technology	1	3,899,985	—	—	—	—	1	3,899,985
University of Virginia, Charlottesville	50	20,208,528	47	19,202,947	3	1,005,581	—	—
Virginia Commonwealth University	30	11,903,319	26	11,524,641	4	378,678	—	—
Virginia Polytechnic Institute and State University	4	1,449,483	4	1,449,483	—	—	—	—
Total Virginia	**96**	**42,244,636**	**84**	**34,208,107**	**7**	**1,384,259**	**5**	**6,652,270**
Washington								
Barlow Scientific, Inc.	1	150,000	1	150,000	—	—	—	—
Battelle Pacific Northwest Laboratories	1	1,624,470	1	1,624,470	—	—	—	—
Benaroya Research Institute at Virginia Mason	4	3,081,532	4	3,081,532	—	—	—	—
DRVision Technologies, LLC	1	987,686	1	987,686	—	—	—	—
EKOS Corporation	1	210,000	1	210,000	—	—	—	—
Fred Hutchinson Cancer Research Center	23	33,854,529	22	17,731,173	—	—	1	16,123,356
Group Health Cooperative	2	606,828	2	606,828	—	—	—	—
Insilicos	1	400,000	1	400,000	—	—	—	—
Matrexa, LLC	1	334,031	1	334,031	—	—	—	—
Puget Sound Blood Center	8	3,191,936	7	3,015,291	—	—	1	176,645
Seattle Biomedical Research Institute	1	144,775	1	144,775	—	—	—	—
Seattle Children's Hospital	13	6,049,516	13	6,049,516	—	—	—	—

	Totals		Grants		Research Training and Career Development		Contracts	
Institution	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**
Seattle Institute for Biomedical and Clinical Research	—	110,250	—	110,250	—	—	—	—
Syntrix Biosystems, Inc.	1	1,147,002	1	1,147,002	—	—	—	—
University of Washington	108	69,125,509	96	55,993,171	7	2,887,959	5	10,244,379
VA Puget Sound Health Care System	2	248,313	—	—	—	—	2	248,313
Virtici	1	689,961	1	689,961	—	—	—	—
Washington State University	2	735,132	2	735,132	—	—	—	—
Total Washington	**171**	**122,691,470**	**155**	**93,010,818**	**7**	**2,887,959**	**9**	**26,792,693**
West Virginia								
West Virginia University	6	1,965,596	4	1,593,632	2	371,964	—	—
Total West Virginia	**6**	**1,965,596**	**4**	**1,593,632**	**2**	**371,964**	**—**	**—**
Wisconsin								
Aurora Health Care, Inc.	1	509,165	1	509,165	—	—	—	—
BellBrook Labs, LLC	1	539,579	1	539,579	—	—	—	—
Blood Center of Southeastern Wisconsin	1	17,954	—	—	—	—	1	17,954
Bloodcenter of Wisconsin, Inc.	9	4,866,434	8	4,725,664	1	140,770	—	—
Medical College of Wisconsin	58	29,241,804	53	28,270,912	5	970,892	—	—
Morgridge Institute for Research, Inc.	1	1,138,719	1	1,138,719	—	—	—	—
Society of Behavioral Medicine	1	20,000	1	20,000	—	—	—	—
University of Wisconsin, La Crosse	1	303,726	1	303,726	—	—	—	—
University of Wisconsin, Madison	48	24,677,968	38	21,802,390	9	979,478	1	1,896,100
University of Wisconsin, Milwaukee	1	349,809	1	349,809	—	—	—	—
Total Wisconsin	**122**	**61,665,158**	**105**	**57,659,964**	**15**	**2,091,140**	**2**	**1,914,054**
Wyoming								
MJ Data Corporation, Ltd.	1	149,977	1	149,977	—	—	—	—
Total Wyoming	**1**	**149,977**	**1**	**149,977**	**—**	**—**	**—**	**—**
Puerto Rico								
Universidad Central Del Caribe	2	394,190	2	394,190	—	—	—	—
University of Puerto Rico Medical Sciences	2	365,900	2	365,900	—	—	—	—
Total Puerto Rico	**4**	**760,090**	**4**	**760,090**	**—**	**—**	**—**	**—**
Total U.S.	**5,259**	**2,730,857,156**	**4,601**	**2,308,491,062**	**463**	**91,387,432**	**195**	**330,978,662**
Argentina								
Institute for Clinical Effectiveness and Health Policy	1	56,780	—	—	—	—	1	56,780
Total Argentina	**1**	**56,780**	—	—	**—**	**—**	**1**	**56,780**

	Totals		Grants		Research Training and Career Development		Contracts	
Institution	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**
Bangladesh								
International Centre for Diarrhoeal Disease Research	1	53,993	—	—	—	—	1	53,993
Total Bangladesh	**1**	**53,993**	—	—	—	—	**1**	**53,993**
Canada								
Hospital for Sick Children (Toronto)	2	591,872	2	591,872	—	—	—	—
McMaster University	1	1,085,356	1	1,085,356	—	—	—	—
Ottawa Hospital Research Institute	1	285,476	1	285,476	—	—	—	—
St. Michael's Hospital	1	180,360	1	180,360	—	—	—	—
University Health Network	1	323,586	1	323,586	—	—	—	—
Total Canada	**6**	**2,466,650**	**6**	**2,466,650**	—	—	—	—
China								
George Institute for International Health, China	1	328,892	—	—	—	—	1	328,892
Total China	**1**	**328,892**	—	—	—	—	**1**	**328,892**
Guatemala								
Instituto de Nutrición de Centro América y Panamá	1	562,207	—	—	—	—	1	562,207
Total Guatemala	**1**	**562,207**	—	—	—	—	**1**	**562,207**
Hungary								
Institute of Enzymology, Biological Research Center	—	26,730	—	26,730	—	—	—	—
Total Hungary	—	**26,730**	—	**26,730**	—	—	—	—
India								
Public Health Foundation of India	1	229,427	—	—	—	—	1	229,427
Total India	**1**	**229,427**	—	—	—	—	**1**	**229,427**
Kenya								
Moi University School of Medicine	1	55,000	—	—	—	—	1	55,000
Total Kenya	**1**	**55,000**	—	—	—	—	**1**	**55,000**
Peru								
Universidad Peruana Cayetano Heredia	1	110,680	—	—	—	—	1	110,680
Total Peru	**1**	**110,680**	—	—	—	—	**1**	**110,680**
South Africa								
University of Cape Town	1	27,000	—	—	—	—	1	27,000
Total South Africa	**1**	**27,000**	—	—	—	—	**1**	**27,000**

	Totals		Grants		Research Training and Career Development		Contracts	
Institution	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**	**No.**	**Dollars**
Uganda								
Makerere University	—	100,000	—	100,000	—	—	—	—
Total Uganda	**—**	**100,000**	**—**	**100,000**	**—**	**—**	**—**	**—**
United Kingdom								
University College London	1	344,795	1	344,795	—	—	—	—
Total United Kingdom	**1**	**344,795**	**1**	**344,795**	**—**	**—**	**—**	**—**
Zimbabwe								
University of Zimbabwe College of Health Sciences	—	100,000	—	100,000	—	—	—	—
Total Zimbabwe	**—**	**100,000**	**—**	**100,000**	**—**	**—**	**—**	**—**
Total, Other	**15**	**4,462,154**	**7**	**3,038,175**	**—**	**—**	**8**	**1,423,979**
Grand Total	**5,274**	**$2,735,319,310**	**4,608**	**$2,311,529,237**	**463**	**$91,387,432**	**203**	**$332,402,641**

Appendixes

Types of Research Activity

List of Abbreviations and Acronyms

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Types of Research Activity

Research Projects

Research Project Grants (R01): To support discrete and specific projects 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) (U19): 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 in the biomedical and behavioral sciences conducted by faculty and students at educational institutions that have not been major recipients of NIH research grant funds. 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 pilot studies to obtain data that are critical to the successful design of a full-scale clinical trial.

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. As of July 2011, no new nominations for MERIT awards are being made.

Clinical Planning Grant Cooperative Agreement (U34): To support pilot studies to obtain data that are critical to the successful design of a full-scale clinical trial. The award involves substantial programmatic involvement by NHLBI staff to assist investigators during performance of the research activities.

NIH Director's Pioneer Award (DP1): To support individual scientists of exceptional creativity who propose bold and highly innovative approaches that have the potential to produce a major impact on broad, important problems in biomedical and behavioral 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.

Exploratory/Developmental Cooperative Agreements Phase I (UH2): To support the development of new research activities in program areas that are relevant to the Institute's mission. Support is generally restricted in level of support and in time. The award requires substantial programmatic involvement by NHLBI staff to assist investigators during the performance of research activities.

Multi-Component Research Project Cooperative Agreements (UM1): To support large-scale cooperative agreements that involve complex clinical trials with multiple components (e.g., clinical networks that are relevant to the Institute's mission). The components represent a variety of supporting functions and are not independent of the research projects. The award requires substantial programmatic involvement by NHLBI staff to assist investigators during the performance of research activities.

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.

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.

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 establish research centers to augment research capabilities and resources in biomedical and behavioral research related to heart, lung, blood, and sleep diseases and disorders.

Centers of Research Grants (P50): To accelerate the translation of promising new therapeutic interventions that are derived from fundamental research discoveries to treat and prevent cardiovascular, lung, and blood diseases through planning and executing well-designed clinical trials that demonstrate safety and efficacy.

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.

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.

Specialized Centers Grants (U54): To support large, interrelated biomedical research that is focused on a disorder within the Institute's mandate and to enhance the translation of basic research discoveries that could lead to improved prevention, diagnosis, and treatment of thrombotic and hemostatic disorders.

Research Career Programs

Mentored Career Development Award To Promote Faculty Diversity in Biomedical Research* (K01): To support underrepresented minority faculty members with varying levels of research experience to prepare them for research careers as independent investigators.

* Formerly known as Mentored Research Scientist Development Award for Minority Faculty.

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.

Mentored Career Award for Faculty at Minority-Serving Institutions* (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 sciences related to heart, lung, and blood diseases; blood resources; and sleep disorders.

Academic Award (K07): To support an individual interested in introducing or improving curricula in a particular scientific field as a means of enhancing the educational or research capacity at the grantee institution and the individual's own career. This program includes Academic Awards in Tuberculosis, Sleep, Nutrition, Cultural Competence and Health Disparities, and Pediatric Transfusion Medicine. Currently, the Career Development program is supporting Innovators in Hemoglobinopathies Care.

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 and sleep disorders.

Research Career Development Program (K12): To promote comprehensive clinical research training for physicians to prepare them for academic roles in mentoring and leadership in clinical research. The program supports research training in vascular medicine, clinical hematology and transfusion medicine, genetics and genomics of lung diseases, and emergency medicine.

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 support the career development of 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 support investigators with quantitative science or engineering backgrounds who have made a commitment to focus their research on basic or clinical biomedicine, bioengineering, bio-imaging, 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 (Career Transition Award) consists of 1 or 2 years of mentored support, followed by the R00 phase (Research Transition Award) of up to 3 years of independent support, which is 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

Cooperative Clinical Research (R10) (U10): To support studies and evaluations of relevant clinical problems.

* Formerly known as Minority Institution Faculty Mentored Research Scientist Development Award.

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 support the development, testing, and evaluation of 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 increase the number of students from underrepresented groups in biomedical and behavioral research who complete the Ph.D. degree programs in these fields. The program offers an opportunity to develop new or expand existing effective academic developmental programs, including student research internships, in order to prepare students from underrepresented groups for competitive research careers and leadership positions in the biomedical or behavioral sciences.

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.

Historical Black College and University Scientist Award (UH1): To augment 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; and 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 and sleep disorders.

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

ACCORDION	Action To Control Cardiovascular Risk in Diabetes Follow-Up
ACE	angiotensin-converting enzyme
AHEAD	Action for Health in Diabetes
AIDS	acquired immunodeficiency syndrome
ALLHAT	Antihypertensive and Lipid-Lowering Treatment To Prevent Heart Attack Trial
AMI	acute myocardial infarction
ARIC	Atherosclerosis Risk in Communities
BABY HUG	Pediatric Hydroxyurea Phase III Clinical Trial
CABG	coronary artery bypass graft
CADET	Centers for Advanced Diagnostics and Experimental Therapeutics in Lung Diseases
CARDIA	Coronary Artery Risk Development in Young Adults
CDC	Centers for Disease Control and Prevention
CF	cystic fibrosis
CHART	Consortium of Hospitals Advancing Research on Tobacco
CHD	coronary heart disease
COPD	chronic obstructive pulmonary disease
COPTR	Childhood Obesity Prevention and Treatment Research
CPHHD	Centers for Population Health and Health Disparities
CVD	cardiovascular diseases
DARD	Division for the Application of Research Discoveries
DASH	Dietary Approaches To Stop Hypertension
DBDR	Division of Blood Diseases and Resources
DCVS	Division of Cardiovascular Sciences
DERA	Division of Extramural Research Affairs
DIR	Division of Intramural Research
DLD	Division of Lung Diseases
EARLY	Early Adult Reduction of Weight Through LifestYle Intervention
EDTA	ethylene diamine tetra-acetic acid
FY	fiscal year
GWAS	genome-wide association study
HCHS-SOL	Hispanic Community Health Study—Study of Latinos
HEW	Department of Health, Education, and Welfare (now HHS)
HHS	Health and Human Services (formerly HEW)
HIV	human immunodeficiency virus
ICD	International Classification of Diseases
JHS	Jackson Heart Study
LOTT	Long-Term Oxygen Treatment Trial

MARC	Minority Access to Research Careers
MESA	Multi-Ethnic Study of Atherosclerosis
NAEPP	National Asthma Education and Prevention Program
NCEP	National Cholesterol Education Program
NCHS	National Center for Health Statistics
NCI	National Cancer Institute
NCSDR	National Center on Sleep Disorders Research
NHANES	National Health and Nutrition Examination Survey
NHBPEP	National High Blood Pressure Education Program
NHI	National Heart Institute
NHLBAC	National Heart, Lung, and Blood Advisory Council
NHLBI	National Heart, Lung, and Blood Institute (formerly NHI and NHLI)
NHLI	National Heart and Lung Institute
NICHD	National Institute of Child Health and Human Development
NIH	National Institutes of Health
NINDS	National Institute of Neurological Disorders and Stroke
NRSA	National Research Service Award
ORBIT	Obesity Related Behavior Intervention Trials
OSA	obstructive sleep apnea
PA	Program Announcement
PAR	Program Announcement with special receipt, referral, or review
PHS	Public Health Service
RFA	Request for Applications
RFP	Request for Proposals
RPG	research project grant
RuSH	Registry and Surveillance System in Hemoglobinopathies
SBIR	Small Business Innovation Research
SCCOR	Specialized Centers of Clinically Oriented Research
SCD	sickle cell disease
SCOR	Specialized Centers of Research
SDB	sleep disordered breathing
SES	socioeconomic status
SIDS	sudden infant death syndrome
SOYA	Study of Soy Isoflavones in Asthma
SPRINT	Systolic Blood Pressure Intervention Trial
STAN	Study of Asthma and Nasal Steroids
STTR	Small Business Technology Transfer
TB	tuberculosis
TOPCAT	Trial of Aldosterone Antagonists Therapy in Adults With Preserved Ejection Fraction Congestive Heart Failure
WHI	Women's Health Initiative

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Discrimination Prohibited: Under provisions of applicable public laws enacted by Congress since 1964, no person in the United States shall, on the grounds of race, color, national origin, handicap, or age, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity (or, on the basis of sex, with respect to any education program or activity) receiving Federal financial assistance. In addition, Executive Order 11141 prohibits discrimination on the basis of age by contractors and subcontractors in the performance of Federal contracts, and Executive Order 11246 states that no federally funded contractor may discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. Therefore, the Heart, Lung, and Blood Institute must be operated in compliance with these laws and Executive Orders.

U.S. Department of Health and Human Services
National Institutes of Health

NIH
National Heart, Lung,
and Blood Institute