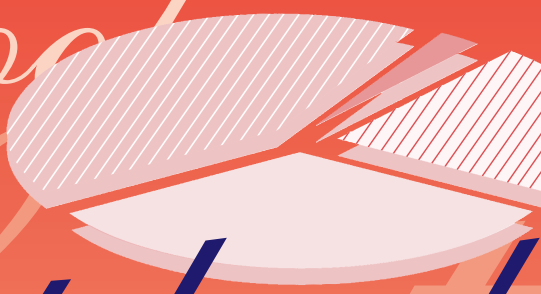


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FACT BOOK

FISCAL YEAR

2009







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# 1. Abbreviated Staff Directory\*

Office of the Director	Bldg.	Room	Phone	MSC** †
Director, <b>Elizabeth G. Nabel, M.D.</b> .....	31	5A48	496-5166	2486
Deputy Director, <b>Susan B. Shurin, M.D.</b> .....	31	5A48	496-1078	2486
Chief of Staff, <b>Sheila Pohl</b> .....	31	5A48	594-5355	2486
Acting Associate Director for Administrative Management, <b>Timothy J. Wheeles</b> .....	31	5A48	496-2411	2490
Administrative Officer, <b>Rebecca Ellett-Tener</b> .....	31	5A16	496-5931	2490
Associate Director for Basic Research, <b>Alan M. Michelson, M.D., Ph.D.</b> .....	31	5A48	594-5353	2490
Associate Director for Biomedical Informatics, <b>Stephan P. Bour, Ph.D.</b> .....	RKL1‡	6100	435-0119	7994
Associate Director for Minority Health, <b>Helena O. Mishoe, Ph.D., M.P.H.</b> .....	RKL2§	9093C	451-5081	7913
Acting Associate Director for Prevention, Education, and Control, <b>Rob Fulwood, Ph.D., M.S.P.H.</b> .....	31	4A10	496-5437	2480
Associate Director for Scientific Program Operation, <b>Carl A. Roth, Ph.D., LL.M.</b> .....	31	5A07	496-6331	2482
Deputy Ethics Counselor, <b>Nancy O'Hanlon, J.D.</b> .....	31	5A33	496-6471	2486
Office of Communications and Legislative Activities Acting Director, <b>Susan B. Shurin, M.D.</b> .....	31	5A48	496-1078	2486
Senior Advisor to the Director for Genome Research, <b>Christopher J. O'Donnell, M.D., M.P.H.</b> .....	73 Mt. Wayte Avenue, Suite 2 Framingham, MA 01702-5827 508-935-3435			
Center for Population Studies Director, <b>Daniel Levy, M.D.</b> .....	73 Mt. Wayte Avenue, Suite 2 Framingham, MA 01702-5827 508-935-3458			
Associate Director, <b>Christopher J. O'Donnell, M.D., M.P.H.</b> .....	73 Mt. Wayte Avenue, Suite 2 Framingham, MA 01702-5827 508-935-3435			
Center for Biomedical Informatics Director, <b>Stephan P. Bour, Ph.D.</b> .....	RKL1	6100	435-0119	7994
Administrative Officer, <b>Kathleen D. Rechen</b> .....	RKL2	8095	435-6373	7921
Applications Development and Support Branch Acting Chief, <b>Zeyad Mobassaleh</b> .....	RKL1	6104	435-0119	7994
Information Technology Resources Branch Chief, <b>Christopher E. Olaes</b> .....	RKL1	6212	435-0119	7994

\* Current as of September 30, 2009. For locating personnel not listed, the general information number is 301-496-4000. All listed phone numbers are in area code 301. The Personnel Directory, which is periodically updated throughout the year, is located on the NHLBI Home Page under About NHLBI.

\*\* MSC—Mail Stop Code.

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

‡ RKL1—Rockledge I Building.

§ RKL2—Rockledge II Building.

Office of the Director (continued)	Bldg.	Room	Phone	MSC
Planning, Architecture, Communication and Evaluation Branch				
Acting Chief, <b>Christopher E. Olaes</b> .....	RKL1	6212	435-0119	7994
Ethics Office				
Director, <b>Nancy O’Hanlon, J.D.</b> .....	31	5A33	496-6471	2486
Lead Ethics Specialist, <b>Kim Y. Brinson</b> .....	31	5A33	496-6471	2486
Ethics Coordinator, <b>Hedy S. Tam</b> .....	31	5A33	496-6471	2486
Office of Administrative Management				
Acting Director/Acting Executive Officer, <b>Timothy J. Wheelles</b> .....	31	5A48	496-2411	2490
Acting Deputy Executive Officer, <b>Alesha M. Holliday</b> .....	31	5A48	496-2411	2490
Administrative Officer, <b>Rebecca Ellett-Tener</b> .....	31	5A16	496-5931	2490
Freedom of Information and Privacy Act Branch				
Director, <b>Suzanne A. Freeman</b> .....	RKL1	6070	496-9737	7957
Management Policy and Administrative Services Branch				
Chief, <b>Marilyn G. Jackson</b> .....	31	5A16	496-5931	2490
Financial Management Branch				
Chief, <b>Sandra L. Gault</b> .....	31	5A34	496-4653	2490
Extramural Administrative Management Branch				
Chief, <b>Loretta L. Usilton</b> .....	RKL2	8095	435-6373	7921
Office of Workforce Management				
Director, <b>Gwen G. Platt</b> .....	RKL1	6070	496-1763	7957
Office of Research Training and Minority Health				
Director, <b>Helena O. Mishoe, Ph.D., M.P.H.</b> .....	RKL2	9093C	451-5081	7913
Deputy Director, <b>Chitra Krishnamurti, Ph.D.</b> .....	RKL2	9093C	451-5081	7913
Administrative Officer, <b>Roy Rich</b> .....	RKL2	8095	435-6373	7921
Office of Science and Technology				
Director, <b>Carl A. Roth, Ph.D., LL.M.</b> .....	31	5A07	496-6331	2482
Deputy Director, <b>Barbara Marzetta, M.S.</b> .....	31	5A07	496-9899	2482
Administrative Officer, <b>Rebecca Ellett-Tener</b> .....	31	5A16	496-5931	2490
Program Studies and Reports Program				
Director, <b>Carl A. Roth, Ph.D., LL.M.</b> .....	31	5A07	496-6331	2482
Science and Special Issues Program				
Director, <b>Barbara Marzetta, M.S.</b> .....	31	5A07	496-9899	2482
Office of Public Liaison				
Coordinator, <b>Hilary S. Leeds, J.D.</b> .....	31	5A07	594-9869	2482
Office of Technology Transfer and Development				
Director, <b>Alan H. Deutch</b> .....	RKL1	6018	402-5579	7992
Administrative Officer, <b>Terri B. Pike</b> .....	RKL2	8095	435-6373	7921
<b>Division of Cardiovascular Diseases</b>				
Office of the Director				
Acting Director, <b>Sonia I. Skarlatos, Ph.D.</b> .....	RKL2	8124	435-0466	7940
Acting Deputy Director, <b>David J. Gordon, M.D., Ph.D.</b> .....	RKL2	8132	435-0466	7940
Administrative Officer, <b>Lisa A. Freeny</b> .....	RKL2	8095	435-6373	7921
Special Assistant for Clinical Studies, <b>David J. Gordon, M.D., Ph.D.</b> .....	RKL2	8134	435-0466	7940
Office of Research Training and Career Development				
Director, <b>Jane Scott, Sc.D., M.S.N.</b> .....	RKL2	8138	435-0535	7940

<b>Division of Cardiovascular Diseases (continued)</b>	<b>Bldg.</b>	<b>Room</b>	<b>Phone</b>	<b>MSC</b>
Advanced Technologies and Surgery Branch Chief, <b>Denis B. Buxton, Ph.D.</b> .....	RKL2	8216	435-0504	7940
Atherothrombosis and Coronary Artery Disease Branch Chief, <b>Michael J. Domanski, M.D.</b> .....	RKL2	8146	435-0550	7940
Heart Development and Structural Diseases Branch Chief, <b>Gail D. Pearson, M.D., Sc.D.</b> .....	RKL2	8104	435-0510	7940
Heart Failure and Arrhythmias Branch Chief, <b>Alice M. Mascette, M.D.</b> .....	RKL2	8170	435-0504	7940
Vascular Biology and Hypertension Branch Acting Chief, <b>Eser E. Tolunay, Ph.D.</b> .....	RKL2	8120	435-0560	7940
<b>Division of Lung Diseases</b>				
Office of the Director				
Director, <b>James P. Kiley, Ph.D.</b> .....	RKL2	10042	435-0233	7952
Deputy Director, <b>Gail G. Weinmann, M.D.</b> .....	RKL2	10042	435-0233	7952
Administrative Officer, <b>Amy W. Sheetz</b> .....	RKL2	8095	435-6373	7921
Research Training Programs				
Leader, <b>Sandra Colombini Hatch, M.D.</b> .....	RLK2	10042	435-0222	7952
Leader, <b>Ann E. Rothgeb</b> .....	RLK2	10042	435-0202	7952
Airway Biology and Disease Branch				
Chief, <b>Thomas L. Croxton, M.D., Ph.D.</b> .....	RKL2	10042	435-0202	7952
Lung Biology and Disease Branch				
Chief, <b>Dorothy B. Gail, Ph.D.</b> .....	RKL2	10042	435-0222	7952
National Center on Sleep Disorders Research				
Director, <b>Michael J. Twery, Ph.D.</b> .....	RKL2	10042	435-0199	7952
<b>Division of Blood Diseases and Resources</b>				
Office of the Director				
Director, <b>W. Keith Hoots, M.D.</b> .....	RKL2	9136	435-0080	7950
Acting Deputy Director, <b>George J. Nemo, Ph.D.</b> .....	RKL2	9144	435-0080	7950
Administrative Officer, <b>Amy W. Sheetz</b> .....	RKL2	8095	435-6373	7921
Senior Program Analyst, <b>Susan E. Pucie</b> .....	RKL2	9138	435-0080	7950
Research Training Programs				
Leader, <b>Traci H. Mondoro, Ph.D.</b> .....	RKL2	9140	435-0065	7950
Leader, <b>Rita Sarkar, Ph.D.</b> .....	RKL2	9161	435-0070	7950
Leader, <b>Ellen M. Werner, Ph.D.</b> .....	RKL2	9162	435-0050	7950
Leader, <b>Henry Chang, M.D.</b> .....	RKL2	9176	435-0080	7950
Blood Diseases Branch				
Chief, <b>Harvey S. Luksenburg, M.D.</b> .....	RKL2	9160	435-0050	7950
Thrombosis and Hemostasis Branch				
Acting Chief, <b>Rebecca P. Link, Ph.D.</b> .....	RKL2	9168	435-0070	7950
Transfusion Medicine and Cellular Therapeutics Branch				
Chief, <b>Simone A. Glynn, M.D.</b> .....	RKL2	9142	435-0065	7950
<b>Division of Prevention and Population Sciences</b>				
Office of the Director				
Director, <b>Michael S. Lauer, M.D.</b> .....	RKL2	10018	435-0422	7936
Deputy Director, <b>Diane E. Bild, M.D., M.P.H.</b> .....	RKL2	10018	435-0422	7936

<b>Division of Prevention and Population Sciences (continued)</b>	<b>Bldg.</b>	<b>Room</b>	<b>Phone</b>	<b>MSC</b>
Senior Scientific Advisor, <b>Denise Simons-Morton, M.D., Ph.D.</b> .....	RKL2	10018	435-0384	7936
Administrative Officer, <b>Lisa A. Freeny</b> .....	RKL2	8095	435-6373	7921
Office of Biostatistics Research				
Director, <b>Nancy L. Geller, Ph.D.</b> .....	RLK2	9202	435-0434	7913
Deputy Director, <b>Myron A. Waclawiw, Ph.D.</b> .....	RLK2	9216	435-0434	7913
Research Training Programs				
Leader, <b>Charlotte A. Pratt, Ph.D.</b> .....	RLK2	10018	435-0382	7936
Leader, <b>Lorraine M. Silsbee</b> .....	RLK2	10018	435-0709	7936
Clinical Applications and Prevention Branch				
Chief, <b>Lawrence J. Fine, M.D.</b> .....	RKL2	10018	435-0305	7936
Deputy Chief, <b>Peter G. Kaufmann, Ph.D.</b> .....	RKL2	10018	435-2467	7936
Epidemiology Branch				
Chief, <b>Paul D. Sorlie, Ph.D.</b> .....	RKL2	10018	435-0707	7936
Deputy Chief, <b>Jean L. Olson, M.D., M.P.H.</b> .....	RKL2	10018	435-0707	7936
Deputy Chief, <b>Richard R. Fabsitz, Ph.D.</b> .....	RKL2	10018	435-0707	7936
Scientific Advisor, <b>Phylliss D. Sholinsky, M.S.P.H.</b> .....	RKL2	10018	435-0707	7936
Women's Health Initiative Branch				
Director, <b>Elizabeth G. Nabel, M.D.</b> .....	31	5A48	496-5166	2486
Chief, <b>Jacques E. Rossouw, Ph.D.</b> .....	RKL2	9192	402-2900	7936
Deputy Chief, <b>Shari E. Ludlam, M.P.H.</b> .....	RKL2	9188	402-2900	7936
<b>Division for the Application of Research Discoveries</b>				
Acting Director, <b>Rob Fulwood, Ph.D., M.S.P.H.</b> .....	31	4A10	496-5437	2480
Administrative Officer, <b>Rebecca Ellett-Tener</b> .....	31	5A16	496-5931	2490
Program Operations				
Senior Manager, <b>Nancy J. Poole, M.B.A.</b> .....	31	4A10	496-5437	2480
Enhanced Dissemination and Utilization Branch				
Acting Chief, <b>Karen Donato, S.M.</b> .....	31	4A10	496-1051	2480
Research Translation Branch				
Acting Chief, <b>Rob Fulwood, Ph.D., M.S.P.H.</b> .....	31	4A10	496-5437	2480
<b>Division of Extramural Research Activities</b>				
Office of the Director				
Director, <b>Stephen C. Mockrin, Ph.D.</b> .....	RKL2	7100	435-0260	7922
Deputy Director, <b>Jodi Black, Ph.D.</b> .....	RKL2	7104	435-0260	7922
Administrative Officer, <b>Veronica M. VanWagner</b> .....	RKL2	8095	435-6373	7921
Chief of Staff, <b>Janet George</b> .....	RKL2	7220	435-0260	7922
Office of Acquisitions				
Director, <b>John C. Taylor</b> .....	RKL2	6100	435-0330	7902
Deputy Director, <b>Christopher J. Belt</b> .....	RKL2	6106	435-6672	7902
Special Assistant to the Director, <b>Debra C. Hawkins</b> .....	RKL2	6224	435-0330	7902
Blood Diseases and Resources Contracts Branch				
Chief, <b>Joanna Magginas</b> .....	RKL2	6136	435-0360	7902
Cardiovascular and Lung Diseases Contracts Branch				
Chief, <b>Pamela S. Lew</b> .....	RKL2	6016	435-0340	7902

<b>Division of Extramural Research Activities (continued)</b>	<b>Bldg.</b>	<b>Room</b>	<b>Phone</b>	<b>MSC</b>
Prevention and Population Sciences Contracts Branch				
Chief, <b>Paul D. McFarlane</b> .....	RKL2	6126	435-0350	7902
Procurement Branch				
Acting Chief, <b>Christopher J. Belt</b> .....	RKL2	6106	435-6672	7902
Office of Committee Management				
Director, <b>Kathryn M. Valeda</b> .....	RKL2	7110	435-0255	7922
Deputy Director, <b>David Alperin</b> .....	RLK2	7118	435-0255	7922
Office of Extramural Policy and Review				
Director, <b>Paul A. Velletri, Ph.D.</b> .....	RKL2	7218	435-0569	7922
Review Branch				
Chief, <b>Valerie L. Prenger, Ph.D.</b> .....	RKL2	7214	435-0270	7924
Office of Grants Management				
Director, <b>Suzanne A. White</b> .....	RKL2	7160	435-0166	7926
Deputy Director, <b>Raymond L. Zimmerman</b> .....	RKL2	7130	435-0166	7926
Blood Diseases and Resources Branch				
Chief, <b>Robert Vinson, Jr.</b> .....	RKL2	7156	435-0166	7926
Cardiovascular Diseases Branch				
Chief, <b>Ryan C. Lombardi</b> .....	RKL2	7154	435-0166	7926
Lung Diseases Branch				
Acting Chief, <b>Raymond L. Zimmerman</b> .....	RKL2	7130	435-0166	7926
Prevention and Population Sciences Branch				
Chief, <b>Teresa F. Marquette</b> .....	RKL2	7128	435-0166	7926
Office of Strategic and Innovative Programs				
Director, <b>Robert A. Musson, Ph.D.</b> .....	RKL2	7106	435-0261	7922
Deputy Director, <b>Rachel Permuth-Levine</b> .....	RKL2	7210	435-0260	7922
<b>Division of Intramural Research</b>				
Office of the Director				
Scientific Director, <b>Robert S. Balaban, Ph.D.</b> .....	10CRC*	4-1581	496-2116	1458
Intramural Administrative Management Branch				
Chief, <b>Gary Unger</b> .....	10	7N214	451-0892	1686
Animal Program				
Director, <b>James Hawkins, D.V.M.</b> .....	14E	105A	451-6743	5570
Office of Education				
Director, <b>Herbert M. Geller, Ph.D.</b> .....	10	2N242	451-9440	1754
Office of the Clinical Director				
Director, <b>Richard O. Cannon III, M.D.</b> .....	10CRC	5-3330	496-9895	1454
Cardiothoracic Surgery				
Director, <b>Keith A. Horvath, M.D.</b> .....	10	2N246	451-7098	1454
Office of Clinical Affairs				
Associate Director, <b>Melissa B. Bryant, M.S.</b> .....	10CRC	6-5140	594-8378	1608
Hematology Branch				
Chief, <b>Neal S. Young, M.D.</b> .....	10CRC	3-5140	496-5093	1202
Flow Cytometry Core (FACS)				
Head, <b>J. Philip McCoy, Ph.D.</b> .....	10	8C104	451-8824	1357

\* 10CRC—Building 10 Clinical Research Center.

<b>Division of Intramural Research (continued)</b>	<b>Bldg.</b>	<b>Room</b>	<b>Phone</b>	<b>MSC</b>
Pulmonary and Vascular Medicine Branch				
Acting Chief, <b>Stewart J. Levine, M.D.</b> .....	10	6D16	435-2345	1590
Genomics Core				
Head, <b>Nalini Raghavachari, Ph.D.</b> .....	10	8C103B	435-2304	1357
Translational Medicine Branch				
Chief, <b>Toren Finkel, M.D., Ph.D.</b> .....	10CRC	5-3330	402-4081	1454
Deputy Chief, <b>Joel Moss, M.D., Ph.D.</b> .....	10	6D03	496-1597	1590
Animal MRI/Imaging Core				
Head, <b>Stasia Anderson, Ph.D.</b> .....	10	2N240	402-0908	1518
Biochemistry and Biophysics Center				
Director, <b>Nico Tjandra, Ph.D.</b> .....	50	3503	402-3029	8012
Cell Biology and Physiology Center				
Director, <b>Clare Waterman, Ph.D.</b> .....	50	4535	435-2949	8019
Light Microscopy Core				
Head, <b>Christian Combs, Ph.D.</b> .....	10	6N309	496-3236	1623
Proteomics Core				
Head, <b>Marjan Gucsek, Ph.D.</b> .....	10	8C103C	594-1060	1774
Genetics and Development Biology Center				
Director, <b>Alan M. Michelson, M.D., Ph.D.</b> .....	31	5A48	594-5353	2490
Electron Microscopy Core				
Head, <b>Mathew Daniels, Ph.D.</b> .....	14E	111B	496-2898	5570
Transgenic Core				
Head, <b>Chengyu Liu, Ph.D.</b> .....	50	3305	435-5034	8018
Immunology Center				
Director, <b>Warren Leonard, M.D.</b> .....	10	7B05	496-0098	1674

## 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 50	Full Name NHLBI, NIH Building 50, Room _____ 50 South Drive MSC* _____ Bethesda, MD 20892–MSC**
Building 14E	Full Name NHLBI, NIH Building 14E, Room _____ 14 Service Road West MSC* _____ Bethesda, MD 20892–MSC**	Rockledge I Building	Full Name NHLBI, NIH One Rockledge Center, Room _____ 6705 Rockledge Drive MSC* _____ Bethesda, MD 20817–MSC**
Building 31	Full Name NHLBI, NIH Building 31, Room _____ 31 Center Drive MSC* _____ Bethesda, MD 20892–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 training in the prevention, diagnosis, and treatment of cardiovascular diseases (CVD). Twenty-four years later—through section 413 of the National Heart, Blood Vessel, Lung, and Blood Act (P.L. 92-423)—Congress mandated the Institute to expand and coordinate its activities in an accelerated attack against heart, blood vessel, lung, and blood diseases. The renamed National Heart, Lung, and Blood Institute (NHLBI) expanded its scientific areas of interest and intensified its efforts related to research on diseases within its purview. Over the years, the Institute's areas of interest have grown to encompass genetic, genomic, and proteomic research; systems biology; sleep disorders; and the Women's Health Initiative (WHI).

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

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

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

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

### NHLBI Programs

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

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

and one intramural unit:

- Division of Intramural Research (DIR)

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

Descriptions of the Divisions follow.

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

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### Cardiovascular Diseases

#### *Advanced Technologies and Surgery*

Diagnostics Development  
Emerging Therapeutics  
Enabling Technologies  
Surgery Advances

#### *Atherothrombosis and Coronary Artery Disease*

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

#### *Heart Developmental and Structural Disease*

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

#### *Heart Failure and Arrhythmias*

Arrhythmias  
Heart Failure  
Myocardial Protection  
Resuscitation  
Sudden Cardiac Death

#### *Vascular Biology and Hypertension*

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

### Lung Diseases

#### *Airway Biology and Disease*

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

### Lung Diseases (continued)

#### *Lung Biology and Disease*

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

#### *National Center on Sleep Disorders Research*

Sleep Disorders and Related Conditions  
Ventilatory Control

### Blood Diseases and Resources

#### *Blood Diseases*

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

#### *Thrombosis and Hemostasis*

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

#### *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

### Prevention and Population Sciences

#### *Clinical Applications and Prevention*

Behavioral Medicine  
Prevention of Cardiovascular Disorders  
Obesity Health Outcomes

#### *Epidemiology*

Analytical Resources  
Field Studies and Clinical Epidemiology  
Genetic Epidemiology

#### *Women's Health Initiative*

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

#### **Application of Research Discoveries**

#### *Research Translation Branch*

Research Translation  
Research Opportunities Identification  
Clinical Guidelines  
Clinical Support and Implementation Applications  
Knowledge Exchange Networks

#### *Enhanced Dissemination and Utilization Branch*

Research Dissemination  
Research Utilization  
Data Analysis and Evaluation

### Intramural Research

#### *Clinical Research*

Cardiothoracic Surgery  
Hematology  
Pulmonary and Vascular Medicine  
Translational Medicine

#### *Laboratory Research*

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

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## **Division of Cardiovascular Diseases**

The DCVD supports research on the causes, diagnosis, prevention, and treatment of CVD through an integrated program of basic and clinical research, including translational research, networks, and multicenter clinical trials. Research funded by the Division is allocated among investigator- and Institute-initiated grants and contracts in disease areas such as atherothrombosis, coronary artery disease, myocardial infarction and ischemia, heart failure, arrhythmia, sudden cardiac death, adult and pediatric congenital heart disease, cardiovascular complications of diabetes and obesity, and hypertension. The DCVD fosters biotechnological research in genomics, proteomics, nanotechnology, imaging, device development, cell- and tissue-based therapeutics, gene therapy, and the development of advanced technologies, including technologies for surgery. SCCORs support clinical collaborative research in cardiac dysfunction and disease; pediatric heart development and disease; and vascular injury, repair, and remodeling.

The Division is organized into the five Branches and one Office described below.

### ***Advanced Technologies and Surgery Branch***

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

### ***Atherothrombosis and Coronary Artery Disease Branch***

The Atherothrombosis and Coronary Artery Disease Branch supports integrated basic and clinical research on the etiology, pathogenesis, prevention, diagnosis, and treatment of coronary artery disease and atherothrombosis. Research on coronary artery disease focuses on

acute and chronic coronary syndromes, including myocardial infarction; acute ischemia, angina, and silent ischemia; and percutaneous and surgical revascularization of stenotic and restenotic coronary lesions. Atherothrombosis research investigates atherosclerotic lesions in coronary arteries and other arterial beds; lipid fractions and interactions with the arterial wall; lesion instability, vulnerable plaques, and thrombosis; and biomarker and imaging diagnostics to quantify plaque and atherosclerosis progression. Atherothrombosis research also includes studies of diet, exercise, diabetes, obesity, and other metabolic conditions related to atherothrombosis.

### ***Heart Development and Structural Diseases Branch***

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

### ***Heart Failure and Arrhythmias Branch***

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

### ***Vascular Biology and Hypertension Branch***

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

### ***Office of Research Training and Career Development***

The Office of Research Training and Career Development provides opportunities for people at a variety of educational levels, from high school students to academic faculty, to pursue and build careers in cardiovascular research. 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 that allows recipients to bridge the gap between a career development award and a research award, and career development programs designed for clinical research.

### **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 disease areas such as asthma, bronchopulmonary dysplasia, COPD, CF, sleep-disordered breathing, critical care and acute lung injury, developmental biology and pediatric pulmonary diseases, immunologic and fibrotic pulmonary disease, rare lung disorders, pulmonary vascular disease, and pulmonary complications of AIDS and tuberculosis. SCCORs support collaborative studies on COPD, pulmonary vascular disease, and host factors in chronic lung diseases.

The Division also supports demonstration and dissemination projects to transfer basic research and clinical

findings to health care professionals and patients, and training and career development programs for individuals interested in furthering their professional abilities in lung diseases research. The DLD, through the National Center on Sleep Disorders Research, coordinates sleep research activities across the NIH, other Federal Agencies, and outside organizations.

The Division is organized into the three Branches described below.

### ***Airway Biology and Disease Branch***

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

Asthma research investigates the origins, pathogenesis, and management of asthma, including the role of immunologic and nonimmunologic events and inflammation in its pathogenesis; the genetics of asthma and atopy; airway remodeling and repair in asthma; the mechanisms of severe asthma; and the regulation of mucous hypersecretion and mucous cell metaplasia.

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

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



### ***Lung Biology and Disease Branch***

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

AIDS and tuberculosis research focuses on the course of pulmonary manifestations of HIV infection and tuberculosis. Emphasis is on identifying lung complications associated with HIV infection and characterizing the lung microbiome in HIV-infected and HIV-uninfected individuals.

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

Research in developmental biology and pediatric pulmonary diseases investigates the regulation of lung development, growth, and repair and focuses on pediatric pulmonary diseases in infants and children, including bronchopulmonary dysplasia and persistent pulmonary hypertension of the newborn. Research also focuses on identification of lung progenitor stem cells and exploration of lung cell-based therapy.

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

Lung cell and vascular biology research investigates lung cell biology and function and pulmonary vascular disease, including pulmonary arterial hypertension and pulmonary embolism diagnosis. Research focuses on pulmonary alveolar epithelial cells, vascular endothelial

cells, and the lung surfactant system. The Branch also performs research on the regulation of barrier function of pulmonary endothelial cells and regulation of lung permeability.

### ***National Center on Sleep Disorders Research***

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

### ***Division of Blood Diseases and Resources***

The DBDR supports research 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. Funding encompasses a broad spectrum of research ranging from basic biology to medical management of blood diseases. SCCORs and other specialized centers support collaborative research in hemostatic and thrombotic diseases, transfusion biology and medicine, SCD, and cell-based therapy for blood diseases. The Division also has a major responsibility to improve the adequacy and safety of the Nation's blood supply. It has a leading role in applying scientific advances in transfusion medicine and stem cell biology to the development of new cell-based therapies to repair and regenerate human tissues and organs.

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 immune disorders such 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; inflammation and 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.

## **Division of Prevention and Population Sciences**

The DPPS supports and provides leadership for population- and clinic-based research on the causes, prevention, and clinical care of cardiovascular, lung, and blood diseases and sleep disorders. Research includes a broad array of epidemiological studies to describe disease and risk factor patterns in populations and to identify risk factors for disease; clinical trials of interventions to prevent disease; studies of genetic, behavioral, sociocultural, and environmental influences on disease risk and outcomes; and studies of the application of prevention and treatment strategies to improve clinical care and public health. The Division also supports training and career development in these areas of research.

The Division is organized into the three Branches and one Office described below.

### ***Clinical Applications and Prevention Branch***

The Clinical Applications and Prevention Branch supports, designs, and conducts research and supports training on behavioral, environmental, clinical, and health care approaches to reduce the occurrence and consequences of CVD. Prevention research examines the effectiveness of interventions to slow or halt risk factor or disease development or progression. Interventions—many of which focus on high-risk individuals and populations—include medications, behavioral strategies, and environmental change. Studies to examine lifestyle, nutrition and exercise, psychological and sociocultural factors, and environmental and genetic influences relevant to prevention are supported. Also supported is clinical application research to examine approaches to improve health care delivery and patient outcomes. Studies include clinical and community trials and observational studies.

### ***Epidemiology Branch***

The Epidemiology Branch supports, designs, and conducts research and supports research training in the epidemiology of cardiovascular, lung, and blood diseases

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

### ***Women’s Health Initiative Branch***

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

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

### ***Office of Biostatistics Research***

The Office of Biostatistics Research (OBR) provides statistical expertise to the Institute and performs diverse functions in planning, designing, implementing, and

analyzing NHLBI-sponsored studies. Its primary responsibility is to provide objective, statistically sound, and medically relevant solutions to problems. The OBR is expected to provide a new and valid statistical solution when presented with a problem for which techniques are not yet available. Its methodological interests concern survival analysis, longitudinal data analysis, and efficient study designs, including the monitoring of ongoing clinical studies for efficacy and safety. Recently the OBR has made contributions to statistical genetics and has extended its expertise to bioinformatics.

### **Division of Intramural Research**

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

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

#### ***Biochemistry and Biophysics Center***

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

#### ***Cell Biology and Physiology Center***

The Cell Biology and Physiology Center develops a global view of the mechanisms that regulate cellular function and physiology. It evaluates the mechanisms that control different molecular machines within the cytosol, including those involved in muscle contraction and cytosolic and membrane transport processes. The Center studies cellular signaling events associated with

hormone action, cytosolic trafficking, and energy metabolism; investigates the role of cellular processes on function and adaptation in whole-animal model systems; and develops unique measuring devices for studying biochemical and physiological processes in intact cells, whole animals, and clinical situations.

### ***Genetics and Development Biology Center***

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

### ***Immunology Center***

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

### ***Translational Medicine Branch***

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

### ***Hematology Branch***

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

### ***Pulmonary and Vascular Medicine Branch***

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

### ***Division for the Application of Research Discoveries***

The DARD supports national and international research translation, dissemination, and utilization programs to speed the application of scientific advances in the prevention, detection, and treatment of cardiovascular, lung, and blood diseases and to shorten the time between the discovery and delivery of research advances. Through knowledge networks, education programs, community outreach, conferences, and symposia, the Division provides opportunities for multidirectional communication and collaboration among researchers, clinical and public health practitioners, patients, and the general public. It connects research and practice by identifying knowledge gaps that should be addressed by future research; synthesizing and organizing evidence related to priority diseases and conditions; facilitating knowledge-sharing and collaboration with key stakeholders; and reaching out to people in high-risk, low-income, and minority communities to eliminate health disparities.

The Division is organized into the two Branches described below.

#### ***Research Translation Branch***

The Research Translation Branch synthesizes and organizes new scientific evidence related to priority diseases and conditions to facilitate rapid translation of research findings. It identifies knowledge gaps to inform



future research directions and promotes the use of evidence-based reviews. The Branch develops or facilitates the development of clinical guidelines with relevant stakeholders. It also develops innovative implementation approaches for use in clinical and public health practice; maximizes opportunities for researchers and users of research to discuss research applicability, relevance, and utility; and addresses future research needs through knowledge networks and other strategies.

***Enhanced Dissemination and Utilization Branch***

The Enhanced Dissemination and Utilization Branch collects, synthesizes, and communicates new knowledge

and recommendations for the dissemination and utilization of research-based findings to diverse target audiences, including minority and underserved groups. It provides technical assistance and information resources to NHLBI grantees to enhance their dissemination plans and practices. The Branch accelerates the introduction of evidence-based tools and education programs into community practice and establishes community-based Enhanced Dissemination and Utilization Centers to apply the latest research advances and evaluate their effects in multiple settings, achieve the U.S. Department of Health and Human Services (HHS) Healthy People 2010 goals, and eliminate health disparities.





## 3. Important Events

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**November 22–24, 1964.** The Second National Conference on Cardiovascular Diseases—cosponsored by the American Heart Association, the NHI,

and the Heart Disease Control Program of the PHS—is held to evaluate progress since the 1950 Conference and to assess needs and goals for continued and accelerated growth against heart and blood vessel diseases.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

chaired by the Director, NHLI. A High Blood Pressure Information Center is established within the NHLI Office of Information to collect and disseminate public and professional information about the disease.

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

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

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

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

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

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

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

**August 2, 1974.** The Secretary, HEW, approves regulations governing the establishment, support, and operation of National Research and Demonstration Centers for heart, blood vessel, lung, and blood diseases, which implement section 415(b) of the PHS Act, as amended by the National Heart, Blood Vessel, Lung, and Blood Act

of 1972: (1) to carry out basic and clinical research on heart, blood vessel, lung, and blood diseases; (2) to provide demonstrations of advanced methods of prevention, diagnosis, and treatment; and (3) to supply a training source for scientists and physicians concerned with the diseases.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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

management of asthma through patient and professional education.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**January 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.

**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), sign 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.



## 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 2006, cardiovascular, lung, and blood diseases accounted for 1,053,000 deaths and 43 percent of all deaths in the United States (p. 33). The projected economic cost in 2010 for these diseases is expected to be \$705 billion, 23 percent of the total economic costs of illness, injuries, and death (p. 49). Of all diseases, heart disease is the leading cause of death, cerebrovascular disease is third (behind cancer), and COPD (including asthma) ranks fourth (p. 36). Cardiovascular and lung diseases account for 3 of the 4 leading causes of death (p. 36) and 4 of the 10 leading causes of infant death (p. 42). Hypertension, heart disease, asthma, and COPD are especially prevalent and account for substantial morbidity in Americans (p. 45).

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

Mortality statistics in this chapter are for diseases or conditions classified as the underlying cause of death. Heart failure, however, is never truly an underlying cause even though 60,337 deaths in 2006 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.

The 2006 mortality statistics in this Fact Book are final counts. They differ from the 2006 mortality statistics presented in the FY 2008 Fact Book because those statistics were preliminary.

### Cardiovascular Diseases

- In 2006, CVD caused 831,000 deaths—34 percent of all deaths (p. 33).
- Heart disease is the leading cause of death; the main form, CHD, caused 425,000 deaths in 2006 (pp. 34, 36).
- The annual number of deaths from CVD increased substantially from 1900 to 1970 and remains high (p. 35).
- The death rate (not age-adjusted) for CVD increased from 1920 until it peaked in 1968. Since then, the trend has been downward. In 2007, the rate was near the all-time low in 1900 (p. 35).
- Cerebrovascular disease, the third leading cause of death, accounted for 137,000 deaths in 2006 (pp. 34, 36).
- Heart disease is second only to all cancers combined in years of potential life lost (p. 36).
- Heart disease is the leading cause of death in blacks, Hispanics, and American Indians, but second to cancer in Asians. Stroke ranks as the third or fourth leading cause of death in the minority groups, except in American Indians, where it ranks sixth (p. 36).
- From 1979 to 1993 deaths with heart failure as the underlying or contributing cause increased 23 percent and subsequently remained constant to 2006. The increase was a major exception to the mortality decline in CVD over the 26-year period (p. 37).
- From 1999 to 2006, death rates for CHD and stroke declined in men and women of all racial/ethnic groups. CHD mortality remained highest in the black population and lowest in the Asian population. Stroke mortality continues to be highest in the black population (p. 38).

- Because of the rapid decline in mortality from CHD since the peak in 1968, there were 1,086,000 fewer deaths from CHD in 2006 than would have occurred if there had been no decline (p. 39).
- Substantial improvements have been made in the treatment of CVD. Since 1975 or 1985, case-fatality rates from hospitalized AMI, stroke, heart failure, and cardiac dysrhythmia declined appreciably (p. 39).
- The decline in CHD mortality began earlier in the United States than in most countries and outpaced that in most countries until the 1990s (only selected countries are shown) (p. 40).
- From 1999 to 2007, the percentage decline in death rates for CHD and stroke was slightly greater for whites than for blacks (p. 41).
- In 2006, an estimated 81.1 million persons in the United States had some form of CVD, 74.5 million had hypertension, and 17.6 million had CHD (p. 45).
- Since the 1960s, there has been a substantial reduction in the prevalence of CVD risk factors: hypertension, smoking, and high cholesterol, but not overweight. The large decline in prevalence of hypertension from 1976–1980 to 1988–1994 was followed by a slightly higher prevalence in 2001–2004 and 2005–2006 (p. 46).
- From 1976–1980 to 2003–2006, 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. 47).
- A 2003–2006 national survey showed only about 45 percent of hypertensive patients (systolic BP  $\geq$  140 mmHg or diastolic BP  $\geq$  90 mmHg or on anti-hypertensive medication) had their condition under control (p. 47).
- Hospitalization rates for heart failure in those aged 45 to 64 years increased from 1971 to 1993 and remained stable to 2006. Rates for those aged 65 years and older increased from 1971 to 1998 and remained relatively stable to 2006.
- The estimated economic cost of CVD for 2010 is approximately \$503 billion:
  - \$324 billion in direct health expenditures
  - \$42 billion in indirect cost of morbidity
  - \$137 billion in indirect cost of mortality (p. 49).
- From 1999 to 2007, death rates for COPD and asthma decreased in both black and white men and women, with one exception: the COPD death rate increased slightly in white women (p. 41).
- From 1980 to 2007, infant death rates for various lung diseases declined markedly (p. 41).
- Of the 10 leading causes of infant mortality, 4 are lung diseases or have a lung disease component (p. 42). From 1997 to 2007, changes in mortality for the causes were:
  - Congenital anomalies (-10 percent)
  - Disorders of short gestation (-3 percent)
  - Sudden infant death syndrome (-40 percent)
  - Respiratory distress syndrome (-45 percent).
- About one in five deaths in children under 1 year of age is due to a lung disease (p. 42).
- From 1980 to 2007, the COPD death rate for women in the United States increased significantly compared with the rates in several other countries (p. 43).
- From 1999 to 2006, death rates for COPD decreased slightly for Asian and Hispanic women but were stable for non-Hispanic white and non-Hispanic black women. For men, the rates decreased in all racial/ethnic groups (p. 44).
- Among the sleep disorders, sleep apnea is increasingly being recognized as an important health problem, which can lead to serious consequences. From 1990 to 2006, physician office visits for sleep apnea increased from 108,000 to 3.1 million (p. 44).
- Asthma is a common chronic condition, particularly in children (pp. 45, 46, 48).
- The economic cost of lung diseases is expected to be \$186 billion in 2010—\$117 billion in direct health expenditures and \$69 billion in indirect cost of morbidity and mortality (p. 49).

## Lung Diseases

- Lung diseases, excluding lung cancer, caused an estimated 225,000 deaths in 2006 (p. 33).
- COPD caused 121,000 deaths in 2006 and is the fourth leading cause of death (pp. 34, 36).

## Blood Diseases

- An estimated 200,000 deaths, 8 percent of all deaths, were attributed to blood diseases in 2006 (p. 33). These include the following:
  - 191,000 due to blood-clotting disorders
  - 9,000 to diseases of the red blood cell and bleeding disorders (p. 34).
- A large proportion of deaths from AMI and cerebrovascular disease involve blood-clotting problems (p. 34).
- In 2010, blood-clotting disorders are expected to cost the Nation's economy \$117 billion, and other blood diseases will cost \$16 billion (p. 49).



## Deaths From All Causes and Deaths From Cardiovascular, Lung, and Blood Diseases, U.S., 1986 and 2006

Cause of Death	1986		2006	
	Number of Deaths	Percent of Total	Number of Deaths	Percent of Total
All Causes	2,105,000	100	2,426,000	100
All Cardiovascular, Lung, and Blood Diseases	1,166,000	55	1,053,000	43
Cardiovascular Diseases	979,000	47	831,000	34
Blood	303,000*	14	200,000**	8
Lung	192,000†	9	225,000‡	9
All Other Causes	939,000	45	1,373,000	57

\* Includes 295,000 CVD deaths involving blood-clotting diseases.

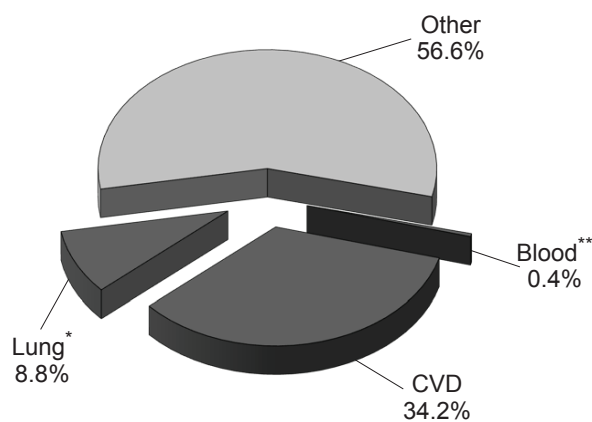
\*\* Includes 191,000 CVD deaths involving blood-clotting diseases.

† Includes 13,000 CVD deaths due to pulmonary heart disease.

‡ Includes 12,000 CVD deaths due to pulmonary heart disease.

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

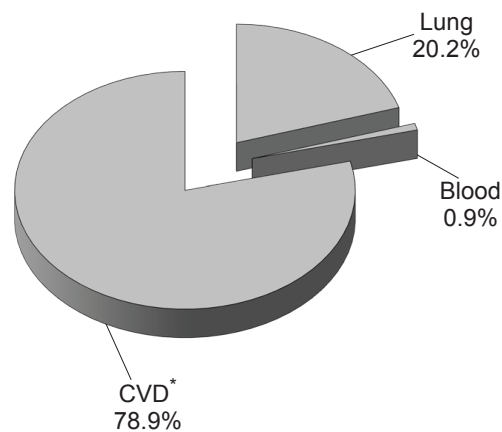
### Deaths by Major Causes, U.S., 2006



■ Total Cardiovascular, Lung, and Blood Diseases 43.4%

\* Excludes 12,000 deaths from pulmonary heart disease (0.6%).  
\*\* Excludes 191,000 deaths from blood-clotting disorders (8.8%).

### Deaths From Cardiovascular, Lung, and Blood Diseases, U.S., 2006



\* CVD involving blood clotting (23.0%).

## Deaths From Specific Cardiovascular, Lung, and Blood Diseases, U.S., 2006

Cause of Death	Deaths (Thousands)		
	Cardiovascular	Lung	Blood
Acute Myocardial Infarction	141	—	96*
Other Coronary Heart Disease	284	—	—
Cerebrovascular Diseases (Stroke)	137	—	85*
Other Atherosclerosis	31	—	3*
Pulmonary Embolism	7	7*	7*
Other Cardiovascular Diseases	231	5*	—
Bleeding and Red Blood Cell Diseases	—	—	9
Chronic Obstructive Pulmonary Disease**	—	121	—
Asthma	—	3	—
Pneumonia	—	56	—
Neonatal Pulmonary Disorders	—	5	—
Interstitial Lung Diseases	—	6	—
Lung Diseases Due to External Agents	—	18	—
Other Lung Diseases	—	4	—
<b>Total</b>	<b>831</b>	<b>225</b>	<b>200</b>

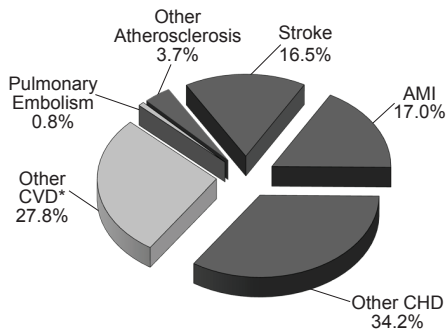
\* Deaths from clotting or pulmonary disorders also are included as cardiovascular deaths.

\*\* This term is preferred to the equivalent term “chronic lower respiratory diseases” given in the 10th revision of the International Classification of Diseases (ICD).

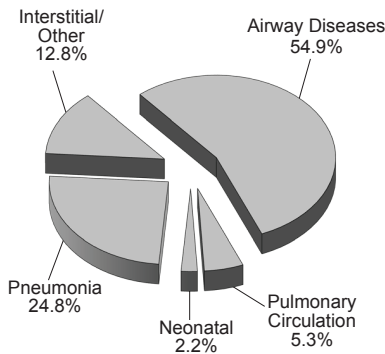
Note: Total, excluding overlap, is 1,054,000.

Source: Vital Statistics of the United States, NCHS.

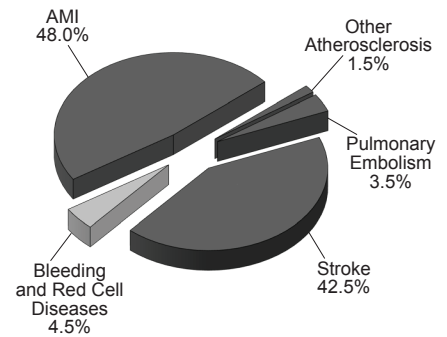
### Deaths From Cardiovascular Diseases, U.S., 2006



### Deaths From Lung Diseases, U.S., 2006



### Deaths From Blood Diseases, U.S., 2006



■ Atherosclerosis-related disease 71.4%

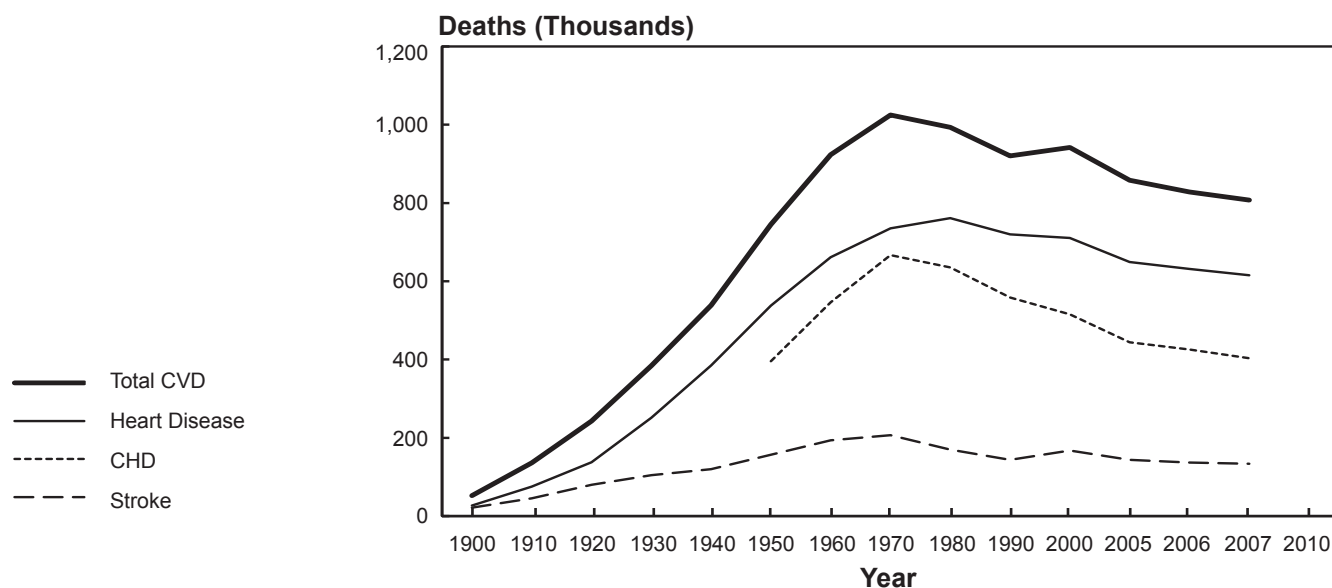
■ Blood clotting disorders 95.5%

\* Includes cardiac dysrhythmias, hypertensive disease, and other heart and blood vessel diseases.

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

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

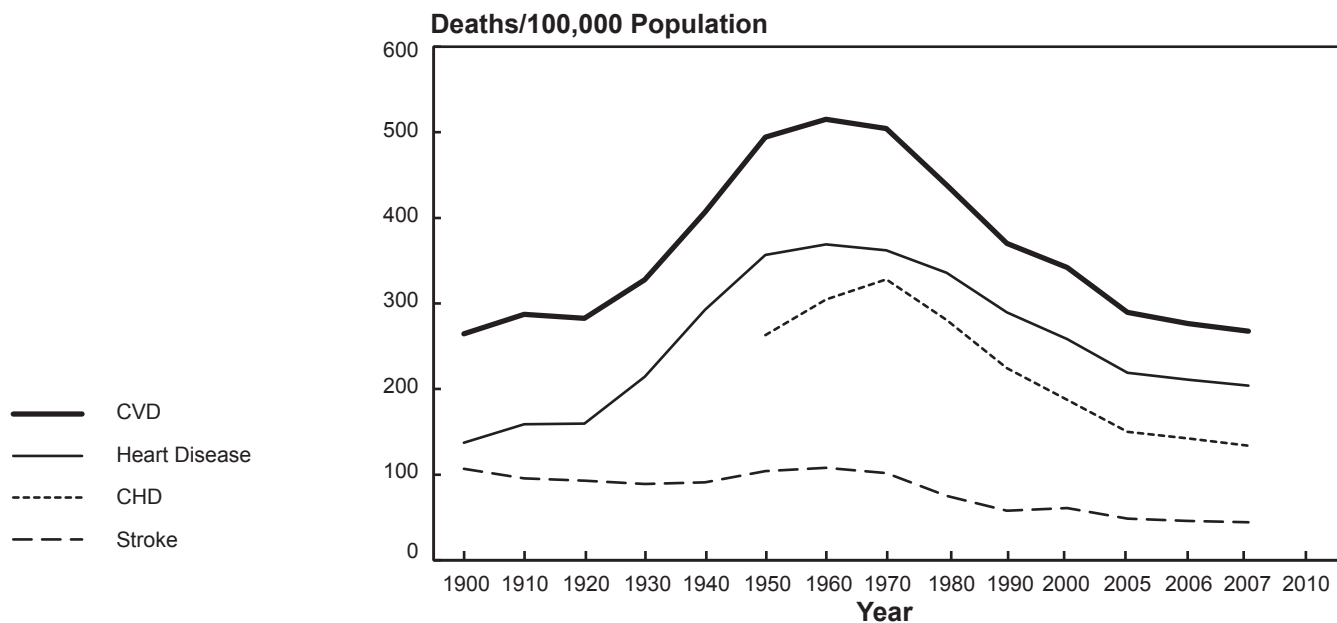
## Deaths From Cardiovascular Diseases, U.S., 1900–2007\*



\* Data for 2007 are preliminary.

Source: Vital Statistics of the United States, NCHS.

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

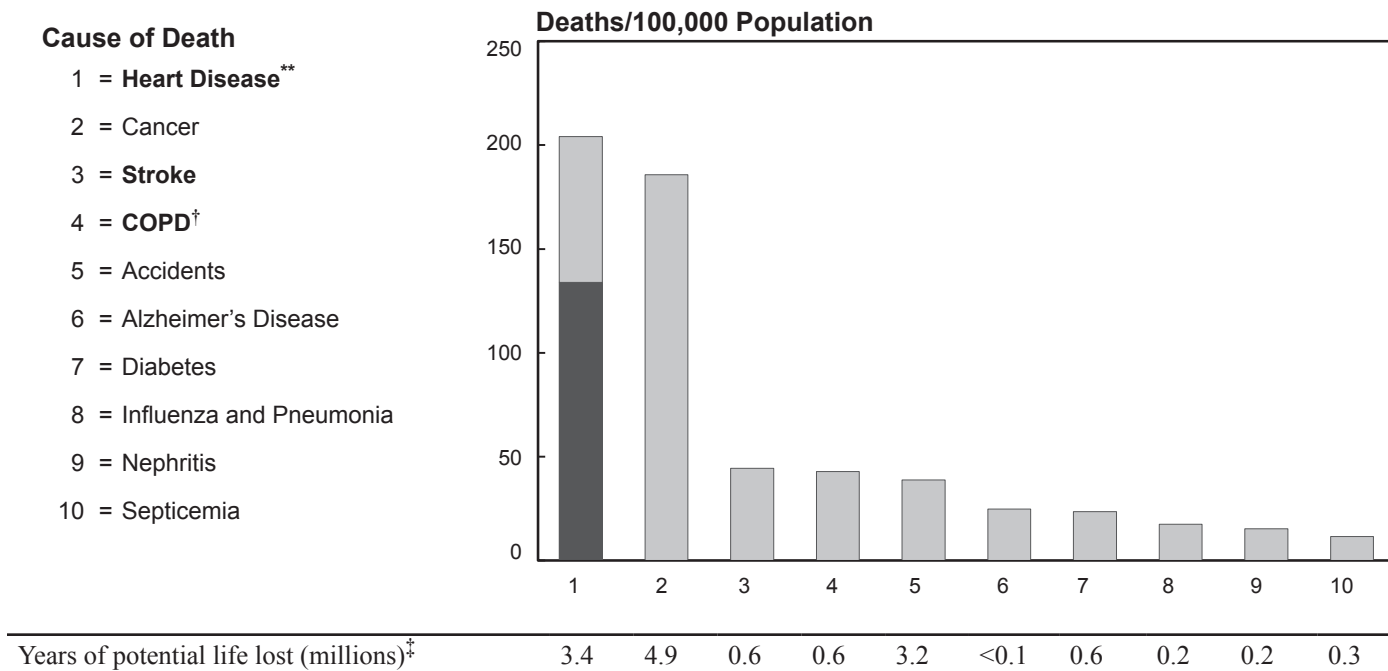


\* Not age-adjusted.

\*\* Data for 2007 are preliminary.

Source: Vital Statistics of the United States, NCHS.

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



\* Data for 2007 are preliminary.

\*\* Includes 133.9 deaths per 100,000 population from CHD.

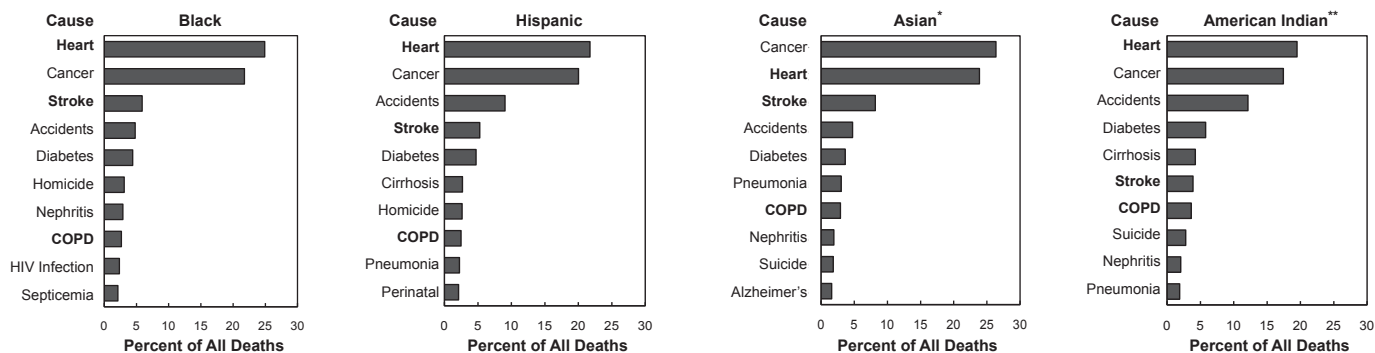
† COPD and allied conditions (including asthma); the term in the ICD/10 is "chronic lower respiratory diseases."

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

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

Source: Vital Statistics of the United States, NCHS.

## Ten Leading Causes of Death Among Minority Groups, U.S., 2006



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

\*\* Includes deaths among Aleuts and Eskimos.

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

Source: Vital Statistics of the United States, NCHS.

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

Cause of Death	Deaths/100,000 Population			Percent Change 1963–2007	Percent Change 1987–2007
	1963	1987	2007		
All Causes	1,346	970	760	-44	-22
Cardiovascular Diseases	805	455	250	-69	-45
Coronary Heart Disease	478	239	125	-74	-48
Stroke	174	75**	42	-76	-45
Other	153	140	84	-45	-40
Noncardiovascular Diseases	541	514	510	-6	-1
COPD and Asthma	16	36†	41	150	13
Other	524	478	469	-11	-2

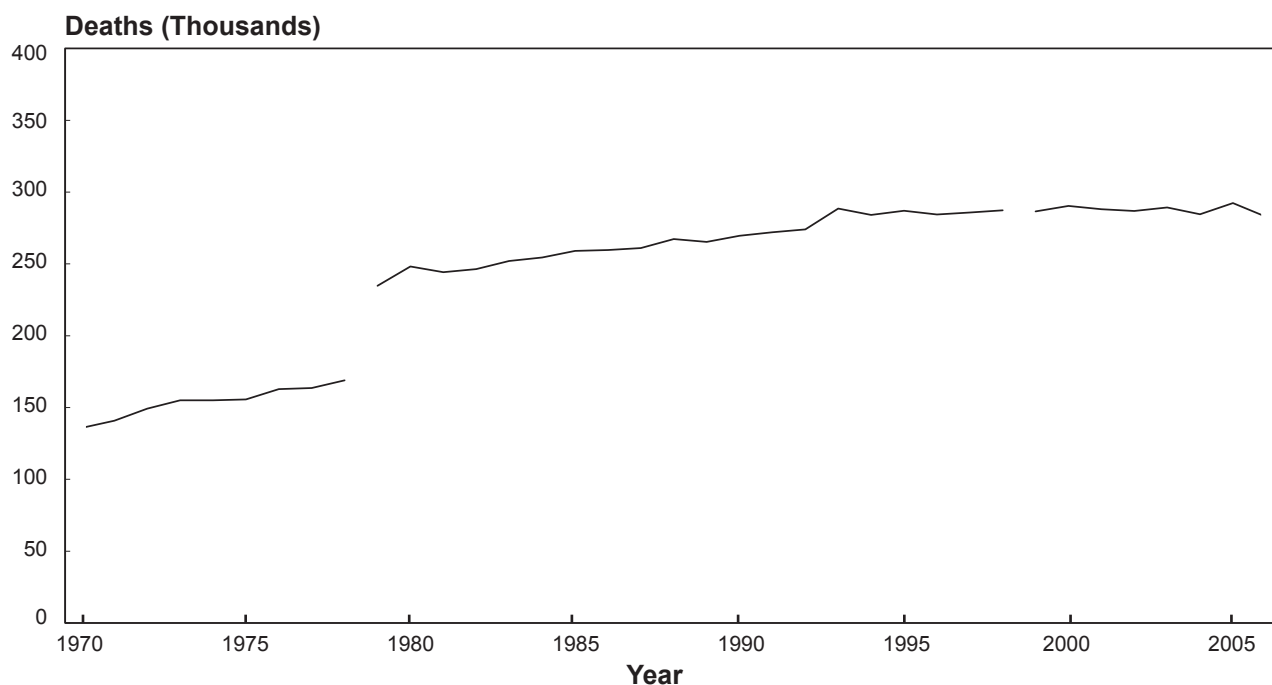
\* Data for 2007 are preliminary.

\*\* Comparability ratio (1.0502) applied.

† Comparability ratio (1.0411) applied.

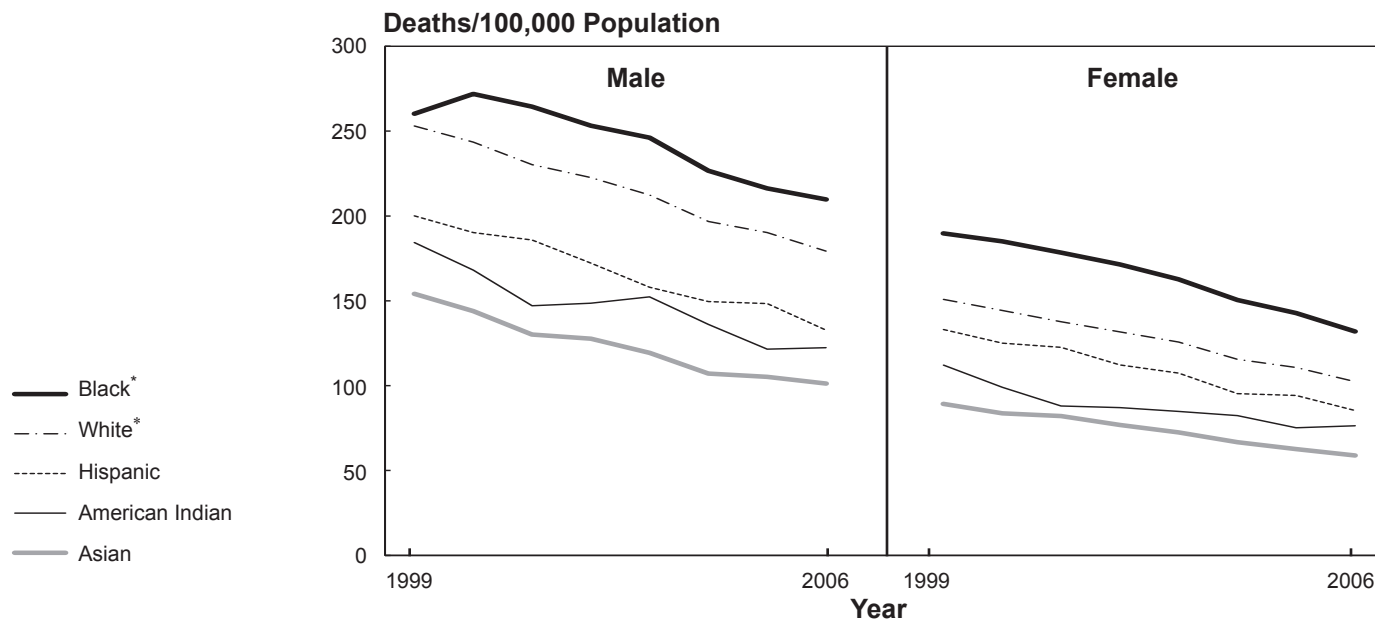
Source: Vital Statistics of the United States, NCHS.

### Deaths Attributed to Heart Failure,\* U.S., 1970–2006



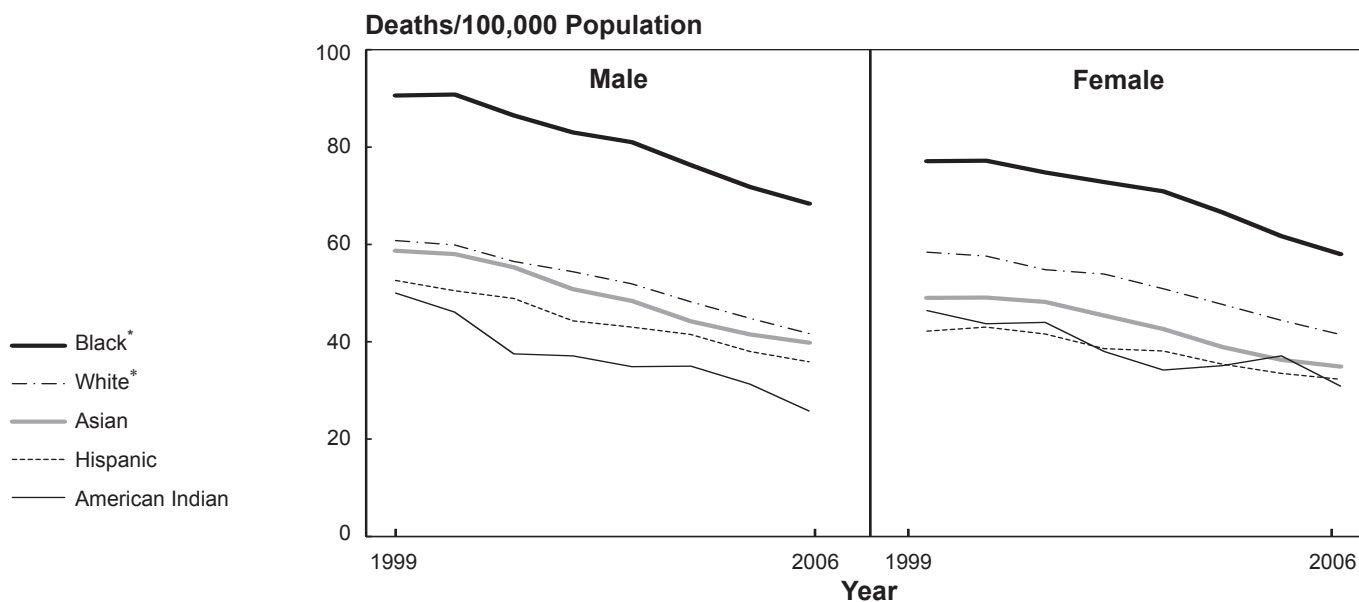
\* Any mention of heart failure on the death certificate.  
Note: Breaks in trend line indicate change in ICD codes.  
Source: Vital Statistics of the United States, NCHS.

### Age-Adjusted Death Rates for Coronary Heart Disease by Race/Ethnicity and Sex, U.S., 1999–2006



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

### Age-Adjusted Death Rates for Stroke by Race/Ethnicity and Sex, U.S., 1999–2006

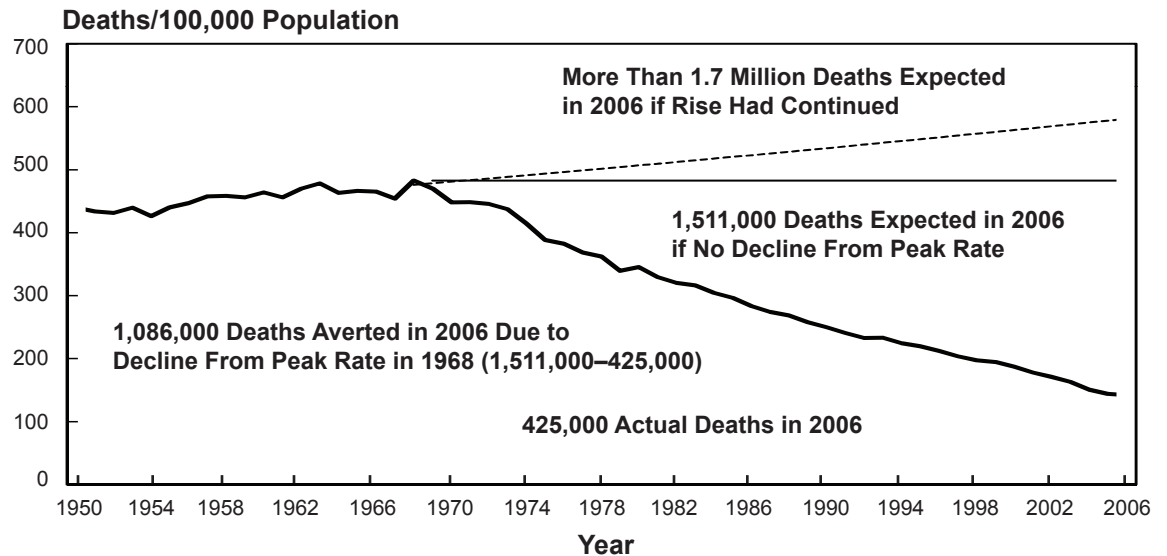


\* Non-Hispanic.  
 Source: Vital Statistics of the United States, NCHS.



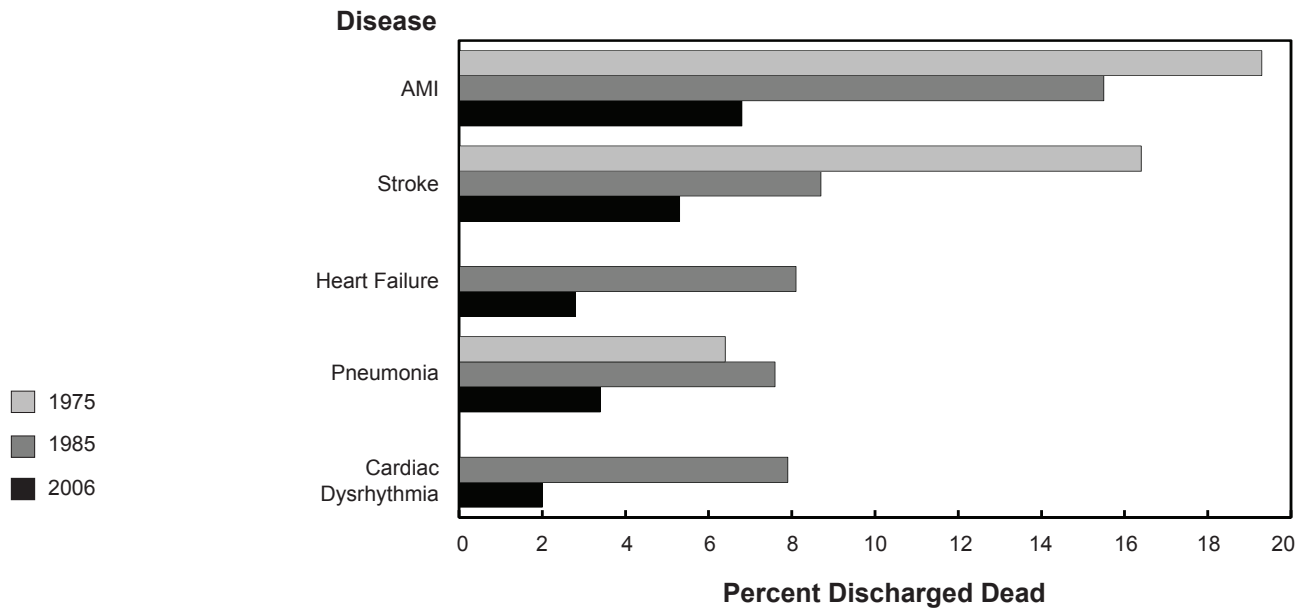
## Age-Adjusted Death Rates for Coronary Heart Disease, U.S., 1950–2006

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



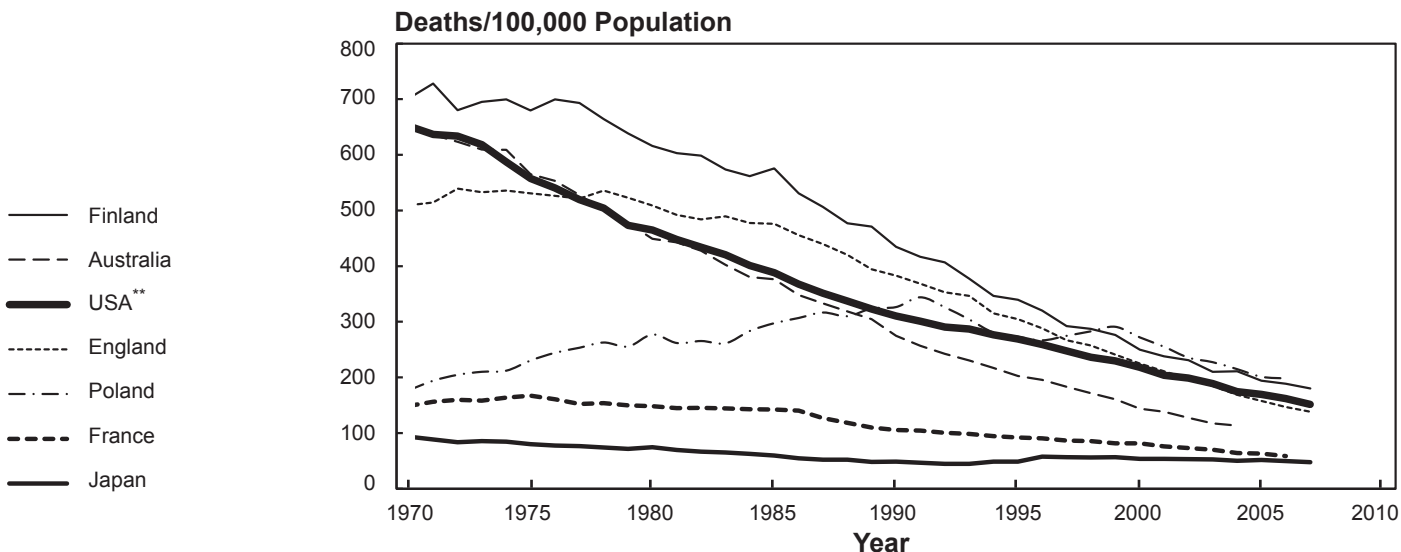
Source: Vital Statistics of the United States, NCHS.

## Common Cardiovascular and Lung Diseases With High Percentage Discharged Dead From Hospitals, U.S., 1975, 1985, and 2006



Source: National Hospital Discharge Survey, NCHS.

### Death Rates\* for Coronary Heart Disease in Men, Ages 35–74, in Selected Countries, 1970–2007

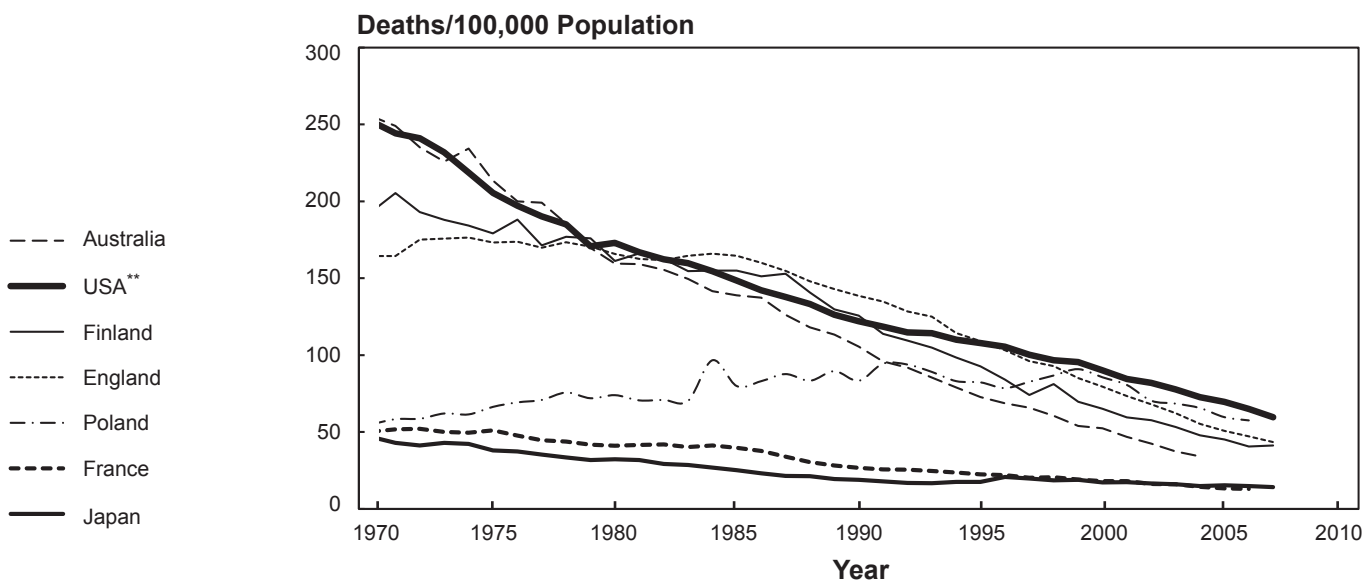


\* Age adjusted to the European Standard Population.

\*\* 2007 data for the United States are preliminary.

Source: World Health Statistics Annual, World Health Organization (WHO).

### Death Rates\* for Coronary Heart Disease in Women, Ages 35–74, in Selected Countries, 1970–2007

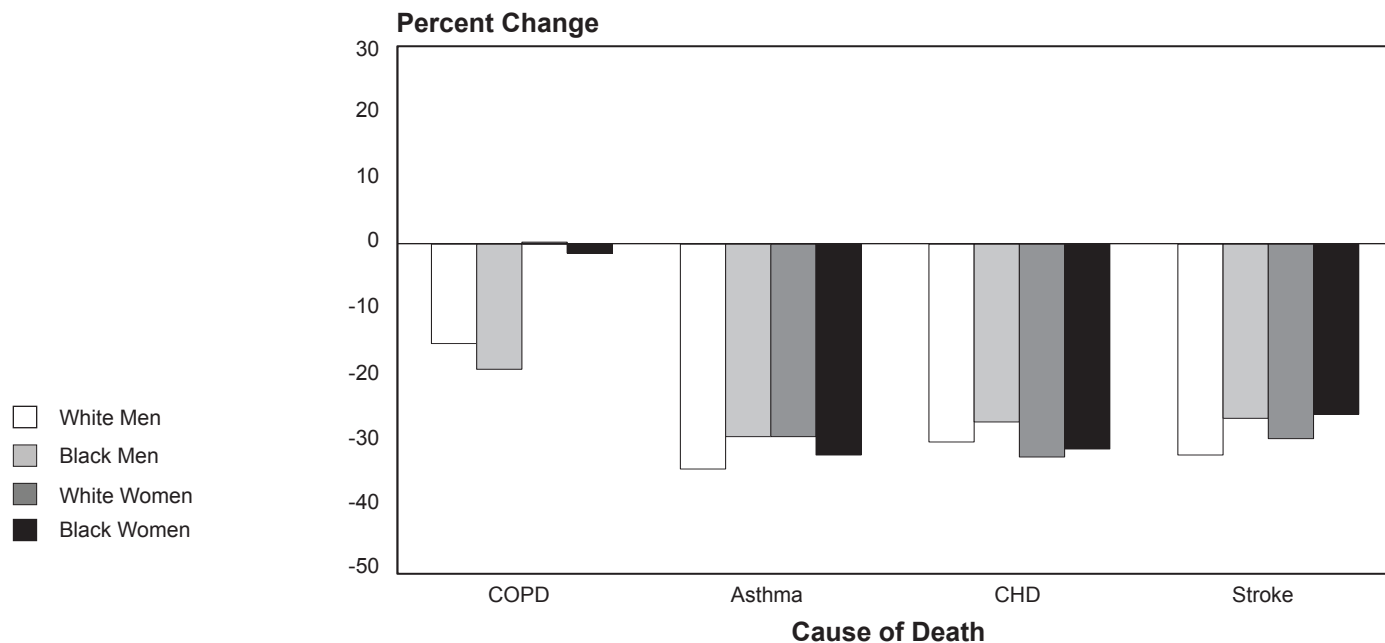


\* Age adjusted to the European Standard Population.

\*\* 2007 data for the United States are preliminary.

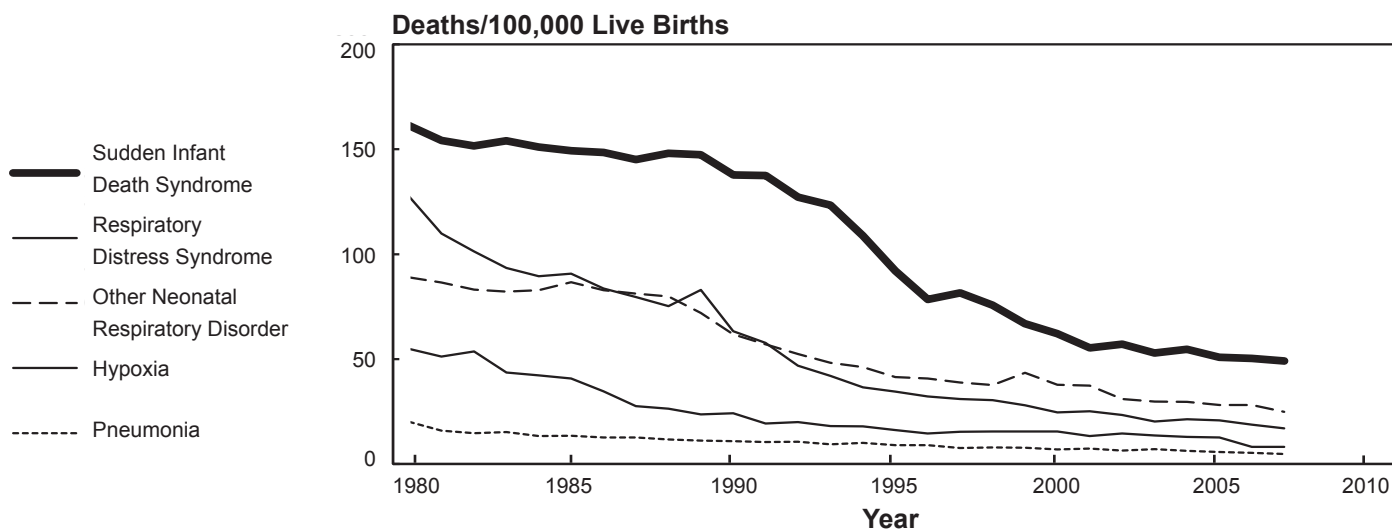
Source: World Health Statistics Annual, WHO.

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



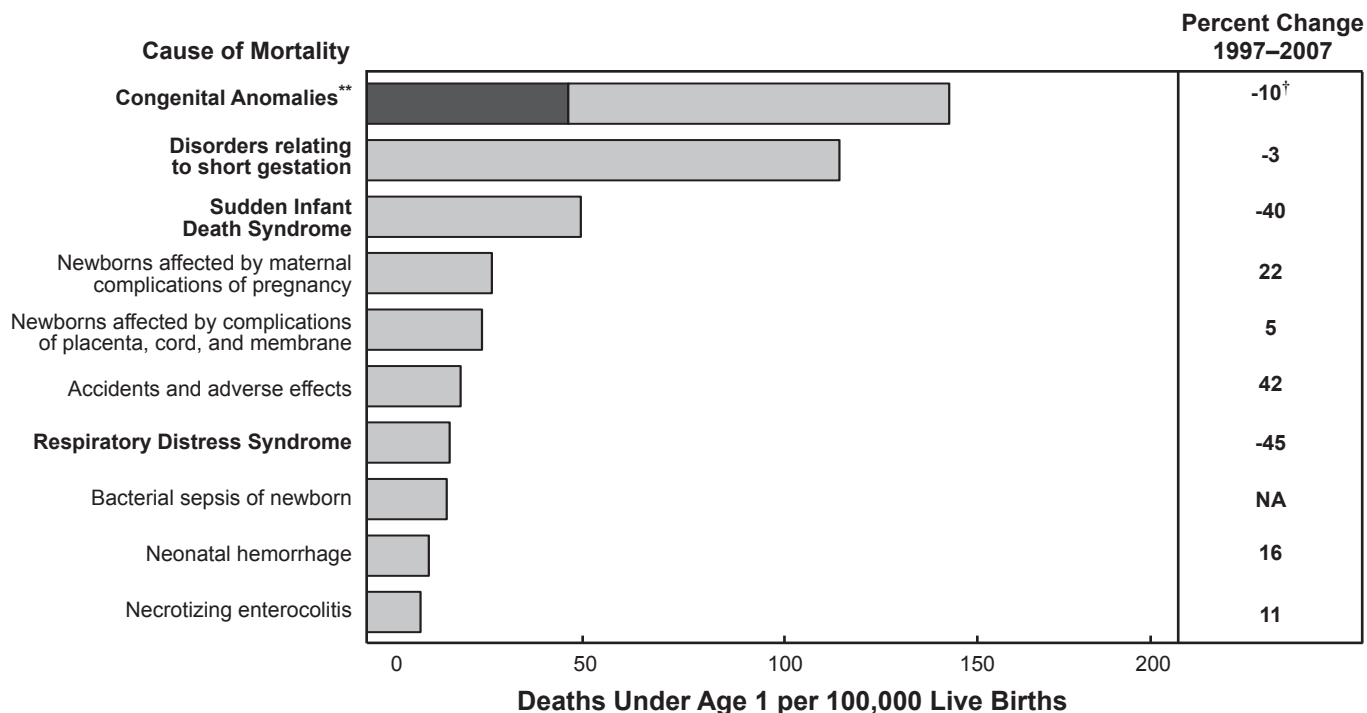
\* Data for 2007 are preliminary.  
Source: Vital Statistics of the United States, NCHS.

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



\* Data for 2007 are preliminary.  
Source: Vital Statistics of the United States, NCHS.

### Ten Leading Causes of Infant Mortality, U.S., 2007\*



\* Data for 2007 are preliminary.

\*\* Congenital CVD and congenital respiratory diseases accounted for 46.2 deaths under age 1 per 100,000 live births (black bar), which is 35 percent of infant deaths due to all congenital anomalies.

† From 1997 to 2007, congenital CVD declined 29 percent; congenital anomalies of the respiratory system declined 46 percent; other congenital anomalies increased 11 percent.

NA: Not available.

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

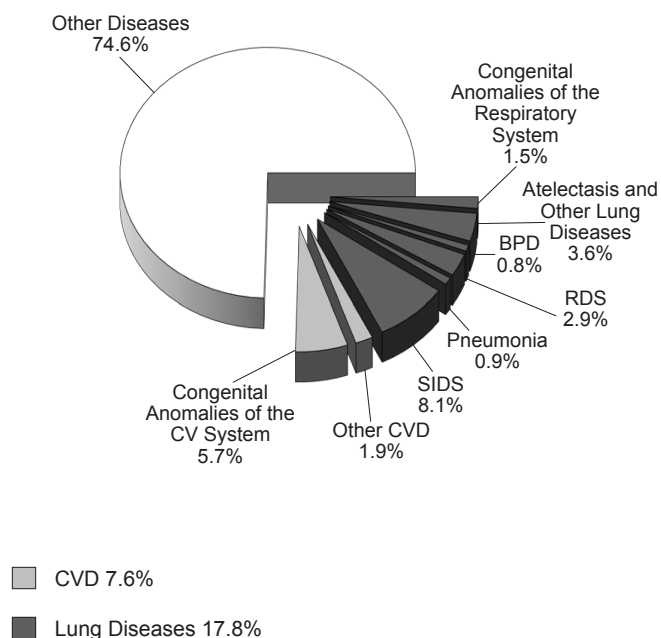
Source: Vital Statistics of the United States, NCHS.

### Deaths Under Age 1 Year Due to Cardiovascular and Lung Diseases, U.S., 2006

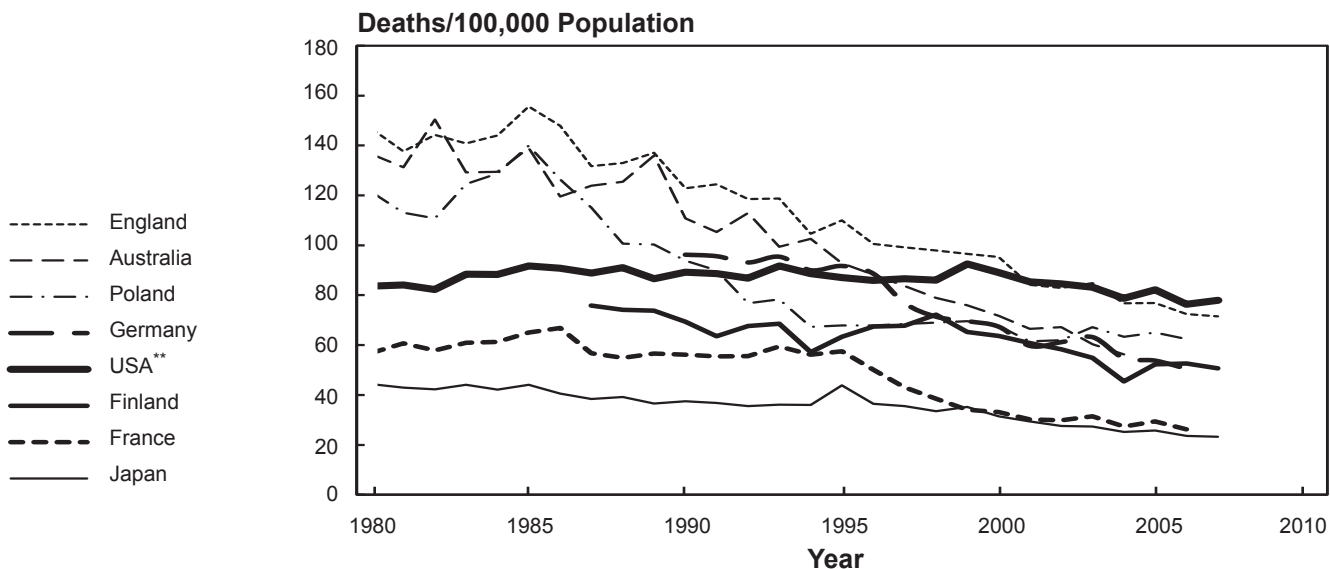
Cause of Death	Deaths Under Age 1
All Causes	28,527
<b>Cardiovascular Diseases</b>	<b>2,175</b>
Congenital Anomalies	1,632
Other	543
<b>Lung Diseases</b>	<b>5,077</b>
<b>Sudden Infant Death Syndrome</b>	<b>2,323</b>
<b>Respiratory Distress Syndrome</b>	<b>825</b>
Pneumonia	245
Bronchopulmonary Dysplasia (BPD)	225
Atelectasis of Newborn	398
<b>Congenital Anomalies</b>	<b>437</b>
Other Lung Diseases	624
<b>Other Diseases</b>	<b>21,275</b>

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

Source: Vital Statistics of the United States, NCHS.



### Death Rates\* for Chronic Obstructive Pulmonary Disease, Including Asthma, in Men, Ages 35 and Older, in Selected Countries, 1980–2007

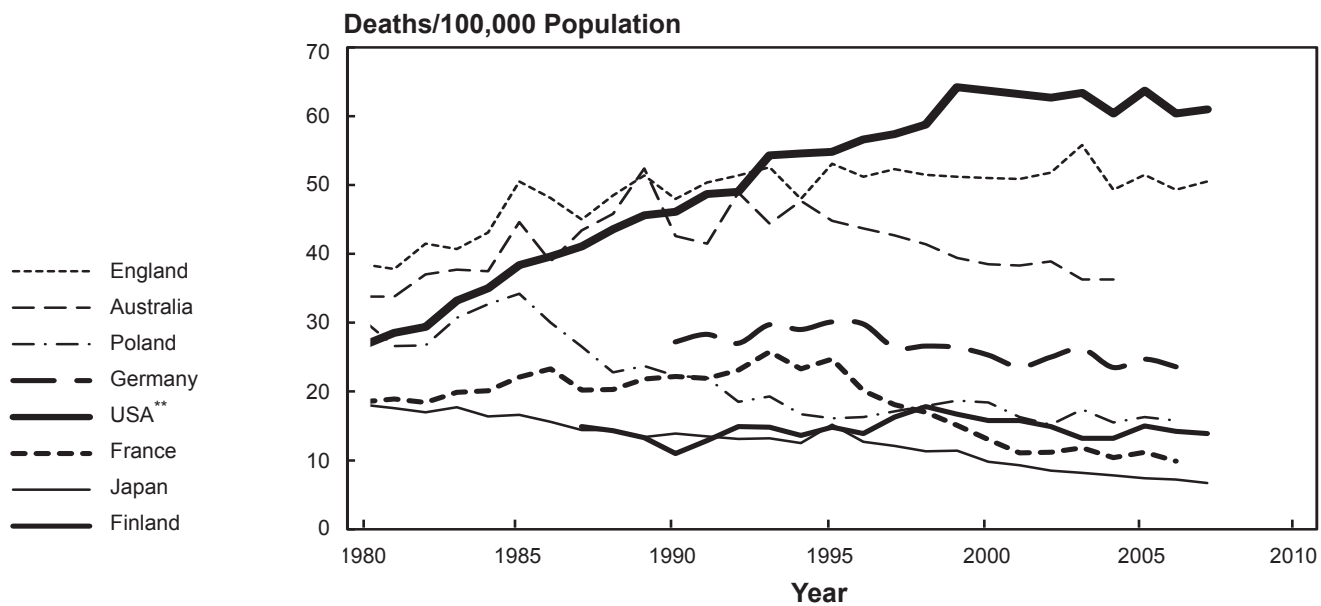


\* Age adjusted to the European Standard Population.

\*\* 2007 data for the United States are preliminary.

Source: World Health Statistics Annual, WHO.

### Death Rates\* for Chronic Obstructive Pulmonary Disease, Including Asthma, in Women, Ages 35 and Older, in Selected Countries, 1980–2007



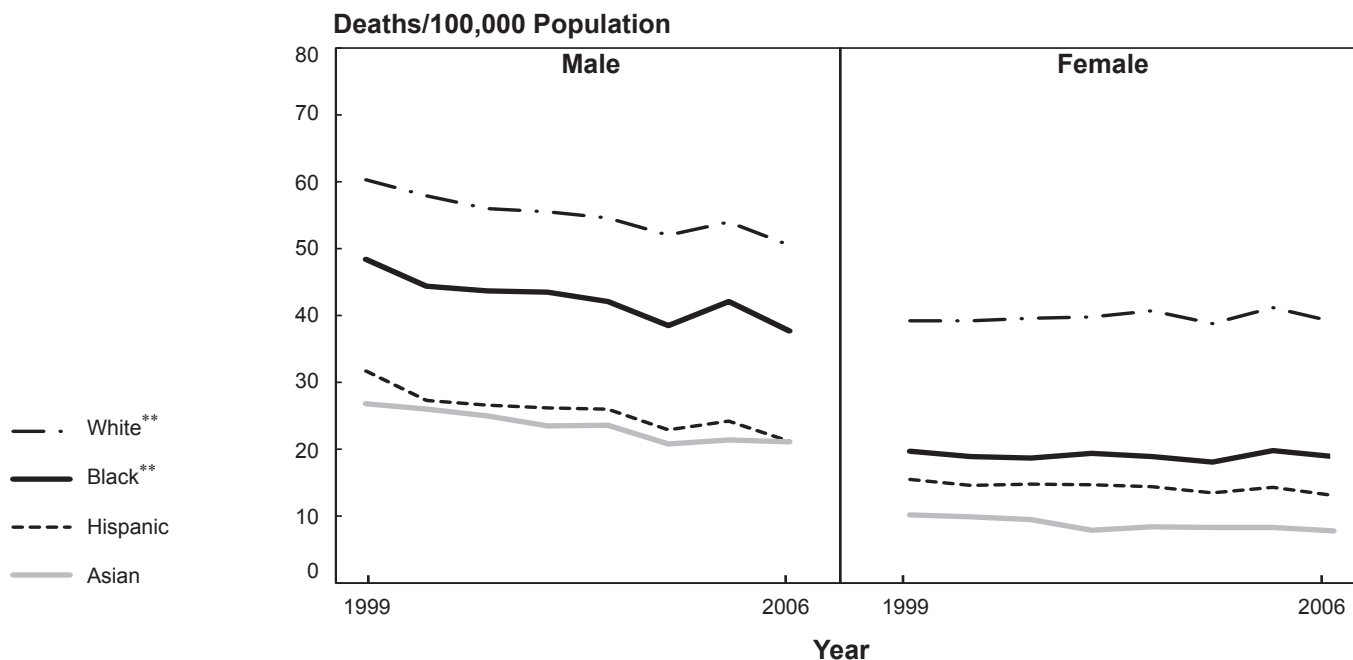
\* Age adjusted to the European Standard Population.

\*\* 2007 data for the United States are preliminary.

Source: World Health Statistics Annual, WHO.



### Age-Adjusted Death Rates for Chronic Obstructive Pulmonary Disease\* by Race/Ethnicity and Sex, U.S., 1999–2006

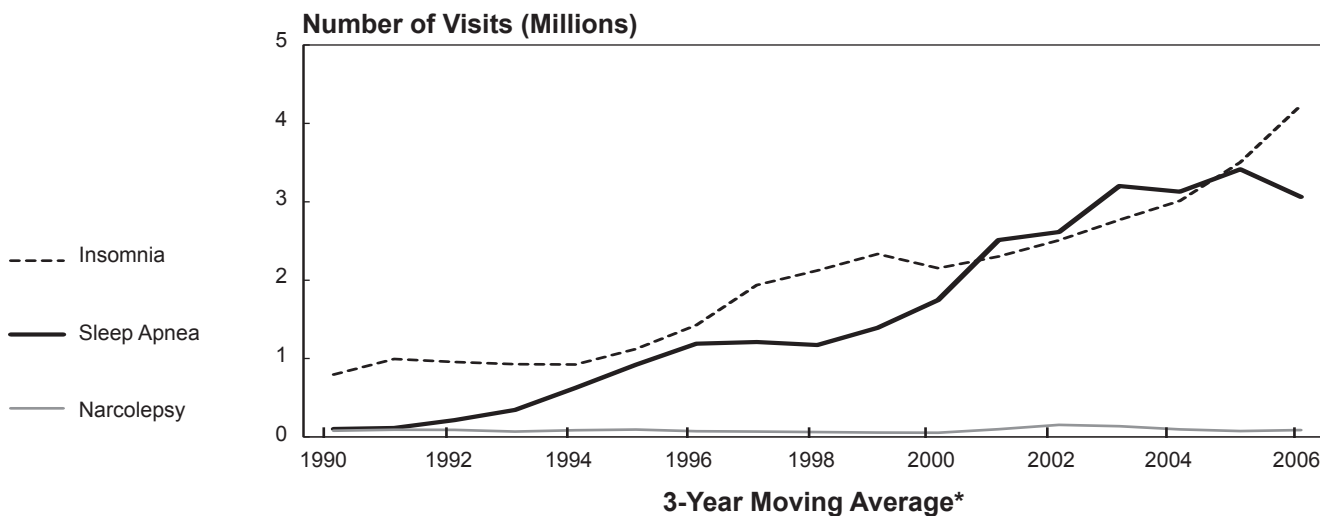


\* COPD and allied conditions (including asthma); the term in the ICD/10 is “chronic lower respiratory diseases.”

\*\* Non-Hispanic.

Source: Vital Statistics of the United States, NCHS.

### Physician Office Visits for Sleep Disorders, U.S., 1990–2006



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

Note: Primary and secondary diagnoses.

Source: National Ambulatory Medical Care Survey, NCHS.

## Prevalence of Common Cardiovascular and Lung Diseases, U.S., 2006

Disease	Number
Cardiovascular Diseases*	81,100,000
Hypertension**	74,500,000
Coronary Heart Disease	17,600,000
Heart Failure	5,800,000
Stroke	6,400,000
Congenital Heart Disease†	1,000,000
Asthma‡	24,400,000
COPD§	24,000,000

\* Includes hypertension, CHD, stroke, or heart failure.

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

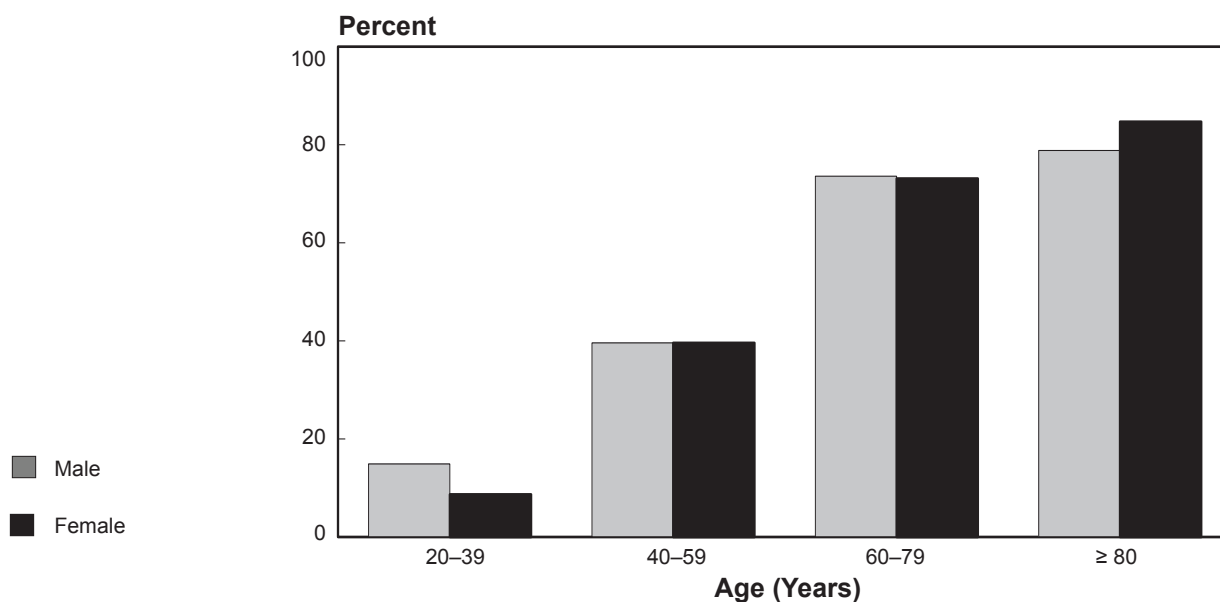
† Range from 650,000 to 1,300,000 (*Am Heart J* 2004;147:425–439).

‡ 12,200,000 (2008) of these had an asthma attack in the past 12 months.

§ An estimated 12,000,000 diagnosed (2008) and 12,000,000 undiagnosed (2006).

Sources: National Health and Nutrition Examination Survey (NHANES) of NCHS (2003–2006 data extrapolated to 2006) and National Health Interview Survey (NHIS) of NCHS.

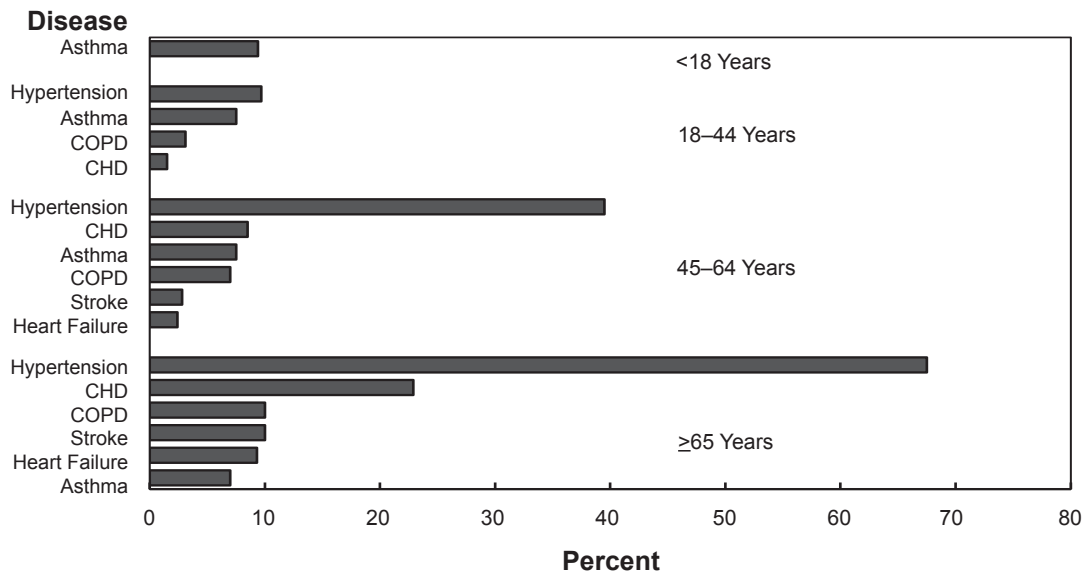
## Prevalence of Cardiovascular Diseases\* in Adults by Age and Sex, U.S., 2003–2006



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

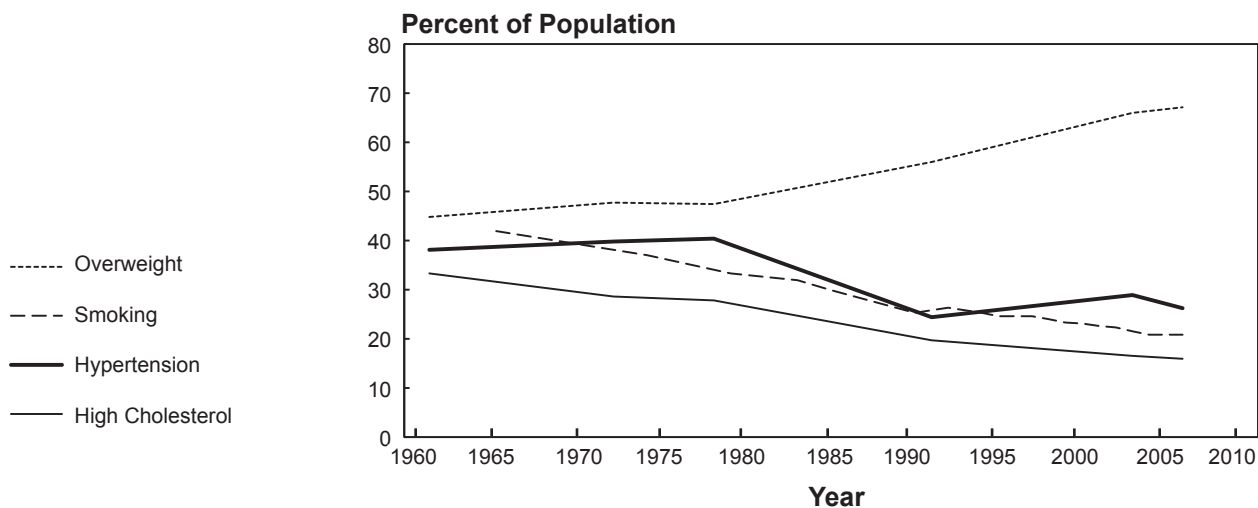
Source: NHANES, 2003–2006, NCHS.

## Prevalence of Common Cardiovascular and Lung Diseases by Age, U.S., 2006



Sources: NHIS and NHANES, NCHS.

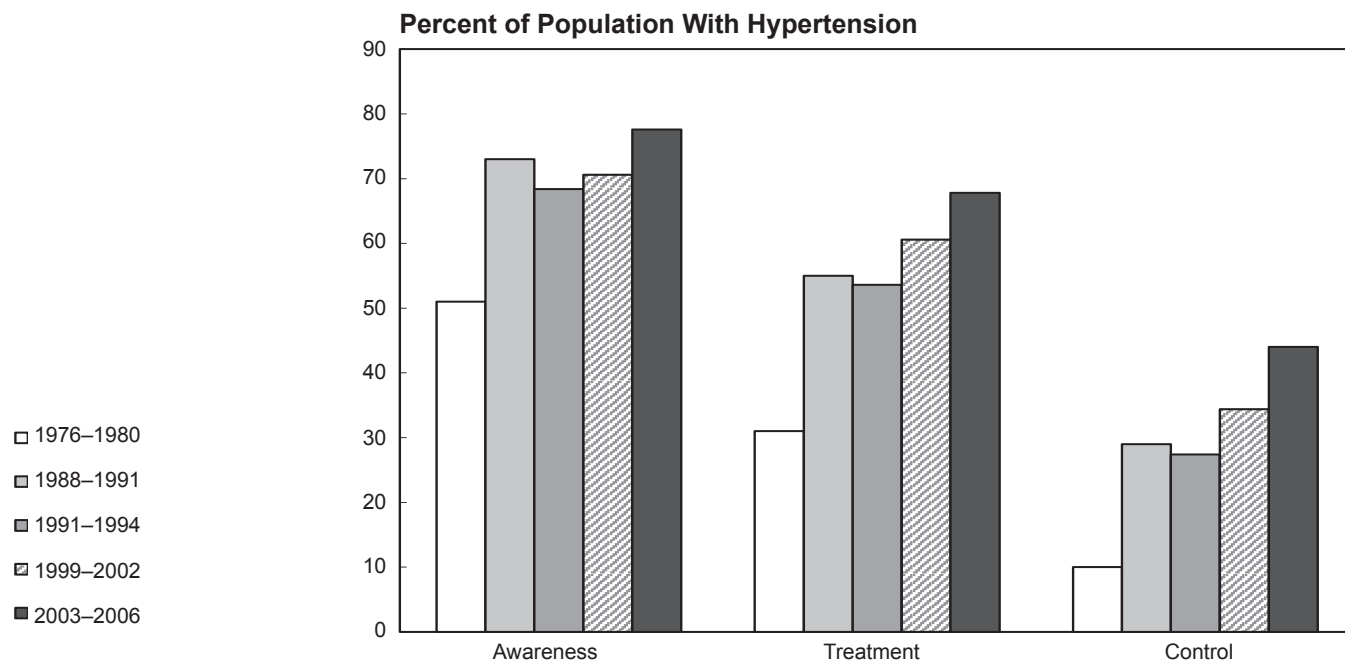
## Age-Adjusted Prevalence of Cardiovascular Disease Risk Factors in Adults, U.S., 1961-2006



Notes: Hypertension is defined as systolic blood pressure  $\geq 140$  mmHg or diastolic blood pressure  $\geq 90$  mmHg, or being on antihypertensive medication. High cholesterol is  $\geq 240$  mg/dL. Overweight is BMI  $\geq 25$  kg/m<sup>3</sup>. Data were collected at six time periods: 1960-1961 (plotted at 1961), 1971-1974 (plotted at 1972), 1976-1980 (plotted at 1978), 1988-1994 (plotted at 1991), 1999-2004 (plotted at 2003), and 2005-2006 (plotted at 2006).

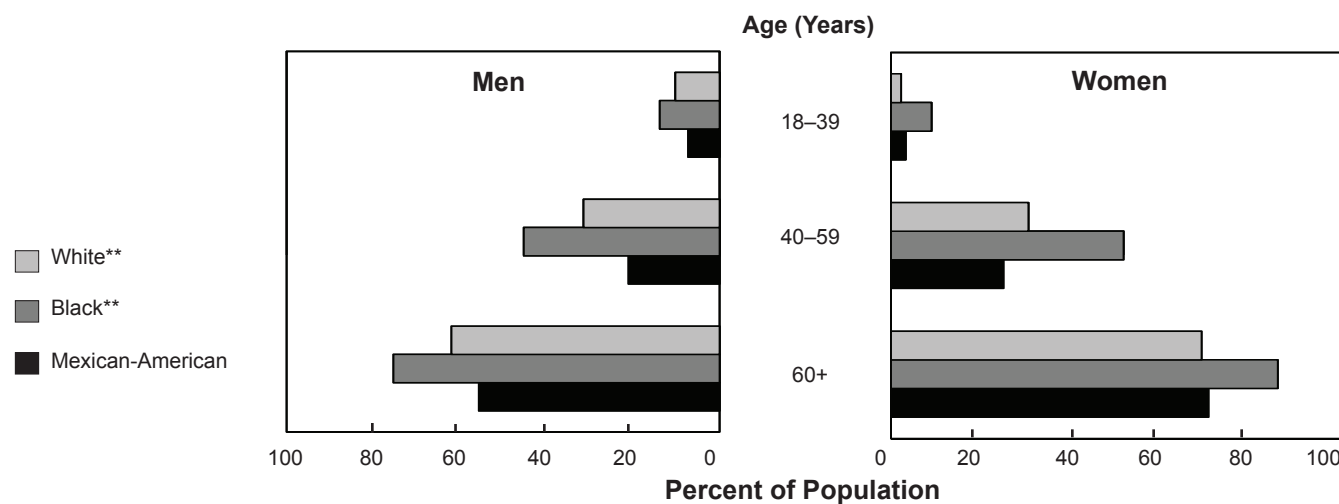
Sources: NHIS for smoking, ages  $\geq 18$ , NCHS; NHANES for the other risk factors, ages 20-74, NCHS.

## Hypertensive\* Population Aware, Treated, and Controlled, Ages 18 and Older, U.S., 1976–1980 to 2003–2006



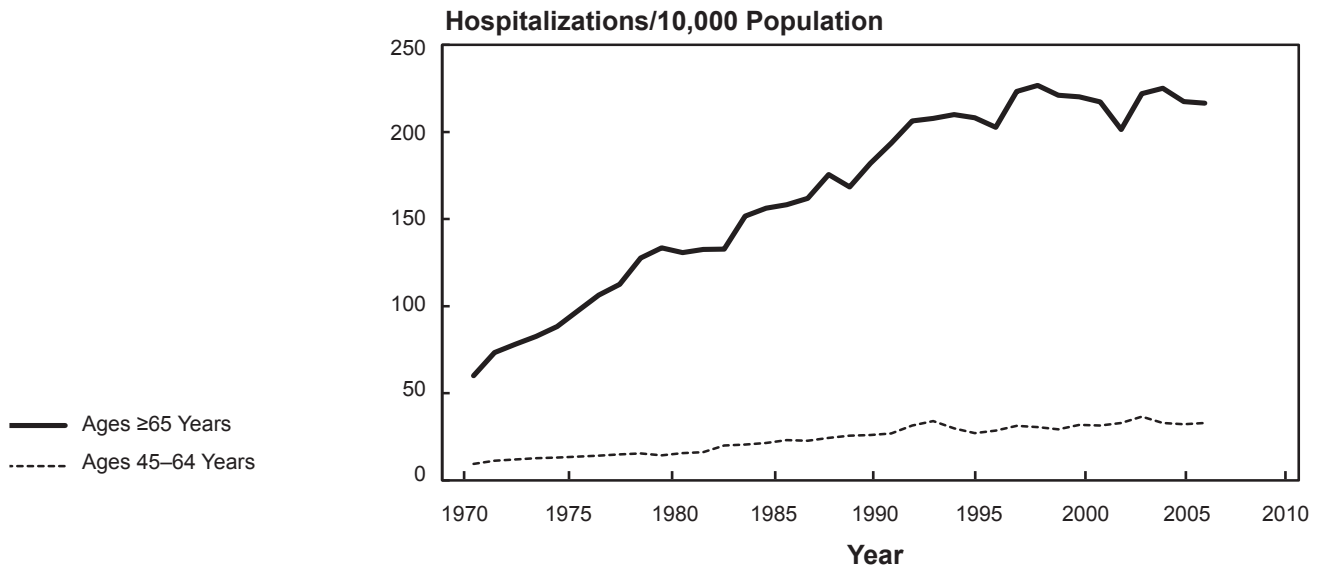
\* Hypertension is defined as systolic blood pressure  $\geq$  140 mmHg, or diastolic blood pressure  $\geq$  90 mmHg, or being on antihypertensive medication.  
Source: NHANES, NCHS.

## Adult Population With Hypertension\* by Age, Race/Ethnicity, and Sex, U.S., 2003–2006



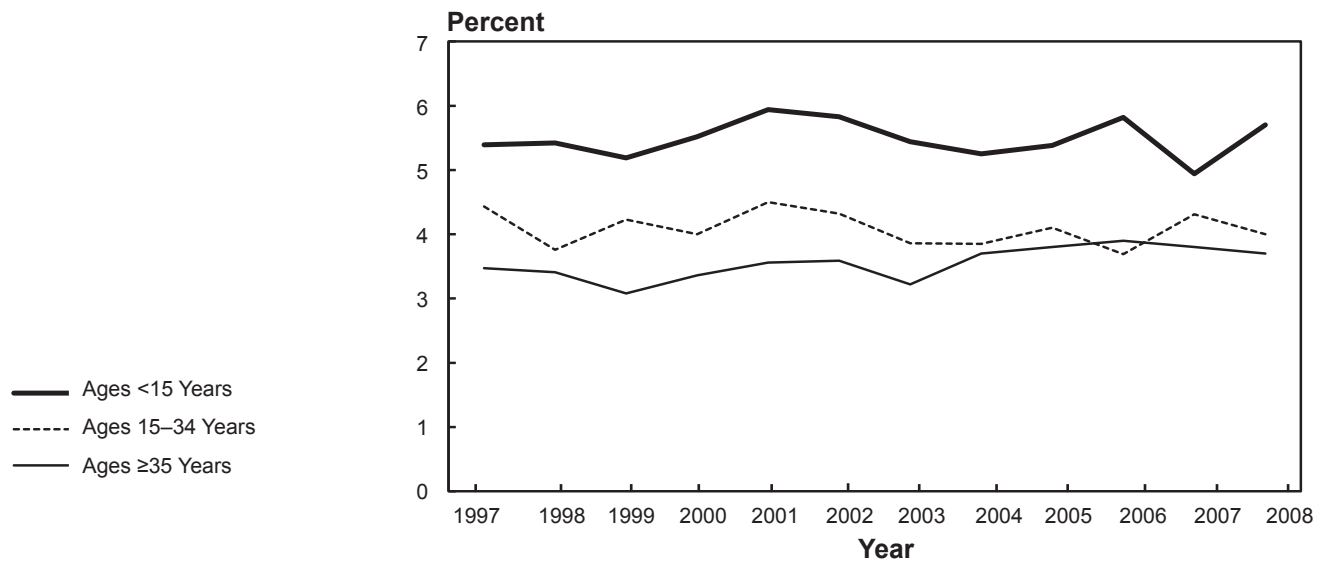
\* Hypertension is systolic blood pressure  $\geq$  140mm Hg, diastolic blood pressure  $\geq$  90 mmHg, or being on antihypertensive medication.  
\*\* Non-Hispanic.  
Source: NHANES, NCHS.

### Hospitalization Rates for Heart Failure, Ages 45–64 and 65 and Older, U.S., 1971–2006



Source: National Hospital Discharge Survey, NCHS.

### Persons Experiencing Asthma Episodes in Previous 12 Months by Age, U.S., 1997–2008



Source: NHIS, NCHS.



## Direct and Indirect Economic Costs of Illness by Major Diagnosis, U.S., 2010

	Amount (Dollars in Billions)				Percent Distribution			
	Direct Costs*	Indirect Costs		Total	Direct Costs	Indirect Costs		Total
		Morbidity**	Mortality†			Morbidity	Mortality	
Cardiovascular Disease (Blood Clotting)‡	\$324.1 (76.1)	\$41.7 (9.2)	\$137.4 (32.0)	\$503.2 (117.3)	14.9% (3.5)	17.0% (3.7)	20.2% (4.7)	16.2% (3.7)
Lung Diseases§	117.1	32.0	36.6	185.7	5.4	13.1	5.4	6.0
Blood Diseases	11.8	0.7	3.4	15.9	0.5	0.3	0.5	0.5
<b>Subtotal</b>	<b>453.0</b>	<b>74.4</b>	<b>177.4</b>	<b>704.8</b>	<b>20.8</b>	<b>30.4</b>	<b>26.1</b>	<b>22.7</b>
Diseases of the Digestive System	227.4	12.6	30.6	270.6	10.4	5.1	4.5	8.7
Neoplasms	102.8	20.9	140.1	263.8	4.7	8.5	20.6	8.5
Mental Disorders	180.8	32.4	12.5	225.7	8.3	13.2	1.8	7.3
Diseases of the Nervous System	157.7	9.6	16.4	183.7	7.2	3.9	2.4	5.9
Diseases of the Musculoskeletal System	127.2	25.0	3.5	155.7	5.8	10.2	0.5	5.0
Diseases of the Genitourinary System	95.1	6.0	8.7	109.8	4.4	2.4	1.3	3.5
Endocrine, Nutritional, and Metabolic Diseases	87.9	8.0	25.5	121.4	4.0	3.3	3.8	3.9
Infectious and Parasitic Diseases	45.1	14.9	29.6	89.6	2.1	6.1	4.4	2.9
Diseases of the Skin	50.6	1.8	0.8	53.2	2.3	0.7	0.1	1.7
Other and Unallocated to Diseases	649.0	39.3	234.2	922.5	29.8	16.0	34.5	29.8
<b>Total</b>	<b>2,176.6</b>	<b>244.9</b>	<b>679.3</b>	<b>3,100.8</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

\* Direct costs are personal health care expenditures for hospital and nursing home care, drugs, home care, and physician and other professional services. The estimation method is based on Centers for Medicare & Medicaid Services (CMS) projections for total 2009 health expenditures by type of direct costs and NCHS estimates of direct costs in 1995 for each of the major diagnostic groups. The proportion of costs for 1995 for each diagnostic group is applied to the equivalent 2010 total by type of direct cost.

\*\* Morbidity costs were estimated for 2010 by multiplying NCHS estimates for 1980 by a 1980–2010 percent inflation factor derived from the increase in mean earnings estimated by the Bureau of the Census.

† The mortality cost for each disease group was estimated for 2009 by first multiplying the number of deaths in 2006 in each age- and sex-specific group by the 2005 present value of lifetime earnings (latest available) discounted at 3 percent; second, summing these estimates for each diagnostic group; and third, multiplying the estimates by a 2005–2010 inflation factor (1.194) based on change in mean earnings.

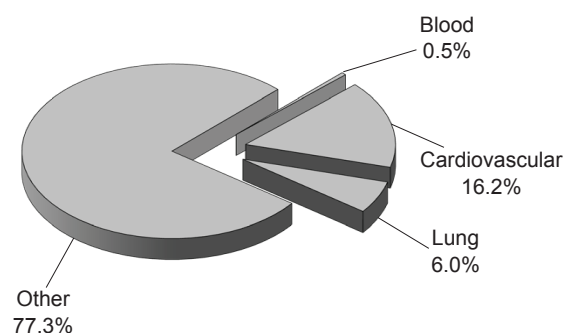
‡ Costs of blood-clotting disease are estimated from predetermined proportions of CVD morbidity and mortality statistics for MI, cerebrovascular diseases, and diseases of arteries.

§ Does not include lung cancer or leukemia.

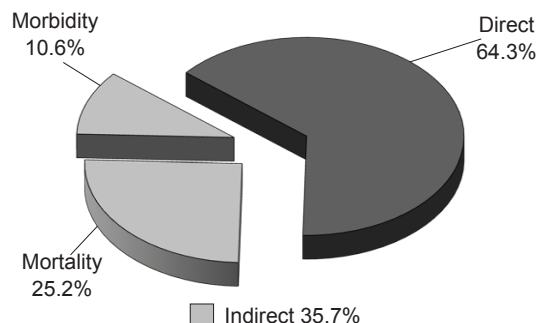
Note: Numbers may not add to totals due to rounding.

Sources: Estimates by NHLBI; data from the NCHS, the CMS, the Bureau of the Census, and the Institute for Health and Aging, University of California.

### Total Economic Costs, U.S., 2010



### Economic Costs of Cardiovascular, Lung, and Blood Diseases, U.S., 2010







## 5. Institute-Initiated Programs Starting in FY 2009

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

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

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

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

Descriptions of the Institute-initiated programs that began or were renewed (i.e., were funded) in FY 2009 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

#### Initiative Being Renewed

##### *Coronary Artery Risk Development in Young Adults (CARDIA) Study*

The purpose of this renewal is to conduct the Year 25 clinical exam of the CARDIA cohort. The study assesses the effect of CVD risk factors and lifestyle throughout young adulthood on the development of subclinical vascular and ventricular function abnormalities in early middle age.

#### New Initiatives

##### *Stress Management Interventions To Reduce Risk of Coronary Artery Disease*

The purpose of this PA is to determine whether stress management interventions can slow the progression of coronary artery disease or reduce major adverse cardiac events in patients with confirmed coronary artery disease.

##### *Systolic Blood Pressure Intervention Trial (SPRINT)*

The purpose of this RFP is to determine whether intensive treatment to achieve a systolic blood pressure goal lower than the one currently recommended will reduce cardiovascular morbidity and mortality.

##### *Targeted Approaches to Weight Control for Young Adults*

The purpose of this RFA is to develop and evaluate innovative behavioral and environmental

approaches for weight control in young adults at high risk for weight gain.

## **Lung Diseases Program**

### **New Initiatives**

#### ***Airway Smooth Muscle Function and Targeted Therapeutics in Human Asthma***

The purpose of this RFA is to investigate the complex role that airway smooth muscle plays in the development of asthma and to use the resultant knowledge to identify innovative therapeutic targets.

#### ***Asthma Network (AsthmaNet)***

The purpose of this RFA is to conduct Phase II and Phase III clinical trials to identify optimal therapies for a variety of asthma phenotypes and genotypes among individuals of diverse racial and ethnic backgrounds.

#### ***Circadian-Coupled Cellular Function in Heart, Lung, and Blood Tissues***

The purpose of this RFA is to stimulate Phase I translation of recent advances in understanding the molecular basis of endogenous, self-sustaining daily (circadian) cycles in cellular function and gene expression to improve understanding of heart, lung, and blood disease pathogenesis.

#### ***Developmental Origins of Altered Lung Physiology and Immune Function***

The purpose of this RFA is to conduct research to improve understanding of the effects of pre- and post-natal environments on the developing lung and immune system and the resulting sustained changes in lung physiology and immune function that lead to suboptimal respiratory health and outcomes.

#### ***Microbiome of the Lung and Respiratory Tract in HIV-Infected Individuals and HIV-Uninfected Controls***

The purpose of this RFA is to characterize the microbiome of the lung in HIV-infected individuals and matched HIV-uninfected controls to create a dataset of sufficient quality and depth to allow analysis of the effects of changes in the respiratory microbiome on the pathogenesis and progression of HIV disease, HIV-related respiratory complications, and anti-HIV therapies.

## **Blood Diseases and Resources Program**

### **New Initiatives**

#### ***Characterizing the Blood Stem Cell Niche***

The purpose of this RFA is to advance understanding of the blood stem cell niche by defining the role of specific cells and the physiological source of factors or extracellular components that are essential for stem cell self-renewal and differentiation.

#### ***Immunomodulatory, Inflammatory, and Vasoregulatory Properties of Transfused Red Blood Cell Units as a Function of Preparation and Storage***

The purpose of this RFA is to (a) identify the molecular and cellular changes that occur during red blood cell unit preparation and storage and (b) evaluate immunomodulatory, inflammatory, and vasoregulatory effects of storage lesion elements from red blood cell units on the blood vessel wall, host cells, and tissue oxygenation.

#### ***Transcranial Doppler (TCD) With Transfusions Changing to Hydroxyurea (TWITCH Trial)***

The purpose of this RFA is to compare standard therapy (transfusion) to alternative therapy (hydroxyurea) for maintenance of TCD velocities in children with sickle cell anemia who have been receiving chronic transfusions for abnormal TCD velocities. Additional objectives include comparison of standard to alternative therapy for incidence of primary stroke, determination of the frequency of nonstroke neurological events and other sickle cell-related events, management of iron overload, assessment of growth and development, recording of adverse events, and measurement of quality of life.

## **Trans-NHLBI**

### **Initiative Being Renewed**

#### ***Ancillary Studies in Clinical Trials***

The purpose of this renewal is to conduct time-sensitive ancillary studies related to heart, lung, and blood diseases using patient cohorts, data, and biological materials from ongoing clinical trials.

### **New Initiatives**

#### ***Global Health Centers of Excellence***

The purpose of this initiative is to establish a worldwide network of research and training Centers of

Excellence to build institutional and community capacity to prevent and control chronic cardiovascular and lung diseases. Each Center will be led by a research institution in a developing country that is paired with at least one partnering academic institution in a developed country.

### ***NHLBI Progenitor Cell Biology Consortium***

The purpose of this RFA is to establish virtual research hubs (clusters of synergistic research projects) 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 their transplantation.

## **Trans-NIH**

### **Initiatives Being Renewed**

#### ***Diabetes Prevention Program Outcomes Study—Phase II***

The purpose of this renewal is to continue following cohort patients in the original Diabetes Prevention Program (DPP) to determine the long-term effects of the DPP interventions. The DPP was a clinical trial that examined the efficacy of treatments to prevent or delay the development of type 2 diabetes in a population at high risk because of impaired glucose tolerance.

#### ***Dissemination and Implementation Research in Health***

The purpose of this PA is to identify and develop effective methods, structures, and strategies that test models to disseminate and implement, in public health and clinical practice settings, research-tested interventions for changing health behavior and evidence-based services for improving prevention, early detection, diagnosis, treatment, and quality of life.

#### ***Effect of Racial and Ethnic Discrimination/Bias on Health Care Delivery***

The objectives of this renewal are to improve the measurement of racial/ethnic discrimination in health care delivery systems in the United States, enhance understanding of the influence of such discrimination and its association with health disparities among disadvantaged racial/ethnic minority groups, and reduce the prevalence of such health disparities by developing interventions to reduce the influence of racial/ethnic discrimination in the delivery of health care.

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

The purpose of this renewal is to provide an intensive, mentored research experience to individuals who either (a) are members of groups that are currently underrepresented on faculty at academic institutions in health-related research or (b) left a health-related post-doctoral or faculty position because of nonacademic issues but are interested in re-entry.

#### ***Midcareer Investigator Award in Patient-Oriented Research***

The purpose of this renewal is to enable midcareer clinician scientists to devote more time to, and augment their capabilities in, patient-oriented research and to mentor new clinical investigators in the conduct of patient-oriented research.

#### ***Minority Institutional Research Training Program***

The purpose of this renewal is to support research training of health professional students for careers in cardiovascular, lung, and blood diseases and sleep disorders at minority schools. Trainees will be selected by the institution and will include racial and ethnic minorities, individuals from disadvantaged backgrounds, individuals with disabilities, and women.

#### ***Nanoscience and Nanotechnology in Biology and Medicine***

The purpose of this renewal is to stimulate nanoscience and nanotechnology research that focuses on problems in biology and medicine.

### **New Initiatives**

#### ***Epigenomics of Human Health and Disease***

The purpose of this RFA is to discover and define global (epigenome-wide) marks or features and their possible interactions in diseased, aged, or otherwise compromised human primary cells or tissues. The goal is to transform our understanding of human disease, aging, or response to insult by correlating changes in the epigenome with an altered cellular state.

#### ***Exploratory Studies in the Neurobiology of Pain in Sickle Cell Disease***

The purpose of this RFA is to conduct basic and translational research into the neurobiology of pain in sickle cell disease.



### ***Human Pluripotent Stem Cell (hPSC) Research Using Non-Embryonic Sources***

The purpose of this PA, which addresses Executive Order 13435 issued by President George W. Bush on June 20, 2007, is to conduct research on hPSCs derived from non-embryonic sources.

### ***Improving Heart Failure Disease Management***

The purpose of this PA is to address inadequately answered questions about the management of chronic heart failure in clinical practice. The broader goal is to identify and disseminate into clinical practice clinically effective disease management tools to improve patient outcomes.

### ***Innovative Computational and Statistical Methodologies for the Design and Analysis of Multilevel Studies on Childhood Obesity***

The purpose of this RFA is to develop and apply innovative statistical or computational methods to the analysis or design of multilevel studies of childhood obesity (i.e., studies that address the range of factors—biological, family, community, sociocultural, environmental, policy, and macro-level economic—that influence diet and physical activity in children). The focus is on methods that can simultaneously examine factors of energy balance that span more than three levels of influence in children.

### ***Predictive Multiscale Models of the Physiome in Health and Disease***

The purpose of this PA is to develop more realistic and predictive multiscale models of health and disease states that include higher scales of the physiome: multi-cell systems, tissue, organ, multiorgan systems, organ-ism structure and function, population, and behavior.

### ***Research on Causal Factors and Interventions That Promote and Support the Careers of Women in Biomedical and Behavioral Science and Engineering***

The purpose of this RFA is to study (a) the causal factors that explain current patterns observed in the careers of women in biomedical and behavioral science and engineering and (b) the efficacy of programs designed to support the careers of women in these disciplines.

### ***Summer Institute for Training in Biostatistics***

The purpose of this RFA is to develop, conduct, and evaluate summer courses for advanced undergraduate

and beginning graduate students in the basic principles and methods of biostatistics as used in biomedical research.

### ***Translating Basic Behavioral and Social Science Discoveries Into Interventions To Reduce Obesity***

The purpose of this RFA 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.

## **Trans-PHS**

### **Initiatives Being Renewed**

#### ***National Health and Nutrition Examination Survey (NHANES)—Cardiovascular, Pulmonary, and Sleep Components***

The purpose of this renewal is to continue collaboration with the National Health and Nutrition Examination Survey to collect data on the prevalence of and risk factors for heart, lung, and blood diseases and sleep disorders.

#### ***Ruth L. Kirschstein National Research Service Awards for Individual Predoctoral Fellowships To Promote Diversity in Health-Related Research***

The purpose of this renewal is to improve the diversity of the health-related research workforce by supporting the training of predoctoral students from groups that are underrepresented in health-related research.

#### ***Understanding and Promoting Health Literacy***

The purpose of this renewal is to support empirical research on health literacy concepts, theory, and interventions as they relate to public health priorities of the U.S. Department of Health and Human Services.

### **New Initiative**

#### ***Behavioral and Social Science Research on Understanding and Reducing Health Disparities***

The purpose of this PA is to (a) conduct behavioral and social science research on the causes of disparities in health and disability among various populations in the United States and (b) develop and test more effective interventions for reducing and eventually eliminating health disparities.



## **Interagency**

### **New Initiatives**

#### ***NHLBI Cardiac Development Consortium***

The purpose of this RFA is to conduct basic collaborative research leading to a comprehensive understanding of the regulatory networks controlling cardiovascular development. The Consortium is part of a new NHLBI translational program in pediatric CVD, which includes the companion NHLBI Pediatric Cardiac Genomics Consortium, an Administrative Coordinating Center, and the existing Pediatric Heart Network. The NHLBI and the Canadian Institutes of Health Research are collaborating on the program.

#### **NHLBI–CDC Registry and Surveillance System in Hemoglobinopathies (RuSH)**

The purpose of this RFP is to develop and implement a national data system and biospecimen repository that

will provide data to describe the epidemiologic and clinical characteristics of people with all genotypes of SCD, thalassemias, and other hemoglobinopathies. The system will collect, analyze, interpret, and disseminate state-specific data on the epidemiology, clinical correlates, health care utilization, and community resources of patients with these conditions.

#### ***NHLBI Pediatric Cardiac Genomics Consortium***

The purpose of this RFA is to conduct clinical and translational research on the genetic causes of congenital heart disease and genetic contributions to outcome in individuals with congenital heart disease. The Consortium is part of a new NHLBI translational program in pediatric CVD. The NHLBI and the Canadian Institutes of Health Research are collaborating on the program.





## 6. Institute Public Advisory Committees

### National Heart, Lung, and Blood Advisory Council

#### Structure

**Chair:** Elizabeth G. Nabel, 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, or Designee, Veterans Affairs
- Assistant Secretary of Defense for Health Affairs, or Designee.

#### Functions

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

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

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

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

#### Meetings

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

## National Heart, Lung, and Blood Advisory Council Membership\*

Elizabeth G. Nabel, M.D.

*Chair*

National Heart, Lung, and Blood Institute

Jeanine Arden Ornt, J.D. (2010)

Case Western Reserve University

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

Cedars-Sinai Medical Center

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

Washington University in St. Louis

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

The Rockefeller University

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

University of California, San Francisco

Victor J. Dzau, M.D. (2009)

Duke University

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

Yale University School of Medicine

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

University of Chicago

Helen H. Hobbs, M.D. (2009)

University of Texas Southwestern Medical Center

Beverly W. Hogan (2012)

Tougaloo College

Jennie R. Joe, Ph.D. (2009)

University of Arizona

Joseph Loscalzo, M.D., Ph.D. (2009)

Brigham and Women's Hospital

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

Columbia University

S. K. Rao Musunuru, M.D. (2009)

Bayonet Point/Hudson Cardiology Associates

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

University of Pennsylvania School of Medicine

Paula Y. Polite (2010)

Division of General Services, Memphis

Marlene Rabinovitch, M.D. (2011)

Stanford University

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

University of Pittsburgh

### **Ex Officio Members**

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

National Institutes of Health

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

Centers for Disease Control and Prevention

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

McGuire Veterans Affairs Medical Center

Cdr. Richard T. Mahon, M.D.

Naval Medical Research Center

Kathleen Sebelius, M.P.A.

Department of Health and Human Services

\* Current as of October 2009. 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:** Vacant

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

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

#### Membership\*

Michael A. Bender, M.D., Ph.D. (2010)  
Fred Hutchinson Cancer Research Center

Punam Malik, M.D. (2010)  
Cincinnati Children's Hospital Medical Center

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

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

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

#### Ex Officio Members

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

Joseph Desimone, Ph.D.  
Department of Veterans Affairs, Chicago

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

David E. McCune, M.D.  
Madigan Army Medical Center

### Sleep Disorders Research Advisory Board

**Chair:** Vacant

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

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

#### Membership\*

Sonia Ancoli-Israel, Ph.D. (2010)  
University of California, San Diego School of Medicine

Rose A. Austin (2011)  
SSM Healthcare

Karen M. Cushing (2011)  
American Insomnia Association

Charles A. Czeisler M.D., Ph.D. (2011)  
Harvard Medical School

Estelle B. Gauda, M.D. (2010)  
Johns Hopkins University School of Medicine

F. Javier Nieto, M.D., Ph.D. (2010)  
University of Wisconsin School of Medicine

Robert H. Waterman (2011)  
The Waterman Group

\* Current as of October 2009.

## Ex Officio Members

Thomas J. Balkin, Ph.D.  
Walter Reed Army Institute of Research

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

Robert W. Greene, M.D., Ph.D.  
Veterans Administration, North Texas Medical Center

Merrill M. Mitler, Ph.D.  
NINDS, National Institutes of Health

Andrew Monjan, Ph.D.  
NIA, National Institutes of Health

Elizabeth G. Nabel, M.D.  
NHLBI, National Institutes of Health

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

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

## Heart, Lung, and Blood Initial Review Group

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

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

## Heart, Lung, and Blood Program Project Review Committee

**Chair:** Ann Marie Schmidt, M.D.,  
Columbia University

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

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

## Membership\*

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

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

Peng-Sheng Chen, M.D. (2010)  
Indiana University School of Medicine

Samuel Hawgood, M.D. (2010)  
University of California, San Francisco

Catherine C. Hedrick, Ph.D. (2011)  
University of Virginia

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

Catherine S. Manno, M.D. (2013)  
New York University

Fernando D. Martinez, M.D. (2013)  
University of Arizona

Christine S. Moravec, Ph.D. (2012)  
Cleveland Clinic Foundation

David J. Pinsky, M.D. (2012)  
University of Michigan

Nanduri R. Prabhakar, Ph.D. (2012)  
University of Chicago

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

\* Current as of October 2009.



Curt D. Sigmund, Ph.D. (2011)  
University of Iowa

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

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

Robert A. Wise, M.D. (2010)  
Johns Hopkins University School of Medicine

Katherine E. Yutzey, Ph.D. (2010)  
Children's Hospital Research Foundation

### **Clinical Trials Review Committee**

**Chair:** John J. Reilly, M.D., University of Pittsburgh

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

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

### **Membership\***

Walter T. Ambrosius, Ph.D. (2010)  
Wake Forest University

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

Ivan Chan, Ph.D. (2010)  
Merck Research Laboratories

Mark D. Eisner, M.D. (2013)  
University of California, San Francisco

Scott S. Emerson, M.D., Ph.D. (2011)  
University of Washington

Kenneth E. Freedland, Ph.D. (2011)  
Washington University School of Medicine

Robert A. Harrington, M.D. (2010)  
Duke School of Medicine

Wendy J. Mack, Ph.D. (2011)  
University of Southern California

Karen L. Margolis, M.D. (2011)  
Health Partners Research Foundation

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

Pamela Ouyang, M.D. (2010)  
Johns Hopkins University School of Medicine

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

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

Amy Dana Shapiro, M.D. (2012)  
Indiana Hemophilia and Thrombosis Center, Inc.

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

### **NHLBI Institutional Training Mechanism Review Committee**

**Chair:** William C. Balke, M.D., University of Kentucky

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

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

\* Current as of October 2009.

### **Membership\***

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

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

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

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

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

David M. Guidot, M.D. (2010)  
Emory University

Carlton A. Hornung, Ph.D. (2010)  
University of Louisville

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

Craig K. Kent, M.D. (2010)  
Weill Medical College of Cornell University

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

Alice H. Lichtenstein, D.S.C. (2013)  
Tufts University

Bertram H. Lubin, M.D. (2010)  
Children's Hospital Oakland Research Institute

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

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

Josef T. Prchal, M.D. (2012)  
University of Utah

Sharon Rounds, M.D. (2010)  
Brown University

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

Sanjeev G. Shroff, Ph.D. (2010)  
University of Pittsburgh

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

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

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

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

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

### **National Heart, Lung, and Blood Institute Special Emphasis Panel**

The Institute has established the NHLBI Special Emphasis Panel (SEP) to perform 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:** Gary K. Owens, M.D., Ph.D., University of Virginia School of Medicine

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

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\* Current as of October 2009.

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

**Membership\***

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

Kenneth R. Chien, M.D., Ph.D. (2012)  
Harvard University

Michael I. Kotlikoff, V.M.D., Ph.D. (2013)  
Cornell University

Aldons Jake Lusic, Ph.D. (2013)  
University of California, Los Angeles

Elizabeth M. McNally, M.D., Ph.D. (2010)  
University of Chicago

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\* Current as of October 2009.





# 7. Fiscal Year 2009 Budget Overview

## NHLBI Obligations by Funding Mechanism: Fiscal Year 2009

Funding Mechanism	Obligated Dollars* (Thousands)	Percent of Total NHLBI Budget
Research Project Grants**	\$2,039,861	67.7%
SCORs/SCCORs	73,331	2.4
Sickle Cell Centers	13,567	0.5
Centers for AIDS Research	3,254	0.1
Other Research Grants	131,001	4.3
<i>Research Careers Programs</i> †	84,647	2.8
Training Programs	96,578	3.2
Research and Development Contracts	361,098	12.0
Intramural Laboratory and Clinical Research	181,734	6.1
Research Management and Support‡	114,128	3.8
<b>Total Obligations</b>	<b>\$3,014,552</b>	<b>100.0%</b>

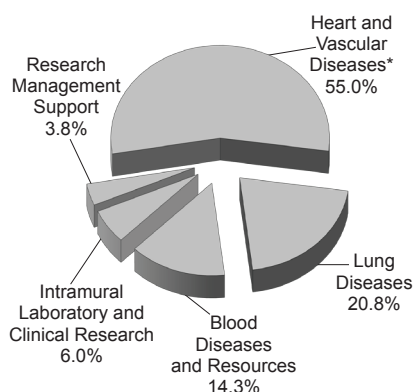
\* Excludes funds provided by other Agencies by means of a reimbursable agreement.

\*\* Includes \$76,341 for Small Business Innovation Research (SBIR) Grants/Small Business Technology Transfer (STTR) Grants.

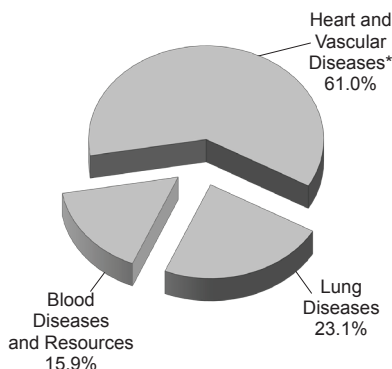
† Research Career Programs are a subset of Other Research Grants and are not added as a distinct funding mechanism.

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

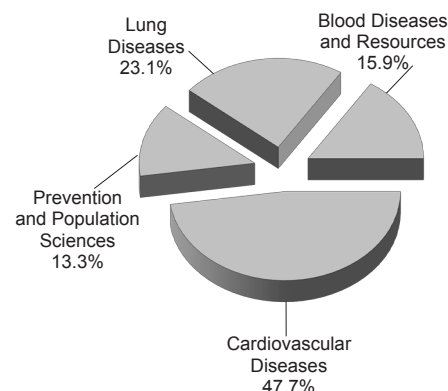
**NHLBI Total Obligations  
by Budget Category**



**NHLBI Extramural  
Obligations by Program**



**NHLBI Extramural  
Obligations by Division**



\* Includes Cardiovascular Diseases and Prevention and Population Sciences.

For detailed data on FY 2009:

- 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 2009

Program	Obligated Dollars (Thousands)	Percent of NHLBI Extramural Budget
Heart and Vascular Diseases*	\$1,659,109	61.0%
Lung Diseases	627,848	23.1
Blood Diseases and Resources	431,733	15.9
<b>Total, Extramural Obligations</b>	<b>\$2,718,690</b>	<b>100%</b>

\* Includes Cardiovascular Diseases and Prevention and Population Sciences.

### NHLBI Cardiovascular Diseases Program\* Obligations by Funding Mechanism: Fiscal Year 2009

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Program Budget
Research Project Grants	\$1,064,115	82.1%
SCORs/SCCORs	28,806	2.2
Other Research Grants	49,130	3.8
<i>Research Career Programs**</i>	34,659	2.7
Training Programs	46,665	3.6
Research and Development Contracts	107,676	8.3
<b>Total, Cardiovascular Diseases</b>	<b>\$1,296,392</b>	<b>100%</b>

\* Includes Cardiovascular Diseases only.

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

### NHLBI Prevention and Population Sciences Program Obligations by Funding Mechanism: Fiscal Year 2009

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Program Budget
Research Project Grants	\$187,013	51.6%
SCORs/SCCORs	—	—
Other Research Grants	11,743	3.2
<i>Research Career Programs*</i>	6,368	1.8
Training Programs	8,063	2.2
Research and Development Contracts	155,898	43.0
<b>Total, Prevention and Population Sciences</b>	<b>\$362,717</b>	<b>100%</b>

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

Note: Numbers may not add to total due to rounding.



### NHLBI Lung Diseases Program Obligations by Funding Mechanism: Fiscal Year 2009

<b>Funding Mechanism</b>	<b>Obligated Dollars (Thousands)</b>	<b>Percent of Program Budget</b>
Research Project Grants	\$478,154	76.2%
SCORs/SCCORs	26,336	4.2
Other Research Grants	51,724	8.2
<i>Research Career Programs</i> *	28,689	4.6
Training Programs	25,100	4.0
Research and Development Contracts	46,534	7.4
<b>Total, Lung Diseases</b>	<b>\$627,848</b>	<b>100%</b>

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

### NHLBI Blood Diseases and Resources Program Obligations by Funding Mechanism: Fiscal Year 2009

<b>Funding Mechanism</b>	<b>Obligated Dollars (Thousands)</b>	<b>Percent of Program Budget</b>
Research Project Grants	\$310,580	71.9%
SCORs/SCCORs	18,190	4.2
Sickle Cell Centers	13,567	3.1
Centers for AIDS Research	3,254	0.8
Other Research Grants	18,403	4.3
<i>Research Career Programs</i> *	14,931	3.5
Training Programs	16,749	3.9
Research and Development Contracts	50,990	11.8
<b>Total, Blood Diseases and Resources</b>	<b>\$431,733</b>	<b>100%</b>

\* 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 1950–2009

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	379,096	368,648	3,327,854
TQ <sup>A</sup>	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
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 <sup>B</sup>	1,355,866	1,351,422 <sup>C</sup>	20,821,930
1997	1,320,555 <sup>D</sup>	1,438,265	1,344,742 <sup>D</sup>	1,432,529 <sup>E</sup>	1,431,821	22,253,751
1998	1,467,189	1,513,004	1,531,898	1,531,061 <sup>F</sup>	1,526,276	23,780,027
1999	1,709,328 <sup>G</sup>	1,720,344	1,793,697	1,793,697 <sup>F</sup>	1,788,008	25,568,035
2000	1,759,806	1,937,404	2,001,185	2,040,291 <sup>F</sup>	2,027,286	27,595,321
2001	2,069,582	2,328,102	2,328,105	2,299,866 <sup>H</sup>	2,298,035	29,893,356
2002	2,567,429	2,547,675	2,618,966	2,576,125 <sup>I</sup>	2,569,794	32,463,150
2003	2,791,411	2,812,011	2,818,684	2,812,011 <sup>J</sup>	2,793,681	35,256,831
2004	2,867,995	2,867,995	2,897,595	2,882,715 <sup>K</sup>	2,882,601	38,139,432
2005	2,963,953	2,963,953	2,985,900	2,965,453	2,922,573 <sup>L</sup>	41,062,005
2006	2,951,270	2,951,270	3,023,381	2,951,270 <sup>J</sup>	2,893,527	43,955,532
2007	2,901,012	2,901,012	2,924,299	2,921,757	2,922,322 <sup>L</sup>	46,877,854
2008	2,894,341	2,965,775	2,992,197	2,974,900 <sup>E</sup>	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

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

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

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

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

E Excludes enacted administrative reduction.

F Excludes Director transfer, Secretary transfer, and rescission.

G Includes Bioterrorism reduction.

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

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

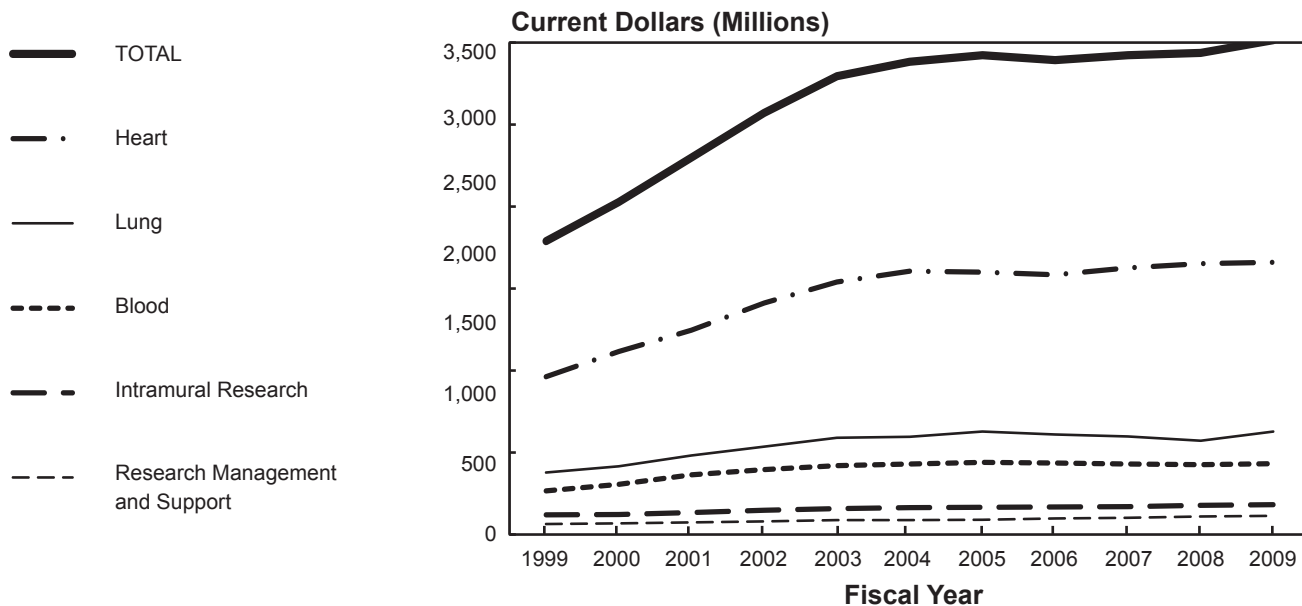
J Excludes Government-wide rescission.

K Includes Roadmap adjustments.

L Includes Roadmap Transfer and Government-wide rescission.

### NHLBI Total Obligations by Budget Category: Fiscal Years 1999–2009

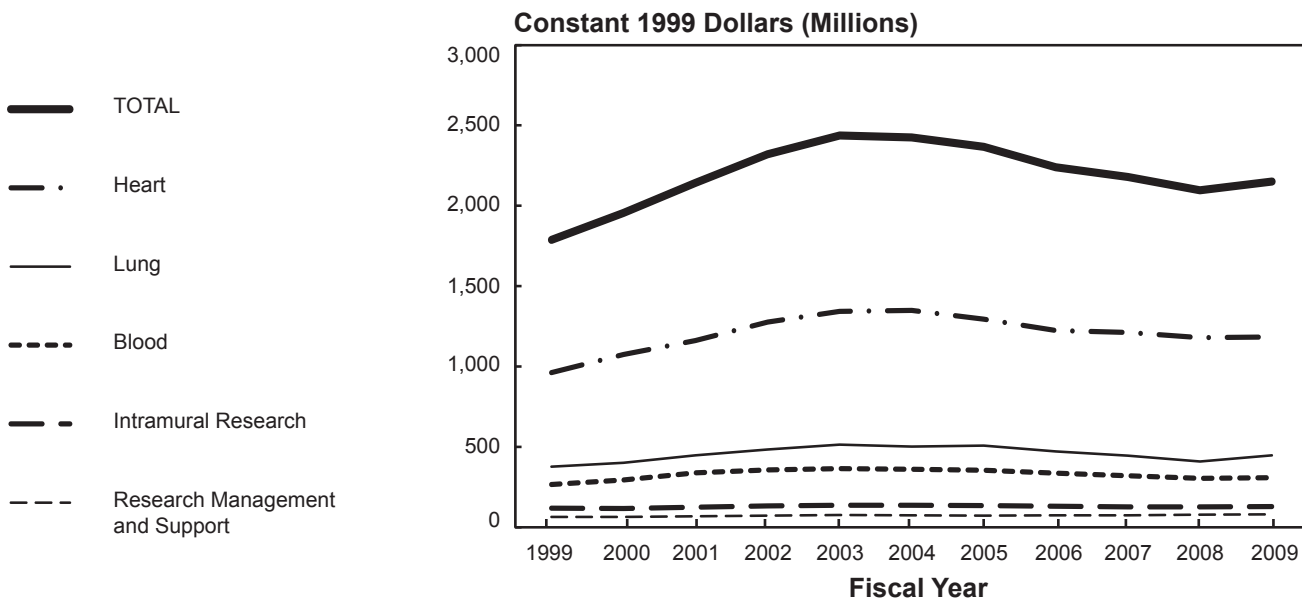
#### Current Dollars



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 1999–2009\*

#### Constant 1999 Dollars



\* This chart is based on the Biomedical Research & Development Price Index through 2009.

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 1999–2009

Budget Category	Current Dollars (Millions)										
	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Extramural Research											
Heart	\$ 961.1	\$1,115.7	\$1,245.8	\$1,412.4	\$1,538.8	\$1,604.7	\$1,599.6	\$1,582.7	\$1,624.9	\$1,652.2	\$1,659.2
Lung	377.4	415.5	481.0	535.2	590.5	596.0	628.2	610.3	597.6	572.2	627.8
Blood	266.1	305.9	364.0	396.0	419.3	429.2	439.5	434.9	429.7	426.2	431.7
Intramural Research	119.5	122.3	133.7	146.7	157.8	164.2	166.3	168.3	169.5	177.5	181.7
Research Management and Support	63.9	67.9	73.5	79.4	87.3	88.5	89.0	97.2	100.6	109.2	114.1
<b>Total</b>	<b>\$1,788.0</b>	<b>\$2,027.3</b>	<b>\$2,298.0</b>	<b>\$2,569.7</b>	<b>\$2,793.7</b>	<b>\$2,882.6</b>	<b>\$2,922.6</b>	<b>\$2,893.4</b>	<b>\$2,922.3</b>	<b>\$2,937.3</b>	<b>\$3,014.5</b>

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.

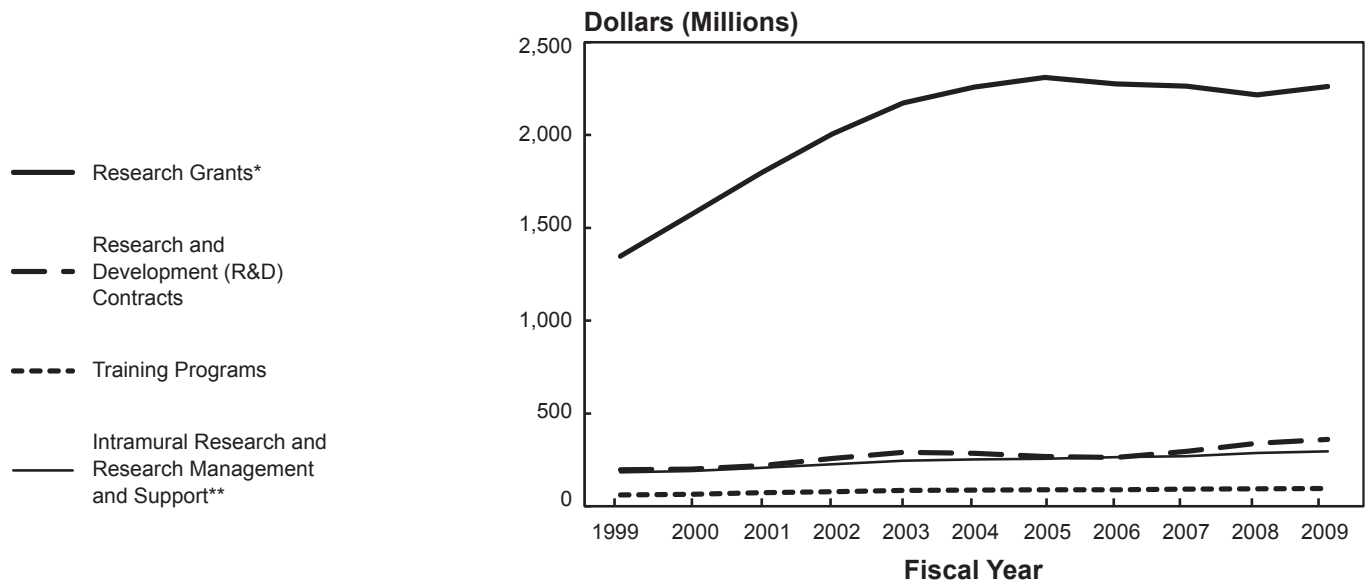
## NHLBI Total Obligations by Budget Category: Fiscal Years 1999–2009

Budget Category	Constant 1999 Dollars (Millions)										
	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Extramural Research											
Heart	\$961.1	\$1,075.9	\$1,162.1	\$1,275.9	\$1,342.8	\$1,349.6	\$1,295.2	\$1,225.0	\$1,211.7	\$1,179.3	\$1,184.3
Lung	377.4	400.7	448.7	483.5	515.3	501.3	508.7	472.4	445.6	408.4	448.1
Blood	266.1	295.0	339.6	357.7	365.9	361.0	355.9	336.6	320.4	304.2	308.2
Intramural Research	119.5	117.9	124.7	132.5	137.7	138.1	134.7	130.3	126.4	126.7	129.7
Research Management and Support	63.9	65.5	68.6	71.7	76.2	74.4	72.1	75.2	75.0	77.9	81.4
<b>Total</b>	<b>\$1,788.0</b>	<b>\$1,955.0</b>	<b>\$2,143.7</b>	<b>\$2,321.3</b>	<b>\$2,437.8</b>	<b>\$2,424.4</b>	<b>\$2,366.5</b>	<b>\$2,239.5</b>	<b>\$2,179.2</b>	<b>\$2,096.6</b>	<b>\$2,151.7</b>

\* This chart is based on the Biomedical Research & Development Price Index through 2009.

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 1999–2009



\* 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 1999–2009

Funding Mechanism	Dollars (Millions)										
	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Research Grants*	\$1,346.6	\$1,570.5	\$1,796.9	\$2,006.2	\$2,172.3	\$2,257.3	\$2,310.2	\$2,275.9	\$2,263.1	\$2,216.9	\$2,261.0
Research and Development (R&D) Contracts	197.2	201.3	220.1	258.3	290.5	285.5	268.6	262.8	295.8	338.8	361.1
Training Programs	60.8	65.4	73.7	79.2	85.8	87.1	88.4	89.2	93.3	94.9	96.6
Intramural Research and Research Management and Support**	183.4	190.1	207.3	226.1	245.1	252.7	255.4	265.6	270.1	286.7	295.8
<b>Total</b>	<b>\$1,788.0</b>	<b>\$2,027.3</b>	<b>\$2,298.0</b>	<b>\$2,569.8</b>	<b>\$2,793.7</b>	<b>\$2,882.6</b>	<b>\$2,922.6</b>	<b>\$2,893.5</b>	<b>\$2,922.3</b>	<b>\$2,937.3</b>	<b>\$3,014.5</b>

\* Includes Research Career Programs.

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

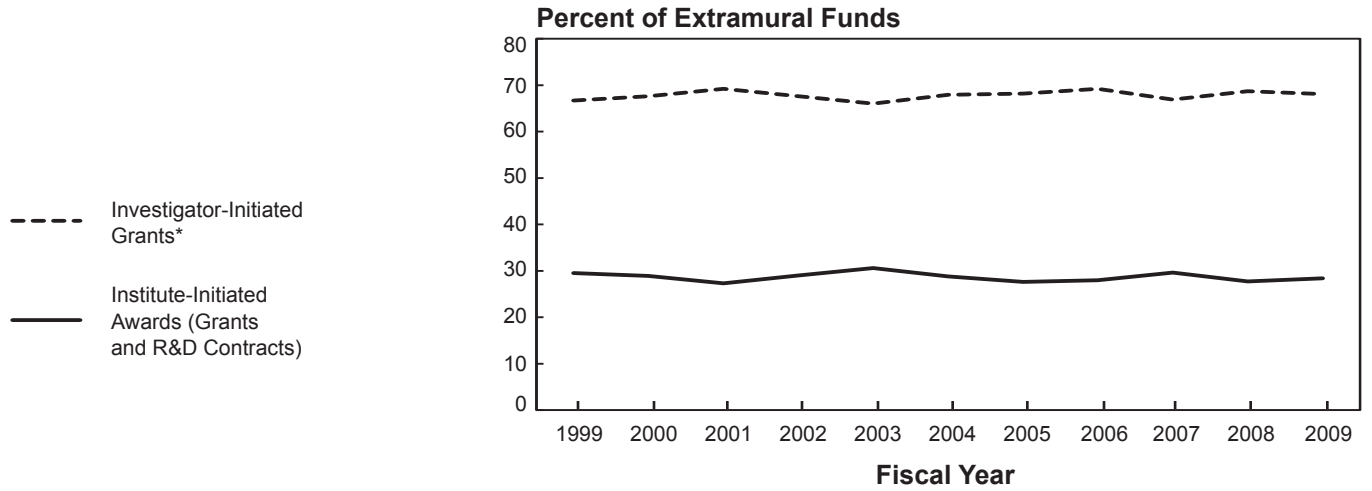
### NHLBI Employment: Fiscal Years 1999–2009

Staff	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
FTEs*	847	865	868	880	880	861	796	797	814	846	856

\* Full-time equivalents.

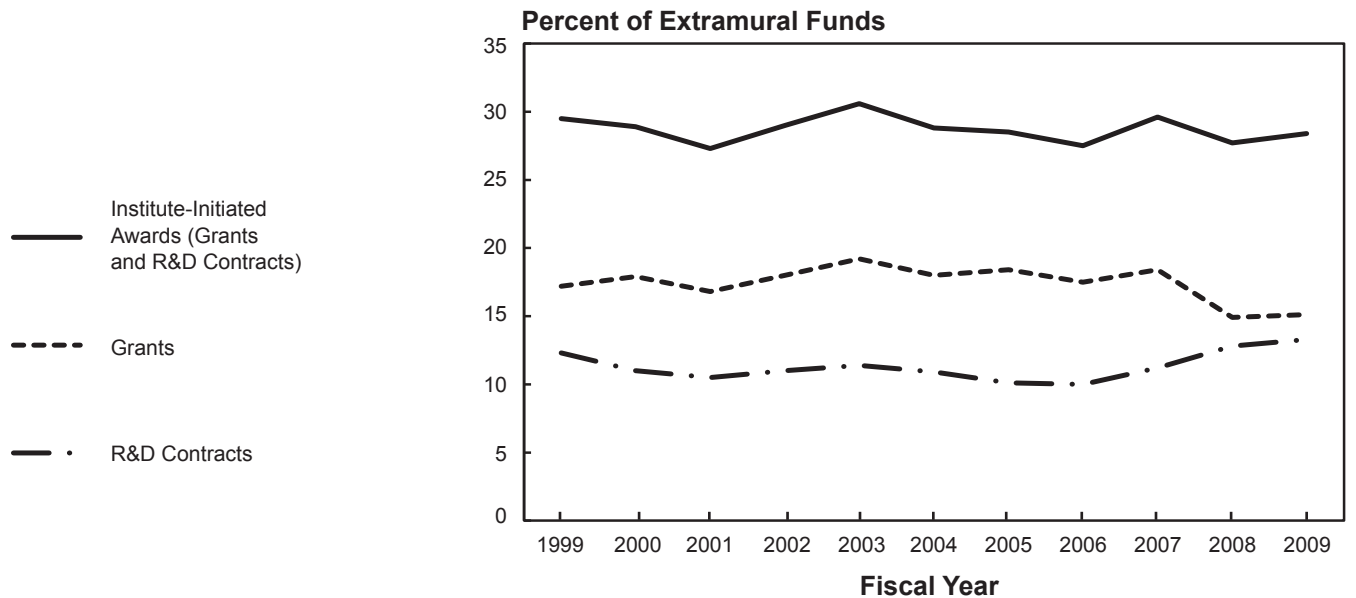


### NHLBI Institute-Initiated and Investigator-Initiated Awards: Fiscal Years 1999–2009



\* Includes Research Career Programs.

### NHLBI Grants and Research and Development Contracts as Subsets of Institute-Initiated Awards: Fiscal Years 1999–2009



## NHLBI Extramural Programs: Fiscal Years 1999–2009

Dollars (Millions)											
Funding Mechanism	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Investigator-Initiated Awards											
Investigator-Initiated Grants*	\$1,022.2	\$1,187.4	\$1,388.8	\$1,521.4	\$1,616.1	\$1,716.8	\$1,747.2	\$1,747.0	\$1,719.3	\$1,742.1	\$1,765.5
Research Career Programs	47.7	54.2	57.5	63.5	65.8	67.8	71.0	70.4	55.4	78.7	84.6
Subtotal, Investigator-Initiated Awards	1,069.9	1,241.6	1,446.3	1,584.9	1,681.9	1,784.6	1,818.2	1,817.3	1,774.7	1,820.8	1,850.1
Institute-Initiated Awards											
Institute-Initiated Grants (RFA)	276.7	328.9	350.7	421.3	490.4	472.5	492.1	458.6	488.2	396.1	410.9
Centers**	119.9	123.8	127.2	128.2	138.9	140.6	151.5	141.1	141.0	107.3	90.1
R&D Contracts (RFP)	197.2	201.3	220.1	258.3	290.5	285.5	268.6	262.9	295.8	338.8	361.1
Subtotal, Institute-Initiated Awards	473.9	530.2	570.8	679.6	780.9	758.0	760.7	721.4	784.0	734.9	772.0
Training											
Individual Awards	9.2	8.9	8.9	9.5	8.6	8.8	9.7	10.0	8.2	9.0	10.3
Institutional Awards	51.6	56.5	64.8	69.7	77.2	78.4	78.7	79.1	85.1	85.8	86.2
Subtotal, Training	60.8	65.4	73.7	79.2	85.8	87.2	88.4	89.2	93.3	94.8	96.5
<b>Total, Extramural</b>	<b>\$1,604.6</b>	<b>\$1,837.2</b>	<b>\$2,090.8</b>	<b>\$2,343.7</b>	<b>\$2,548.6</b>	<b>\$2,629.8</b>	<b>\$2,667.3</b>	<b>\$2,628.0</b>	<b>\$2,652.0</b>	<b>\$2,650.5</b>	<b>\$2,718.6</b>

\* 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.

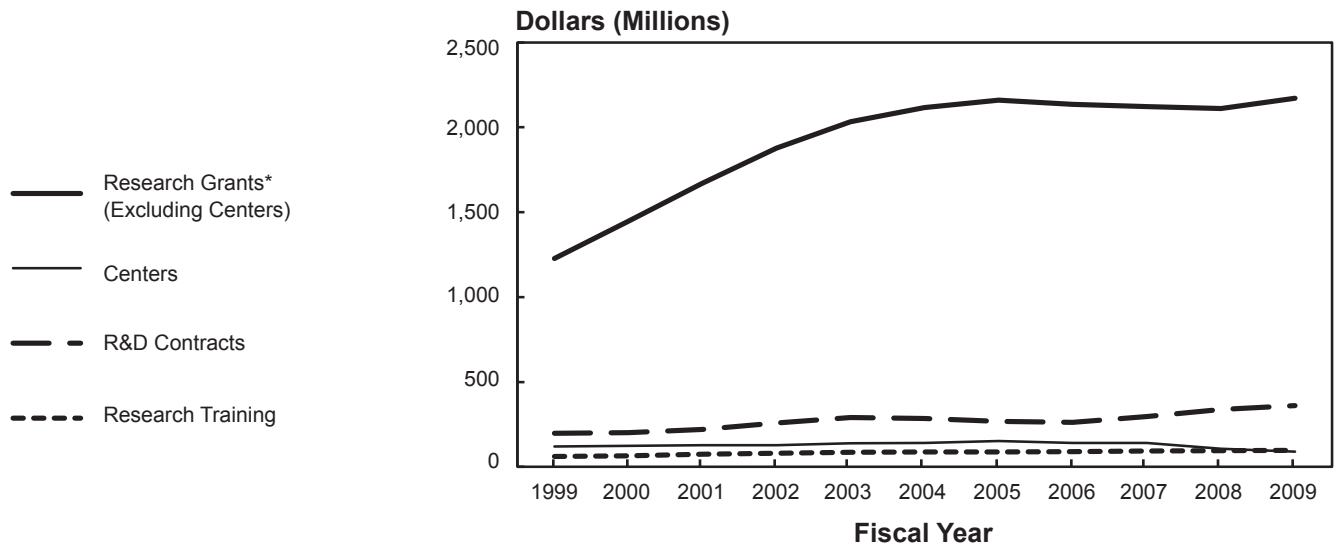
## NHLBI Extramural Programs: Fiscal Years 1999–2009

Percent of Total Extramural Budget											
Funding Mechanism	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Investigator-Initiated Awards											
Investigator-Initiated Grants*	63.7%	64.6%	66.4%	64.9%	63.4%	65.3%	65.5%	66.5%	64.8%	65.7%	64.9%
Research Career Programs (K04, K06)	3.0	3.0	2.8	2.7	2.6	2.6	2.7	2.7	2.1	3.0	3.1
Subtotal, Investigator-Initiated Awards	66.7	67.6	69.2	67.6	66.0	67.9	68.2	69.2	66.9	68.7	68.1
Institute-Initiated Awards											
Institute-Initiated Grants (RFA)	17.2	17.9	16.8	18.0	19.2	18.0	18.4	17.5	18.4	14.9	15.1
Centers**	7.5	6.7	6.1	5.5	5.5	5.3	5.7	5.4	5.3	4.0	3.3
R&D Contracts (RFP)	12.3	11.0	10.5	11.0	11.4	10.9	10.1	10.0	11.2	12.8	13.3
Subtotal, Institute-Initiated Awards	29.5	28.9	27.3	29.0	30.6	28.8	28.5	27.5	29.6	27.7	28.4
Training											
Individual Awards	0.6	0.5	0.4	0.4	0.3	0.3	0.4	0.4	0.3	0.3	0.4
Institutional Awards	3.2	3.1	3.1	3.0	3.0	3.0	3.0	3.0	3.2	3.2	3.2
Subtotal, Training	3.8	3.6	3.5	3.4	3.4	3.3	3.3	3.4	3.5	3.6	3.5
<b>Total, Extramural</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

\* 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 1999–2009



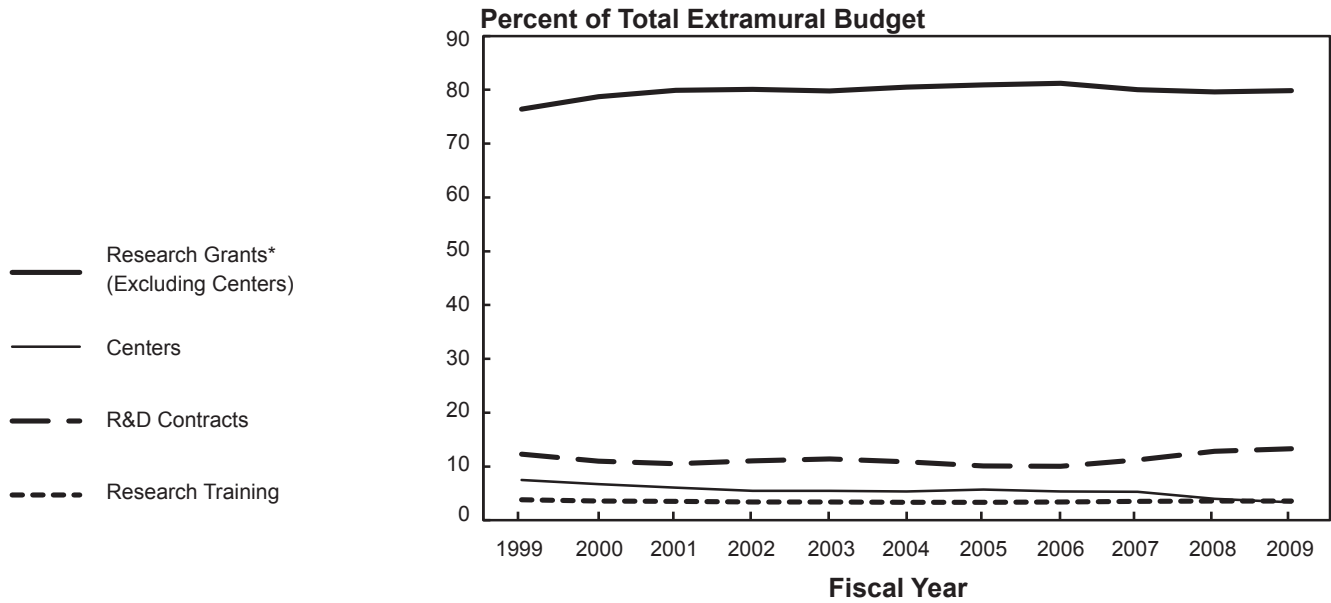
\* Includes Research Career Programs; does not include Centers.

### NHLBI Extramural Research Funding Mechanism: Fiscal Years 1999–2009

Funding Mechanism	Dollars (Millions)										
	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Research Grants*	\$1,226.7	\$1,446.7	\$1,669.8	\$1,878.0	\$2,033.4	\$2,116.5	\$2,158.8	\$2,134.9	\$2,121.9	\$2,109.6	\$2,170.9
Centers	119.9	123.8	127.2	128.2	138.9	140.6	151.5	141.1	141.0	107.3	90.1
R&D Contracts	197.2	201.3	220.1	258.3	290.5	285.5	268.6	262.9	295.8	338.8	361.1
Research Training	60.8	65.4	73.7	79.2	85.8	87.2	88.4	89.2	93.3	94.8	96.5
<b>Total, Extramural</b>	<b>\$1,604.6</b>	<b>\$1,837.2</b>	<b>\$2,090.8</b>	<b>\$2,343.7</b>	<b>\$2,548.6</b>	<b>\$2,629.8</b>	<b>\$2,667.3</b>	<b>\$2,628.0</b>	<b>\$2,652.0</b>	<b>\$2,650.5</b>	<b>\$2,718.6</b>

\* Includes Research Career Programs; does not include Centers.

### NHLBI Extramural Research Funding Mechanism: Fiscal Years 1999–2009



\* Includes Research Career Programs; does not include Centers.

### NHLBI Extramural Research Funding Mechanism: Fiscal Years 1999–2009

Funding Mechanism	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Research Grants*	76.4%	78.7%	79.9%	80.1%	79.8%	80.5%	80.9%	81.2%	80.0%	79.6%	79.9%
Centers	7.5	6.7	6.1	5.5	5.5	5.3	5.7	5.4	5.3	4.0	3.3
R&D Contracts (RFP)	12.3	11.0	10.5	11.0	11.4	10.9	10.1	10.0	11.2	12.8	13.3
Research Training	3.8	3.6	3.5	3.4	3.4	3.3	3.3	3.4	3.5	3.6	3.5
<b>Total, Extramural</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

\* Includes Research Career Programs; does not include Centers.

Note: Numbers may not add to total due to rounding.

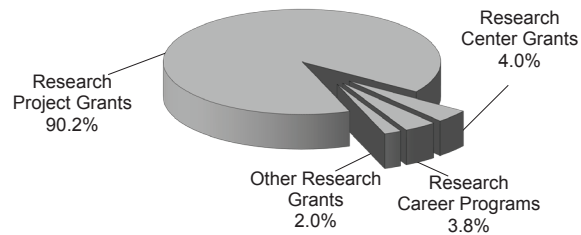


## 9. Research Grants

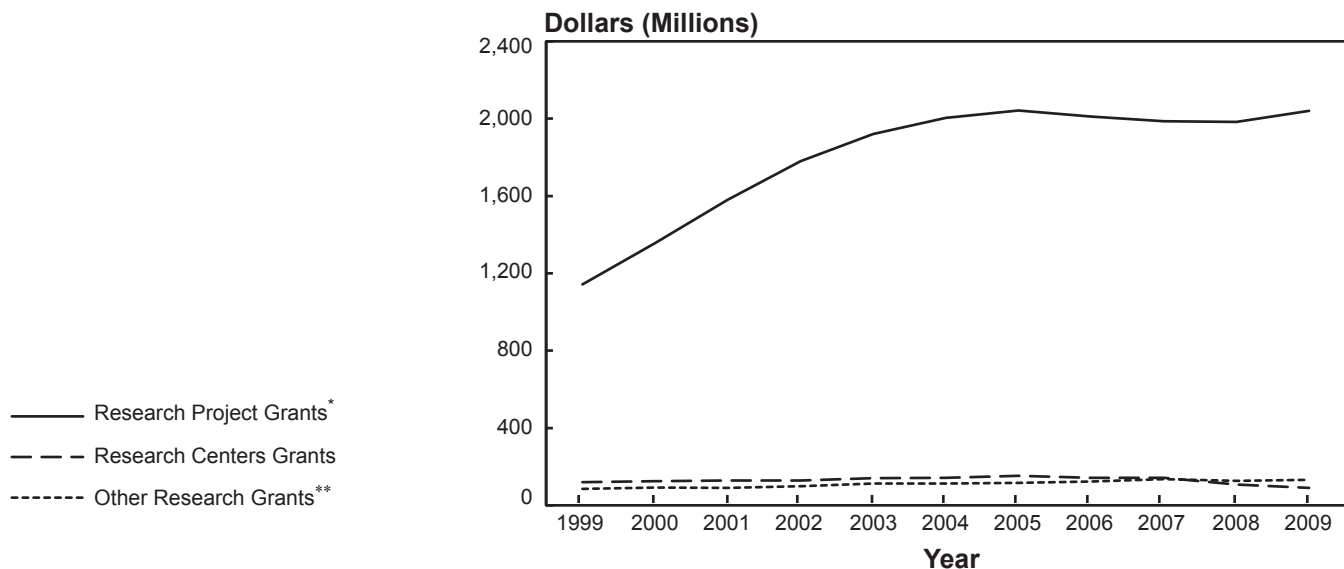
### NHLBI Research Grants by Funding Mechanism: Fiscal Year 2009

	Number of Grants	Total Cost (Dollars in Thousands)	Percent of Total NHLBI Research Grant Dollars
<b>Research Project Grants (RPGs)</b>			
<b>Research Project Grants (Excluding Small Business RPGs)</b>			
Regular Research Grants (R01)	3,098	\$1,350,194	59.72%
Program Project Grants (P01)	156	320,690	14.18
Cooperative Agreements (U01)	201	182,392	8.07
Exploratory/Developmental Grants (R21)	248	52,615	2.33
Method to Extend Research in Time (R37)	71	31,450	1.39
Exploratory/Developmental Grants Phase II (R33)	29	9,251	0.41
AREA Grants (R15)	15	3,262	0.14
Research Transition Award (R00)	33	8,166	0.36
Cooperative Agreements (U19)	1	1,808	0.08
Small Research Grants (R03)	43	2,085	0.09
NIH Director's Pioneer Award (DP1)	1	1,607	0.07
<b>Subtotal, Research Project Grants (Excluding Small Business RPGs)</b>	<b>3,896</b>	<b>1,963,520</b>	<b>86.84</b>
<b>Small Business Research Project Grants</b>			
Small Business Technology Transfer (STTR Phase I) (R41)	8	1,753	0.08
Small Business Technology Transfer (STTR Phase II) (R42)	12	7,072	0.31
Small Business Innovation Research (SBIR Phase I) (R43)	60	11,182	0.49
Small Business Innovation Research (SBIR Phase II) (R44)	92	56,334	2.49
<b>Subtotal, Small Business Research Project Grants</b>	<b>172</b>	<b>76,341</b>	<b>3.37</b>
<b>Subtotal, Research Project Grants</b>	<b>4,068</b>	<b>2,039,861</b>	<b>90.21</b>
<b>Research Center Grants</b>			
Specialized Centers of Clinical Research (SCCOR) (P50)	23	65,227	2.88
Sickle Cell Centers (U54)	15	13,567	0.60
Centers for AIDS Research (P30)	—	3,254	0.14
Specialized Centers (Cooperative Agreements) (U54)	5	7,649	0.34
National Swine Research and Resource Center (U42)	—	455	0.02
<b>Subtotal, Research Center Grants</b>	<b>43</b>	<b>90,152</b>	<b>3.98</b>
<b>Research Career Programs</b>			
Mentored Research Development Award for Minority Faculty (K01)	37	4,745	0.21
Minority Institution Faculty Mentored Research Scientist Award (K01)	5	663	0.03
Mentored Scientist Development Award in Research Ethics (K01)	1	165	0.01
Independent Scientist Award (K02)	19	1,880	0.08
Pediatric Transfusion Medicine Academic Award (K07)	4	486	0.02
Cultural Competence and Health Disparities Academic Award (K07)	9	1,138	0.05
Clinical Investigator Scientist Award (K08)	231	29,706	1.31
Vascular Medicine Research Career Development Program (K12)	7	7,325	0.32
Clinical Hematology Research Career Development Program (K12)	6	2,375	0.11
Genetics and Genomics of Lung Disease Career Development Program (K12)	8	3,190	0.14
Career Enhancement Award for Stem Cell Research (K18)	3	477	0.02
Career Transition Award (K22)	1	162	0.01
Mentored Patient-Oriented Research Career Development Award (K23)	149	20,831	0.92
Midcareer Investigator Award in Patient-Oriented Research (K24)	32	5,078	0.22
Mentored Quantitative Research Career Development Award (K25)	14	1,996	0.09
Career Transition Award (K99)	46	4,430	0.20
<b>Subtotal, Research Career Programs</b>	<b>572</b>	<b>84,647</b>	<b>3.75</b>
<b>Other Research Grants</b>			
Cooperative Clinical Research (U10, R10)	23	18,775	0.83
Minority Biomedical Research Support (S06, R25, SC2)	9	2,167	0.10
Other (R09, R13, R18, R24, R25, T15, U09, U24, UH1)	112	25,412	1.12
<b>Subtotal, Other Research Grants</b>	<b>144</b>	<b>46,354</b>	<b>2.05</b>
<b>Total, NHLBI Research Grants</b>	<b>4,827</b>	<b>\$2,261,014</b>	<b>100%</b>

## NHLBI Total Research Grants by Category



## NHLBI Research Project Grants,\* Research Centers Grants, and Other Research Grant Obligations: Fiscal Years 1999–2009



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

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

## NHLBI Research Project Grants,\* Research Centers Grants, and Other Research Grant Obligations: Fiscal Years 1999–2009

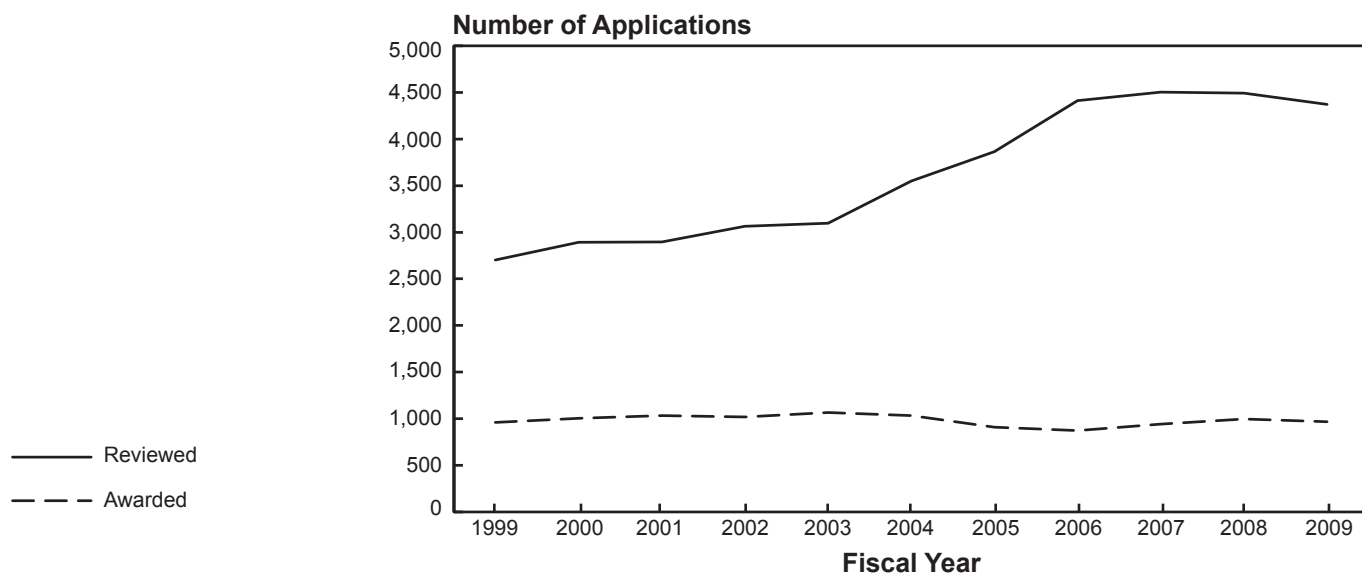
	Dollars (Thousands)										
	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Research Project Grants*	\$1,142,473	\$1,356,034	\$1,580,751	\$1,779,573	\$1,920,201	\$2,003,769	\$2,042,050	\$2,011,049	\$1,986,692	\$1,983,633	\$2,039,861
Research Centers Grants	119,889	123,803	127,232	128,161	138,941	140,600	151,495	141,086	141,034	107,393	90,152
Other Research Grants**	84,219	90,666	88,958	98,460	113,172	112,785	116,713	123,802	135,284	125,942	131,001
<b>Total</b>	<b>\$1,346,581</b>	<b>\$1,570,503</b>	<b>\$1,796,941</b>	<b>\$2,006,194</b>	<b>\$2,172,314</b>	<b>\$2,257,154</b>	<b>\$2,310,258</b>	<b>\$2,275,937</b>	<b>\$2,263,010</b>	<b>\$2,216,968</b>	<b>\$2,261,014</b>

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

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

## NHLBI Competing Research Project Grant Applications:<sup>\*</sup> Fiscal Years 1999–2009

### Number Reviewed and Awarded

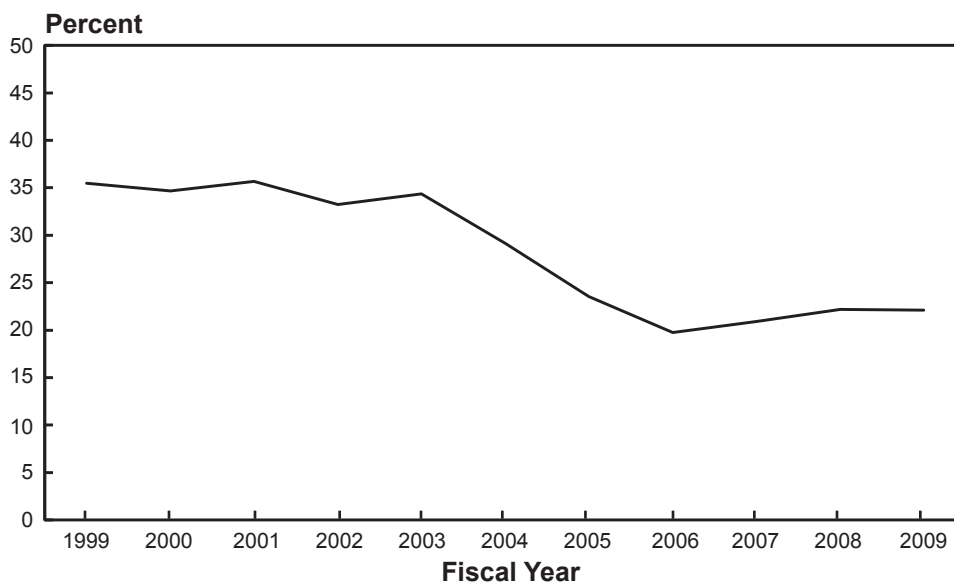


### Number Reviewed and Awarded and Percent Funded

	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Applications Reviewed	2,704	2,893	2,895	3,064	3,098	3,548	3,865	4,412	4,504	4,492	4,373
RPGs Awarded	959	1,003	1,033	1,018	1,064	1,034	909	871	943	997	968
Success Rate (percent)	35.5	34.7	35.7	33.2	34.3	29.1	23.5	19.7	20.9	22.2	22.1

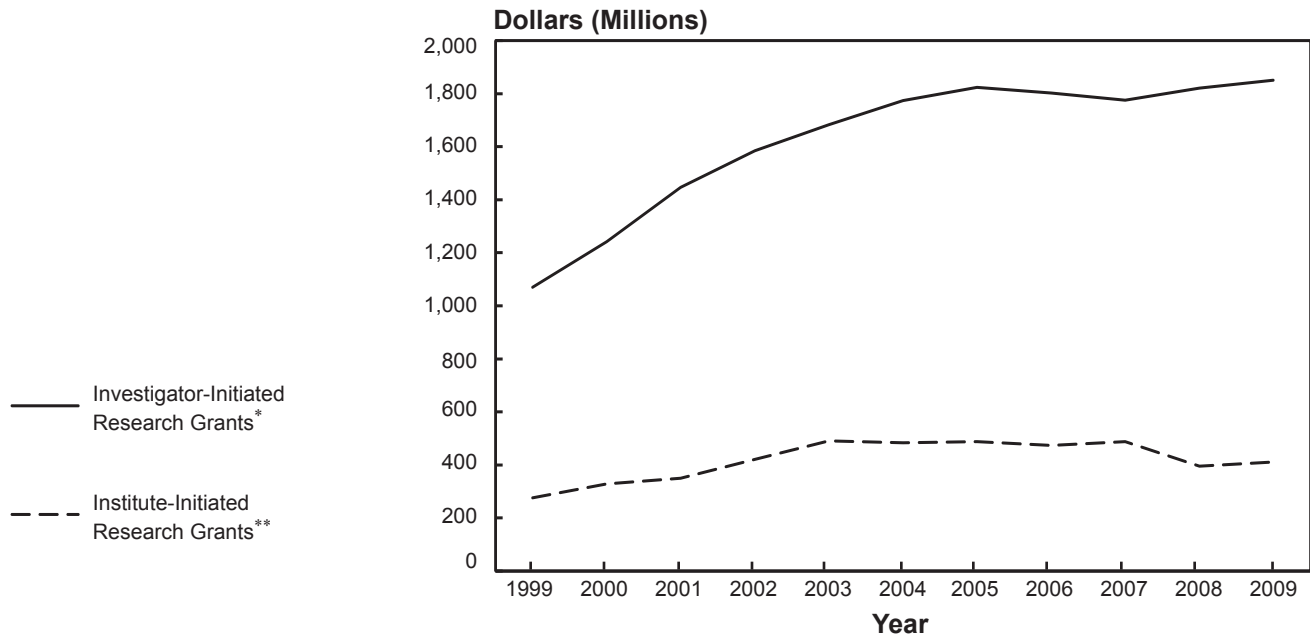
\* Includes R01, U01, P01, R03, R15, R21, R29, and R37; R33 beginning in 2001; DP2 and U19 beginning in 2007; and DP1 and R00 beginning in 2008.

### Percent of Reviewed Applications Funded (Success Rate)





### NHLBI Investigator-Initiated and Institute-Initiated Grant Obligations: Fiscal Years 1999–2009



\* 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 1999–2009

	Dollars (Millions)										
	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Investigator-Initiated*	\$1,069.9	\$1,241.6	\$1,446.2	\$1,584.9	\$1,681.9	\$1,773.4	\$1,822.9	\$1,802.1	\$1,774.8	\$1,820.8	\$1,850.1
Institute-Initiated**	276.7	328.9	350.7	421.3	490.4	483.8	487.3	473.8	488.2	396.1	410.9
<b>Total</b>	<b>\$1,346.6</b>	<b>\$1,570.5</b>	<b>\$1,796.9</b>	<b>\$2,006.2</b>	<b>\$2,172.3</b>	<b>\$2,257.2</b>	<b>\$2,310.2</b>	<b>\$2,275.9</b>	<b>\$2,263.0</b>	<b>\$2,216.9</b>	<b>\$2,261.0</b>

\* 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 1999–2009

	Dollars (Millions)										
	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Competing</b>											
New Competing	\$ 202.0	\$ 266.4	\$ 280.0	\$ 291.2	\$ 285.5	\$ 290.5	\$ 270.0	\$ 242.9	\$ 330.9	\$ 314.2	\$ 340.2
Renewal Competing	127.2	152.0	143.9	143.9	177.2	185.5	176.1	168.3	169.4	196.9	172.6
Competing Supplements	1.2	0.9	0.4	2.3	1.0	1.3	1.7	0.4	—	1.7	0.3
Subtotal, Competing	330.4	419.3	424.3	437.4	463.7	477.3	447.8	411.6	500.3	512.8	513.1
<b>Noncompeting</b>											
Subtotal, Noncompeting	770.6	889.3	1,101.5	1,281.3	1,390.3	1,454.9	1,520.0	1,527.0	1,486.4	1,470.8	1,526.8
<b>Total, Competing and Noncompeting</b>	<b>\$1,101.0</b>	<b>\$1,308.6</b>	<b>\$1,525.8</b>	<b>\$1,718.7</b>	<b>\$1,854.0</b>	<b>\$1,932.2</b>	<b>\$1,967.8</b>	<b>\$1,938.6</b>	<b>\$1,986.7</b>	<b>\$1,983.6</b>	<b>\$2,039.9</b>

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

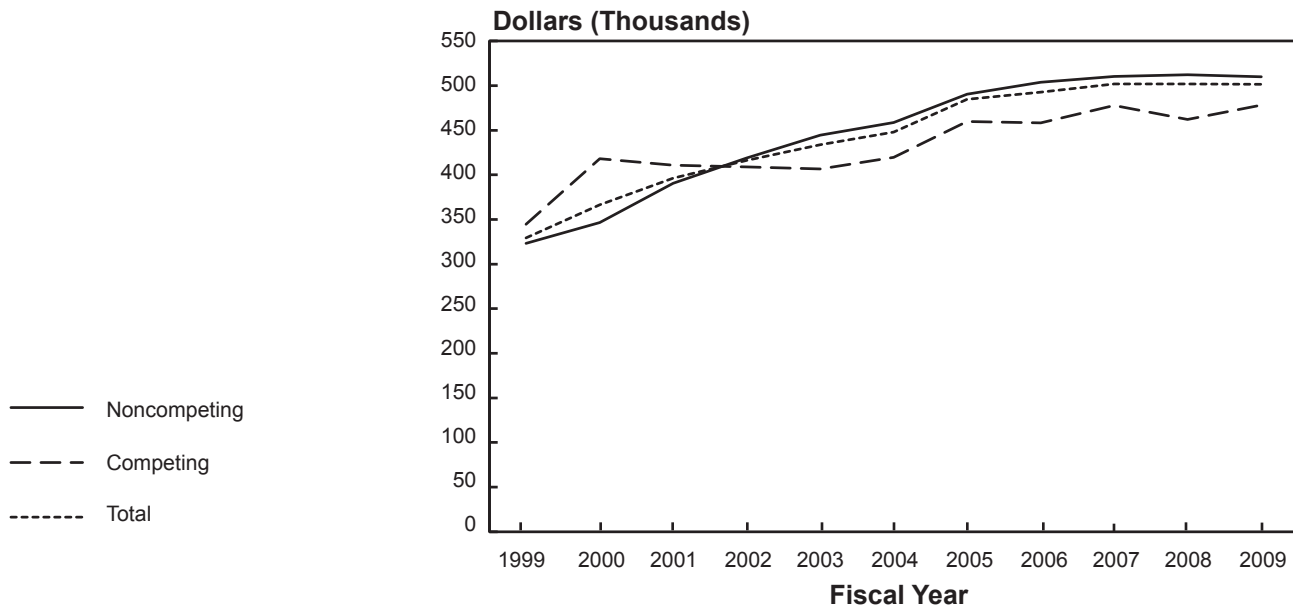
## Facility and Administrative (F&A) Costs of NHLBI Research Project Grants: \* Fiscal Years 1999–2009

Fiscal Year	Dollars (Thousands)			F&A Cost as a Percent of Direct Cost
	Direct Cost	F&A Cost	Total Cost	
1999	764,198	336,756**	1,100,954	44.1
2000	891,244	417,312	1,308,556	46.8
2001	1,045,144	480,673	1,525,817	46.0
2002	1,182,408	536,324	1,718,732	45.4
2003	1,276,819	577,131	1,853,950	45.2
2004	1,329,106	603,133	1,932,239	45.4
2005	1,355,803	612,007	1,967,810	45.1
2006	1,334,406	604,183	1,938,589	45.3
2007	1,378,134	608,558	1,986,692	44.2
2008	1,376,276	607,357	1,983,633	44.1
2009	1,410,033	629,828	2,039,861	44.7

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

\*\* Excludes Program Evaluation Assessment of \$1,216,000.

**NHLBI Research Project Grants: \* Average Costs, Fiscal Years 1999–2009**



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

**NHLBI Research Project Grants: \* Average Costs, Fiscal Years 1999–2009**

	Dollars (Thousands)										
	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Noncompeting	\$323.4	\$346.6	\$390.7	\$418.8	\$444.4	\$458.7	\$490.6	\$503.9	\$510.3	\$512.4	\$509.8
Competing	344.5	418.0	410.8	409.1	406.7	419.7	459.9	458.1	477.8	462.0	478.2
<b>Total</b>	<b>\$329.4</b>	<b>\$366.6</b>	<b>\$396.1</b>	<b>\$416.2</b>	<b>\$433.8</b>	<b>\$447.9</b>	<b>\$484.8</b>	<b>\$492.8</b>	<b>\$501.7</b>	<b>\$501.8</b>	<b>\$501.4</b>

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

## NHLBI Cooperative Agreements (U01, U10) 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 2009	Total FY 2009 Obligations	Total Obligations to Date
<b>Heart and Vascular Diseases</b>			
AIM HIGH: Niacin Plus Statin to Prevent Vascular Events	\$ 14,385,611	\$ 1,132,517	\$ 15,518,128
Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics (BARI 2D)	57,052,642	1,129,551	58,182,193
Cardiovascular Cell Therapy Research Network	11,992,445	6,226,923	18,219,368
Cardiovascular Heart Study (CHS) Events Follow-up Study	4,561,785	1,295,541	5,857,326
Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL)	21,413,274	—	21,413,274
Catheter Ablation Versus Antiarrhythmic Drug Therapy for Atrial Fibrillation (CABANA) Trial	—	2,940,676	2,940,676
Claudication: Exercise Versus Endoluminal Revascularization	4,745,409	1,822,084	6,567,493
Clinical Research Consortium To Improve Resuscitation Outcomes	40,203,762	—	40,203,762
Community-Responsive Intervention To Reduce Cardiovascular Risk in American Indians and Alaska Natives	6,883,288	1,999,367	8,882,655
Dynamic Evaluation of Percutaneous Coronary Intervention	6,928,502	753,041	7,681,543
Genetics of Coronary Artery Disease in Alaska Natives (GOCADAN)	15,925,349	1,440,550	17,365,899
Heart Failure Clinical Research Network	21,256,277	7,938,673	29,194,950
Improved Measures of Diet and Physical Activity for the Genes and Environment Initiative	4,851,197	2,340,995	7,192,192
Network for Cardiothoracic Surgical Investigation in Cardiovascular Medicine	14,689,861	3,210,240	17,900,101
NHLBI Cardiac Development Consortium	—	1,113,042	1,113,042
NHLBI Pediatric Cardiac Genomics Consortium	—	1,370,839	1,370,839
NHLBI Progenitor Cell Biology Consortium	—	22,721,547	22,721,547
Occluded Artery Trial (OAT)	19,953,495	1,269,829	21,223,324
Pediatric Heart Network	48,440,735	7,637,122	56,077,857
Pharmacogenetics Research Network	62,887,956	4,959,258	67,847,214
Practice-Based Opportunity for Weight Reduction (POWER) Trials	9,937,264	3,728,927	13,666,191
Programs of Excellence in Nanotechnology	39,522,116	11,279,810	50,801,926
Rule Out Myocardial Infarction Using Computed Assisted Tomography (ROMICAT II)	—	2,111,994	2,111,994
Strong Heart Study	69,831,832	1,026,776	70,858,608
Surgical Treatment for Ischemic Heart Failure (STICH)	38,081,071	726,648	38,807,719
Targeted Approaches to Weight Control for Young Adults	—	4,656,109	4,656,109
Therapeutic Hypothermia After Pediatric Cardiac Arrest (THAPCA) Trials	—	3,648,449	3,648,449
Translating Basic Behavioral and Social Science Discoveries Into Interventions to Reduce Obesity	—	5,431,213	5,431,213
Weight Loss Maintenance (WLM)	17,463,982	149,857	17,613,839
<b>Subtotal, Heart and Vascular Diseases</b>	<b>531,007,853</b>	<b>104,061,578</b>	<b>635,069,431</b>
<b>Lung Diseases</b>			
Asthma Networks (AsthmaNet)	—	8,300,000	8,300,000
Childhood Asthma Management Program–Continuation Study (CAMP-CS)/Phase III	4,043,232	1,145,547	5,188,779
COPD Clinical Research Network	40,030,386	3,150,000	43,180,386
Genetic Epidemiology of COPD	14,234,023	9,063,922	23,297,945
Idiopathic Pulmonary Fibrosis Clinical Research Network	25,205,892	7,324,944	32,530,836
Infant Study of Inhaled Saline in Cystic Fibrosis (ISIS)	732,476	736,708	1,469,184
Microbiome of the Lung and Respiratory Tract in HIV-Infected Individuals and HIV-Uninfected Controls	—	5,390,250	5,390,250
Pharmacogenetics of Asthma Treatment	23,813,429	3,192,109	27,005,538

	Total Obligations Prior to FY 2009	Total FY 2009 Obligations	Total Obligations to Date
<b>Lung Diseases (continued)</b>			
Randomized Controlled Study of Adenotonsillectomy for Childhood Sleep Apnea	6,000,740	2,500,880	8,501,620
Randomized Trial of Maternal Vitamin D Supplementation To Prevent Childhood Asthma	—	2,510,267	2,510,267
Sedation Management in Pediatric Patients With Acute Respiratory Failure	567,715	3,884,512	4,452,227
Study of Acid Reflux Therapy for Children With Asthma	2,462,212	882,798	3,345,010
Study of Asthma and Nasal Steroids (STAN)	—	724,724	724,724
Study of Soy Isoflavones in Asthma (SOYA)	—	774,607	774,607
Trial of Late Surfactant To Prevent Bronchopulmonary Dysplasia (TOLSURF)	—	1,986,898	1,986,898
Subtotal, Lung Diseases	117,090,105	51,568,166	168,658,271
<b>Blood Diseases and Resources</b>			
Blood and Marrow Transplant Clinical Research Network	50,147,120	6,350,697	56,497,817
Bridging Anticoagulation on Patients Requiring Temporary Interruption of Warfarin Therapy for an Elective Invasive Procedure or Surgery (BRIDGE) Trial	4,632,060	5,673,071	10,305,131
Pharmacomechanical Catheter-Directed Thrombolysis for Acute DVT-ATTRACT Trial	2,070,898	2,107,633	4,178,531
Stroke With Transfusions Changing to Hydroxyurea (SWITCH)	14,636,993	3,215,757	17,852,750
Thalassemia (Cooley's Anemia) Clinical Research Network	22,006,021	657,580	22,663,601
Transfusion Medicine/Hemostasis Clinical Research Network	43,909,114	6,541,087	50,450,201
Subtotal, Blood Diseases and Resources	137,402,206	24,545,825	161,948,031
<b>Total, NHLBI Cooperative Agreements</b>	<b>\$785,500,164</b>	<b>\$180,175,569</b>	<b>\$965,675,733</b>

## Heart and Vascular Diseases Program

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

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

#### Obligations

##### Funding History:

Fiscal Year 2009—\$1,132,517  
Fiscal Years 2005–2008—\$14,385,611  
Total Funding to Date—\$15,518,128

#### Current Active Organizations and Grant Numbers

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

### Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics (BARI 2D), Initiated in Fiscal Year 2000

The purpose of this trial is to compare alternative treatment strategies for managing patients with type 2 diabetes and angiographically proven coronary artery disease, stable angina, or ischemia. Revascularization combined with aggressive medical anti-ischemia treatment is being compared to aggressive medical anti-ischemia treatment alone. Simultaneously, researchers seek to determine whether insulin-sensitizing drugs such as metformin and the glitazones for controlling blood sugar level offer any survival advantage over drugs that increase insulin level. One-third of the patients are from minority populations.

Research findings indicate that neither prompt revascularization versus delayed revascularization or insulin sensitization versus insulin provision in patients with type 2 diabetes and stable CHD was superior in terms of mortality and the prevention of major cardiovascular events.

#### Obligations

##### Funding History:

Fiscal Year 2009—\$1,129,551  
Fiscal Years 2000–2008—\$57,052,642  
Total Funding to Date—\$58,182,193

#### Current Active Organization and Grant Number

1. University of Pittsburgh  
Pittsburgh, Pennsylvania —HL-061744

### Cardiovascular Cell Therapy Research Network, Initiated in Fiscal Year 2007

See Chapter 11. Clinical Trials.

### Cardiovascular Heart Study (CHS) Events Follow-Up Study, Initiated in Fiscal Year 2005

The purpose of this project is to continue follow-up of the CHS cohort for cardiovascular events in order to enhance power among subgroups to study associations of CVD risk factors and incidence and prognosis following CVD events in older adults. The additional events will permit greater opportunity to address the study aims by CHS investigators and other researchers interested in making use of the study’s extensive database and specimens. Seventeen percent of the participants are from minority populations.

#### Obligations

##### Funding History:

Fiscal Year 2009—\$1,295,541  
Fiscal Years 2005–2008—\$4,561,785  
Total Funding to Date—\$5,857,326

#### Current Active Organization and Grant Number

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

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

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

#### Obligations

##### Funding History:

Fiscal Year 2009—\$0  
Fiscal Years 2004–2008—\$21,413,274  
Total Funding to Date—\$21,413,274

### Current Active Organizations and Grant Numbers

1. University of Toledo Health Sciences Campus  
Toledo, Ohio —HL-071556
2. University of Minnesota, Twin Cities  
Minneapolis, Minnesota —HL-072734
3. University of Virginia  
Charlottesville, Virginia —HL-072735
4. Mid-America Heart Institute of St. Luke Hospital  
Kansas City, Missouri —HL-072736
5. Beth Israel Deaconess Medical Center  
Boston, Massachusetts —HL-072737

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

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

#### Obligations

Funding History:

Fiscal Year 2009—\$2,940,676

Total Funding to Date—\$2,940,676

### 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

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

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

### Obligations

Funding History:

Fiscal Year 2009—\$1,822,084

Fiscal Years 2005–2008—\$4,745,409

Total Funding to Date—\$6,567,493

### Current Active Organizations and Grant Numbers

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

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

See Chapter 11. Clinical Trials.

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

See Chapter 11. Clinical Trials.

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

This program, which complements prior NHLBI percutaneous transluminal coronary angioplasty (PTCA) registries and the New Approaches to Coronary Intervention Registry, is evaluating patterns of device usage, as well as immediate and follow-up outcomes in patients undergoing percutaneous transluminal coronary revascularization. Results will provide guidance to the cardiology community in selecting appropriate therapies and in designing clinical trials to evaluate competing devices.

#### Obligations

Funding History:

Fiscal Year 2009—\$753,041

Fiscal Years 1997–2008—\$6,928,502

Total Funding to Date—\$7,681,543

### Current Active Organization and Grant Number

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



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

The purpose of this study is to document CVD and CVD risk factors in approximately 40 extended families (1,214 members from villages in Northern Alaska). Scientists seek to identify and characterize genes that contribute to CVD in this unique and understudied population.

#### **Obligations**

Funding History:

Fiscal Year 2009—\$1,440,550

Fiscal Years 2000–2008—\$15,925,349

Total Funding to Date—\$17,365,899

#### **Current Active Organizations and Grant Numbers**

1. MedStar Research Institute  
Hyattsville, Maryland —HL-064244
2. Norton Sound Health Corporation  
Nome, Alaska —HL-082458
3. Southwest Foundation for  
Biomedical Research  
San Antonio, Texas —HL-082490

### **Heart Failure Clinical Research Network, Initiated in Fiscal Year 2006**

See Chapter 11. Clinical Trials.

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

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

#### **Obligations**

Funding History:

Fiscal Year 2009—\$2,340,995

Fiscal Years 2007–2008—\$4,851,197

Total Funding to Date—\$7,192,192

#### **Current Active Organizations and Grant Numbers**

1. University of Pittsburgh  
Pittsburgh, Pennsylvania —HL-091736

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

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

See Chapter 11. Clinical Trials.

### **NHLBI Cardiac Development Consortium, Initiated in Fiscal Year 2009**

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

#### **Obligations**

Funding History:

Fiscal Year 2009—\$1,113,042

Total Funding to Date—\$1,113,042

#### **Current Active Organizations and Grant Numbers**

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

### **NHLBI Pediatric Cardiac Genomics Consortium, Initiated in Fiscal Year 2009**

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

#### **Obligations**

Funding History:

Fiscal Year 2009—\$1,370,839

Total Funding to Date—\$1,370,839

### 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 Progenitor Cell Biology Consortium, Initiated in Fiscal Year 2009

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

#### Obligations

Funding History:

Fiscal Year 2009—\$22,721,547

Total Funding to Date—\$22,721,547

### Current Active Organizations and Grant Numbers

1. Children's Hospital of Philadelphia  
Philadelphia, Pennsylvania —HL-099656
2. University of Wisconsin, Madison  
Madison, Wisconsin —HL-099773
3. Johns Hopkins University  
Baltimore, Maryland —HL-099775
4. Stanford University  
Stanford, California —HL-099776
5. Fred Hutchinson Cancer Research Center  
Seattle, Washington —HL-099993
6. Stanford University  
Stanford, California —HL-099995
7. Stanford University  
Stanford, California —HL-099999
8. Children's Hospital Boston  
Boston, Massachusetts —HL-100001
9. Fred Hutchinson Cancer Research Center  
Seattle, Washington —HL-100395
10. Stanford University  
Stanford, California —HL-100397
11. Vanderbilt University  
Nashville, Tennessee —HL-100398

12. University of Texas Southwestern  
Medical Center  
Dallas, Texas —HL-100401
13. Massachusetts General Hospital  
Boston, Massachusetts —HL-100402
14. University of Pennsylvania  
Philadelphia, Pennsylvania —HL-100405
15. J. David Gladstone Institutes  
San Francisco, California —HL-100406
16. University of Minnesota, Twin Cities  
Minneapolis, Minnesota —HL-100407
17. Massachusetts General Hospital  
Boston, Massachusetts —HL-100408

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

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

#### Obligations

Funding History:

Fiscal Year 2009—\$1,269,829

Fiscal Years 1999–2008—\$19,953,495

Total Funding to Date—\$21,223,324

### Current Active Organizations and Grant Numbers

1. New York University  
School of Medicine  
New York, New York —HL-062509
2. Maryland Medical Research  
Institute, Inc.  
Baltimore, Maryland —HL-062511

### Pediatric Heart Network, Initiated in Fiscal Year 2006

See Chapter 11. Clinical Trials.

### Pharmacogenetics Research Network, Initiated in Fiscal Year 2001

The purpose of this study is to establish a network to systematically evaluate candidate genes that may influence pharmacologic response to drug treatments for

arrhythmia, heart failure, hypertension, and lipid disorders. Investigators seek to identify gene polymorphisms capable of predicting drug toxicity and efficacy. One of the projects has 38 percent minority participation.

### Obligations

#### Funding History:

Fiscal Year 2009—\$4,959,258  
Fiscal Years 2001–2008—\$62,887,956  
Total Funding to Date—\$67,847,214

### Current Active Organizations and Grant Numbers

1. Vanderbilt University  
Nashville, Tennessee —HL-065962
2. Children's Hospital and Research Center  
Oakland, California —HL-069757

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

See Chapter 11. Clinical Trials.

### Programs of Excellence in Nanotechnology, Initiated in Fiscal Year 2005

The purpose of this program is to establish multidisciplinary teams to develop nanotechnology and biomolecular engineering tools and methodologies to detect and analyze atherosclerotic plaque formation. The program presents an unique opportunity for research collaboration and skills training by bring bioengineering and nanotechnology solutions into medicine and vice versa.

### Obligations

#### Funding History:

Fiscal Year 2009—\$11,279,810  
Fiscal Years 2005–2008—\$39,522,116  
Total Funding to Date—\$50,801,926

### Current Active Organizations and Grant Numbers

1. Emory University  
Atlanta, Georgia —HL-080711
2. Burnham Institute for Medical Research  
La Jolla, California —HL-080718
3. Washington University  
St. Louis, Missouri —HL-080729
4. Massachusetts General Hospital  
Boston, Massachusetts —HL-080731

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

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

### Obligations

#### Funding History:

Fiscal Year 2009—\$2,111,994  
Total Funding to Date—\$2,111,994

### Current Active Organizations and Grant Numbers

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

### Strong Heart Study, Initiated in Fiscal Year 1988

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

### Obligations

#### Funding History:

Fiscal Year 2009—\$1,026,776  
Fiscal Years 1988–2008—\$69,831,832  
Total Funding to Date—\$70,858,608

### Current Active Organization and Grant Number

1. Southwest Foundation for  
Biomedical Research  
San Antonio, Texas —HL-065520

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

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

The purpose of this clinical trial is to determine whether CABG plus intensive medical therapy improves long-term survival of patients with heart failure and left ventricular (LV) dysfunction who have coronary artery disease amenable to surgical revascularization, compared to medical therapy alone; and to determine whether CABG plus surgical ventricular restoration to a more normal LV size improves survival free of subsequent hospitalizations of patients with anterior LV dysfunction, compared to CABG alone.

### **Obligations**

Funding History:

Fiscal Year 2009—\$726,648

Fiscal Years 2002–2008—\$38,081,071

Total Funding to Date—\$38,807,719

### **Current Active Organizations and Grant Numbers**

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

## **Targeted Approaches to Weight Control for Young Adults, Initiated in Fiscal Year 2009**

See Chapter 11. Clinical Trials

## **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.

### **Obligations**

Funding History:

Fiscal Year 2009—\$3,648,449

Total Funding to Date—\$3,648,449

### **Current Active Organizations and Grant Numbers**

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

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

The purpose of this study is to develop innovative obesity-reducing strategies rather than evaluating the effectiveness of already well-defined or proven strategies. Some projects are expected to have 50- to 100-percent participation from minorities. The new strategies should be effective in small-scale trials, acceptable to target populations of interest, and ready to be tested in large-scale randomized clinical and community trials.

### **Obligations**

Funding History:

Fiscal Year 2009—\$5,431,213

Total Funding to Date—\$5,431,213

### **Current Active Organizations and Grant Numbers**

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

## **Weight Loss Maintenance (WLM), Initiated in Fiscal Year 2003**

The purpose of this multicenter trial is to evaluate the effectiveness of two strategies to maintain weight loss for 2.5 years in approximately 1,700 overweight or obese adults. Of those, 1,032 who lost at least 9 pounds during a 6-month weight loss program were randomized into one of three maintenance groups: brief monthly personal counseling on diet and physical activities; Web-based intervention providing similar advice; or self-directed control, where participants received minimal further intervention. Approximately 40 percent of participants were black.

The majority of individuals who successfully completed an initial behavioral weight loss program maintained a weight below their initial level. Monthly brief personal contact provided modest benefits to sustaining



weight loss, whereas an interactive technology-based intervention provided early but transient benefits.

### Obligations

#### Funding History:

Fiscal Year 2009—\$149,857  
Fiscal Years 2003–2008—\$17,463,982  
Total Funding to Date—\$17,613,839

### Current Active Organization and Grant Number

1. Kaiser Foundation Research Institute  
Oakland, California —HL-068676

## Lung Diseases Program

### Asthma Networks (AsthmaNet)

See Chapter 11. Clinical Trials.

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

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

### Obligations

#### Funding History:

Fiscal Year 2009—\$1,145,547  
Fiscal Years 2007–2008—\$4,043,232  
Total Funding to Date—\$5,188,779

### Current Active Organizations and Grant Numbers

1. Washington University  
St. Louis, Missouri —HL-075232
2. Hospital for Sick Children  
Toronto, Ontario —HL-075407
3. Johns Hopkins University  
Baltimore, Maryland —HL-075408
4. Asthma, Inc.  
Seattle, Washington —HL-075409
5. University of California, San Diego  
La Jolla, California —HL-075415
6. National Jewish Medical  
and Research Center  
Denver, Colorado —HL-075416
7. Johns Hopkins University  
Baltimore, Maryland —HL-075417

8. Brigham and Women’s Hospital  
Boston, Massachusetts —HL-075419
9. University of New Mexico  
Albuquerque, New Mexico —HL-075420

### COPD Clinical Research Network, Initiated in Fiscal Year 2003

See Chapter 11. Clinical Trials.

### Genetic Epidemiology of COPD, Initiated in Fiscal Year 2007

The purpose of this study is to perform a genome-wide association analysis to identify the genetic risk factors that determine susceptibility for COPD and COPD-related phenotypes in a large biracial population.

### Obligations

#### Funding History:

Fiscal Year 2009—\$9,063,922  
Fiscal Years 2007–2008—\$14,234,023  
Total Funding to Date—\$23,297,945

### Current Active Organizations and Grant Numbers

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

### Idiopathic Pulmonary Fibrosis Clinical Research Network, Initiated in Fiscal Year 2005

See Chapter 11. Clinical Trials.

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

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

### Obligations

#### Funding History:

Fiscal Year 2009—\$736,708  
Fiscal Year 2008—\$732,476  
Total Funding to Date—\$1,469,184

### Current Active Organizations and Grant Numbers

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

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

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

#### Obligations

Funding History:

Fiscal Year 2009—\$5,390,250  
Total Funding to Date—\$5,390,250

### Current Active Organizations and Grant Numbers

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

### 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 2009—\$3,192,109  
Fiscal Years 2000–2008—\$23,813,429  
Total Funding to Date—\$27,005,538

### Current Active Organization and Grant Number

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

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

The purpose of this randomized controlled study is to compare adenotonsillectomy and watchful waiting followed by reevaluation after 7 months for treatment of OSA in children aged 5 to 9 years; 50 percent of the participants are expected to be black.

#### Obligations

Funding History:

Fiscal Year 2009—\$2,500,880  
Fiscal Years 2006–2008—\$6,000,740  
Total Funding to Date—\$8,501,620

### Current Active Organizations and Grant Numbers

1. Case Western Reserve University  
Cleveland, Ohio —HL-083075
2. University of Pennsylvania  
Philadelphia, Pennsylvania —HL-083129

### 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 higher vitamin D intake and increased levels in a pregnant woman will prevent asthma and allergy in her child at age 3. Investigators will recruit 870 pregnant women who are in the first trimester of pregnancy. This sample will be randomized to one of two treatment arms of a 4-year clinical trial: 4,000 international units of vitamin D in addition to typical prenatal vitamins and typical prenatal vitamins alone.

### Obligations

#### Funding History:

Fiscal Year 2009—\$2,510,267  
Total Funding to Date—\$2,510,267

### Current Active Organizations and Grant Numbers

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

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

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

### Obligations

#### Funding History:

Fiscal Year 2009—\$3,884,512  
Fiscal Year 2008—\$567,715  
Total Funding to Date—\$4,452,227

### Current Active Organizations and Grant Numbers

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

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

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

### Obligations

#### Funding History:

Fiscal Year 2009—\$882,798  
Fiscal Years 2006–2008—\$2,462,212  
Total Funding to Date—\$3,345,010

### Current Active Organizations and Grant Numbers

1. Emory University  
Atlanta, Georgia —HL-080433
2. Johns Hopkins University  
Baltimore, Maryland —HL-080450

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

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

### Obligations

#### Funding History:

Fiscal Year 2009—\$724,724  
Total Funding to Date—\$724,724

### Current Active Organizations and Grant Numbers

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

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

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



## Obligations

### Funding History:

Fiscal Year 2009—\$774,607

Total Funding to Date—\$774,607

### 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 To Prevent Bronchopulmonary Dysplasia (TOLSURF), 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 2009—\$1,986,898

Total Funding to Date—\$1,986,898

### 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

### 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 will randomly allocate 3,282 patients with atrial fibrillation to either LMWH or matching placebo before and after surgery. Investigators hypothesize that simply withholding warfarin in a 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 2009—\$5,673,071

Fiscal Year 2008—\$4,632,060

Total Funding to Date—\$10,305,131

### Current Active Organizations and Grant Numbers

1. Duke University  
Durham, North Carolina —HL-86755
2. Duke University  
Durham, North Carolina —HL-87229

## Pharmacomechanical Catheter-Directed Thrombolysis for Acute DVT—ATTRACT Trial, Initiated in Fiscal Year 2008

The purpose of this study is to determine whether adjunctive pharmacomechanical catheter-directed thrombolysis, which includes intrathrombus administration of recombinant tissue plasminogen activator, can prevent postthrombotic syndrome in patients with symptomatic proximal deep vein thrombosis (DVT) compared with optimal standard DVT therapy alone.

## Obligations

### Funding History:

Fiscal Year 2009—\$2,107,633

Fiscal Year 2008—\$2,070,898

Total Funding to Date—\$4,178,531

### Current Active Organizations and Grant Numbers

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

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

The purpose of this Phase III clinical trial is to compare standard therapy (transfusions and chelation) with alternative therapy (hydroxyurea and phlebotomy) for the prevention of secondary stroke and management of iron overload in children with sickle cell anemia. Additional objectives include comparisons of growth

and development, frequency of nonstroke neurological and other sickle-related events, and quality of life. Participants will be black.

### **Obligations**

#### Funding History:

Fiscal Year 2009—\$3,215,757

Fiscal Years 2005–2008—\$14,636,993

Total Funding to Date—\$17,852,750

### **Current Active Organizations and Grant Numbers**

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

### **Thalassemia (Cooley's Anemia) Clinical Research Network, Initiated in Fiscal Year 2000**

See Chapter 11. Clinical Trials.

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

See Chapter 11. Clinical Trials.

## NHLBI Research Centers (P50) Programs

### Specialized Centers of Clinically Oriented Research (P50)

The NHLBI initiated the Specialized Centers of Research (SCOR) program in 1971 to encourage translational research—converting basic science findings to the clinic—in high priority areas. The SCOR concept emphasized multidisciplinary research (i.e., basic science and clinical investigations) on diseases relevant to the Institute’s mission. In 2002, the NHLBI revised the SCOR program—primarily on recommendation from the NHLBAC—to place more emphasis on clinical research projects. The SCCOR program still requires clinical and basic scientists to work together on a unified theme, but now requires at least 50 percent of the projects to be clinical. The SCOR program ended in 2008.

The funding history for individual SCCORs supported by the Institute is listed below.

Area of Concentration	Period of Operation	Obligations (Dollars in Thousands)		
		Prior to FY 2009	FY 2009	Total to Date
<b>Heart and Vascular Diseases Program</b>				
Cardiac Dysfunction and Disease (SCCOR)	2005–	\$ 65,449	\$13,486	\$ 78,935
Vascular Injury, Repair, and Remodeling (SCCOR)	2006–	44,674	12,496	57,170
Subtotal, Heart and Vascular Diseases Program		110,123	25,982	136,105
<b>Lung Diseases Program</b>				
Chronic Obstructive Pulmonary Disease (SCCOR)	2007–	22,236	11,228	33,464
Host Factors in Chronic Lung Diseases (SCCOR)	2006–	23,865	8,473	32,338
Pulmonary Vascular Disease (SCCOR)	2007–	12,732	6,480	19,212
Subtotal, Lung Diseases Program		58,833	26,181	85,014
<b>Blood Diseases and Resources Program</b>				
Hemostatic and Thrombotic Diseases (SCCOR)	2006–	24,141	8,413	32,554
Transfusion Biology and Medicine (SCCOR)	2005–	17,818	4,651	22,469
Subtotal, Blood Diseases and Resources Program		41,959	13,064	55,023
<b>Total, Specialized Centers of Clinically Oriented Research (P50)</b>		<b>\$210,915</b>	<b>\$65,227</b>	<b>\$276,142</b>

## Heart and Vascular Diseases Program

### Cardiac Dysfunction and Disease

The purpose of this SCCOR is to foster multidisciplinary research on clinically relevant questions related to dysfunction and disease of the myocardium. The program will enable rapid application of basic science findings to the prevention, diagnosis, and treatment of cardiac disorders, including ischemic and other cardiomyopathies, left ventricular dysfunction, metabolic abnormalities, heart failure, and rhythm disturbances. Because some segments of the population disproportionately suffer from heart disease, research that addresses issues of health disparity will be emphasized.

#### Obligations

Fiscal Year 2009—\$13,486,219

#### Current Active Organizations and Grant Numbers

1. Columbia University  
Health Science Center  
New York, New York —HL-077096
2. University of Alabama at Birmingham  
Birmingham, Alabama —HL-077100
3. University of Cincinnati  
Cincinnati, Ohio —HL-077101
4. Cleveland Clinical Lerner College  
Cleveland, Ohio —HL-077107
5. Washington University  
St. Louis, Missouri —HL-077113

### Vascular Injury, Repair, and Remodeling

The purpose of this SCCOR is to foster multidisciplinary research on clinically relevant questions that will enable basic science findings to be more rapidly translated into clinical applications. Major goals of the program are to stimulate interdependent clinical and multidisciplinary basic research projects that investigate molecular and cellular mechanisms of vascular injury, repair, and remodeling; promote patient-oriented research that will improve our ability to prevent, detect, characterize, manage, and treat vascular diseases; and develop the skills and research capabilities of new clinical investigators.

#### Obligations

Fiscal Year 2009—\$12,496,418

#### Current Active Organizations and Grant Numbers

1. Washington University  
St. Louis, Missouri —HL-083762

2. University of Texas Health  
Science Center  
Houston, Texas —HL-083794
3. University of Pennsylvania  
Philadelphia, Pennsylvania —HL-083799
4. Stanford University  
Stanford, California —HL-083800
5. Boston University Medical Campus  
Boston, Massachusetts —HL-083801
6. 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. The program will include a broad spectrum of basic and clinical research that will encompass animal models of COPD pathogenesis, human proteomic, genetic and genomic investigations, technologically refined disease phenotypes classification, and the development of new experimental therapeutic interventions.

#### Obligations

Fiscal Year 2009—\$11,227,890

#### Current Active Organizations and Grant Numbers

1. Washington University  
St. Louis, Missouri —HL-084922
2. Weill Medical College  
of Cornell University  
New York, New York —HL-084936
3. Johns Hopkins University  
Baltimore, Maryland —HL-084945
4. University of Pittsburgh  
Pittsburgh, Pennsylvania —HL-084948

### Host Factors in Chronic Lung Diseases

The purpose of this SCCOR is to identify alterations in host responses and lung homeostasis and to determine how the dysregulation contributes to development or progression of chronic lung diseases. Enhanced understanding of these processes should facilitate identification of new targets for intervention, providing the basis for development of new therapeutic options for prevention and treatment of chronic lung diseases.

#### Obligations

Fiscal Year 2009—\$8,472,710

### **Current Active Organizations and Grant Numbers**

1. Duke University  
Durham, North Carolina —HL-084917
2. Children's Hospital  
Pittsburgh, Pennsylvania —HL-084932
3. University of North Carolina  
Chapel Hill, North Carolina —HL-084934

### **Pulmonary Vascular Disease**

The objective of this SCCOR is to facilitate multidisciplinary research that proposes original hypotheses and applies cutting-edge approaches, including genomics and proteomics, to clinical issues in pulmonary vascular disease.

#### **Obligations**

Fiscal Year 2009—\$6,480,043

### **Current Active Organizations and Grant Numbers**

1. University of Colorado at Denver  
Denver, Colorado —HL-084923
2. Johns Hopkins University  
Baltimore, Maryland —HL-084946

### **Blood Diseases and Resources Program**

#### **Hemostatic and Thrombotic Diseases**

The purpose of this SCCOR is to conduct multidisciplinary research to improve the prevention, diagnosis, and treatment of thrombotic and bleeding disorders. The program will support rapid translation of basic science findings into clinical application.

#### **Obligations**

Fiscal Year 2009—\$8,412,822

### **Current Active Organizations and Grant Numbers**

1. Vanderbilt University  
Nashville, Tennessee —HL-081009
2. Cleveland Clinic Lerner College  
Cleveland, Ohio —HL-081011
3. University of Pennsylvania  
Philadelphia, Pennsylvania —HL-081012

### **Transfusion Biology and Medicine**

The purpose of this SCCOR is to foster new approaches for improving the availability, efficacy, safety, and quality of blood and blood products for therapeutic uses. One of the centers has a large minority population.

#### **Obligations**

Fiscal Year 2009—\$4,650,915

### **Current Active Organizations and Grant Numbers**

1. Puget Sound Blood Center  
Seattle, Washington —HL-081015
2. University of California, San Francisco  
San Francisco, California —HL-081027

## Basic and Translational Research Program (U54)

The NHLBI reconfigured the Comprehensive Sickle Cell Centers program into a Basic and Translational Research Program (BTRP). The Program emphasizes fundamental investigations and their translation into initial studies in humans, as well as community translation to promote evidence-based clinical practice. The BTRP continues to support the Sickle Cell Disease Scholars program for the career development of young investigators and the Summer-for-Sickle Cell-Science program for research training and mentoring of high-school students. These components are part of a larger effort by NHLBI to prepare the next generation of scientists to advance the field of SCD research.

### Obligation

Fiscal Year 2009—\$13,566,634

### Current Active Organizations and Grant Numbers

1. Thomas Jefferson University Philadelphia, Pennsylvania	—HL-070585	8. Howard University Washington, DC	—HL-090508
2. RHO Federal Systems Division, Inc. Chapel Hill, North Carolina	—HL-070587	9. Children's Hospital Los Angeles, California	—HL-090511
3. University of Texas Southwestern Medical Center Dallas, Texas	—HL-070588	10. University of Chicago Chicago, Illinois	—HL-090513
4. St. Jude Children's Research Hospital Memphis, Tennessee	—HL-070590	11. Johns Hopkins University Baltimore, Maryland	—HL-090515
5. Boston Medical Center Boston, Massachusetts	—HL-070819	12. Virginia Commonwealth University Richmond, Virginia	—HL-090516
6. Children's Hospital Medical Center Cincinnati, Ohio	—HL-070871	13. University of Miami School of Medicine Miami, Florida	—HL-090569
7. Medical College of Wisconsin Milwaukee, Wisconsin	—HL-090503		

## Specialized Centers for Cell-Based Therapies for Heart, Lung, and Blood Diseases (U54) Program

The Specialized Centers for Cell-Based Therapies Program, which includes a Data and Coordinating Center, was initiated in FY 2005 to support preclinical and clinical studies for cell-based therapy for heart, lung, and blood diseases and sleep disorders. A key feature of the program is the ability to conduct preclinical studies in the first year or two of the program in order to meet the requirements for an Investigational New Drug application prior to initiating clinical studies. Clinical studies are expected to be initiated by the beginning of the third year.

### Obligations

Fiscal Year 2009—\$7,649,361

### Current Active Organizations and Grant Numbers

1. Baylor College of Medicine Houston, Texas	—HL-081007	3. Cedars-Sinai Medical Center Los Angeles, California	—HL-081028
2. EMMES Corporation Rockville, Maryland	—HL-081021	4. Massachusetts General Hospital Boston, Massachusetts	—HL-081030

## 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 2009—\$3,254,346

### Current Active Organizations and Grant Numbers

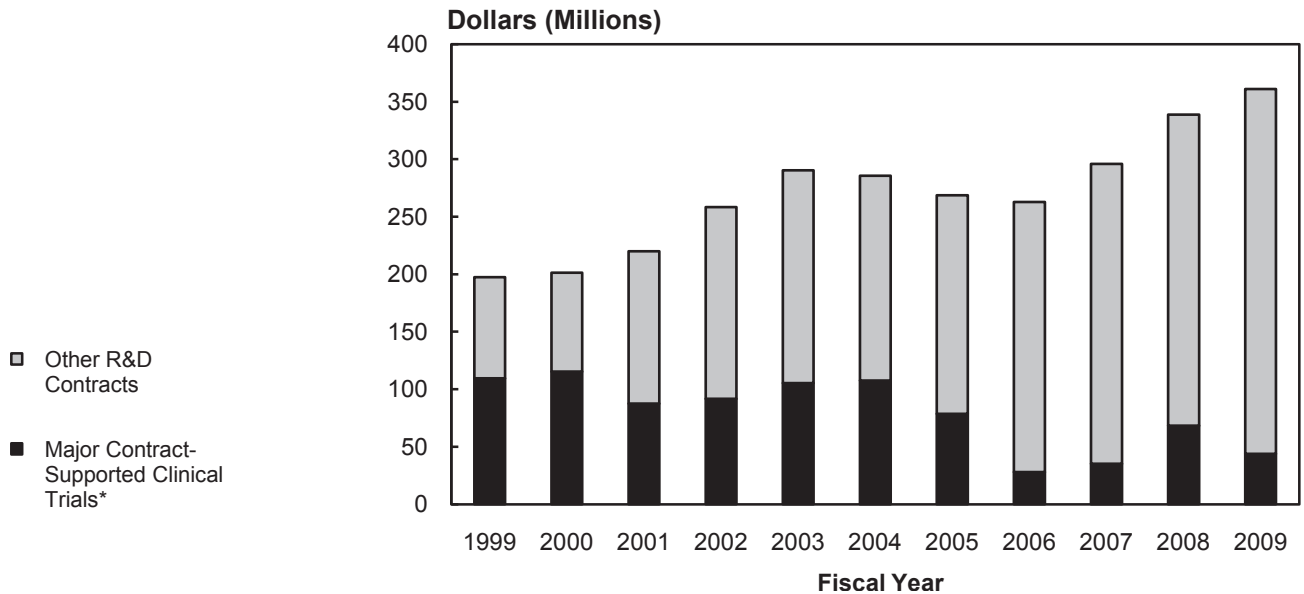
1. New York University School of Medicine New York, New York	—AI-027742	11. University of Pennsylvania Philadelphia, Pennsylvania	—AI-045008
2. University of Washington Seattle, Washington	—AI-027757	12. Emory University Atlanta, Georgia	—AI-050409
3. University of California, San Francisco San Francisco, California	—AI-027763	13. University of North Carolina at Chapel Hill Chapel Hill, North Carolina	—AI-050410
4. University of Alabama at Birmingham Birmingham, Alabama	—AI-027767	14. Yeshiva University New York, New York	—AI-051519
5. University of California, Los Angeles Los Angeles, California	—AI-028697	15. Vanderbilt University Nashville, Tennessee	—AI-054999
6. Baylor University Houston, Texas	—AI-036211	16. Harvard Medical School Boston, Massachusetts	—AI-060354
7. University of California, San Diego La Jolla, California	—AI-036214	17. Duke University Durham, North Carolina	—AI-064518
8. Case Western Reserve University Cleveland, Ohio	—AI-036219	18. University of Miami School of Medicine Coral Gables, Florida	—AI-073961
9. University of Massachusetts Medical School Worcester, Massachusetts	—AI-042845	19. University of Rochester Rochester, New York	—AI-078498
10. Miriam Hospital Providence, Rhode Island	—AI-042853	20. Rush University Medical Center Chicago, Illinois	—AI-082151





# 10. Research and Development Contracts

## NHLBI Research and Development Contract Obligations: \* Fiscal Years 1999–2009



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

## NHLBI Total Research and Development Contract Obligations: Fiscal Years 1999–2009

Dollars (Thousands)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Heart	\$156,370	\$156,415	\$184,491	\$214,971	\$258,647	\$245,881	\$219,796	\$213,320	\$260,205	\$296,445	\$321,223
Lung	25,432	23,341	10,993	16,578	11,745	14,131	20,946	25,902	15,191	20,249	17,710
Blood	15,436	21,538	24,572	26,751	20,082	25,460	27,831	23,629	20,446	22,093	22,164
<b>Total</b>	<b>\$197,238<sup>A</sup></b>	<b>\$201,294<sup>B</sup></b>	<b>\$220,056<sup>C</sup></b>	<b>\$258,300<sup>D</sup></b>	<b>\$290,474<sup>E</sup></b>	<b>\$285,472<sup>F</sup></b>	<b>\$268,573<sup>G</sup></b>	<b>\$262,851<sup>H</sup></b>	<b>\$295,842<sup>I</sup></b>	<b>\$338,787<sup>J</sup></b>	<b>\$361,097<sup>K</sup></b>

A Includes Program Evaluation and IMPAC II Assessments of \$14,904,000.

B Includes Program Evaluation and IMPAC II Assessments of \$17,944,000.

C Includes Program Evaluation and IMPAC II Assessments of \$24,579,000.

D Includes Program Evaluation and IMPAC II Assessments of \$35,827,000.

E Includes Program Evaluation and IMPAC II Assessments of \$54,550,000.

F Includes Program Evaluation and IMPAC II Assessments of \$57,545,722.

G Includes Program Evaluation and IMPAC II Assessments of \$64,399,000.

H Includes Program Evaluation and IMPAC II Assessments of \$67,795,000.

I Includes Program Evaluation and IMPAC II Assessments of \$68,405,000.

J Includes Program Evaluation and IMPAC II Assessments of \$77,487,000.

K Includes Program Evaluation and IMPAC II Assessments of \$79,693,000.

Note: From 1999 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 2009	Total FY 2009 Obligations	Total Obligations to Date
<b>Heart and Vascular Diseases</b>			
Atherosclerosis Risk in Communities (ARIC)	\$142,401,024	\$7,311,416	\$149,712,440
Candidate Gene Association Resources	18,220,930	4,199,645	22,420,575
Cardiovascular Health Study (CHS)	78,051,026	702,999	78,754,025
Coronary Artery Risk Development in Young Adults (CARDIA)	88,529,300	9,834,016	98,363,316
DNA Resequencing and Genotyping	25,352,366	1,277,670	26,630,036
Framingham Heart Study	99,133,876	14,499,000	113,632,876
Genetically Triggered Thoracic Aortic Aneurysms and Other Cardiovascular Conditions (GENTAC): National Registry	4,808,249	1,937,221	6,745,470
Global Health Centers of Excellence	—	13,399,780	13,399,780
Hispanic Community Health Study (HCHS)	39,784,884	11,454,663	51,239,547
Jackson Heart Study (JHS)	32,796,573	5,610,000	38,406,573
Multi-Ethnic Study of Atherosclerosis (MESA)	76,518,417	24,757,152	101,275,569
NHLBI Gene Therapy Resource Program (GTRP)	11,800,000	7,327,735	19,127,735
Pediatric Circulatory Support	22,195,025	1,101,398	23,296,423
Proteomics Initiative	157,606,085	—	157,606,085
Randomized Trial of Genotype-Guided Dosing of Warfarin Therapy	2,637,062	3,530,000	6,167,062
Registry for Mechanical Circulatory Support	5,061,898	1,277,005	6,338,903
<b>Lung Diseases</b>			
Lung Tissue Research Consortium	23,874,972	2,629,236	26,504,208
Subpopulations and Intermediate Outcome Measures in COPD Study (SPIROMICS)	—	594,954	594,954
Tuberculosis Curriculum Coordinating Center	6,000,000	787,728	6,787,728
<b>Blood Diseases and Resources</b>			
Maintenance of NHLBI Biological Specimen Repository	13,367,735	4,296,738	17,664,473
NHLBI–CDC Registry and Surveillance System in Hemoglobinopathies (RuSH)	—	1,506,239	1,506,239
Retrovirus Epidemiology Donor Study II (REDS-II)	37,213,866	6,377,477	43,591,343
Somatic Cell Therapy Processing Facilities	21,750,926	1,999,855	23,750,781

### Heart and Vascular Diseases Program

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

The ARIC is a large, longitudinal study comprising a community surveillance component and a prospective cohort component to investigate the etiology of atherosclerosis and its clinical sequelae and variation in cardiovascular risk factors by race, gender, and location. The community surveillance component monitors trends in hospitalized myocardial infarction, fatal CHD, and heart failure (2005–2009) by race and gender in four U.S. communities. The cohort component investi-

gates the etiology of CHD in 15,792 participants, aged 46–64 at baseline, who were selected from the same communities. The participants received an extensive examination upon entry into the study (1987–1989) that included gathering medical, social, and demographic data. Subsequent examinations occurred in 1990–1992, 1993–1995, and 1996–1998, followed by contact annually by telephone to assess the health status of the cohort. Beginning in 2011, the study will reexamine the cohort participants with a focus on heart failure—a major epidemic in the rapidly aging population in the United States. Three of the cohort components represent the racial mix of their community, and the fourth is exclusively black.

## Obligations

### Funding History:

Fiscal Year 2009—\$7,311,416  
Fiscal Years 1985–2008—\$142,401,024  
Total Funding to Date—\$149,712,440

### Current Active Organizations and Contract Numbers

1. University of North Carolina at Chapel Hill  
Chapel Hill, North Carolina —HC-55015
2. Baylor College of Medicine  
Houston, Texas —HC-55016
3. University of North Carolina at Chapel Hill  
Chapel Hill, North Carolina —HC-55018
4. University of Minnesota, Twin Cities  
Minneapolis, Minnesota —HC-55019
5. Johns Hopkins University  
Baltimore, Maryland —HC-55020
6. Mississippi Medical Center  
Jackson, Mississippi —HC-55021

### Candidate Gene Association Resources, Initiated in Fiscal Year 2006

This program establishes a genotyping and bioinformatics center to perform high-throughput genotyping for candidate gene association studies in up to 50,000 participants, and a genome-wide association study in about 500 disease cases and 1,000 controls. The data will be combined with available phenotype data to form a genotype–phenotype resource for public use. DNA for the 50,000-person sample will be collected from multiple NHLBI cohort studies that have stored samples and available data on a wide array of heart, lung, blood, and sleep phenotypes.

## Obligations

### Funding History:

Fiscal Year 2009—\$4,199,645  
Fiscal Years 2006–2008—\$18,220,930  
Total Funding to Date—\$22,420,575

### Current Active Organization and Contract Number

1. Massachusetts Institute of Technology  
Cambridge, Massachusetts —HC-65226

### Cardiovascular Health Study (CHS), Initiated in Fiscal Year 1988

The CHS is a population-based, longitudinal study of risk factors for development and progression of CHS

and stroke in elderly adults, 17 percent of whom are from minority populations. Extensive data and samples have been collected from nearly 6,000 participants since 1989–1990. The current CHS: Transition Phase provides partial support for an infrastructure to enable continued access to study resources and expertise, scientific collaborations, and mentorship of early-career investigators.

## Obligations

### Funding History:

Fiscal Year 2009—\$702,999  
Fiscal Years 1988–2008—\$78,051,026  
Total Funding to Date—\$78,754,025

### Current Active Organization and Contract Number

1. University of Washington  
Seattle, Washington —HC-85239

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

CARDIA is a long-term study examining the evolution of CVD risk factors in a cohort of black and white adults, aged 18 to 30 years in 1985–1986. The study examines risk factors for heart and lung diseases by collecting information on body mass index, physical activity and lifestyle, genetics, serologic and metabolic components, inflammatory markers, and other subclinical measures of disease. Fifty percent of the participants are black.

## Obligations

### Funding History:

Fiscal Year 2009—\$9,834,016  
Fiscal Years 1984–2008—\$88,529,300  
Total Funding to Date—\$98,363,316

### Current Active Organizations and Contract Numbers

1. University of Alabama at Birmingham  
Birmingham, Alabama —HC-48047
2. University of Minnesota, Twin Cities  
Minneapolis, Minnesota —HC-48048
3. Northwestern University  
Chicago, Illinois —HC-48049
4. Kaiser Permanente Division of Research  
Oakland, California —HC-48050
5. University of Alabama at Birmingham  
Birmingham, Alabama —HC-95095

## DNA Resequencing and Genotyping, Initiated in Fiscal Year 2004

The purpose of this program is to obtain rapid, reliable, and cost-efficient DNA sequencing and genotyping of candidate genomic regions potentially important in the disease pathways of heart, lung, and blood diseases and sleep disorders. This information will assist ongoing investigations of genetic components involved in the causes, variable outcome, and progression of the diseases and disorders.

### Obligations

#### Funding History:

Fiscal Year 2009—\$1,277,670

Fiscal Years 2004–2008—\$25,352,366

Total Funding to Date—\$26,630,036

### Current Active Organizations and Contract Numbers

1. Constella  
Rockville, Maryland —HV-48193
2. Johns Hopkins University  
Baltimore, Maryland —HV-48195
3. J. Craig Venter Institute, Inc.  
Rockville, Maryland —HV-48196

## Framingham Heart Study

The original Framingham Heart Study was designed as a longitudinal investigation of constitutional and environmental factors influencing the development of CVD in individuals free of these conditions at the outset. Of the original 5,209 subjects, about 400 members remain alive. In 1971, the Framingham Offspring Study was initiated to assess familial and genetic factors associated with CHD. More than 5,000 offspring (and their spouses) were included. A third-generation cohort consisting of approximately 4,000 grandchildren has been 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.

### Obligations

#### Funding History:

Fiscal Year 2009—\$14,499,000

Fiscal Years 1983–2008—\$99,133,876

Total Funding to Date—\$113,632,876

### Current Active Organization and Contract Number

1. Boston University Medical Center  
Boston, Massachusetts —HC-25195

## Genetically Triggered Thoracic Aortic Aneurysms and Other Cardiovascular Conditions (GENTAC): National Registry, Initiated in Fiscal Year 2006

The purpose of this program is to establish a national registry to enable investigators to determine the best medical practices to advance the clinical management of genetic thoracic aortic aneurysms and other cardiovascular complications associated with connective tissue diseases such as Marfan, Loeys-Dietz, and Ehlers Danlos (vascular type) Syndromes.

### Obligations

#### Funding History:

Fiscal Year 2009—\$1,937,221

Fiscal Years 2006–2008—\$4,808,249

Total Funding to Date—\$6,745,470

### Current Active Organization and Contract Number

1. Research Triangle Institute  
Research Triangle Park, North Carolina —HV-68199

## Global Health Centers of Excellence, Initiated in Fiscal Year 2009

The purpose of this program is to support a worldwide network of research and training centers to prevent and control chronic diseases, such as cardiovascular diseases, lung diseases, and diabetes. The NHLBI joined with Minneapolis-based UnitedHealth Group's Chronic Disease Initiative in establishing the UnitedHealth and NHLBI Collaborating Centers of Excellence network. Each center is led by a research institution in a low- or middle-income, developing country that is paired with at least one partner academic institution in a developed country to enhance research and training opportunities.

### Obligations

#### Funding History:

Fiscal Year 2009—\$13,399,780

Total Funding to Date—\$13,399,780

### Current Active Organizations and Contract Numbers

1. St. John's Research Institute  
Karnataka, India —HV-98215

2. Public Health Foundation in India New Delhi, India	—HV-98216
3. The George Institutes in China Beijing, China	—HV-98217
4. Instituto de Nutrición de Centro América Guatemala City, Guatemala	—HV-98218
5. Institute for Clinical Effectiveness and Health Policy Buenos Aires, Argentina	—HV-98219
6. University of Cape Town Cape Town, South Africa	—HV-98220
7. Moi University School of Medicine Eldoret, Kenya	—HV-98221
8. International Center for Diarrhoeal Disease Branch Mohakhali, Bangladesh	—HV-98222
9. University of Peruana San Martin, Peru	—HV-98223
10. Westat Rockville, Maryland	—HV-98224

### Hispanic Community Health Study (HCHS), Initiated in Fiscal Year 2006

The purpose of this program is to determine the prevalence of and risk factors for cardiovascular and lung diseases in Hispanic populations and the role of cultural adaptation and disparities in development of these and other chronic diseases. The program is supporting a multicenter, 6.5-year epidemiology study comprising approximately 16,000 participants aged 18–74 years with diverse backgrounds, including Americans of Mexican, Puerto Rican, Cuban American, and Central/South American descent, 4,000 at each of 4 sites.

#### Obligations

##### Funding History:

Fiscal Year 2009—\$11,454,663  
 Fiscal Years 2006–2008—\$39,784,884  
 Total Funding to Date—\$51,239,547

#### Current Active Organizations and Contract Numbers

1. University of North Carolina at Chapel Hill Chapel Hill, North Carolina	—HC-65233
2. University of Miami Miami, Florida	—HC-65234
3. Albert Einstein College of Medicine New York, New York	—HC-65235
4. Northwestern University Chicago, Illinois	—HC-65236

5. San Diego State University San Diego, California	—HC-65237
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### Jackson Heart Study (JHS), Initiated in Fiscal Year 1998

The JHS is a single-site, epidemiologic study of CVD in blacks, similar to established studies in Framingham, Massachusetts, and Honolulu, Hawaii, with primary goals of identifying risk factors for development and progression of CVD; enhancing retention; building research capabilities at minority institutions; developing partnerships between minority and majority institutions; and expanding minority investigator participation in large-scale, epidemiologic studies.

#### Obligations

##### Funding History:

Fiscal Year 2009—\$5,610,000  
 Fiscal Years 1998–2008—\$32,796,573  
 Total Funding to Date—\$38,406,573

#### Current Active Organizations and Contract Numbers

1. Jackson State University Jackson, Mississippi	—HC-95170
2. Mississippi Medical Center Jackson, Mississippi	—HC-95171
3. Tougaloo College Tougaloo, Mississippi	—HC-95172

### Multi-Ethnic Study of Atherosclerosis (MESA), Initiated in Fiscal Year 1999

The purpose of this study is to investigate the prevalence, correlates, and progression of subclinical CVD, i.e., disease detected noninvasively before it has produced clinical signs and symptoms, in a population that is 38 percent white, 28 percent black, 22 percent Hispanic, and 12 percent Asian. Plans are underway for a fifth examination to begin in 2010 that will include a measurement of cardiac function with MRI. Periodic monitoring of participants to identify recent hospitalizations and other clinical events will continue.

#### Obligations

##### Funding History:

Fiscal Year 2009—\$24,757,152  
 Fiscal Years 1999–2008—\$76,518,417  
 Total Funding to Date—\$101,275,569



### Current Active Organizations and Contract Numbers

1. University of Washington Seattle, Washington	—HC-95159
2. University of California, Los Angeles Los Angeles, California	—HC-95160
3. Columbia University New York, New York	—HC-95161
4. Johns Hopkins University Baltimore, Maryland	—HC-95162
5. University of Minnesota, Twin Cities Minneapolis, Minnesota	—HC-95163
6. Northwestern University Chicago, Illinois	—HC-95164
7. Wake Forest University Winston-Salem, North Carolina	—HC-95165
8. University of Vermont Colchester, Vermont	—HC-95166
9. New England Medical Center Boston, Massachusetts	—HC-95167
10. Johns Hopkins University Baltimore, Maryland	—HC-95168
11. Harbor-UCLA Research and Education Institute Los Angeles, California	—HC-95169

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

The purpose of this program is to promote the translation of basic research into clinical trials. The program will support the production of safe and well-characterized vectors; conduct extensive toxicology and pharmacology studies on animals to determine vector dosing, related toxicity, and vector dissemination; and provide investigators with regulatory assistance to initiate a clinical trial. The GTRP also will support a maximum of two phase I/II gene transfer clinical trials per year that have successfully met all regulatory requirements and are ready to enroll patients within 12 months of application approval.

#### Obligations

Funding History:

Fiscal Year 2009—\$7,327,735

Fiscal Year 2008—\$11,800,000

Total Funding to Date—\$19,127,735

### Current Active Organizations and Contract Numbers

1. Social and Scientific Systems, Inc. Silver Spring, Maryland	—HV-78200
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2. Lovelace Biomedical Research & Education Institute Albuquerque, New Mexico	—HV-78201
3. University of Pennsylvania Philadelphia, Pennsylvania	—HV-78202
4. Children's Hospital of Philadelphia Philadelphia, Pennsylvania	—HV-78203
5. Indiana University Indianapolis, Indiana	—HV-78204

### Pediatric Circulatory Support, Initiated in Fiscal Year 2004

The purpose of this program is to establish multidisciplinary teams to develop innovative circulatory assist devices or other bioengineered systems for infants and children with congenital and acquired CVD who experience cardiopulmonary failure and circulatory collapse.

#### Obligations

Funding History:

Fiscal Year 2009—\$1,101,398

Fiscal Years 2004–2008—\$22,195,025

Total Funding to Date—\$23,296,423

### Current Active Organizations and Contract Numbers

1. Cleveland Clinic Lerner College of Medicine Cleveland, Ohio	—HV-48188
2. Ension, Inc. Pittsburgh, Pennsylvania	—HV-48189
3. Jarvik Heart, Inc. New York, New York	—HV-48190
4. Pennsylvania State University Hershey, Pennsylvania	—HV-48191
5. University of Pittsburgh Pittsburgh, Pennsylvania	—HV-48192

### 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. Scientists will focus on the cells' protein machinery directed toward understanding the molecular basis of the causes and progression of heart, lung, and blood diseases and sleep disorders and identifying targets for therapeutic interventions.

**Obligations**

Funding History:

Fiscal Year 2009—\$0  
 Fiscal Years 2002–2008—\$157,606,085  
 Total Funding to Date—\$157,606,085

**Current Active Organizations and Contract Numbers**

1. Boston University  
 Boston, Massachusetts —HV-28178
2. Institute for Systems Biology  
 Seattle, Washington —HV-28179
3. Johns Hopkins University  
 Baltimore, Maryland —HV-28180
4. Medical University of South Carolina  
 Charleston, South Carolina —HV-28181
5. Medical College of Wisconsin  
 Milwaukee, Wisconsin —HV-28182
6. Stanford University  
 Stanford, California —HV-28183
7. University of Texas  
 Galveston, Texas —HV-28184
8. University of Texas  
 Southwestern Medical Center  
 Dallas, Texas —HV-28185
9. Yale University  
 New Haven, Connecticut —HV-28186
10. Henry M. Jackson Foundation for the  
 Advancement of Military Medicine, Inc.  
 Rockville, Maryland —HV-28187

**Randomized Trial of Genotype-Guided Dosing of Warfarin Therapy, Initiated in Fiscal Year 2008**

See Chapter 11. Clinical Trials.

**Registry for Mechanical Circulatory Support, Initiated in Fiscal Year 2005**

The purpose of this program is to establish a data and clinical coordinating center to manage a registry of patients receiving an FDA-approved mechanical circulatory support device (MCSD) to treat heart failure. The registry will collect and analyze clinical and laboratory data and tissue samples from patients who receive MCSDs as destination therapy for end-stage heart failure at 90 to 100 participating hospitals.

**Obligations**

Funding History:

Fiscal Year 2009—\$1,277,005  
 Fiscal Years 2005–2008—\$5,061,898  
 Total Funding to Date—\$6,338,903

**Current Active Organization and Contract Number**

1. University of Alabama  
 Birmingham, Alabama —HV-58198

**Lung Diseases Program**

**Lung Tissue Research Consortium, Initiated in Fiscal Year 2004**

The purpose of this program is to establish a consortium for collecting lung tissues and preparing and distributing them for research. Scientists seek to improve management of lung diseases by increasing understanding of the pathogenetic mechanisms of lung diseases through molecular histopathological studies on tissues with and without disease. Primary emphases are on COPD and idiopathic pulmonary fibrosis.

**Obligations**

Funding History:

Fiscal Year 2009—\$2,629,236  
 Fiscal Years 2004–2008—\$23,874,972  
 Total Funding to Date—\$26,504,208

**Current Active Organizations and Contract Numbers**

1. Mayo Clinic College of Medicine  
 Rochester, New York —HR-46158
2. University of Colorado  
 Health Science Center  
 Denver, Colorado —HR-46159
3. Mayo Clinic College of Medicine  
 Rochester, New York —HR-46161
4. University of Michigan  
 Ann Arbor, Michigan —HR-46162
5. University of Pittsburgh  
 Pittsburgh, Pennsylvania —HR-46163
6. Clinical Trials and Survey Corporation  
 Baltimore, Maryland —HR-46164

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

See Chapter 11. Clinical Trials.

**Tuberculosis Curriculum Coordinating Center, Initiated in Fiscal Year 2003**

The purpose of this program is to establish a consortium of five Tuberculosis Curriculum Centers to strengthen and increase access to the best ongoing educational and training opportunities in TB for medical,



nursing, and allied health schools, especially those that provide primary care to communities where TB is endemic and the population is at high risk.

### **Obligations**

#### **Funding History:**

Fiscal Year 2009—\$787,728

Fiscal Years 2003–2008—\$6,000,000

Total Funding to Date—\$6,787,728

### **Current Active Organization and Contract Number**

1. University of California, San Diego  
La Jolla, California —HR-36157

## **Blood Diseases and Resources Program**

### **Maintenance of NHLBI Biological Specimen Repository, Initiated in Fiscal Year 1998**

The purpose of this project is to establish an NHLBI Biological Specimen Repository for blood specimens from Institute-supported research. The Repository monitors storage, labeling, and testing of the specimens, as well as administers safe shipment of precise sample aliquots to approved investigators for future studies.

### **Obligations**

#### **Funding History:**

Fiscal Year 2009—\$4,296,738

Fiscal Years 1998–2008—\$13,367,735

Total Funding to Date—\$17,664,473

### **Current Active Organization and Contract Number**

1. SeraCare Life Sciences, Inc.  
Rockville, Maryland —HB-87144

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

The purpose of this program is to develop and implement a national data system and biospecimen repository that will provide data to describe the epidemiologic and clinical characteristics of people who have all genotypes of SCD, thalassemias, and other hemoglobinopathies. The system will be designed to collect, analyze, interpret, and disseminate data on the epidemiology, clinical correlates, health care use, and community resources of patients who have these conditions. It will support research, information dissemination, policy decisions,

health care planning, and provider training at the local, state, and national levels.

### **Obligations**

#### **Funding History:**

Fiscal Year 2009—\$1,506, 239

Total Funding to Date—\$1,506, 239

### **Current Active Organization and Contract Number**

1. Centers for Disease Control and Prevention  
Atlanta, Georgia —HR-9045

### **Retrovirus Epidemiology Donor Study-II (REDS-II), Initiated in Fiscal Year 2005**

The purpose of the program is to conduct epidemiologic, laboratory, and survey research on volunteer blood donors within the United States to ensure the safety and availability of the blood supply. The study seeks to assess the prevalence and incidence of existing as well as newly discovered infectious agents that pose a threat to blood safety; evaluate characteristics and behaviors of voluntary blood donors; determine the causes of adverse transfusion reactions of unknown etiology; assess new and existing blood donor screening methodologies; assess the impact of new blood bank technologies on blood safety and availability; and evaluate the donation process for ways to improve the adequacy of the blood supply.

An international component was added to conduct epidemiologic, laboratory, and survey research on blood donors in China and Brazil, two countries seriously affected by the AIDS epidemic, to ensure the availability and safety of blood for transfusion.

### **Obligations**

#### **Funding History:**

Fiscal Year 2009—\$6,377,477

Fiscal Years 2005–2008—\$37,213,866

Total Funding to Date—\$43,591,343

### **Current Active Organizations and Contract Numbers**

1. Blood Center of Southeastern Wisconsin  
Milwaukee, Wisconsin —HB-47168
2. American Red Cross Blood Service,  
New England  
Farmington, Connecticut —HB-47169
3. Emory University  
Atlanta, Georgia —HB-47170
4. University of Cincinnati  
Cincinnati, Ohio —HB-47171

5. Institute for Transfusion Medicine  
Pittsburgh, Pennsylvania —HB-47172
6. University of California, San Francisco  
San Francisco, California —HB-47174
7. Westat, Inc.  
Rockville, Maryland —HB-47175
8. Blood System Research, Inc.  
San Francisco, California —HB-57181

### **Somatic Cell Therapy Processing Facilities, Initiated in Fiscal Year 2003**

This program is designed to develop novel somatic cellular therapies in areas ranging from basic science through animal studies to proof-of-principle and eventually human trials for heart, lung, and blood diseases and sleep disorders. The goal is to provide rapid, safe translation of basic research ideas into clinical practice.

### **Obligations**

#### **Funding History:**

Fiscal Year 2009—\$1,999,855

Fiscal Years 2003–2008—\$21,750,926

Total Funding to Date—\$23,750,781

### **Current Active Organizations and Contract Numbers**

1. Baylor College of Medicine  
Houston, Texas —HB-37163
2. University of Minnesota, Twin Cities  
Minneapolis, Minnesota —HB-37164
3. University of Pittsburgh  
Pittsburgh, Pennsylvania —HB-37165
4. The EMMES Corporation  
Rockville, Maryland —HB-37166





# 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 1999–2009

### Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Heart and Vascular Diseases</b>											
Infant Heart Surgery: Central Nervous System Sequelae of Circulatory Arrest	\$ 584	\$ 392	\$ 75	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Women's Health Study (WHS)	1,530	1,594	—	—	—	—	889	—	868	875	919
Cardiovascular Risk Factors and the Menopause	186	—	—	—	—	—	—	—	—	—	—
Women's Antioxidant and Cardiovascular Study (WACS)	540	556	572	598	592	599	670	—	—	—	—
Stress Reduction and Atherosclerotic CVD in Blacks	326	339	360	376	394	—	—	—	—	—	—
Estrogen Replacement and Atherosclerosis (ERA) Trial*	1,017	—	—	—	—	—	—	—	—	—	—
Shock Trial: Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock?	—	440	362	298	291	296	—	—	—	—	—
HDL-Atherosclerosis Treatment Study	—	326	—	—	—	—	—	—	—	—	—
Women's Estrogen/Progestin Lipid Lowering Hormone Atherosclerosis Regression Trial (WELL-HART)*	1,131	—	32	—	—	—	—	—	—	—	—
Mode Selection Trial in Sinus Node Dysfunction (MOST)*	2,879	1,136	154	—	—	—	—	—	—	—	—
Postmenopausal Hormone Therapy in Unstable Angina	276	—	—	—	—	—	—	—	—	—	—
Estrogen and Graft Atherosclerosis Research Trial (EAGER)*	—	361	371	—	—	—	—	—	—	—	—
REMATCH Trial*	1,333	825	750	—	—	—	—	—	—	—	—
Dietary Patterns, Sodium Intake, and Blood Pressure (DASH Sodium)**	3,646	1,247	151	387	376	395	—	—	—	—	—
Sudden Cardiac Death in Heart Failure Trial (SCD-HeFT)*	1,709	1,698	1,798	1,412	1,930	—	—	—	—	—	—
CVD Risk and Health in Post-Menopausal Phytoestrogen Users	574	244	—	304	152	—	—	—	—	—	—
Treatment of Hypertension With Two Exercise Intensities	473	481	420	—	—	—	—	—	—	—	—
Prevention of Recurrent Venous Thromboembolism (PREVENT)	894	521	543	1,272	—	—	—	—	—	—	—
PREMIER: Lifestyle Interventions for Blood Pressure Control*	3,425	3,595	2,925	1,505	—	—	—	—	—	—	—

\* Paid by U01/U10.

\*\* Previously an Institute-Initiated Clinical Trial.

**NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 1999–2009 (continued)**

**Research Grants and Cooperative Agreements (Dollars in Thousands)**

	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Heart and Vascular Diseases (continued)</b>											
Azithromycin and Coronary Events Study (ACES)*	2,663	2,182	720	1,254	1,137	—	—	—	—	—	—
Antiarrhythmic Effects of N-3 Fatty Acids	514	542	529	647	—	—	—	—	—	—	—
Fatty Acid Antiarrhythmia Trial (FAAT)	519	605	—	—	—	—	—	—	—	—	—
Occluded Artery Trial (OAT)*	4,892	5,079	2,604	1,724	1,963	—	—	963	1,452	1,277	1,270
Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics (BARI 2D)*	—	3,942	6,515	9,342	8,189	8,265	8,304	8,592	2,647	1,971	1,130
Hematocrit Strategy in Infant Heart Surgery*	—	473	557	596	590	492	—	—	—	—	—
Angiotensin-II Blockade in Mitral Regurgitation	—	—	553	610	629	500	—	—	—	—	—
Heart Failure Adherence and Retention Trial (HART)	—	—	795	1,617	1,453	1,174	862	740	304	—	—
Reduction of Triglycerides in Women on HRT	—	—	708	746	555	544	721	—	625	501	—
Women's Ischemia Syndrome Evaluation (WISE)**	—	—	1,502	1,506	1,306	1,303	996	—	—	—	—
ACE Inhibition and Novel Cardiovascular Risk Factors	—	—	—	694	656	602	—	—	—	—	—
Heart Failure: A Controlled Trial Investigating Outcomes of Exercise (HF-ACTION)*	—	—	—	7,471	9,582	7,973	4,483	4,590	2,846	652	—
Clinical Trial of Dietary Protein on Blood Pressure	—	—	—	655	610	612	504	500	—	—	—
Home Automatic External Defibrillator Trial (HAT)*	—	—	—	3,567	5,433	4,264	1,801	2,115	—	—	—
Perioperative Interventional Neuroprotection Trial (POINT)	—	—	—	553	553	562	572	378	—	—	—
Stop Atherosclerosis in Native Diabetics Study (SANDS)*	—	—	—	2,410	2,165	2,107	2,324	2,074	197	218	—
Surgical Treatment for Ischemic Heart Failure (STICH)*	—	—	—	5,709	4,495	1,613	6,082	5,583	9,396	3,639	727
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	—
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
IMMEDIATE Trial: Immediate Myocardial Metabolic Enhancement During Initial Assessment and Treatment in Emergency Care*	—	—	—	—	—	5,170	9,514	10,966	—	—	—

\* Paid by U01/U10.

\*\* Previously an Institute-Initiated Clinical Trial.

## NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 1999–2009 (continued)

### Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Heart and Vascular Diseases (continued)</b>											
AIM HIGH: Niacin Plus Statin To Prevent Vascular Events*	—	—	—	—	—	—	663	6,324	6,018	1,380	2,324
Claudication: Exercise Versus Endoluminal Revascularization (CLEVER)*	—	—	—	—	—	—	1,368	1,478	1,898	—	1,822
Intervention To Control Obesity in College	—	—	—	—	—	—	—	677	633	670	686
PACemaker and Beta-Blocker Therapy Post-Myocardial Infarction (PACE-MI)	—	—	—	—	—	—	—	1,300	4,555	384	—
Efficacy of Smoking Quit Line in the Military	—	—	—	—	—	—	—	—	739	720	731
Vest prevention of Early Sudden Death Trial (VEST) and PREDiction of ICD Therapies Studies (PREDICTS)*	—	—	—	—	—	—	—	—	1,390	1,356	1,391
Planned Care for Obesity and Risk Reduction (Planned CORR)	—	—	—	—	—	—	—	—	—	784	770
Effects of Niacin on Lp(a), Oxidized LDL, and Inflammation on the AIM-HIGH Trial	—	—	—	—	—	—	—	—	—	302	312
Women's Ischemia Syndrome Evaluation (WISE) Coronary Vascular Dysfunction	—	—	—	—	—	—	—	—	—	776	742
Rule-Out Myocardial Infarction Using Computer Assisted Tomography (ROMICAT II)*	—	—	—	—	—	—	—	—	—	—	2,112
Collaborative Model To Improve BP Control and Minimize Racial Disparities	—	—	—	—	—	—	—	—	—	—	1,963
Multi-Scale Model of the Human Heart for Imaging Research	—	—	—	—	—	—	—	—	—	—	566
Catheter Ablation Versus Antiarrhythmic Drug Therapy for Atrial Fibrillation (CABANA)*	—	—	—	—	—	—	—	—	—	—	2,941
Therapeutic Hypothermia After Pediatric Cardiac Arrest (THAPCA)*	—	—	—	—	—	—	—	—	—	—	3,648
Subtotal, Heart and Vascular Diseases	29,111	26,578	22,996	45,253	50,163	52,377	56,681	58,312	45,091	21,737	25,862
<b>Lung Diseases</b>											
Lung Health Study III* **	1,986	1,616	1,672	927	—	—	—	—	—	—	—
Asthma Clinical Research Network (ACRN) **	5,399	5,686	5,705	5,863	—	—	—	—	—	—	—
Fetal Tracheal Occlusion for Severe Diaphragmatic Hernia*	419	429	181	—	—	—	—	—	—	—	—
Scleroderma Lung Study*	1,040	1,501	1,761	1,501	1,055	—	—	71	—	—	—
Inhaled Nitric Oxide for Prevention of Chronic Lung Disease*	—	1,959	1,803	1,764	1,442	1,245	—	—	—	—	—
Inhaled Nitric Oxide in Prevention of Chronic Lung Disease*	—	1,548	1,742	1,839	1,604	903	—	—	—	—	—
Prospective Investigation of Pulmonary Embolism Diagnosis II (PIOPED II)*	—	2,190	3,667	3,388	472	—	—	—	—	—	—
Randomized Trial To Reduce ETS in Children With Asthma	—	555	545	468	277	—	—	—	—	—	—

\* Paid by U01/U10.

\*\* Previously an Institute-Initiated Clinical Trial.

## NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 1999–2009 (continued)

### Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Lung Diseases (continued)</b>											
Apnea Positive Pressure Long-Term Efficacy Study (APPLES)*	—	—	—	3,224	3,021	3,110	3,188	—	1,532	—	—
Childhood Asthma Management Program-Continuation Study (CAMP-CS)/Phase II***	—	—	—	—	1,489	2,043	2,623	2,750	—	—	—
Acid Reflux Therapy in Asthma*	—	—	—	—	736	783	791	773	662	—	—
Impact of CPAP on Functional Outcomes in Milder Obstructive Sleep Apnea (CATNAP)	—	—	—	—	682	612	608	694	—	—	—
Outcomes of Sleep Disorders in Older Men	—	—	—	—	4,163	4,262	1,390	1,142	910	—	—
Supplemental Selenium and Vitamin E and Pulmonary Function	—	—	—	—	698	610	630	605	561	—	—
Improving Asthma Care in Minority Children in Head Start	—	—	—	—	—	721	826	1,004	779	—	—
Randomized Controlled Study of Adenotonsillectomy for Childhood Sleep Apnea	—	—	—	—	—	—	—	2,255	2,388	1,346	2,501
Early Insulin Therapy and Development of ARDS	—	—	—	—	—	—	—	—	489	454	464
Childhood Asthma Management Program—Continuation Study (CAMP-CS)/Phase III***	—	—	—	—	—	—	—	—	2,077	1,966	1,146
Infant Study of Inhaled Saline in Cystic Fibrosis (ISIS)*	—	—	—	—	—	—	—	—	—	732	737
Scleroderma Lung Study II	—	—	—	—	—	—	—	—	—	2,281	2,297
Sedation Management in Pediatric Patients With Acute Respiratory Failure*	—	—	—	—	—	—	—	—	—	568	3,885
Study of Asthma and Nasal Steroids (STAN)*	—	—	—	—	—	—	—	—	—	—	725
Outpatient Treatment of Low-Risk Patients With Pulmonary Embolism	—	—	—	—	—	—	—	—	—	—	755
Translating COPD Guidelines Into Primary Care Practice	—	—	—	—	—	—	—	—	—	—	733
Family Intervention for Pediatric Asthma Self-Management in Puerto Ricans	—	—	—	—	—	—	—	—	—	—	225
Physical Activity Self-Management in Patients With COPD	—	—	—	—	—	—	—	—	—	—	663
Study of Soy Isoflavones in Asthma (SOYA)*	—	—	—	—	—	—	—	—	—	—	775
Trial of Late Surfactant To Prevent Bronchopulmonary Dysplasia (TOLSURF)*	—	—	—	—	—	—	—	—	—	—	1,987

\* Paid by U01/U10.

\*\* Previously an Institute-Initiated Clinical Trial.



## NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 1999–2009 (continued)

### Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Lung Diseases (continued)</b>											
Randomized Trial of Maternal Vitamin D Supplementation To Prevent Childhood Asthma*	—	—	—	—	—	—	—	—	—	—	2,510
Effects of HIV Antiretroviral Therapy on Pulmonary Function	—	—	—	—	—	—	—	—	—	—	614
<b>Subtotal, Lung Diseases</b>	<b>8,844</b>	<b>15,484</b>	<b>17,076</b>	<b>18,974</b>	<b>15,639</b>	<b>14,289</b>	<b>10,056</b>	<b>9,294</b>	<b>9,398</b>	<b>7,347</b>	<b>20,017</b>
<b>Blood Diseases and Resources</b>											
Stroke Prevention in Sickle Cell Anemia (STOP)*	—	293	—	—	—	—	—	—	—	—	—
Stroke Prevention in Sickle Cell Anemia (STOP 2)*	—	4,200	3,166	3,168	2,320	2,366	—	—	—	—	—
Induction of Stable Chimerism for Sickle Cell Anemia*	—	—	489	525	527	551	—	—	—	—	—
Sibling Donor Cord Blood Banking and Transplantation*	—	—	1,222	1,224	1,286	1,353	—	—	—	—	—
FOCUS*	—	—	—	—	1,639	1,796	2,923	2,446	1,974	—	—
Stroke With Transfusions Changing to Hydroxyurea (SWITCH)*	—	—	—	—	—	—	3,345	3,932	3,531	3,828	3,216
Randomized Trial of Interventions To Improve Warfarin Adherence	—	—	—	—	—	—	—	—	—	801	787
Bridging Anticoagulation on Patients Requiring Temporary Interruption of Warfarin Therapy for an Elective Invasive Procedure or Surgery (BRIDGE) Trial*	—	—	—	—	—	—	—	—	—	4,632	5,673
Pharmacomechanical Catheter-Directed Thrombolysis for Acute DVT-ATTRACT Trial	—	—	—	—	—	—	—	—	—	2,071	2,108
Transcranial Doppler With Transfusions Changing to Hydroxyurea	—	—	—	—	—	—	—	—	—	—	4,176
<b>Subtotal, Blood Diseases and Resources</b>	<b>—</b>	<b>4,493</b>	<b>4,877</b>	<b>4,917</b>	<b>5,772</b>	<b>6,066</b>	<b>6,268</b>	<b>6,378</b>	<b>5,505</b>	<b>11,332</b>	<b>15,960</b>
<b>Total, NHLBI</b>	<b>\$37,955</b>	<b>\$46,555</b>	<b>\$44,949</b>	<b>\$69,144</b>	<b>\$71,574</b>	<b>\$72,732</b>	<b>\$73,005</b>	<b>\$73,984</b>	<b>\$59,994</b>	<b>\$40,416</b>	<b>\$61,839</b>

\* Paid by U01/U10.

\*\* Previously an Institute-Initiated Clinical Trial.

## NHLBI Investigator-Initiated Clinical Trials, Fiscal Year 2009: Summary by Program

	Total Obligations Prior to 2009	FY 2009 Obligations	Total Obligation to Date
<b>Heart and Vascular Diseases</b>			
AIM HIGH: Niacin Plus Statin To Prevent Vascular Events*	\$14,385,611	\$2,324,428	\$16,710,039
Bypass Angioplasty Revascularization Investigation in Type 2 Diabetes (BARI 2D)*	57,767,642	1,129,551	58,897,193
Catheter Ablation Versus Antiarrhythmic Drug therapy for Atrial Fibrillation Trial (CABANA)*	—	2,940,676	2,940,676
Claudication: Exercise Versus Endoluminal Revascularization (CLEVER)*	4,745,409	1,822,084	6,567,493
Collaborative Model To Improve BP Control and Minimize Racial Disparities	—	1,962,536	1,962,536
Effects of Niacin on Lp(a), Oxidized LDL, and Inflammation in the AIM-HIGH Trial	301,776	311,988	613,764
Efficacy of Smoking Quit Line in the Military	1,458,373	731,359	2,189,732
FREEDOM Trial: Future Revascularization Evaluation in Patients With Diabetes Mellitus: Optimal Management of Multivessel Disease	16,330,637	1,658,233	17,988,870
Interventions To Control Obesity in College	1,970,554	686,261	2,656,815
Multi-Scale Model of the Human Heart for Imaging Research	—	565,856	565,856
Occluded Artery Trial (OAT)	19,953,495	1,269,829	21,223,324
Planned CORR: Planned Care for Obesity and Risk Reduction	784,317	769,846	1,554,163
Rule-Out Myocardial Infarction Using Computer Assisted Tomography (ROMICAT II)*	—	2,111,994	2,111,994
Surgical Treatment for Ischemic Heart Failure (STICH)*	36,516,990	726,648	37,243,638
Therapeutic Hypothermia After Pediatric Cardiac Arrest (THAPCA)*	—	3,648,449	3,648,449
Vest Prevention of Early Sudden Death Trial (VEST) and PREDiction of ICD Therapies Studies (PREDICTS)*	2,746,077	1,391,303	4,137,380
Weight Loss Maintenance (WLM)*	17,463,982	149,857	17,613,839
Women's Health Study (WHS)	18,665,689	918,834	19,584,523
Women's Ischemia Syndrome Evaluation (WISE) Coronary Vascular Dysfunction	775,836	741,640	1,517,476
<b>Subtotal, Heart and Vascular Diseases</b>	<b>193,866,388</b>	<b>25,861,372</b>	<b>219,727,760</b>
<b>Lung Diseases</b>			
Childhood Asthma Management Program–Continuation Study (CAMP–CS)/Phase III*	4,043,232	1,145,547	5,188,779
Early Insulin Therapy and Development of ARDS	943,216	464,295	1,407,511
Effects of HIV Antiretroviral Therapy on Pulmonary Function	—	613,957	613,957
Family Intervention for Pediatric Asthma Self-Management in Puerto Ricans	—	225,000	225,000
Infant Study of Inhaled Saline in Cystic Fibrosis (ISIS)*	732,476	736,708	1,469,184
Outpatient Treatment of Low-Risk Patients With Pulmonary Embolism	—	755,080	755,080
Physical Activity Self-Management in Patients With COPD	—	662,744	662,744

\* Paid by U01/U10.

**NHLBI Investigator-Initiated Clinical Trials, Fiscal Year 2009: Summary by Program (continued)**

	<b>Total Obligations Prior to 2009</b>	<b>FY 2009 Obligations</b>	<b>Total Obligation to Date</b>
<b>Lung Diseases (continued)</b>			
Randomized Controlled Study of Adenotonsillectomy for Childhood Sleep Apnea*	5,988,040	2,500,880	8,488,920
Randomized Trial of Maternal Vitamin D Supplementation To Prevent Childhood Asthma*	—	2,510,267	2,510,267
Scleroderma Lung Study II	2,280,616	2,296,684	4,577,300
Sedation Management in Pediatric Patients With Acute Respiratory Failure*	567,715	3,884,512	4,452,227
Study of Soy Isoflavones in Asthma (SOYA)*	—	774,607	774,607
Study of Asthma and Nasal Steroids (STAN)*	—	724,724	724,724
Translating COPD Guidelines Into Primary Care Practice	—	733,424	733,424
Trial of Late Surfactant To Prevent Bronchopulmonary Dysplasia (TOLSURF)*	—	1,986,898	1,986,898
<b>Subtotal, Lung Diseases</b>	<b>14,555,295</b>	<b>20,015,327</b>	<b>34,570,622</b>
<b>Blood Diseases and Resources</b>			
Bridging Anticoagulation on Patients Requiring Temporary Interruption of Warfarin Therapy for an Elective Invasive Procedure or Surgery (BRIDGE) Trial	4,632,060	5,673,071	10,305,131
Pharmacomechanical Catheter-Directed Thrombolysis for Acute DVT—ATTRACT Trial*	2,070,898	2,107,633	4,178,531
Randomized Trial of Interventions To Improve Warfarin Adherence	800,516	786,913	1,587,429
Stroke With Transfusions Changing to Hydroxyurea (SWITCH)*	14,636,993	3,215,757	17,852,750
Transcranial Doppler With Transfusions Changing to Hydroxyurea	—	4,175,979	4,175,979
<b>Subtotal, Blood Diseases and Resources</b>	<b>22,140,467</b>	<b>15,959,353</b>	<b>38,099,820</b>
<b>TOTAL, NHLBI</b>	<b>\$230,562,150</b>	<b>\$61,836,052</b>	<b>\$292,398,202</b>

\* Paid by U01/U10.

## Institute-Initiated Clinical Trials: Fiscal Years 1999–2009

### Contracts

Dollars (Thousands)

	Fiscal Year											
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
<b>Heart and Vascular Diseases</b>												
Antiarrhythmic Versus Implantable Defibrillator (AVID)	\$ 548	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Antihypertensive and Lipid-Lowering Treatment To Prevent Heart Attack Trial (ALLHAT)	—	6,259	7,000	3,980	2,761	3,346	—	—	—	—	—	—
Enhancing Recovery in Coronary Heart Disease Patients (ENRICHED)	3,303	3,487	596	425	70	—	—	—	—	—	—	—
Atrial Fibrillation Follow-Up: Investigation in Rhythm Management (AFFIRM)	3,785	1,239	2,401	802	—	—	—	—	—	—	—	—
Women's Angiographic Vitamin and Estrogen Trial (WAVE)	3,878	886	756	—	32	—	—	—	—	—	—	—
Women's Ischemia Syndrome Evaluation (WISE)	856	1,424	10	50	—	—	—	—	—	—	—	—
Prevention of Events With Angiotensin Converting Enzyme Inhibitor Therapy (PEACE)	2,850	5,988	—	2,849	558	—	—	—	—	—	—	—
Magnesium in Coronaries (MAGIC)	2,009	1,243	—	238	—	—	—	—	—	—	—	—
Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness (ESCAPE)	1,750	1,820	—	1,129	—	—	—	311	—	—	—	—
Action To Control Cardiovascular Risk in Diabetes (ACCORD)	4,130	6,590	—	1,750	18,521	33,779	26,126	—	19,484	16,343	15,461	—
Public Access Defibrillation (PAD) Community Trial	2,923	2,414	3,058	1,101	—	—	—	—	—	—	—	—
Trial of Aldosterone Antagonist Therapy in Adults With Preserved Ejection Fraction Congestive Heart Failure (TOPCAT)	—	—	—	—	—	837	5,162	5,480	2,218	7,912	4,408	—
Women's Health Initiative	59,100	57,700	59,200	59,010	63,222	57,483	37,826	12,124	14,873	22,609	30,615	—
Systolic Blood Pressure Intervention Trial (SPRINT)	—	—	—	—	—	—	—	—	—	—	—	7,508
Randomized Trial of Genotype-Guided Dosing of Warfarin Therapy	—	—	—	—	—	—	—	—	—	—	2,637	3,530
<b>Subtotal, Heart and Vascular Diseases</b>	<b>85,132</b>	<b>89,050</b>	<b>73,021</b>	<b>71,334</b>	<b>85,164</b>	<b>95,445</b>	<b>69,114</b>	<b>17,915</b>	<b>36,575</b>	<b>49,501</b>	<b>61,522</b>	<b>—</b>
<b>Lung Diseases</b>												
Pediatric Pulmonary and Cardiac Complications of HIV Infection (P2C2)	—	315	—	113	—	—	—	—	—	—	—	—
Childhood Asthma Management Program (CAMP)	6,551	729	1,330	2,786	2,287	1,475	599	—	—	—	—	—
Acute Respiratory Distress Syndrome Clinical Network (ARDSNet)	6,837	5,587	2,667	1,502	4,402	5,517	4,707	7,396	5,037	1,992	6,195	—

## Institute-Initiated Clinical Trials: Fiscal Years 1999–2009 (continued)

### Contracts (continued)

	Dollars (Thousands)										
	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Lung Diseases (continued)</b>											
National Emphysema Treatment Trial (NETT)	7,545	4,047	6,989	7,910	1,630	1,648	357	—	—	—	285
Feasibility of Retinoid Treatment in Emphysema (FORTE)	884	7,711	—	2,429	725	507	185	—	—	—	—
Long-Term Oxygen Treatment Trial (LOTT)	—	—	—	—	—	—	—	—	6,208	10,042	202
Subpopulations and Intermediate Outcome Measures in COPD Study (SPIROMICS)	—	—	—	—	—	—	—	—	—	—	2,082
<b>Subtotal, Lung Diseases</b>	<b>21,817</b>	<b>18,389</b>	<b>10,986</b>	<b>14,740</b>	<b>9,044</b>	<b>9,147</b>	<b>5,848</b>	<b>7,396</b>	<b>11,245</b>	<b>12,034</b>	<b>8,764</b>
<b>Blood Diseases and Resources</b>											
Clinical Course of Sickle Cell Disease	350	106	—	—	—	—	—	—	—	—	—
T-Cell Depletion in Unrelated Donor Marrow Transplantation	690	1,085	1,144	557	774	164	—	—	—	—	—
Viral Activation Transfusion Study (VATS)	—	339	—	—	—	—	—	—	—	—	—
Cord Blood Stem Cell Transplantation Study (COBLT)	1,456	5,122	1,846	2,166	588	707	822	—	—	—	—
Multicenter Study of Hydroxyurea (MSH) in Sickle Cell Anemia Adult Follow-Up	469	—	—	588	994	1,136	1,340	—	—	—	—
Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG)	—	1,606	405	3,100	1,112	1,964	1,526	891	3,966	5,573	1,704
Sildenafil for Sickle Cell Disease-Associated Pulmonary Hypertension	—	—	—	—	—	—	—	1,867	2,801	3,702	963
<b>Subtotal, Blood Diseases and Resources</b>	<b>2,965</b>	<b>8,258</b>	<b>3,395</b>	<b>6,411</b>	<b>3,468</b>	<b>3,971</b>	<b>3,688</b>	<b>2,758</b>	<b>6,767</b>	<b>9,275</b>	<b>2,667</b>
<b>Total, NHLBI Clinical Trials Contracts</b>	<b>\$109,914</b>	<b>\$115,697</b>	<b>\$87,402</b>	<b>\$92,485</b>	<b>\$97,676</b>	<b>\$108,563</b>	<b>\$78,650</b>	<b>\$28,069</b>	<b>\$54,587</b>	<b>\$70,810</b>	<b>\$72,953</b>

## Institute-Initiated Clinical Trials: Fiscal Years 1999–2009 (continued)

### Cooperative Agreements

	Dollars (Thousands)											
	Fiscal Year											
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
<b>Heart and Vascular Diseases</b>												
Bypass Angioplasty Revascularization Investigation (BARI)	\$ 1,609	\$ 1,634	\$ 1,549	\$ 1,456	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Child and Adolescent Trial for Cardiovascular Health (CATCH)	210	—	—	—	—	—	—	—	—	—	—	—
Obesity Prevention in Young American Indians (PATHWAYS)	4,196	2,459	—	—	—	—	—	—	—	—	—	—
Girls Health Enrichment Multisite Studies (GEMS)	2,282	2,365	2,877	2,713	—	—	—	—	—	—	—	—
Trial of Activity for Adolescent Girls (TAAG)	—	5,274	4,831	5,919	5,828	6,350	5,103	905	—	—	—	—
Pediatric Heart Network Clinical Research Consortium To Improve Resuscitation Outcome	—	—	3,447	4,822	5,381	4,948	3,992	6,988	6,607	12,255	7,637	—
Dynamic Assessment of Patient-Reported Chronic Disease Outcomes	—	—	—	—	—	1,010	—	—	—	—	—	—
Clinical Trials in Organ Transplantation (CTOT)	—	—	—	—	—	—	1,900	1,855	1,801	1,635	—	—
Heart Failure Clinical Research Network	—	—	—	—	—	—	—	5,642	7,801	7,813	7,939	—
Weight Loss in Obese Adults With Cardiovascular Risk Factors	—	—	—	—	—	—	—	2,567	3,714	3,656	—	—
Pediatric HIV/AIDS Cohort Study (PHACS)—Data and Operations Center	—	—	—	—	—	—	—	1,000	500	490	500	—
Cardiovascular Cell Therapy Research Network	—	—	—	—	—	—	—	—	4,424	7,568	6,227	—
Community-Responsive Interventions To Reduce Cardiovascular Risk in American Indians and Alaska Natives	—	—	—	—	—	—	—	1,419	2,314	3,151	1,999	—
Network for Cardiothoracic Surgical Investigations in Cardiovascular Medicine	—	—	—	—	—	—	—	—	6,009	8,681	3,210	—
EDTA Chelation Therapy for Coronary Artery Disease	—	—	—	—	—	—	—	—	—	—	—	2,109
Practice-Based Opportunity for Weight Reduction (POWER) Trials*	—	—	—	—	—	—	—	—	—	—	—	3,729

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

## Institute-Initiated Clinical Trials: Fiscal Years 1999–2009 (continued)

### Cooperative Agreements (continued)

	Dollars (Thousands)											
	1999	2000	2001	2002	Fiscal Year		2005	2006	2007	2008	2009	
<b>Heart and Vascular Diseases (continued)</b>												
Look AHEAD: Action for Health in Diabetes	—	—	—	—	—	—	—	—	—	—	—	4,000
Targeted Approaches to Weight Control for Young Adults	—	—	—	—	—	—	—	—	—	—	—	4,656
Diabetes Prevention Program Outcomes Study—Phase II	—	—	—	—	—	—	—	—	—	—	—	1,100
Subtotal, Heart and Vascular Diseases	8,297	11,732	12,704	14,910	11,209	19,194	20,334	30,104	42,142	50,528	43,106	
<b>Lung Diseases</b>												
Asthma Clinical Research Network (ACRN)**	—	—	—	—	8,181	8,424	8,667	7,839	8,918	872	—	—
Childhood Asthma Research and Education (CARE) Network	4,175	5,002	5,314	6,005	5,610	5,292	5,704	5,735	5,916	4,887	—	—
COPD Clinical Research Network	—	—	—	—	6,843	6,848	8,438	7,664	6,836	3,400	3,150	—
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
Subtotal, Lung Diseases	4,175	5,002	5,314	6,005	20,634	20,564	26,295	29,923	29,124	16,340	18,775	
<b>Blood Diseases and Resources</b>												
Thalassemia (Cooley's Anemia) Clinical Research Network	—	2,192	2,219	2,269	2,320	2,375	2,730	2,682	2,618	2,600	658	—
Blood and Marrow Transplant Clinical Research Network	—	—	5,360	5,899	5,950	5,972	6,460	6,845	6,709	6,952	6,351	—
Transfusion Medicine/Hemostasis Clinical Research Network	—	—	—	6,053	6,241	6,093	6,221	6,521	6,407	6,374	6,541	—
Sickle Cell Disease Clinical Research Network	—	—	—	—	—	—	—	3,761	7,498	7,173	—	—
Subtotal, Blood Diseases and Resources	—	2,192	7,579	14,221	14,511	14,440	15,411	19,809	23,232	23,099	13,550	
<b>Total, NHLBI-Initiated Clinical Trials, Cooperative Agreements</b>	<b>\$12,472</b>	<b>\$18,926</b>	<b>\$25,597</b>	<b>\$35,136</b>	<b>\$46,354</b>	<b>\$54,198</b>	<b>\$62,040</b>	<b>\$79,836</b>	<b>\$94,498</b>	<b>\$89,967</b>	<b>\$75,431</b>	
<b>Total, NHLBI-Initiated Clinical Trials</b>	<b>\$122,386</b>	<b>\$134,623</b>	<b>\$112,999</b>	<b>\$127,621</b>	<b>\$144,030</b>	<b>\$162,761</b>	<b>\$140,690</b>	<b>\$107,905</b>	<b>\$149,085</b>	<b>\$158,140</b>	<b>\$148,384</b>	

\*\* Investigator-Initiated from 1998 to 2002.



## Institute-Initiated Clinical Trials, Fiscal Year 2009: Summary by Program

### Contracts

	Total Obligations Prior to FY 2009	Total FY 2009 Obligations	Total Obligations to Date
<b>Heart and Vascular Diseases</b>			
Action To Control Cardiovascular Risk in Diabetes (ACCORD)	\$ 126,723,481	\$15,461,000	\$ 142,184,481
Systolic Blood Pressure Intervention Trial (SPRINT)	—	7,508,288	7,508,288
Trial of Aldosterone Antagonists Therapy in Adults With Preserved Ejection Fraction Congestive Heart Failure (TOPCAT)	21,608,801	4,407,564	26,016,365
Randomized Trial of Genotype-Guided Dosing of Warfarin Therapy	2,637,062	3,530,000	6,167,062
Women's Health Initiative	760,047,045	30,615,041	790,662,086
Subtotal, Heart and Vascular Diseases	911,016,389	61,521,893	972,538,282
<b>Lung Diseases</b>			
Acute Respiratory Distress Syndrome Clinical Network (ARDSNET)	65,339,896	6,195,077	71,534,973
Long-Term Oxygen Treatment Trial (LOTT)	16,250,145	202,302	16,452,447
National Emphysema Treatment Trial (NETT)	36,203,000	285,156	36,488,156
Subpopulations and Intermediate Outcome Measures in COPD Study (SPIROMICS)	—	2,081,851	2,081,851
Subtotal, Lung Diseases	117,793,041	8,764,386	126,557,427
<b>Blood Diseases and Resources</b>			
Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG)	20,143,615	1,703,918	21,847,533
Sildenafil for Sickle Cell Disease-Associated Pulmonary Hypertension	8,370,142	962,952	9,333,094
Subtotal, Blood Diseases and Resources	28,513,757	2,666,870	31,180,627
<b>Total, NHLBI-Initiated Clinical Trials, Contracts</b>	<b>\$1,057,323,187</b>	<b>\$72,953,149</b>	<b>\$1,130,276,336</b>

Note: From 1999 to 2006, the WHI was reported separately under its own major heading. In this table, it is included in the Heart and Vascular Diseases section.

### Cooperative Agreements

	Total Obligations Prior to FY 2009	Total FY 2009 Obligations	Total Obligations to Date
<b>Heart and Vascular Diseases</b>			
Cardiovascular Cell Therapy Research Network	\$ 11,992,445	\$ 6,226,923	\$ 18,219,368
Clinical Research Consortium To Improve Resuscitation Outcomes	40,203,762	—	40,203,762
Community-Responsive Interventions To Reduce Cardiovascular Risk in American Indians and Alaska Natives	6,883,288	1,999,367	8,882,655
Diabetes Prevention Program Outcomes Study—Phase II	—	1,100,000	1,100,000
EDTA Chelation Therapy for Coronary Artery Disease	—	2,109,044	2,109,044
Heart Failure Clinical Research Network	21,256,277	7,938,673	29,194,950
Look AHEAD: Action for Health in Diabetes	—	4,000,000	4,000,000
Network for Cardiothoracic Surgical Investigations in Cardiovascular Medicine	14,689,861	3,210,240	17,900,101
Pediatric Heart Network	48,440,735	7,637,122	56,077,857
Pediatric HIV/AIDS Cohort Study—Data and Operations Center (PHACS)	1,990,000	500,000	2,490,000
Practice-Based Opportunity for Weight Reduction (POWER) Trials*	9,937,264	3,728,927	13,666,191
Targeted Approaches to Weight Control for Young Adults	—	4,656,109	4,656,109
Subtotal, Heart and Vascular Diseases	155,393,632	43,106,405	198,500,037
<b>Lung Diseases</b>			
Asthma Network (AsthmaNet)	—	8,300,000	8,300,000
COPD Clinical Research Network	40,030,386	3,150,000	43,180,386
Idiopathic Pulmonary Fibrosis Clinical Research Network	25,205,892	7,324,944	32,530,836
Subtotal, Lung Diseases	65,236,278	18,774,944	84,011,222
<b>Blood Diseases and Resources</b>			
Blood and Marrow Transplant Clinical Research Network	50,147,120	6,350,697	56,497,817
Thalassemia (Cooley's Anemia) Clinical Research Network	22,006,021	657,580	22,663,601
Transfusion Medicine/Hemostasis Clinical Research Network	43,909,114	6,541,087	50,450,201
Subtotal, Blood Diseases and Resources	116,062,255	13,549,364	129,611,619
<b>Total, NHLBI-Initiated Clinical Trials, Cooperative Agreements</b>	<b>\$336,692,165</b>	<b>\$75,430,713</b>	<b>\$412,122,878</b>
<b>Total, NHLBI-Initiated Clinical Trials</b>	<b>\$1,412,987,091</b>	<b>\$148,383,862</b>	<b>\$1,565,778,517</b>

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

## Heart and Vascular Diseases Program

### Action To Control Cardiovascular Risk in Diabetes (ACCORD), Initiated in Fiscal Year 1999

The purpose of this clinical trial is to evaluate the effects of three diabetic treatment strategies (intensive glycemic control, blood pressure control, and fibrate treatment to raise HDL-cholesterol and lower triglycerides) to prevent major cardiovascular events in adults with type 2 diabetes mellitus. The primary outcome measure is CVD mortality or major morbidity (MI and stroke). A total of 10,251 participants were recruited across 77 clinical sites in the United States and Canada. In February 2008, the NHLBI announced that participants in the intensive glycemia treatment will be transitioned to the ACCORD standard treatment approach due to higher mortality in the intensive treatment group. The blood pressure and lipid trials are continuing as designed.

#### Obligations

##### Funding History:

Fiscal Year 2009—\$15,461,000

Fiscal Years 1999–2008—\$126,723,481

Total Funding to Date—\$142,184,481

#### Current Active Organizations and Contract Numbers

1. Veterans Affairs Medical Center,  
Albuquerque  
Albuquerque, New Mexico —HC-10100
2. Veterans Affairs Medical Center, Memphis  
Memphis, Tennessee —HC-90350
3. Wake Forest University  
Winston-Salem, North Carolina —HC-95178
4. McMaster University  
Hamilton, Ontario —HC-95179
5. University of Washington  
Seattle, Washington —HC-95180
6. Case Western Reserve University  
Cleveland, Ohio —HC-95181
7. Wake Forest University  
Winston-Salem, North Carolina —HC-95182
8. Minneapolis Medical Research Foundation  
Minneapolis, Minnesota —HC-95183
9. Trustees of Columbia University of  
New York  
New York, New York —HC-95184

## 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 treatment strategies for individuals with CVD. The network will provide the necessary infrastructure to develop, coordinate, and conduct multiple collaborative clinical protocols to facilitate application of emerging scientific discoveries to improve CVD outcomes.

#### Obligations

##### Funding History:

Fiscal Year 2009—\$6,226,923

Fiscal Years 2007–2008—\$11,992,445

Total Funding to Date—\$18,219,368

#### 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

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

The purpose of this study is to establish a resuscitation research consortium to conduct research in cardiopulmonary arrest and traumatic injury leading to arrest. The consortium will facilitate the rapid translation of promising scientific and clinical advances to improve resuscitation outcomes.

#### Obligations

##### Funding History:

Fiscal Year 2009—\$0

Fiscal Years 2004–2008—\$40,203,762

Total Funding to Date—\$40,203,762

### Current Active Organizations and Grant Numbers

1. University of Washington  
Seattle, Washington —HL-077863
2. University of Iowa  
Iowa, City, Iowa —HL-077865
3. Medical College of Wisconsin  
Milwaukee, Wisconsin —HL-077866
4. University of Washington  
Seattle, Washington —HL-077867
5. University of Pittsburgh  
Pittsburgh, Pennsylvania —HL-077871
6. St. Michael's Hospital  
Toronto, Ontario —HL-077872
7. Oregon Health and Science University  
Portland, Oregon —HL-077873
8. University of Alabama at Birmingham  
Birmingham, Alabama —HL-077881
9. Ottawa Health Research Institute  
Ottawa, Ontario —HL-077885
10. University of Texas  
Southwestern Medical Center  
Dallas, Texas —HL-077887
11. University of California, San Diego  
La Jolla, California —HL-077908

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

The purpose of this program is to develop and evaluate the effectiveness of culturally appropriate interventions to promote the adoption of healthy lifestyle behaviors to reduce CVD risk in American Indian/Alaska Native communities. Interventions will focus on weight reduction, regular physical activity, and smoking cessation. A central feature of this project is to develop interventions that can be incorporated into clinical programs of the community health care system or delivered through public health approaches in Native communities.

#### Obligations

##### Funding History:

Fiscal Year 2009—\$1,999,367

Fiscal Years 2006–2008—\$6,883,288

Total Funding to Date—\$8,882,655

### Current Active Organizations and Grant Numbers

1. University of Washington  
Seattle, Washington —HL-087322
2. University of Oklahoma Health  
Sciences Center  
Oklahoma City, Oklahoma —HL-087354

3. University of Wisconsin—Madison  
Madison, Wisconsin —HL-087381
4. Black Hills Center/American Indian  
Health  
Rapid City, South Dakota —HL-087422

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

The purpose of this multicenter clinical trial is to determine the efficacy of treatments to prevent or delay the development of type 2 diabetes in a population at high risk due to the presence of impaired glucose tolerance. The Phase II trial will continue to follow the original cohort to determine the long-term effects of the interventions (metformin versus lifestyle) on further diabetes development, microvascular outcomes, and CVD and CVD risk factors. Forty-five percent of participants are from diverse minority populations.

#### Obligations

##### Funding History:

Fiscal Year 2009—\$1,100,000

Total Funding to Date—\$1,100,000

### Current Active Organizations and Grant Numbers

1. University of California, San Diego  
La Jolla, California —DK-048339
2. Albert Einstein College of Medicine of  
Yeshiva University  
Bronx, New York —DK-048349
3. University of Colorado  
Aurora, Colorado —DK-048375
4. Louisiana State University  
Pennington Biomedical Research Center  
Baton Rouge, Louisiana —DK-048377
5. Northwestern University  
Chicago, Illinois —DK-048380
6. University of Chicago  
Chicago, Illinois —DK-048381
7. MEDSTAR Research Institute  
Hyattsville, Maryland —DK-048387
8. Massachusetts General Hospital  
Boston, Massachusetts —DK-048397
9. Washington University  
St. Louis, Missouri —DK-048400
10. St. Luke's Roosevelt Institute  
for Health Sciences  
New York, New York —DK-048404
11. Indiana University-Purdue  
University at Indianapolis  
Indianapolis, Indiana —DK-048406

12. University of New Mexico Albuquerque, New Mexico	—DK-048407
13. University of Tennessee Health Science Center Memphis, Tennessee	—DK-048411
14. University of Pittsburgh Pittsburgh, Pennsylvania	—DK-048412
15. Seattle Institute for Biomedical and Clinical Research Seattle, Washington	—DK-048413
16. University of Miami School of Medicine Coral Gables, Florida	—DK-048434
17. Joslin Diabetes Center Boston, Massachusetts	—DK-048437
18. University of California, Los Angeles Los Angeles, California	—DK-048443
19. Thomas Jefferson University Philadelphia, Pennsylvania	—DK-048468
20. George Washington University Washington, DC	—DK-048489
21. University of Texas Health Science Center San Antonio, Texas	—DK-048514

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

The purpose of this multisite, 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.

#### **Obligations**

Funding History:

Fiscal Year 2009—\$2,109,044

Total Funding to Date—\$2,109,044

#### **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 in order to improve outcomes through optimal application of existing therapies and evaluation of novel therapies. The network provides the necessary infrastructure to develop, coordinate, and conduct multiple collaborative clinical protocols to facilitate application of emerging basic science discoveries into clinical investigations.

#### **Obligations**

Funding History:

Fiscal Year 2009—\$7,938,673

Fiscal Years 2006–2008—\$21,256,277

Total Funding to Date—\$29,194,950

#### **Current Active Organizations and Grant Numbers**

1. Minneapolis Medical Research  
Foundation, Inc.  
Minneapolis, Minnesota —HL-084861
2. Duke University  
Durham, North Carolina —HL-084875
3. Brigham and Women's Hospital  
Boston, Massachusetts —HL-084877
4. University of Utah  
Salt Lake City, Utah —HL-084889
5. Baylor College of Medicine  
Houston, Texas —HL-084890
6. Morehouse School of Medicine  
Atlanta, Georgia —HL-084891
7. University of Vermont and State  
Agriculture College  
Burlington, Vermont —HL-084899
8. Duke University  
Durham, North Carolina —HL-084904
9. Mayo Clinic College of Medicine  
Rochester, Minnesota —HL-084907
10. Montreal Heart Institute  
Montreal, Quebec, Canada —HL-084931

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

The purpose of this multicenter randomized clinical trial is to determine the effect of a lifestyle intervention—designed to achieve and maintain weight loss over the long term through decreased caloric intake and exercise—in obese individuals with type 2 diabetes. Participants have been randomly assigned to one of two interventions—either Lifestyle Intervention or Diabetes Support and Education—and will be followed for up to 11.5 years. The trial will monitor major cardiovascular events, such as heart attack, stroke, and cardiovascular-related death. Investigators will also examine the impact of the interventions on other cardiovascular disease-related outcomes, cardiovascular risk factors, all-cause mortality, diabetes control and complications, fitness, general health, and health-related quality of life and psychological outcomes. One of the 16 clinical centers is targeting American Indians.



## Obligations

### Funding History:

Fiscal Year 2009—\$4,000,000

Total Funding to Date—\$4,000,000

### Current Active Organizations and Grant Numbers

1. University of Alabama at Birmingham  
Birmingham, Alabama —DK-057008
2. University of Tennessee Health  
Science Center  
Memphis, Tennessee —DK-057078
3. University of Pennsylvania  
Philadelphia, Pennsylvania —DK-057135
4. University of Colorado  
Denver, Colorado —DK-057151

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

The purpose of this program is to establish a network to evaluate newer surgical techniques, technologies, devices, and innovative pharmaceutical and bioengineered products directed at CVD to ensure that the public has access to the best procedures determined by careful assessment. The Network will also serve as a clinical trials training ground for fellows and junior faculty.

## Obligations

### Funding History:

Fiscal Year 2009—\$3,210,240

Fiscal Years 2007–2008—\$14,689,861

Total Funding to Date—\$17,900,101

### Current Active Organizations and Grant Numbers

1. University of Virginia, Charlottesville  
Charlottesville, Virginia —HL-088925
2. Emory University  
Atlanta, Georgia —HL-088928
3. Albert Einstein College of Medicine  
of Yeshiva University  
Bronx, New York —HL-088939
4. Columbia University Health Sciences  
New York, New York —HL-088942
5. Mount Sinai School of Medicine  
New York, New York —HL-088951
6. Duke University  
Durham, North Carolina —HL-088953
7. Case Western Reserve University  
Cleveland, Ohio —HL-088955

8. University of Pennsylvania  
Philadelphia, Pennsylvania —HL-088957
9. Montreal Heart Institute  
Montreal, Quebec, Canada —HL-088963

## Pediatric Heart Network, Initiated in Fiscal Year 2001

The objective of this study is to establish a clinical network to evaluate novel treatment methods and management strategies for children with structural congenital heart disease, inflammatory heart disease, heart muscle disease, or arrhythmias.

## Obligations

### Funding History:

Fiscal Year 2009—\$7,637,122

Fiscal Years 2001–2008—\$48,440,735

Total Funding to Date—\$56,077,857

### Current Active Organizations and Grant Numbers

1. Duke University  
Durham, North Carolina —HL-068269
2. New England Research Institute, Inc.  
Watertown, Massachusetts —HL-068270
3. Children's Hospital of Philadelphia  
Philadelphia, Pennsylvania —HL-068279
4. Medical University of South Carolina  
Charleston, South Carolina —HL-068281
5. Children's Hospital  
Boston, Massachusetts —HL-068285
6. Hospital for Sick Children  
Toronto, Ontario —HL-068288
7. Columbia University Health Sciences  
New York, New York —HL-068290
8. University of Utah  
Salt Lake City, Utah —HL-068292
9. Children's Hospital Medical Center  
Cincinnati, Ohio —HL-085057

## Pediatric HIV/AIDS Cohort Study (PHACS)— Data and Operations Center, Initiated in Fiscal Year 2006

The purpose of this study is to create a body of data to understand more fully the effect of HIV on sexual maturation, pubertal development, and socialization of perinatally HIV-infected preadolescents and adolescents, and to acquire more definitive information regarding long-term safety of antiretroviral agents when used during pregnancy and in newborns.

## Obligations

### Funding History:

Fiscal Year 2009—\$500,000  
Fiscal Years 2006–2008—\$1,990,000  
Total Funding to Date—\$2,490,000

### Current Active Organization and Contract Number

1. Harvard University  
Boston, Massachusetts —HD-052102

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

The purpose of this study is to conduct randomized clinical trials in routine clinical practice settings to test the effectiveness of weight loss interventions in obese patients who have one or more additional cardiovascular risk factors. An important secondary focus of these effectiveness clinical trials is to incorporate the weight loss strategies with approaches to improve application of evidence-based guidelines to reduce the other cardiovascular risk factors commonly present in obese patients, such as elevated lipids, hypertension, metabolic syndrome, diabetes, or cigarette smoking. All of the participants will be from minority populations.

## Obligations

### Funding History:

Fiscal Year 2009—\$3,728,927  
Fiscal Years 2006–2008—\$9,937,264  
Total Funding to Date—\$13,666,191

### Current Active Organizations and Grant Numbers

1. Washington University  
St. Louis, Missouri —HL-087071
2. University of Pennsylvania  
Philadelphia, Pennsylvania —HL-087072
3. Johns Hopkins University  
Baltimore, Maryland —HL-087085

## Randomized Trial of Genotype-Guided Dosing of Warfarin Therapy, Initiated in Fiscal Year 2008

The purpose of this clinical trial is to compare two approaches to the initiation of warfarin therapy for optimal anticoagulation. One approach is based on algorithms using clinical information and an individual's genotype using genes known to influence warfarin response (“genotype-guided dosing”), and the other is

based on algorithms using only clinical information (“clinical-guided dosing”).

## Obligations

### Funding History:

Fiscal Year 2009—\$3,530,000  
Fiscal Year 2008—\$2,637,062  
Total Funding to Date—\$6,167,062

### Current Active Organization and Contract Number

1. University of Pennsylvania  
Philadelphia, Pennsylvania —HV-88210

## Systolic Blood Pressure Intervention Trial (SPRINT), Initiated in Fiscal Year 2009

The purpose of this study is to establish a clinical network to test the effects of intensive lowering of systolic blood pressure (SBP) on preventing CVD. Approximately 7,500 participants will be randomized into one of two groups—either the lower SBP goal of less than 120 mmHg or the standard SBP goal of less than 140 mmHg. The primary composite endpoints will be CVD mortality and non-fatal MI, stroke, and heart failure.

## Obligations

### Funding History:

Fiscal Year 2009—\$7,508,288  
Total Funding to Date—\$7,508,288

### Current Active Organizations and Contract Numbers

1. Wake Forest University Health  
Science Center  
Winston-Salem, North Carolina —HC-95240
2. University of Utah  
Salt Lake City, Utah —HC-95255
3. University of Birmingham  
Birmingham, Alabama —HC-95256
4. Wake Forest University Health  
Science Center  
Winston-Salem, North Carolina —HC-95257
5. Case Western Reserve University  
Cleveland, Ohio —HC-95258

## Targeted Approaches to Weight Control for Young Adults, Initiated in Fiscal Year 2009

The purpose of this study is to conduct two-phase clinical research studies to develop and evaluate innovative behavioral and environmental approaches for

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

weight control in young adults. The first phase will consist of research to refine the proposed intervention, recruitment, retention, and adherence strategies. The second phase will consist of a randomized controlled trial to test the efficacy of the intervention. The study will target ethnically and socioeconomically diverse adults, ages 18–35 years, who are at high risk of gaining weight (e.g., having an overweight parent, postpartum women, becoming a parent).

### Obligations

#### Funding History:

Fiscal Year 2009—\$4,656,109  
Total Funding to Date—\$4,656,109

### 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

### Trial of Aldosterone Antagonists Therapy in Adults With Preserved Ejection Fraction Congestive Heart Failure (TOPCAT), Initiated in Fiscal Year 2004

The purpose of this study is to evaluate the effectiveness of aldosterone antagonist therapy to reduce mortality in patients who have heart failure with preserved systolic function.

### Obligations

#### Funding History:

Fiscal Year 2009—\$4,407,564  
Fiscal Years 2004–2008—\$21,608,801  
Total Funding to Date—\$26,016,365

### Current Active Organization and Contract Number

1. New England Research Institutes, Inc.  
Watertown, Massachusetts —HC-45207

### Women's Health Initiative, Initiated in Fiscal Year 1992

The purpose of the WHI is to study cardiovascular disease, cancer, and osteoporosis in postmenopausal women. The program consists of three major components: randomized controlled clinical trials of HRT, dietary modification, and calcium/vitamin D supplementation; an observational study to identify predictors of disease; and a study of community approaches to developing healthful behaviors.

In 2007, the WHI began a program to maximize the scientific yield from the biologic resources and associated participant exposure and outcome data from the study. The program seeks innovative technologies that will enable comprehensive investigation of sets of markers associated with disease outcomes or treatment effects, or of groups of mediators that might explain the pathway of exposure or treatment effects on disease outcomes.

### Obligations

#### Funding History:

Fiscal Year 2009—\$30,615,041  
Fiscal Years 1992–2008\*\*—\$760,047,045  
Total Funding to Date—\$790,662,086

### Current Active Organizations and Contract Numbers

1. Fred Hutchinson Cancer Research Center  
Seattle, Washington —WH-22110
2. University of Medicine and Dentistry  
of New Jersey  
Newark, New Jersey —WH-24152
3. Fred Hutchinson Cancer Research Center  
Seattle, Washington —WH-32100
4. University of Minnesota, Twin Cities  
Minneapolis, Minnesota —WH-32101
5. University of Iowa College of Medicine  
Iowa City, Iowa —WH-32102
6. University of Alabama at Birmingham  
Birmingham, Alabama —WH-32105
7. Wake Forest University  
Winston-Salem, North Carolina —WH-32106
8. Northwestern University  
Chicago, Illinois —WH-32108
9. Brigham and Women's Hospital  
Boston, Massachusetts —WH-32109
10. Emory University  
Atlanta, Georgia —WH-32111

\*\* 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.



11. University of Pittsburgh Pittsburgh, Pennsylvania	—WH-32112	35. University of California, Los Angeles Los Angeles, California	—WH-42125
12. University of California, Davis Davis, California	—WH-32113	36. University of Cincinnati Medical Center Cincinnati, Ohio	—WH-42126
13. University of Arizona Tucson, Arizona	—WH-32115	37. University of Florida College of Medicine Gainesville, Florida	—WH-42129
14. University of Tennessee Memphis, Tennessee	—WH-32118	38. University of Hawaii at Manoa Honolulu, Hawaii	—WH-42130
15. Memorial Hospital of Rhode Island Pawtucket, Rhode Island	—WH-32119	39. University of Miami Miami, Florida	—WH-42131
16. State University of New York at Buffalo Buffalo, New York	—WH-32122	40. University of Wisconsin Madison, Wisconsin	—WH-42132
17. University of California, Irvine Irvine, California	—WH-42107	41. Wake Forest University Winston-Salem, North Carolina	—WH-44221
18. George Washington University Washington, DC	—WH-42108	42. Albert Einstein College of Medicine New York, New York	—WH-74310
19. Stanford University Stanford, California	—WH-42109	43. Brigham and Women's Hospital Boston, Massachusetts	—WH-74311
20. Baylor College of Medicine Houston, Texas	—WH-42110	44. California Pacific Medical Center San Francisco, California	—WH-74312
21. University of Texas Health Science Center San Antonio, Texas	—WH-42111	45. Fred Hutchinson Cancer Research Center Seattle, Washington	—WH-74313
22. Ohio State University Columbus, Ohio	—WH-42112	46. Fred Hutchinson Cancer Research Center Seattle, Washington	—WH-74314
23. University of Nevada School of Medicine Reno, Nevada	—WH-42113	47. Fred Hutchinson Cancer Research Center Seattle, Washington	—WH-74315
24. Kaiser Foundation Research Institute Oakland, California	—WH-42114	48. The Ohio State University Columbus, Ohio	—WH-74316
25. State University of New York at Stony Brook Stony Brook, New York	—WH-42115	49. Tufts University Boston, Massachusetts	—WH-74317
26. University of Massachusetts Medical School Worcester, Massachusetts	—WH-42116	50. University of Pittsburgh Pittsburgh, Pennsylvania	—WH-74318
27. University of North Carolina at Chapel Hill Chapel Hill, North Carolina	—WH-42117	51. University of California, Davis Davis, California	—WH-74319
28. Wayne State University Detroit, Michigan	—WH-42118	52. University of Pittsburgh Pittsburgh, Pennsylvania	—WH-74320
29. Albert Einstein College of Medicine New York, New York	—WH-42119	53. Wake Forest University Winston-Salem, North Carolina	—WH-74321
30. Harbor-UCLA Research and Education Institute Torrance, California	—WH-42120	54. Ohio State University Columbus, Ohio	—WH-94341
31. Kaiser Foundation Research Institute Oakland, California	—WH-42121	55. University of Pittsburgh Pittsburgh, Pennsylvania	—WH-94342
32. Medical College of Wisconsin Milwaukee, Wisconsin	—WH-42122	56. Fred Hutchinson Cancer Research Center Seattle, Washington	—WH-94343
33. MedStar Research Institute Washington, DC	—WH-42123	57. Fred Hutchinson Cancer Research Center Seattle, Washington	—WH-94344
34. Rush-Presbyterian-St. Luke's Medical Center Chicago, Illinois	—WH-42124	58. Fred Hutchinson Cancer Research Center Seattle, Washington	—WH-94346
		59. Fred Hutchinson Cancer Research Center Seattle, Washington	—WH-94347
		60. Fred Hutchinson Cancer Research Center Seattle, Washington	—WH-94348

61. Albert Einstein College of Medicine  
New York, New York —WH-94349
62. Brigham and Women's Hospital  
Boston, Massachusetts —WH-94350

## Lung Diseases Program

### Acute Respiratory Distress Syndrome Clinical Network (ARDSNet), Initiated in Fiscal Year 1994

The purpose of this network is to develop and conduct randomized controlled clinical trials to prevent, treat, and improve the outcome of patients with acute lung injury, ARDS, and other related critical illnesses.

#### Obligations

Funding History:

Fiscal Year 2009—\$6,195,077

Fiscal Years 1994–2008—\$65,339,896

Total Funding to Date—\$71,534,973

#### 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. John Hopkins University  
Baltimore, Maryland —HR-56170
7. LDS Hospital  
Salt Lake City, Utah —HR-56171
8. Louisiana State University  
New Orleans, Louisiana —HR-56172
9. University of Washington  
Seattle, Washington —HR-56173
10. Vanderbilt University Medical Center  
Nashville, Tennessee —HR-56174
11. Wake Forest University Health Sciences  
Winston-Salem, North Carolina —HR-56175
12. Mayo Clinic College of Medicine  
Rochester, Minnesota —HR-56176
13. Massachusetts General Hospital  
Boston, Massachusetts —HR-56179

### Asthma Network (AsthmaNet), Initiated in Fiscal Year 2009

The purpose of this network is to develop and conduct multiple clinical trials to address the most important asthma management questions and new treatment approaches in pediatric and adult populations. Investigators will identify optimal therapies for a variety of asthma phenotypes, genotypes, and racial and ethnic backgrounds. They will also conduct a limited number of proof-of-concept studies to advance the development of innovative therapies and perform studies to investigate the mechanistic bases for the interventions. Approximately 30 percent of the participants will be from diverse minority populations.

#### Obligations

Funding History:

Fiscal Year 2009—\$8,300,000

Total Funding to Date—\$8,300,000

#### Current Active Organizations and Grant Numbers

1. National Jewish Health  
Denver, Colorado —HL-098075
2. University of Wisconsin, Madison  
Madison, Wisconsin —HL-098090
3. Northwestern University  
Chicago, Illinois —HL-098096
4. Washington University  
St. Louis, Missouri —HL-098098
5. Brigham and Women's Hospital  
Boston, Massachusetts —HL-098102
6. Wake Forest University Health  
Science Center  
Winston-Salem, North Carolina —HL-098103
7. University of California, San Francisco  
San Francisco, California —HL-098107
8. University of Arizona  
Tucson, Arizona —HL-098112
9. Pennsylvania State University  
Hershey, Pennsylvania —HL-098115
10. University of Pittsburgh  
Pittsburgh, Pennsylvania —HL-098177

### COPD Clinical Research Network, Initiated in Fiscal Year 2003

The purpose of this network is to investigate disease management approaches in patients with moderate-to-severe COPD and to ensure that the findings are rapidly disseminated to the medical community.

## Obligations

### Funding History:

Fiscal Year 2009—\$3,150,000

Fiscal Years 2003–2008—\$40,030,386

Total Funding to Date—\$43,180,386

### Current Active Organizations and Grant Numbers

1. Harbor-UCLA Research and Education Institute  
Torrance, California —HL-074407
2. Temple University  
Philadelphia, Pennsylvania —HL-074408
3. Denver Health and Hospital Authority  
Denver, Colorado —HL-074409
4. Minnesota Veterans Research Institute  
Minneapolis, Minnesota —HL-074416
5. University of Alabama at Birmingham  
Birmingham, Alabama —HL-074418
6. University of Michigan at Ann Arbor  
Ann Arbor, Michigan —HL-074422
7. University of Minnesota, Twin Cities  
Minneapolis, Minnesota —HL-074424
8. Brigham and Women's Hospital  
Boston, Massachusetts —HL-074428
9. University of California, San Francisco  
San Francisco, California —HL-074431
10. University of Pittsburgh  
Pittsburgh, Pennsylvania —HL-074439
11. University of Maryland  
Baltimore Professional School  
Baltimore, Maryland —HL-074441

## Idiopathic Pulmonary Fibrosis Clinical Research Network, Initiated in Fiscal Year 2005

The purpose of this network is to establish six to seven clinical centers to design and perform multiple therapeutic trials for treatment of patients with newly diagnosed idiopathic pulmonary fibrosis and a Data Coordinating Center for the network.

## Obligations

### Funding History:

Fiscal Year 2009—\$7,324,944

Fiscal Years 2005–2008—\$25,205,892

Total Funding to Date—\$32,530,836

### Current Active Organizations and Grant Numbers

1. Mayo Clinic College of Medicine  
Rochester, Minnesota —HL-080274
2. Vanderbilt University  
Nashville, Tennessee —HL-080370

3. University of Michigan at Ann Arbor  
Ann Arbor, Michigan —HL-080371
4. Weill Medical College of Cornell University  
New York, New York —HL-080383
5. University of California, Los Angeles  
Los Angeles, California —HL-080411
6. Duke University  
Durham, North Carolina —HL-080413
7. University of Washington  
Seattle, Washington —HL-080509
8. Tulane University of Louisiana  
New Orleans, Louisiana —HL-080510
9. University of Chicago  
Chicago, Illinois —HL-080513
10. Emory University  
Atlanta, Georgia —HL-080543
11. National Jewish Medical and  
Research Center  
Denver, Colorado —HL-080571
12. University of California, San Francisco  
San Francisco, California —HL-080685

## 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, home-administered oxygen therapy in patients with COPD. Approximately 3,200 patients with moderate COPD will be enrolled to determine whether supplemental oxygen can improve their quality of life and extend their lifespan. Research findings will help Medicare decide whether to extend coverage for home oxygen treatment for patients with moderately severe disease.

## Obligations

### Funding History:

Fiscal Year 2009—\$202,302

Fiscal Years 2007–2008—\$16,250,145

Total Funding to Date—\$16,452,447

### Current Active Organizations and Contract Numbers

1. Brigham and Women's Hospital  
Boston, Massachusetts —HR-76183
2. Cleveland Clinic Foundation  
Cleveland, Ohio —HR-76184
3. Denver Health and Hospital Authority  
Denver, Colorado —HR-76185
4. Duke University Medical Center  
Durham, North Carolina —HR-76186
5. Kaiser Foundation Hospitals  
Portland, Oregon —HR-76187

6. Los Angeles Biomedical Institute/Harbor-UCLA Los Angeles, California	—HR-76188
7. The Ohio State University Columbus, Ohio	—HR-76189
8. Temple University Philadelphia, Pennsylvania	—HR-76190
9. University of Alabama at Birmingham Birmingham, Alabama	—HR-76191
10. University of Michigan Ann Arbor, Michigan	—HR-76192
11. University of Pittsburgh Pittsburgh, Pennsylvania	—HR-76193
12. University of Utah Salt Lake City, Utah	—HR-76194
13. University of Washington Seattle, Washington	—HR-76195
14. Washington University St. Louis, Missouri	—HR-76196
15. Johns Hopkins University Baltimore, Maryland	—HR-76197

### **National Emphysema Treatment Trial (NETT), Initiated in Fiscal Year 1997**

The NETT was designed to determine the role, safety, and effectiveness of lung volume reduction surgery in the treatment of severe emphysema. Investigators continue to analyze data from the original NETT Master Data set and to publish their findings.

#### **Obligations**

Funding History:

Fiscal Year 2009—\$285,156

Fiscal Years 1997–2008—\$36,203,000

Total Funding to Date—\$36,488,156

#### **Current Active Organization and Contract Number**

1. Johns Hopkins University Baltimore, Maryland	—HR-76119
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### **Subpopulations and Intermediate Outcome Measures in COPD Study (SPIROMICS), Initiated in Fiscal Year 2009**

The purpose of this study is 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 2009—\$2,081,851

Total Funding to Date—\$2,081,851

#### **Current Active Organizations and Contract Numbers**

1. University of California, San Francisco San Francisco, California	—HR-96199
2. University of California, Los Angeles Los Angeles, California	—HR-96200
3. Columbia University New York, New York	—HR-96201
4. University of Michigan Ann Arbor, Michigan	—HR-96202
5. University of Utah, Salt Lake City, Utah	—HR-96203
6. Wake Forest University Winston-Salem, North Carolina	—HR-96204
7. University of Iowa Iowa City, Iowa	—HR-96205
8. University of North Carolina at Chapel Hill Chapel Hill, North Carolina	—HR-96206

### **Blood Diseases and Resources Program**

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

The purpose of this network is to promote the efficient comparison of novel treatment methods and management strategies of potential benefit for children and adults undergoing blood or marrow transplantation.

#### **Obligations**

Funding History:

Fiscal Year 2009—\$6,350,697

Fiscal Years 2001–2008—\$50,147,120

Total Funding to Date—\$56,497,817

#### **Current Active Organizations and Grant Numbers**

1. University of Nebraska Medical Center Omaha, Nebraska	—HL-069233
2. Fred Hutchinson Cancer Research Center Seattle, Washington	—HL-069246
3. Dana Farber Cancer Institute Boston, Massachusetts	—HL-069249
4. National Childhood Cancer Foundation Arcadia, California	—HL-069254



5. University of California, San Diego La Jolla, California	—HL-069273	5. Medical University of South Carolina Charleston, South Carolina	—HB-07154
6. Duke University Durham, North Carolina	—HL-069274	6. St. Jude Children's Research Hospital Memphis, Tennessee	—HB-07155
7. City of Hope Medical Center Duarte, California	—HL-069278	7. The Research Foundation of SUNY New York, New York	—HB-07156
8. University of Pennsylvania Philadelphia, Pennsylvania	—HL-069286	8. University of Miami Miami, Florida	—HB-07157
9. University of Minnesota, Twin Cities Minneapolis, Minnesota	—HL-069290	9. University of Mississippi Medical Center Jackson, Mississippi	—HB-07158
10. Stanford University Stanford, California	—HL-069291	10. University of Texas Southwestern Medical Center Dallas, Texas	—HB-07159
11. Medical College of Wisconsin Milwaukee, Wisconsin	—HL-069294	11. Clinical Trials and Surveys Corporation Baltimore, Maryland	—HB-07160
12. University of Florida Gainesville, Florida	—HL-069301		
13. Johns Hopkins University Baltimore, Maryland	—HL-069310		
14. Sloan Kettering Institute for Cancer Research New York, New York	—HL-069315		
15. University of Michigan at Ann Arbor Ann Arbor, Michigan	—HL-069330		
16. University of Texas M.D. Anderson Cancer Center Houston, Texas	—HL-069334		
17. Case Western Reserve University Cleveland, Ohio	—HL-069348		

### **Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG), Initiated in Fiscal Year 2000**

The objective of this clinical trial is to determine if hydroxyurea therapy is effective in prevention of chronic end organ damage in pediatric patients with sickle cell anemia.

#### **Obligations**

##### **Funding History:**

Fiscal Year 2009—\$1,703,918  
Fiscal Years 2000–2008—\$20,143,615  
Total Funding to Date—\$21,847,533

#### **Current Active Organizations and Contract Numbers**

1. Children's Research Institute Washington, DC	—HB-07150
2. Duke University Medical Center Durham, North Carolina	—HB-07151
3. Howard University Washington, DC	—HB-07152
4. Johns Hopkins University Baltimore, Maryland	—HB-07153

### **Sildenafil for Sickle Cell Disease-Associated Pulmonary Hypertension, Initiated in Fiscal Year 2006**

The purpose of this clinical trial is to evaluate the safety and efficacy of 18 weeks of therapy with sildenafil, a nitric oxide potentiator, in adult patients with SCD and pulmonary hypertension; exercise endurance and pulmonary artery pressure will be measured. Pulmonary hypertension occurs in up to 30 percent of SCD cases and is strongly associated with mortality in adults with SCD.

#### **Obligations**

##### **Funding History:**

Fiscal Year 2009—\$962,952  
Fiscal Years 2006–2008—\$8,370,142  
Total Funding to Date—\$9,333,094

#### **Current Active Organizations and Contract Numbers**

1. Rho Federal Systems Division, Inc. Chapel Hill, North Carolina	—HB-67182
2. Imperial College of London London, England	—HB-67183
3. Children's Hospital of Pittsburgh Pittsburgh, Pennsylvania	—HB-67184
4. University of Colorado Denver, Colorado	—HB-67185
5. Children's Hospital and Research Center at Oakland Oakland, California	—HB-67186
6. University of Illinois at Chicago Chicago, Illinois	—HB-67187
7. Johns Hopkins University Baltimore, Maryland	—HB-67188

8. Howard University  
Washington, DC —HB-67189
9. Albert Einstein College of Medicine of  
Yeshiva University  
New York, New York —HB-67190

### **Thalassemia (Cooley's Anemia) Clinical Research Network, Initiated Fiscal Year 2000**

The purpose of this network is to accelerate research in the management of thalassemia, standardize existing treatments, and evaluate new ones in a network of clinical centers.

#### **Obligations**

##### **Funding History:**

- Fiscal Year 2009—\$657,580
- Fiscal Years 2000–2008—\$22,006,021
- Total Funding to Date—\$22,663,601

#### **Current Active Organizations and Grant Numbers**

1. Children's Hospital of Philadelphia  
Philadelphia, Pennsylvania —HL-065232
2. Hospital for Sick Children  
Toronto, Ontario —HL-065233
3. New England Research Institute, Inc.  
Watertown, Massachusetts —HL-065238
4. Children's Hospital and Research  
Center at Oakland  
Oakland, California —HL-065239
5. Weill Medical College  
of Cornell University  
New York, New York —HL-065244
6. Children's Hospital  
Boston, Massachusetts —HL-065260

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

The purpose of this network is to promote the efficient comparison of new management strategies for individuals with hemostatic disorders, such as idiopathic thrombocytopenia and thrombotic thrombocytopenic purpura, and to evaluate new and existing blood products and cytokines for treatment of hematologic disorders.

#### **Obligations**

##### **Funding History:**

- Fiscal Year 2009—\$6,541,087
- Fiscal Years 2002–2008—\$43,909,114
- Total Funding to Date—\$50,450,201

#### **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. Children's Hospital  
Boston, Massachusetts —HL-072291
13. Massachusetts General Hospital  
Boston, Massachusetts —HL-072299
14. Puget Sound Blood Center  
Seattle, Washington —HL-072305
15. University of Pittsburgh  
Pittsburgh, Pennsylvania —HL-072331
16. University of Pennsylvania  
Philadelphia, Pennsylvania —HL-072346
17. University of North Carolina at  
Chapel Hill  
Chapel Hill, North Carolina —HL-072355
18. University of Maryland  
Baltimore Professional School  
Baltimore, Maryland —HL-072359



## 12. Minority Activities

Throughout its history, the NHLBI has been a leader in conducting and supporting research to eliminate health disparities that exist between various segments of the U.S. population. The Institute has not only initiated research projects with significant minority participation to compare health status between various populations, but has also given high priority to programs that focus exclusively on minority health issues.

Since FY 1991, the Institute has had procedures in place to ensure full compliance with the NIH Policy on Inclusion of Women and Minorities as Subjects in Clinical Research. As a result, all NHLBI-supported research that involves human subjects includes minorities, with the exception of a very few projects for which a compelling justification for limited diversity in the study population exists. Thus, all segments of the population, minority and nonminority, women, and children, stand to benefit from the Institute's research programs.

It has long been a goal of the NHLBI to increase the number of individuals from underrepresented groups in biomedical and behavioral research. Selected FY 2009 activities addressing this goal include the following:

- Historically Black Colleges and Universities (HBCU) Research Scientist Award and the Research Scientist Award for Minority Institutions: Strengthens the biomedical and behavioral research capabilities and resources of HBCUs or minority institutions by recruiting an established research scientist in areas related to cardiovascular, lung, or blood health and disease; transfusion medicine; or sleep disorders
- Sickle Cell Scholars Program: Supports career development of young or new investigators in SCD research as part of the BTRP
- Summer for Sickle Cell Science Program: Supports research training and mentoring of individuals at the high school level as part of the BTRP

- Clinical Research Education and Career Development in Minority Institutions: Encourages the development and implementation of curriculum-dependent programs in minority institutions to train selected doctoral and postdoctoral candidates in clinical research leading to a Master of Science Degree in Clinical Research or Master of Public Health Degree in a clinically relevant area
- Minority Undergraduate Biomedical Education Program: Encourages development of pilot demonstration programs at minority undergraduate educational institutions to recruit and retain talented undergraduate students in the biomedical sciences
- Summer Institute Program To Increase Diversity in Health-Related Research: Enables faculty and scientists from underrepresented racial and ethnic groups or with disabilities to advance their research skills and knowledge in basic and applied sciences relevant to heart, lung, and blood diseases and sleep disorders, so that they can compete for funding for scientific research in the biomedical and behavioral sciences

The Office of Research Training and Minority Health (ORTMH) within the Office of the Director provides oversight for, and coordinates, supports, and evaluates Institute programs related to minority health outcomes, including research, research training and career development, public outreach, and translation of research findings. The ORTMH also coordinates activities to foster greater participation of underrepresented minorities in NHLBI research and research training and career development programs. Selected FY 2009 activities include the following:

- Issuing four training and career development RFAs to increase the number of highly trained minorities conducting biomedical and behavioral research. Additional targeted groups include individuals from disadvantaged backgrounds and individuals with disabilities
- Participating in HHS-Endorsed Minority Organization Internship Programs by supporting positions in NHLBI extramural and intramural



divisions for students from the National Association for Equal Opportunity in Higher Education, the Hispanic Association of Colleges and Universities, the Washington Internships for Native Students programs, and the Directors of Health Promotion and Education Internship Program/CDC

- Cosponsoring with the NIH, the Cherokee Elementary School Project: Out of the Box, which is designed to create awareness and interest in the importance of science, medicine, and health; eliminate gaps in quality of health among minorities by encouraging health-related careers; and encourage children to take responsibility for their own health
- Supporting the African American, Hispanic, and Native American Youth Initiatives to bring minority students to the NIH campus for scientific presentations, an introduction to NHLBI research training and career development programs, and a tour of NHLBI laboratories
- Providing undergraduate students from the Tougaloo College Scholars program an opportunity to learn about the NIH, biomedical research, and research training opportunities at the NHLBI during a 3-day tour of the NIH
- Serving as a Web site resource for recruitment of minority individuals into the Ruth L. Kirschstein Institutional National Research Service Award (T32)
- Increasing recruitment of individuals for the NHLBI intramural and extramural training programs by representing the Institute at five minority-focused research meetings to raise awareness of research and research training and career development opportunities available from the NHLBI
- Coordinating the Biomedical Research Training Program for Individuals from Underrepresented Groups, which offers opportunities for underrepresented undergraduate, postbaccalaureate, and graduate students to receive training in fundamental biomedical sciences and clinical research as they relate to the etiology and treatment of heart, blood vessel, lung, and blood diseases and sleep disorders
- Serving as the NHLBI contact for guidance to candidates applying for the NIH Pathway to Independence (PI) Award (K99/R00) and the NHLBI Career Transition Award (K22) for extramural programmatic issues

See Chapter 13 for additional NHLBI-supported minority research training and career development programs.

The following text describes selected current projects that focus on minority populations and reflect the Institute's research portfolio related to minority health. Additional information can be found in Chapters 9–11.

## Heart and Vascular Diseases

### Risk Factors

#### *Epidemiology*

Long-term epidemiologic studies are critical to uncovering risk factors that lead to disease. The Institute has initiated several major studies of heart disease focused significantly or completely on minority populations:

- **CARDIA** (see Chapter 10): To determine the evolution of CHD risk factors and lifestyle characteristics in young adults that may influence development of risk factors prior to middle age. Fifty percent of participants are black.
- **ARIC** (see Chapter 10): To investigate the association of CHD risk factors with development of atherosclerosis and CVD in an adult population. Thirty percent of participants are black.
- **CHS** (see Chapter 10): To examine risk factors for CHD and stroke in the elderly. Sixteen percent of participants are black.
- **Strong Heart Study** (see Chapter 9): To compare risk factor levels and morbidity and mortality from CVD among American Indians from three different geographic locations.
- **JHS** (see Chapter 10): To identify environmental and genetic factors influencing evolution and progression of CVD in blacks.
- **MESA** (see Chapter 10): To examine the characteristics of subclinical CVD that predict progression to clinically overt CVD and related risk factors that predict subclinical disease in blacks, whites, Hispanics, and Asians. Sixty-two percent of participants are from minority populations.
- **GOCADAN** (see Chapter 9): To document CVD risk factors and measures of subclinical disease and to identify and characterize genes that contribute to CVD in approximately 40 extended Alaska Native families.
- **HCHS** (see Chapter 10): To identify risk factors for cardiovascular and lung disease in Hispanic 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.

Ancillary studies to MESA are investigating subclinical CVD in ethnic minority groups. They include investigations of regional left ventricular function, progression of calcification in the aorta, abnormalities in the small vessels of the retina, association of air pollution and subclinical CVD, lung function in relation to endothelial dysfunction and biomarkers, identification of genes for subclinical CVD, and relationships of sociodemographic factors and other factors to subclinical CVD.

The Institute is supporting additional epidemiologic investigations that include a project to use pooled data from nine existing U.S. studies to compare between blacks and whites, CHD incidence and mortality rates, exposure–outcome relationships, patterns of comorbidity, and population attributable risk; and a study to evaluate and compare the extent of atherosclerosis and risk factors for CHD in three different populations: U.S. (75 percent white and 25 percent black), Japanese Americans in Hawaii, and Japanese in Japan.

## Treatment and Prevention

Although great progress has been achieved in reducing CVD morbidity and mortality in the United States over the past 40 years, minorities have not shared fully in the progress and continue to have higher CVD morbidity. To address this problem, the Institute has initiated programs directed at reducing cardiovascular health disparities:

- **Cultural Competence and Health Disparities Academic Award Program:** To enhance the ability of physicians and other health care professionals to address, in a culturally sensitive manner, disparities in the occurrence, management, and outcomes of cardiovascular, lung, and blood diseases and sleep disorders among various population groups in the United States. The award addresses ethnic, cultural, religious, socioeconomic, linguistic, and other factors that contribute to health disparities and seeks culturally competent approaches to mitigating them.
- **Community-Responsive Interventions To Reduce Cardiovascular Risk in American Indians and Alaska Natives (see Chapter 11):** To test the effectiveness of culturally appropriate behavioral

interventions that promote adoption of healthy lifestyles (healthy diet, regular physical activity, smoking cessation, and stress management) related to heart disease and stroke risk in American Indians and Alaska Natives.

- **Effect of Racial and Ethnic Discrimination/Bias on Health Care Delivery:** To improve the measurement of racial/ethnic discrimination in health care delivery systems and enhance understanding of the influence of such discrimination and its association with health disparities among disadvantaged racial/ethnic minority groups. Research results should lead to the development of interventions that are focused on reducing or eliminating discrimination in health care delivery. Fifty percent of participants will be black.
- **Behavioral and Social Science Research on Understanding and Reducing Health Disparities:** To encourage behavioral and social science research on the causes of and solutions to health and disabilities disparities in the U.S. population and to develop and test more effective interventions for reducing and eventually eliminating health disparities.

## Education

The NHLBI, through the DARD, seeks to translate research findings into practice by communicating research advances effectively and disseminating health information to physicians, health care professionals, patients, and the public on ways to prevent or treat diseases within the Institute's mandate.

The Division has developed the Community Health Worker (CHW) Initiative as a community-based strategy to help improve cardiovascular health among various cultural/ethnic groups in the United States: black, Hispanic, American Indian, Alaska Native, and Filipino.

- **NHLBI–U.S. Department of Housing and Urban Development HOPE VI:** To address cardiovascular health disparities in public housing settings. With the aid of the NHLBI heart health curriculum, residents of the black community are trained to become educators of other public housing residents.
- **NHLBI–Health Resources and Services Administration Bureau of Primary Care Partnership:** To integrate clinical care management teams and trained community health educators to implement pilot programs for blacks, Hispanics, and Filipinos in the United States who are at high risk for CVD.

- *Salud para su Corazón*: To develop networks to disseminate information and strategies about CVD prevention and control by promoting heart healthy behaviors in Hispanic communities.
- NHLBI–Pan American Health Organization/WHO Partnership To Promote Cardiovascular Health in the Americas: To develop and evaluate community-based interventions to prevent and control CVD risk factors among low-resource communities in Argentina, Chile, and Guatemala.
- *Honoring the Gift of Heart Health*: To develop and evaluate community-based interventions to prevent and control CVD risk factors through education and outreach using tribal community health workers and community health educators.
- *Healthy Heart, Healthy Family*: To develop and evaluate culturally and linguistically appropriate outreach activities and information to increase community awareness of heart disease and its associated risk factors and to promote heart healthy lifestyles among the growing Filipino population in the United States.
- *The Heart Truth Campaign*: To raise awareness of heart disease in women through community-based interventions. Special populations are especially targeted through the Heart Truth’s Women of Color Initiative, a partnership with national black and Hispanic organizations.

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

- *With Every Heartbeat Is Life: A Community Health Worker’s Manual for African Americans*
- *On the Move to Better Heart Health for African Americans*
- *Honoring the Gift of Heart Health: A Heart Health Educational Manual for American Indians and Alaska Natives*
- *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
- *Vietnamese Aspire for Healthy Hearts* in Vietnamese and English
- *Your Heart Is Golden: Heart Health Promotion Activities for Vietnamese Communities*
- *Your Heart, Your Life: A Health Educator’s Manual for the Latino Community* in English and Spanish
- *Healthy Homes, Healthy Hearts Series* (six easy-to-read English and Spanish booklets on heart healthy living)
- *Bringing Heart Health to Latinos: A Guide for Building Community Programs*
- *The Heart Truth for African American Women: An Action Plan*
- *The Heart Truth for Latinas: An Action Plan*

The educational materials listed throughout this chapter can be obtained from the NHLBI public Web site or through the NHLBI online catalog.

## Arrhythmias

Arrhythmia is a disorder of the normal rhythms of the heart, whereby it beats too fast (tachycardia), too slow (bradycardia), or irregularly. The NHLBI is supporting basic and genetic research on the mechanisms that underlie cardiac arrhythmias to improve diagnosis, treatment, and prevention of arrhythmias in all racial and ethnic groups in the United States. One study is investigating the genetic basis and electrophysiological mechanisms of Ca<sup>2+</sup> triggered arrhythmias in inherited diseases and syndromes—such as catecholaminergic polymorphic ventricular tachycardia, long QT syndrome, and hypertrophic cardiomyopathy—as a means to improve understanding of the pathogenesis of sudden cardiac arrest. Another study is evaluating variants of the gene NOS1AP that affect the QT interval in different racial populations, including blacks and Hispanics. A third study is evaluating the distributions of electrocardiographic predictors of atrial fibrillation in different ethnic groups to identify whether minority populations may have a higher risk for this arrhythmia than whites.

Scientists have identified an association between variations in certain receptors that are activated during sympathetic nervous system stimulation and an increased risk of sudden cardiac death, most often due to ventricular arrhythmia. Although significant differences in associated risk of sudden cardiac death were not found between blacks and whites, continued research is expected to

advance understanding of differences in genetic predisposition for cardiac arrhythmias among racial and ethnic groups and ultimately lead to improved therapy.

Investigators identified two mutations in a gene encoding the major intracellular calcium release channel in two cases of SIDS. One mutation was identified in 1 of 50 black infants and the other in 1 of 83 white infants. Researchers reported a pathogenic mechanism for SIDS, whereby SIDS-linked mutant ion channels become “leaky” during stress and thus potentially trigger fatal cardiac arrhythmias. Importantly, researchers have found further evidence that cardiac arrhythmias of genetic origin contribute to SIDS, a concept that offers a chance to prevent some avoidable tragedies.

## Heart Failure

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

The NHLBI is supporting basic and clinical research associated with heart failure that will benefit Americans of all ethnicities. One Institute-initiated study is facilitating the translation of basic science discoveries into clinical applications:

- Heart Failure Clinical Research Network (see Chapter 9): To develop, coordinate, and conduct multiple collaborative proof-of-concept clinical protocols to improve heart failure outcomes. The Network has been expanded to include a historically black medical center with minority investigators and access to a high-risk, underserved population.

Other research targeting minority populations includes an investigation of genetic variations (especially those common in blacks) that affect individual responses to the beta blocker drugs used to treat heart failure; a study of underlying genetic variations that result in familial dilated cardiomyopathy, an inherited form of heart dysfunction; and a study on angioedema—a severe allergic reaction and a life-threatening side effect of ACE-inhibitor drugs that is more common in blacks than in whites. Investigators are determining the mechanisms that cause this side effect and are studying the genetic profile of affected individuals and their families to determine who should avoid taking the drugs.

Individuals with heart failure typically have a poor prognosis and a diminished quality of life. Depression is common, and it worsens functional impairment and quality of life, and decreases chances of survival. An investigator-initiated study is seeking to determine whether cognitive behavioral intervention is superior to supportive clinical management for depressed outpatients with heart failure. Thirty percent of participants are expected to be black.

An investigator-initiated, multicenter observational clinical study is being conducted to improve the ability of physicians to identify and treat appropriately patients who are at high risk for serious complications from heart failure. Participants will comprise individuals who visit the emergency department at one of three hospitals that treats racially and socioeconomically diverse patients.

## High Blood Pressure

### *Etiology and Pathophysiology*

High blood pressure is a serious health problem that is especially prevalent and severe among minorities. The NHLBI supports a number of investigator-initiated studies to identify genes linked to hypertension in blacks, Mexican Americans, and whites to determine if part of the disparity in prevalence can be attributed to genetic differences among the groups. Genes under investigation include those associated with the renin-angiotensin system, the autonomic nervous system, and sodium transport.

The role of dietary factors, particularly macronutrients, in the etiology of high blood pressure is another area of investigation. Scientists are conducting epidemiologic studies among participants with diverse ethnicity, SES, and dietary habits in four countries to determine the effect of selected dietary components (proteins, lipids, carbohydrates, amino acids, calcium, magnesium, sodium, potassium, antioxidants, fiber, and caffeine) on blood pressure. Another study is seeking to identify the link between healthy diet, genetic factors, and their underlying biological mechanisms.

### *Treatment and Prevention*

An investigator-initiated ancillary study to ALLHAT, the largest hypertension clinical trial conducted by the NHLBI, is evaluating the pharmacogenetic response to antihypertensive treatment and long-term clinical



complications in blacks, whites, and Hispanics. Scientists seek to determine whether pharmacogenetics is a feasible approach to personalized therapy for hypertension.

The Institute also supports a number of investigator-initiated studies to prevent hypertension and improve blood pressure control in racial and ethnic minorities. Interventions target both lay and medical communities. Strategies being tested include communication skill enhancement, organizational change, educational programs, lifestyle and nutritional counseling, use of technology, case management, pharmacy-based interventions, and provision of care by community health workers and other nontraditional providers.

Understanding racial differences in blood pressure control is an area of major interest for the Institute. Scientists are examining whether variations in genes of the renin-angiotensin-aldosterone system predict differences in blood pressure response to diuretic therapy among hypertensive blacks and whites. Research also is being focused on variations in the ACE gene between blacks and whites to explain racial differences in the antihypertensive responsiveness to ACE inhibitors.

### **Education**

The NHLBI has developed a number of outreach activities to inform minority populations of the importance of blood pressure control. Included among them are a toll-free number that provides materials on hypertension in English or Spanish; mini telenovelas (*Más vale prevenir que lamentar*), “health moments” to reinforce CVD prevention for local Spanish-language television stations; a Spanish version of the High Blood Pressure Education Month Kit; and several publications and Web-based products for health professionals, patients, and the public. Some examples are:

- *Plan de Alimentación Saludable Contra la Hipertensión: Prevenir y Controlar la Presión Arterial Alta Siguiendo el Plan de Alimentación Conocida Como DASH* (DASH to the Diet: Prevent and Control High Blood Pressure Following the DASH Eating Plan)
- *Presión Arterial Alta: NHLBI Diseases and Conditions Index*
- *Si se Puede: Prevenir y Controlar la Presión Arterial Alta: Lo Que Usted Debe Saber Sobre la*

*Prevenición y Control de la Presión Arterial Alta* (Prevent and Control High Blood Pressure: What You Should Know)

- *Si se Puede: Prevenir y Controlar la Presión Arterial Alta: Lo Que los Médicos Deben Saber* (Prevent and Control High Blood Pressure. What Every Physician Should Know)
- *Keep the Beat: Control Your High Blood Pressure* in English and Spanish
- *Help Your Heart: Control Your High Blood Pressure* in Tagalog and English
- *Keep Your Heart in Check—Know Your Blood Pressure Number* in Vietnamese and English
- *Prevent and Control High Blood Pressure: Mission Possible*

### **High Serum Cholesterol**

#### **Etiology**

The Institute supports investigator-initiated studies to identify genes that influence the lipoprotein profile within various racial and ethnic groups. Research findings could offer an explanation for differences in susceptibility to CHD found among various racial and ethnic groups. One project involving extended families of Mexican Americans in the San Antonio Family Heart Study has detected and mapped many quantitative trait loci (QTLs) for CVD risk factors, including some that influence HDL and LDL levels. Scientists will seek to determine the genes for the QTLs related to lipoproteins. Another study is focused on the variation in hepatic lipase activity that leads to differences in plasma concentrations of HDL and LDL synthesis and catabolism. Investigators are seeking to determine whether racial differences in hepatic lipase activity are responsible for the well-known differences in plasma HDL concentrations found in blacks and whites. Thirty-nine percent of participants are black.

#### **Prevention**

The NHLBI is supporting an investigator-initiated study among minority preschool children to track the long-term effectiveness of nutrition interventions on diet and blood cholesterol levels. Additional potential risk factors such as increased blood pressure, obesity, and intention to smoke, will also be monitored.

## Education

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

- *Do You Know Your Cholesterol Levels?* in English and Spanish
- *Heart-Healthy Home Cooking African American Style*
- *Delicious Heart-Healthy Latino Recipes*
- *American Indian and Alaska Native People: Treat Your Heart to a Healthy Celebration!*
- *Be Heart Smart: Keep Your Cholesterol in Check* in Tagalog and English
- *Serve Up a Healthy Life—Give the Gift of Good Nutrition* in Vietnamese and English

## Obesity

### Etiology

Obesity is a major health concern that affects children and adults. Minorities, including blacks and Mexican Americans, are especially at risk. Data from the 2003–2006 NHANES show that 33 percent of adults and 16 percent of children (aged 2–19 years) are obese. Understanding the causes of obesity could lead to effective strategies to combat this problem.

The Institute is supporting a program to study the effects of short sleep duration on mechanisms underlying weight gain and obesity:

- **Mechanisms Linking Short Sleep Duration and Risk of Obesity or Overweight:** To elucidate cause-and-effect relationships and mechanisms to explain associations between short sleep duration and increased risk of obesity or overweight due to altered metabolism, appetite, or inflammation. Blacks comprise 29 percent of participants in one project, and Asians comprise 100 percent of participants in another project.

Researchers have found that black and Hispanic children are especially likely to develop sleep disordered breathing (sleep apnea). A new study in Hispanic adolescents is investigating the relationship between untreated sleep disordered breathing and the likelihood of being overweight, obese, or having problems with glucose metabolism (insulin resistance)—which may indicate susceptibility to developing diabetes and hypertension.

## Treatment and Prevention

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

- **WLM** (see Chapter 9): To determine the effectiveness of continuous patient contact on weight loss maintenance in adults who recently lost weight; 40 percent of the patients are black.
- **POWER** (see Chapter 11): To test the effectiveness of interventions delivered in routine clinical practice on achieving weight loss in obese patients who have other CVD risk factors (e.g., hypertension). One study focuses on a low-income minority population.
- **Targeted Approaches to Weight Control for Young Adults** (see Chapter 11): To develop and evaluate innovative approaches for weight control in young adults at high risk for weight gain. Participants will be ethnically and socioeconomically diverse.
- **Translating Basic Behavior and Social Science Discoveries Into Interventions To Reduce Obesity** (see Chapter 9): To translate findings from basic research on human behavior into more effective clinical, community, and population interventions to reduce obesity and improve obesity-related behaviors. Some of the studies are expected to have 50- to 100-percent participation from minority populations.
- **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.

The Institute supports a number of investigator-initiated studies on the effectiveness of obesity prevention and control interventions among diverse populations. One study is testing the effectiveness of weight-control interventions (involving diet, physical activity, psychosocial and familial influences) administered during the critical transition period from prepuberty to puberty in black girls at high risk for obesity. Another study in preadolescent black girls is evaluating the efficacy of an after-school dance program and a family-based intervention involving reduced use of television, videotapes, and video games to reduce weight gain. A third study is testing an integrated school- and community-based intervention that involves physical activity and diet to reduce the prevalence of obesity among Asians, Hispanics, and whites.



Blacks at high risk of CVD often have limited success in weight loss and lifestyle change programs. A study was initiated to examine the role of social support, particularly from family members and friends, to facilitate weight loss and related dietary and physical activity changes in blacks.

Hispanics are also an important population targeted for intervention programs. One project is studying the effects of physical activity and dietary behaviors in a microenvironment (i.e., home environment) and in a macroenvironment (i.e., apartment complex, schools, grocery stores, parks, restaurants). Community health workers (promotoras) are working with the families and the community to increase awareness and promote environmental change. Another project with strong Hispanic participation is evaluating how well an intervention, Planned Care for Obesity and Risk Reduction, supports primary care treatment of obesity in adults with at least one other cardiovascular risk factor. The study is seeking to improve the way primary care providers offer services to their patients who are overweight and who also have other important medical conditions or health risks such as hypertension, smoking, or high cholesterol.

Obesity is one of the major health challenges facing Native American children and has serious implications for the development of type 2 diabetes. A school-based intervention, augmented with a family intervention, is focusing on reducing excess weight gain by increasing physical activity and healthy dietary practices in kindergarten and first-grade Native American children.

### **Education**

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

- *Do You Need To Lose Weight?* in English and Spanish
- *On the Move to Better Health for African Americans*
- *Keep the Beat: Aim for a Healthy Weight* in Tagalog and English
- *We Can!*<sup>TM</sup> (Ways to Enhance Children's Activity & Nutrition): Many bilingual (English and Spanish) publications on energy balance are available on the Web site

### **Physical Inactivity**

Despite substantial research about the positive impact of physical activity on CVD and its risk factors, physical inactivity is highly prevalent, especially among minority populations. Researchers have observed an age-related decline in physical activity or aerobic capacity in the biracial cohorts of Institute-initiated longitudinal cohort studies (National Growth and Health Study and CARDIA). Those results, when coupled with findings from MESA and HCHS, have helped to increase understanding of the interrelationships of cardiorespiratory fitness, body composition, and CVD-related risk factors and endpoints, and may provide the basis for more specific evidence-based recommendations on the role of fitness in cardiovascular health among minority children and adults.

Physical inactivity among children is often attributed to lack of open space, lack of recreational equipment, and fear by parents for the safety of children playing outdoors. A study is being conducted to determine if an intervention that changes these neighborhood features in a low-income, inner-city neighborhood will increase physical activity in children. Components of CARDIA, MESA, and HCHS are also examining the effects of the neighborhood environment on physical activity.

A longitudinal follow-up of the Trial of Activity for Adolescent Girls is examining the effects of a school–community joint intervention on physical activity among middle school girls.

A number of investigator-initiated studies are evaluating culturally appropriate interventions to increase physical activity. One study is using lay health advisors to increase moderate intensity physical activity among Mexican American women, a group with many countervailing family and community influences. Several studies are using faith-based approaches—including community-based participatory research approaches to engage church leaders and congregations—to increase activity levels in blacks. Other studies are testing culturally targeted interventions in schools or among pregnant women and mothers/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 potentially transformative platform to deliver convenient and sustainable adherence strategies.

### **Education**

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

- *On the Move to Better Health for African Americans*
- *Si se Puede: Prevenir y Controlar la Presión Arterial Alta con Actividad Física* (Move To Prevent and Control High Blood Pressure With Physical Activity)
- *American Indian and Alaska Native People: Be Active for Your Heart!*
- *Are You at Risk for Heart Disease?* in Tagalog and English
- *Be Active for a Healthier Heart* in Vietnamese and English

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 NHLBI supports a number of investigator-initiated studies of smoking cessation in underserved populations. One study targets low-income, high-risk women from a variety of racial and ethnic backgrounds who quit smoking during pregnancy, and compares maintenance of smoking abstinence postpartum between those who received usual care and those who received intervention-based telephone counseling. Another study among 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.

Technology is increasingly being used to deliver smoking cessation interventions, particularly to young adult smokers. One study is evaluating whether WeBREATHe (Web-Based Respiratory Education About Tobacco and Health), an interactive Internet-based program, can help to augment the efforts of respiratory therapists and nurses who provide cessation interventions to parents of hospitalized pediatric patients with respiratory illness. Forty-two percent of participants are expected to be from minority populations. Another study is assessing the efficacy of telemedicine as a way to provide smoking cessation counseling to primary care patients who live in rural areas.

Smokers often have other cardiovascular risk factors, such as obesity, and some smokers are reluctant to quit because of fear of weight gain. Post-cessation weight gain in patients with hypertension is a particular concern. Two studies of smokers with hypertension will compare the effectiveness of a pharmacologic smoking cessation intervention followed by a weight gain prevention and blood pressure control program that consists of changes in dietary intake and physical activity to the same smoking cessation intervention followed by general health education. Sixty percent of participants are expected to be black.

The estimated prevalence of smoking in the HIV-seropositive population is approximately 50 percent. Evidence shows that before the onset of AIDS-related pulmonary complications, HIV-seropositive individuals are at increased risk of developing accelerated emphysema, possibly related to an increased susceptibility to cigarette smoke. A study of smokers with HIV will examine the effects of a specialized smoking cessation intervention on the natural history of emphysema. Thirty-eight percent of participants are expected to be black.

In addition to smoking cessation research, the NHLBI also supports a number of investigator-initiated studies that seek to improve understanding of the mechanisms that link smoking to cardiovascular and pulmonary diseases. Studies focus on mechanisms of smoking-induced chromatin remodeling in lung inflammation, adaptive glutathione response to smoking in individuals with COPD, genomic contributions of intrauterine smoking exposure and asthma, and the natural history of HIV-associated emphysema following smoking cessation.

## **Education**

The Institute has prepared the following publications on smoking cessation for minorities:

- *Enjoy Living Smoke Free* in English and Spanish
- *On the Move to Better Health for African Americans*
- *American Indian and Alaska Native People: Help Your Heart*
- *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/ethnicity, gender, and social class are important factors that can influence these associations in important ways.

The NHLBI is funding research to identify more precisely the nature of the relationship between depression and adverse cardiac outcomes and the conditions associated with successful treatment of depression. Research results will guide clinical care and inform future trials of depression treatment in heart patients and minority patient populations. Studies include defining the biologic pathways that link depression to physiological mechanisms in post-myocardial infarction and acute coronary syndrome patients—including inflammatory processes implicated in atherogenesis, autonomic nervous system dysfunction, and platelet aggregation and adhesion. Approximately 30 percent of participants are black.

The Institute is also supporting research among middle-aged black and white women to determine whether depression is associated with the adipocytokines adiponectin and leptin, which are bioactive molecules secreted by adipose tissue that play a critical role in atherogenesis and metabolic dysregulation. Research results will provide information on how depression affects risk for diabetes, metabolic syndrome, obesity, and CVD in women.

The Institute supports investigator-initiated research on the interactions of psychosocial factors with race and ethnicity, environmental factors, and low SES in the development of CHD. Scientists are investigating the contribution of biobehavioral factors (hostility, anxiety, and heightened cardiovascular reactivity to stress) in the etiology, pathogenesis, and course of CHD. Racial differences in stress-induced physiologic responses are also being examined. Other investigators are focused on the relationship of psychosocial stress and sleep-disordered breathing with emerging risk factors for subclinical CVD in blacks.

The nature of the relationship between acute and chronic forms of stress and cardiac morbidity and mortality is particularly relevant to minority populations, because stress induced by environmental, social, and discriminatory influences can be significant. One study is investigating whether the effect of acute and chronic exposure to established risk factors (depressive symptoms, major life events, and lack of social support) for CVD over a 5-year period is related to a 2-year increase of subclinical CVD in a sample of women undergoing menopause. Fifty-four percent of participants will be black. Other studies are seeking to clarify the physiologic pathways through which stress affects cardiovascular outcomes—including hemodynamic, sympathetic nervous system and neuroendocrine mechanisms, and inflammatory processes. The ultimate goal is to determine whether stress management interventions can alter these physiological indicators and improve cardiovascular outcomes.

Additional research supported by the Institute includes studies that are addressing the genetic basis of behavioral risk factors and the relationships between risk-promoting variables (psychosocial stress, smoking, poor diet, physical inactivity, lack of adherence to cardiac medications), presumed mediating variables (sympathetic nervous system activity and insulin metabolism), and CHD risk factors.

### **Treatment**

The Institute supports several investigator-initiated studies to develop and evaluate interventions that seek to improve cardiovascular outcomes. One study is seeking to determine the efficacy of a personalized health plan intervention that incorporates mind–body techniques targeted at reducing various risk factors for CVD—such as

insulin resistance, inflammatory markers, and self-reported negative effect. Participants select their own goals on which to focus, and the intervention is tailored to their individual risk profile. Twenty-nine percent of participants will be from minority populations. Another study is evaluating the effectiveness of stress management training combined with exercise-based cardiac rehabilitation as a way to reduce stress in vulnerable cardiac patients. Approximately 25 percent of participants are black. A third study is developing and evaluating an intervention among racial minorities that reduces the impact of bias by reducing stereotypic perceptions that render patients and providers less able to communicate effectively and impair the effect of the visit to improve patient self-management behavior. Additional studies are investigating whether stress management in a high-risk population of blacks with hypertension can influence cardiovascular risk factors.

## Diabetes

### *Etiology*

Diabetes mellitus is a strong risk factor for CVD. Individuals with type 2 diabetes are 2- to 4-times more likely to be at risk for CHD than the general population. Using genome-wide association studies, 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 Rica study.

Another study is investigating two key pathways that lead to diabetes and the mechanisms by which it leads to CVD in older adults. The two pathways are the adipocyte-hepatocyte axis (in the development of diabetes) and the advanced glycation endproduct profibrosis pathway (in CVD complications). Data from CHS will be used.

Two studies are determining the associations of fetuin-A with CVD mortality and diabetes. Fetuin-A is a protein that may simultaneously inhibit vascular calcification and promote insulin resistance and diabetes. One of the studies will use data from MESA.

### *Treatment*

The NHLBI supports clinical trials to determine the benefits of various strategies to reduce CVD among patients with diabetes or treat patients with coronary artery disease and diabetes:

- ACCORD (see Chapter 11): To evaluate the benefits of different therapies to reduce CVD in type 2 diabetes. More than one-third of participants are from minority populations.
- BARI 2D (see Chapter 9): To evaluate whether urgent revascularization offers an advantage over medical therapy in patients with coronary artery disease and diabetes. One-third of participants are from minority populations.

### *Education*

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

- *Protect Your Heart Against Diabetes* in English and Spanish
- *Protect Your Heart: Prevent and Control Diabetes* in Tagalog and English

## Women's Health Initiative

WHI (see Chapter 11) is a long-term national health program designed to address the most frequent causes of death, disability, and diminished quality of life—CVD, cancer, and osteoporosis—in postmenopausal women. The original WHI study enrolled 161,808 postmenopausal women (17 percent of whom were from minority populations) in clinical trials and an observational study, all of which have been completed. Followup studies and data analyses are ongoing.

In January 2007, WHI entered a new phase: funding investigations using blood, DNA, and other biological samples and clinical data from WHI participants. The studies will help to explain the findings from the clinical trials and will investigate the impact of genetic and biological markers on common diseases that affect postmenopausal women. Four of the 12 2-year contracts focused on minority women. A subsequent solicitation resulted in 10 awards, including one that focused on predictive modeling for CVD in multiethnic postmenopausal women.



Recently a genome-wide association study to investigate genes that predict heart disease, stroke, and breast cancer was completed in approximately 12,000 black and Hispanic WHI participants.

## Lung Diseases

The NHLBI supports research on a number of lung diseases, such as asthma, COPD, sarcoidosis, TB, and HIV-related lung diseases, which disproportionately affect minorities. The following section provides examples of research to address health disparities in lung diseases; selected sleep disorders are also included.

### Asthma

Asthma is a chronic lung disease that inflames and narrows the airways. It affects people of all ages, but it most often starts in childhood. In the United States, more than 22 million people are known to have asthma, and more than 6 million of them are children. Prevalence rates are especially high in blacks and Puerto Ricans.

#### *Etiology and Pathophysiology*

The NHLBI has initiated several studies to determine the etiology and pathophysiology of asthma:

- **Severe Asthma Research Program:** To determine the mechanistic basis for severe asthma and to determine how it differs from mild-to-moderate asthma. Several of the projects have strong minority participation.
- **Genome-Wide Association Studies to Identify Genetic Components Related to Heart, Lung, and Blood Disorders:** To identify genetic variants related to heart, lung, and blood disorders and their risk factors using existing population, family, and clinical studies. Several of the asthma-related projects have strong minority representation in the study 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 identify innovative therapeutic targets. Two projects expect 30 to 50 percent of participants to be from minority populations.

The Institute also supports investigator-initiated projects on the etiology and pathophysiology of asthma. One study will (a) 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 (b) determine their role in the subsequent development of asthma, airway hyperreactivity, and allergy. Forty percent of participants will be black. Another study will identify the genetic basis for differences between blacks and whites in asthma susceptibility and development (e.g., risk of exacerbations).

A new study is focused on the possible common genetic determinants for obesity and asthma. It will first identify single nucleotide polymorphisms (SNPs) that are jointly associated with asthma and obesity, using data from the CAMP study, and subsequently validate the SNPs in three independent and ethnically diverse (Hispanic, black, and white) cohorts.

Environmental factors are known to trigger asthma symptoms. An investigator-initiated study is focusing on understanding the mechanisms by which occupational or environmental factors trigger the onset of asthma among low-income, urban blacks and Hispanics. Another study is examining multiple environmental stressors in a predominantly disadvantaged population to determine the effects of maternal stressors and environmental factors in the onset of asthma in early childhood. A third study is examining the reasons why children from lower SES groups suffer from worse asthma than children from higher SES groups. The goal is to develop models of how the social environment affects the onset and severity of childhood asthma and eventually build interventions to ameliorate these effects.

#### *Treatment and Control*

The Institute has initiated research to identify optimal drug strategies for treatment and management of asthma. Because the burden of asthma disproportionately affects minority children, it is important for them to be well represented in clinical trials.

- **AsthmaNet** (see Chapter 11): To develop and conduct multiple clinical trials to identify optimal therapies for a variety of asthma phenotypes, genotypes, and racial and ethnic backgrounds in pediatric and adult populations. Approximately 30 percent of participants will be from minority populations.
- **STAN** (see Chapter 9): To determine whether treatment of chronic rhinitis and sinusitis with nasal steroids will improve control of asthma. One-third of participants are expected to be from minority populations.

The Institute is also supporting investigator-initiated studies focusing on finding effective treatment for various populations. One study in whites, blacks, and Hispanics is creating an asthma self-management skills training program for children and their parents. The program is being created for Web, CD-ROM, and DVD formats and focuses on improving understanding of asthma, preventing asthma attacks, and creating an asthma management plan. Another study will assess an asthma self-management intervention in Puerto Rican children, ages 8 to 16 years, delivered to families by Puerto Rican community health workers. The intervention will tailor a standard asthma core curriculum to family needs and cultural beliefs. A third study will seek to improve health among urban black adolescents with asthma. This study will use peer support—enhanced by a culturally sensitive, technology-based MP3 player platform—to increase adherence to daily controller medications. A fourth study will evaluate a Web-based intervention program that addresses asthma management and avoidance of tobacco use in rural, black adolescent boys.

Many individuals with asthma have poor disease management. A new study will determine whether a multifaceted prompting intervention, administered in urban primary care offices, reduces morbidity among urban children with asthma. Fifty percent of participants will be black. The intervention, designed to stimulate communication between caregivers and clinicians, includes information about the patient's asthma severity or level of control and individualized guideline-based recommendations for care. To improve asthma management, another study will use a highly tailored telephone counseling approach to foster a partnership between women and a clinician. Black women will be the target of this study. A third study will evaluate the efficacy of an evidence-based lifestyle weight loss intervention on asthma control among obese adults. Thirty-six percent of participants will be from minority populations.

### **Education**

The Institute is supporting several education activities. It has developed easy-to-read materials on asthma treatment and control directed to English and Spanish audiences with low literacy:

- *Facts About Controlling Your Asthma*
- *El Asma: Cómo Controlar Esta Enfermedad* (Facts About Controlling Your Asthma)

The Institute also disseminates clinical practice guidelines for the treatment and monitoring of asthma, patient education materials, and information on environmental control of allergens in the United States and throughout the world. It has developed several asthma education programs that are directed at controlling asthma in black and Hispanic children. For example, A Tailored Asthma Education Program for Urban Teens II is evaluating a school-based approach to motivate black students to change negative behaviors related to asthma management. The Institute supports projects that (a) focus on innovative techniques to improve adherence to medical regimes among minorities and people living in poverty and (b) address methods to improve physician adherence to clinical practice guidelines.

### **Chronic Obstructive Pulmonary Disease**

COPD is a disease in which the lungs are damaged, making breathing difficult. It is responsible for more than 500,000 hospitalizations and 100,000 deaths in the United States each year. The Institute has established a research network to determine effective disease management approaches for individuals with moderate-to-severe COPD:

- COPD Clinical Research Network (see Chapter 11): To perform collaborative, therapeutic interventional trials of medications, devices, and disease management strategies in individuals with moderate-to-severe COPD. In addition to evaluating treatment efficacy, network studies include examinations of genetic factors, biomarkers, or genomic/proteomic profiles that may identify patients who are more or less likely to benefit from various treatments.

The NHLBI is supporting a large, investigator-initiated study of genetic factors that determine the risk of developing COPD or that influence the type and extent of damage done to the body by the disease. The COPDGene™ study will enroll approximately 3,500 blacks with a substantial history of cigarette smoking, obtain extensive baseline clinical and phenotypic data regarding the individuals, and compare the severity and character of COPD in the subjects to analyses of their DNA. Genomewide genetic assays will be performed on a substantial fraction of this cohort.

Although COPD is less common among blacks than among whites, it is nevertheless the seventh leading cause of death among blacks. Any disparity, whether



higher or lower in the minority group, may reflect racial differences in the biology of the disease that would require use of different treatments or drugs for optimal disease management. If the genes found to be determinants of COPD risk differ in blacks and whites, this will provide clues to how the roles of specific pathogenetic pathways of COPD differ among races.

## Sarcoidosis

Sarcoidosis is an inflammatory disease of unknown etiology characterized by persistent granulomas with damage to surrounding tissue. The Institute has initiated a program to determine the immunopathogenesis of granulomatous inflammation found in sarcoidosis, including the role of predisposing factors, the immune components involved in the formation of granulomas, and the defective regulatory immune response.

In the United States, sarcoidosis often occurs more frequently and with more severity in blacks than in whites. This may reflect the intensity of the noncaseating granuloma, the hallmark of sarcoidosis, in affected tissue. A twofold greater density of granuloma in bronchiolar lung biopsies was recently found in black patients, which correlated as a measure of disease severity.

Investigator-initiated studies supported by the Institute address the causes of sarcoidosis. They include a study to identify genes linked to sarcoidosis susceptibility in blacks and to determine whether hereditary susceptibility predisposes blacks to sarcoidosis, a study to examine the potential role of a mycobacterial etiology of sarcoidosis, and a study to elucidate the mechanisms involved in the immunologic and inflammatory processes that ultimately lead to end-stage fibrosis in progressive pulmonary sarcoidosis. Many participants are black.

A mentored research project conducted within the Black Women's Health Study is investigating potential risk factors for sarcoidosis.

## Sleep Disorders

Sleep-disordered breathing (SDB), a condition characterized by repetitive interruption in breathing, is a common disorder that disproportionately affects blacks. It is associated with an increased risk of CVD, including hypertension and stroke, and is particularly prevalent in

patients with heart failure. Ongoing programs are assessing the interrelationship between sleep disorders and heart failure and the mechanisms leading to cardiovascular stress when the two intersect.

The Institute also supports investigator-initiated projects to elucidate cardiovascular and other health consequences of SDB, sleep deprivation, and shift work in various community settings. Characterization of how SDB occurs within family groups is helping to identify potential genetic risk factors that may allow early identification and treatment of high-risk individuals. A community-based study of sleep in Hispanics is assessing the prevalence and awareness of sleep disorders.

## Treatment and Control

The Institute initiated a clinical trial to determine whether adenotonsillectomy is an effective treatment for SDB in children:

- Randomized Controlled Study of Adenotonsillectomy for Childhood Sleep Apnea (see Chapter 9): To assess the efficacy of adenotonsillectomy as a treatment for SDB in children aged 5 to 9 years. Fifty percent of participants are from various minority and ethnic populations.

Investigator-initiated research will assess treatment strategies in minorities. One study is seeking to develop in-home personalized sleep plans that can improve nightly sleep duration, neurocognitive function, and behavioral disorders in lower income minority children (ages 5 to 6 years). Another study of adults is examining the effect of a sleep apnea treatment (positive airway pressure therapy) on biological markers of CVD risk, including inflammation and metabolism. More than 50 percent of study participants are from minority populations.

## Education

The NHLBI published *Your Guide to Healthy Sleep*, which provides the latest information about sleep apnea and other sleep disorders, including insomnia, restless legs syndrome, and narcolepsy.

## HIV-Related Lung Diseases

HIV infection disproportionately affects minority populations in the United States and due to multidrug antiretroviral therapy, has become a chronic condition for many

patients. Among them, HIV-associated lung complications are frequent causes of illness and death. But the long-term consequences of HIV infection and HIV-associated lung infections and complications are unknown. Little is known about drug-resistant *Pneumocystis*, the prevalence and pathogenesis of HIV-associated COPD, HIV-associated pulmonary hypertension, and immune reconstitution syndromes. In developing countries where millions of people are HIV-infected, many have serious or fatal lung complications including TB and bacterial pneumonias that have never been well characterized.

### ***Etiology and Pathophysiology***

In addition to supporting investigator-initiated research on the etiology and pathogenesis of HIV-associated lung diseases, the Institute has initiated research to understand their causes and impact and to identify potential therapeutic targets and preventive strategies:

- **The Mechanisms of HIV-Related Pulmonary Complications:** To encourage innovative research on the roles of co-infections, immune factors, and genetic predisposition in the pathogenesis of HIV-related pulmonary diseases.
- **Longitudinal Studies of HIV-Associated Lung Infections and Complications:** To accelerate research on lung complications associated with HIV-infection by characterizing lung infections, other HIV-associated lung complications, and their consequences in longitudinal studies in existing HIV-infected cohorts and other established groups of patients who are HIV-infected. Depending on the center, participation from minority populations ranges from approximately 40 to 100 percent.
- **Mechanisms and Management of Cardiovascular and Metabolic Complications of HIV/AIDS:** To elucidate the underlying mechanisms of metabolic and anthropometric abnormalities seen in HIV infection and highly active antiretroviral therapy (HAART) and their relationship to CVD risk; to evaluate new and existing biomarkers and imaging modalities in the assessment of coronary artery disease and risk in HIV patients; and to identify treatment strategies and interventional approaches to reduce cardiovascular risk while optimizing the medical management of HIV infection. Enrollment from minority populations is expected to range from approximately 30 to more than 70 percent.

- **Microbiome of the Lung and Respiratory Tract in HIV-Infected Individuals and HIV-Uninfected Controls** (see Chapter 9): To characterize the microbiome of the lung alone or in combination with the upper airways in HIV-infected individuals and matched HIV-uninfected controls using molecular techniques to identify bacteria and if possible other organisms (e.g., viruses, cell-wall deficient organisms, protozoa, and fungi). Enrollment from minority populations is expected to range from 35 to 76 percent.

### **Tuberculosis**

TB is a common and often deadly infectious disease caused by the bacteria *Mycobacterium tuberculosis*. In the United States, an estimated 10 to 15 million people are infected with the TB bacteria. The rates among minorities and in the foreign-born remain high. In 2008, according to the CDC, more than 58 percent of all active TB cases in the United States were among the foreign born. Racial disparity in TB rates was greatest for U.S.-born blacks, whose rate was 7-times higher than the rate for U.S.-born whites.

### ***Etiology and Pathogenesis***

The immune response to TB infection is complex and involves the formation of granulomas in the lungs of infected individuals. In 2008, as part of the NHLBI Exploratory Program in Systems Biology, the Institute initiated a study that uses multiscale computational models and multisystem approaches to improve understanding of the role of granuloma formation in TB.

The Institute also supports investigator-initiated research that characterizes genes associated with TB susceptibility; investigates host lung defenses, including immune responses to infection; and studies the impact of TB on HIV disease. A new genetics study will fine-map chromosomal regions that have been linked to resistance to TB. Investigators will also analyze innate immune responses and model genetic predictors of resistance using data from a long-term household contact study conducted in Uganda.

### ***Treatment and Control***

The NHLBI supports a number of investigator-initiated studies focused on understanding the relationship between the immune system and TB. Most of the studies are being conducted among patients from

minority populations. Included among them are studies to compare susceptibility to TB in populations in Mexico and Peru and examine the role of interferon-gamma in the pathogenesis of TB among Hispanics with and without HIV.

### **Education**

Building on the foundation laid by the Tuberculosis Academic Award program, the NHLBI is supporting a consortium of five TB curriculum centers:

- TB Curriculum Coordinating Center (See Chapter 10): To strengthen, expand, and increase access to the best ongoing educational and training opportunities in TB for medical, nursing, and allied health schools, especially those that provide primary care to communities where TB is endemic and the population is at high risk of developing TB

## **Blood Diseases**

The NHLBI supports basic and clinical research on SCD and Cooley's anemia with the goal of curing the disorders and improving patient care.

### **Sickle Cell Disease**

#### **Basic Research**

SCD is an inherited blood disorder that produces chronic anemia, periodic episodes of pain, and end organ damage. It affects about 1 in 500 blacks and 1 in 1,000 Hispanics. Since 1972, the NHLBI has supported an extensive research program to improve understanding of the pathophysiology of SCD, identify better approaches for its diagnosis and treatment, and prevent complications.

Basic and translational research currently focuses on genetic influences on disease manifestations, regulation of hemoglobin synthesis, discovery of drugs to increase fetal hemoglobin production, transplantation of blood-forming stem cells, gene therapy, and development of animal models for preclinical studies. The NHLBI supports this research through Institute-initiated and investigator-initiated projects:

- BTRP (see Chapter 9): To encourage fundamental investigations and their translation into initial studies in humans, as well as community translation to promote evidence-based clinical practice. SCD Scholars programs for the career development of

young investigators and Summer-for-Sickle-Cell-Science programs for research training and mentoring of high-school students also will be supported as part of a larger effort by the Institute to prepare the next generation of scientists to advance the field of SCD research. The BTRP was reconfigured from the NHLBI Comprehensive Sickle Cell Centers (CSCC) program.

- Pulmonary Complications of Sickle Cell Disease: To stimulate collaborative translational research on the pulmonary complications of SCD. Researchers in hematology and pulmonary science—using a combination of basic and clinical approaches—are investigating the major known pulmonary complications of SCD due to acute chest syndrome, pulmonary hypertension, and oxyhemoglobin desaturation.

Two trans-NHLBI initiatives support research in SCD:

- Genome-Wide Association Studies to Identify Genetic Components Related to Heart, Lung, and Blood Disorders (see page 146): To investigate common genes involved in subphenotypes of SCD and centenarians. Scientists seek to identify genetic associations with specific clinical features in the two populations and subsequently compare the two data-sets for differences and similarities. Research results could lead to improved treatment for SCD and increase our understanding of the genetic components that enhance healthy aging.
- Ancillary Studies in Clinical Trials: To conduct time-sensitive ancillary studies in conjunction with ongoing Phase II-III clinical trials or network clinical trials related to heart, lung, and blood diseases and sleep disorders. One study seeks to identify genetic variations underlying Rh antigenic diversity in patients who have SCD. Research findings will be used to develop high throughput microchips to screen for matching donors and recipients prior to blood transfusion. Knowledge of the genetic basis for compatibility between donors and patients who have SCD for transfusion could contribute to preventing alloimmunization and improve care for patients who have SCD. Another study employs proteomic approaches to identify biomarkers of early cerebral ischemia in children who have SCD. Identifying such circulating biomarkers could allow earlier therapeutic intervention in these children.

#### **Clinical Research**

The NHLBI is committed to finding improved treatments and ultimately a cure for SCD and other

hemoglobinopathies. Institute-initiated studies have begun to yield therapies that will alleviate the symptoms of sickle cell anemia and procedures that should ultimately provide a cure.

- **BABY HUG** (see Chapter 11): To assess the effectiveness of hydroxyurea in preventing onset of chronic organ damage in young black children who have sickle cell anemia. At baseline, the trial has demonstrated that the spleens and kidneys of 1-year-old children are already damaged.
- **SWITCH** (see Chapter 9): To determine whether hydroxyurea and phlebotomy can maintain an acceptable stroke recurrence rate and significantly reduce hepatic iron burden compared with transfusion plus chelation in black children who have had overt stroke.
- **Sildenafil for Sickle Cell Disease-Associated Pulmonary Hypertension** (see Chapter 11): To test the effects of 16 weeks of chronic sildenafil therapy on exercise endurance and pulmonary artery pressure in patients aged 14 years and older with pulmonary hypertension and SCD.
- **Sickle Cell Disease Clinical Research Network** (see Chapter 11): To conduct Phase III randomized controlled clinical trials to test the efficacy and effectiveness of new therapies to treat and prevent complications of SCD and, when appropriate, thalassemia.
- **Adult Sickle Cell Quality of Life Measurement Information System**: To develop, validate, and disseminate a sickle cell-specific quality-of-life measurement tool that is a partner with and complementary to the NIH Roadmap Patient-Reported Outcomes Measurement Information System.
- **Exploratory Studies in the Neurobiology of Pain in Sickle Cell Disease**: To conduct basic and translational research on the neurobiology of pain in SCD. The ability to identify standardized measures (such as those reflecting pain sensitivity, pain-evoked inflammatory/immune responses, and psychosocial factors) that help to explain disease status (especially patient response to opioid therapy) will have a substantial effect on how health care providers approach pain management.
- **Transcranial Doppler (TCD) With Transfusions Changing to Hydroxyurea**: To compare standard therapy (transfusions) to alternative therapy

(hydroxyurea) for maintenance of TCD velocities in children who have sickle cell anemia and are receiving chronic transfusions for abnormal TCD velocities.

The NHLBI supports several transplant-related clinical studies that seek to reach minority populations:

- **Blood and Marrow Transplant Clinical Research Network (BMT CRN)** (see Chapter 11): In collaboration with the NCI, to perform clinical trials to advance hematopoietic stem cell transplantation. To reach minority populations, the Network supports bilingual transplant center personnel and provides public Web pages and educational materials. In addition, the Network is working with the National Marrow Donor Program to develop strategies and implement procedures to enhance enrollment of patients from minority groups.
- **The Sickle Cell Unrelated Transplant Trial**: To assess unrelated donor marrow and umbilical cord blood transplantation for severe SCD. The trial, supported by the BMT CRN and the Sickle Cell Disease Clinical Research Network, is the first Phase II study to assess the promise of this therapy as a curative option for patients who are severely affected by SCD.

The NIH Hydroxyurea Treatment for SCD Consensus Conference, sponsored by the NIH Office of Medical Applications of Research and the NHLBI, along with other NIH and HHS components was held in February 2008. The conference assessed the available scientific evidence and concluded that hydroxyurea treatment for patients who have sickle cell anemia is underutilized and should be increased in adolescents and adults. Research has shown that patients who have SCD and are taking hydroxyurea experience fewer pain crises and hospital admissions. The conference panel advocated increased use of the drug with appropriate monitoring, and continuing follow-up of children in ongoing clinical trials.

To build capacity for clinical research, the NHLBI is funding the Clinical Hematology Research Career Development Program, which supports the early career development of clinical researchers who are expected to become independent investigators and assume academic leadership roles in nonmalignant clinical hematology.



### **Recommitment to Sickle Cell Disease Research**

In March 2008, after a rigorous program assessment, extensive public input, and advice from the NHLBAC, the NHLBI announced a comprehensive and innovative restructuring of its research SCD program. As a result, the NHLBI is moving forward with the following innovations to its SCD portfolio:

- **Basic science:** Support for basic research will be expanded through funding of investigator-initiated grant applications and through NHLBI-initiated RFAs focused on the pathophysiology of SCD, the biology of pain in SCD, fetal hemoglobin switching, and genetic modifiers of disease expression and progression.
- **Translational and clinical research:** The Institute reconfigured the CSCC program into the BTRP with dedicated training components.
- **Participation in clinical research:** The scope of clinical research trials will be broadened to allow a greater number of people with SCD to participate in NIH-sponsored clinical research trials.
- **Translation and dissemination to the community:** In partnership with the Sickle Cell Disease Association of America and other patient advocacy groups and professional organizations, the NHLBI is developing evidence-based guidelines for the care of people with SCD across the life-span that can be used by health care practitioners throughout the world.

### **Education**

The NHLBI has developed a number of publications on SCD that target minorities:

- *Datos Sobre La Anemia Falciforme* (Facts About Sickle Cell Anemia)
- *Fact Sheet: Hydroxyurea in Pediatric Patients With Sickle Cell Disease*
- *Facts About Sickle Cell Anemia*
- *Patient Fact Sheet: The Multicenter Study of Hydroxyurea in Sickle Cell Anemia (MSH)*
- *Management and Therapy of Sickle Cell Disease*

### **Cooley's Anemia**

Cooley's anemia is an inherited disorder of red blood cells that affects primarily people of African, Asiatic Indian, Chinese, Mediterranean, and Southeast Asian origin. In 2000, the Institute initiated a program to establish a network of clinical research centers to evaluate new therapeutic agents:

- **Thalassemia (Cooley's anemia) Clinical Research Network** (see Chapter 11): To establish a group of clinical centers to accelerate research in the management of thalassemia, standardize existing treatments, and evaluate new ones

The NHLBI supports research efforts that include developing oral chelators to remove iron overload caused by repetitive transfusion therapy, testing drugs to enhance fetal hemoglobin production, and examining hematopoietic transplantation and gene therapy approaches to cure the disease. A registry with samples has been established to foster genomic and proteomic studies. International collaborations have also been initiated.

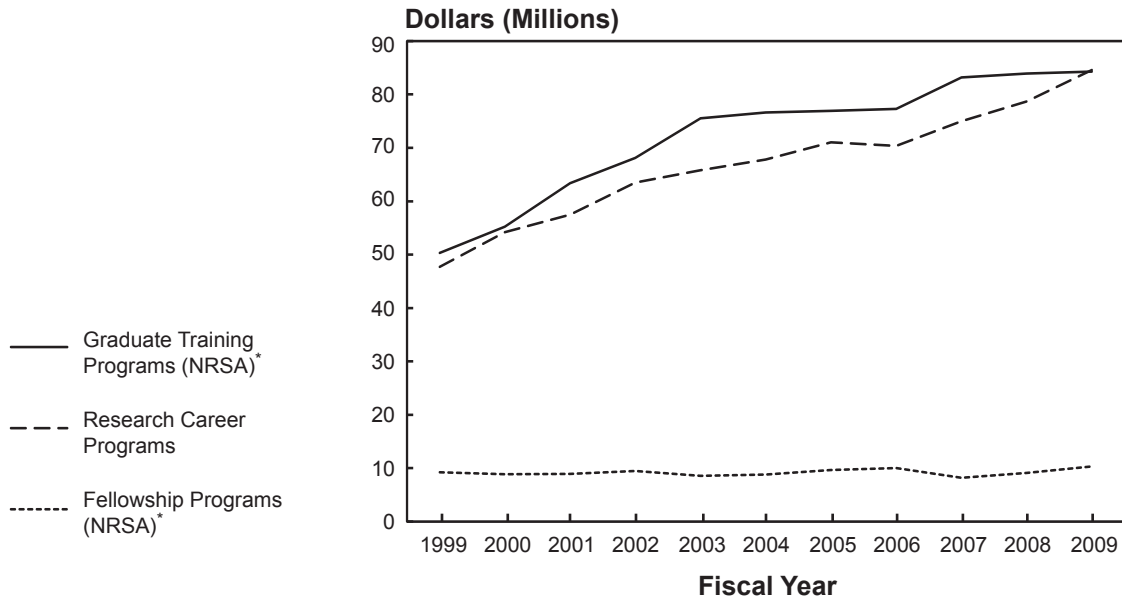
In 2006, the Institute established the NHLBI Clinical Hematology Research Career Development Program to support career development of clinical researchers in nonmalignant clinical hematology including Cooley's anemia.

The Institute recently entered into an Interagency Agreement with the CDC to develop and implement a national data system and biospecimen repository that will provide data to describe the epidemiologic and clinical characteristics of people with SCD, thalassemia, and hemoglobin-E diseases. The program will support research, information, dissemination, policy decisions, health care planning, and provider training at the local, state, and national levels.



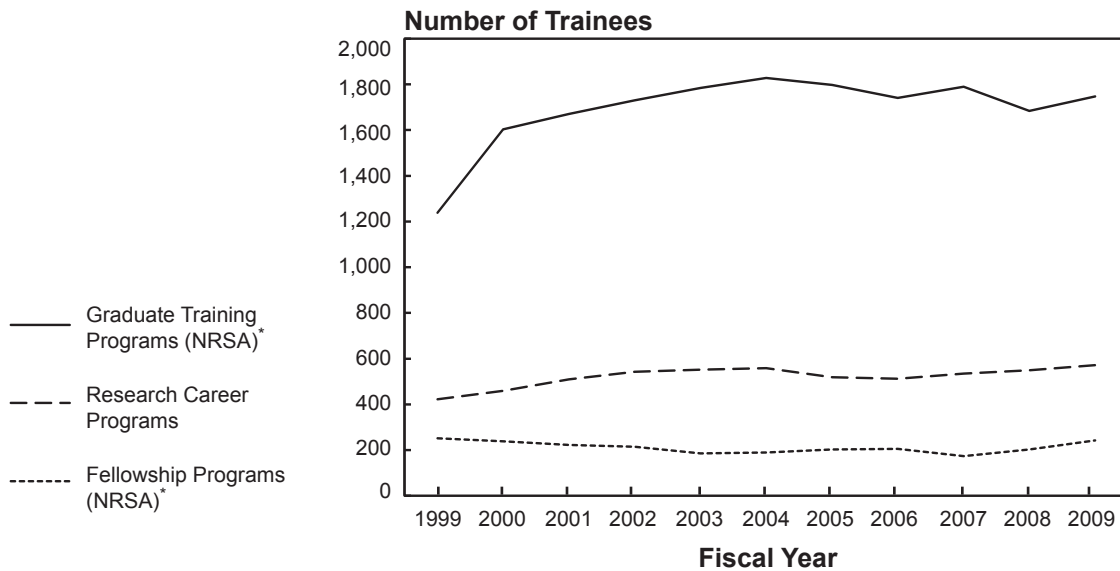
# 13. Research Training and Career Development Programs

## NHLBI Research Training and Career Development Obligations: Fiscal Years 1999–2009



\* National Research Service Awards (NRSA).

## NHLBI Full-Time Training Positions: Fiscal Years 1999–2009



\* 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 2009**

	<b>Number of Awards Obligated</b>	<b>Trainees (Full-time Training Positions)</b>	<b>Direct Cost</b>	<b>Indirect Cost</b>	<b>Total Cost</b>	<b>Percent of Total NHLBI Training Program Dollars</b>
<b>Fellowship Programs</b>						
Individual Predoctoral NRSA for M.D./Ph.D. (F30)	63	63	\$ 2,190,667	\$ —	\$ 2,190,667	2.3%
Predoctoral Individual NRSA (F31)	59	59	2,009,290	—	2,009,290	2.1
Postdoctoral Individual NRSA (F32)	118	118	6,012,102	—	6,012,102	6.4
Senior Fellowships NRSA (F33)	2	2	118,288	—	118,288	0.1
Subtotal, Fellowships	242	242	10,330,347	—	10,330,347	9.8
<b>Graduate Training Programs</b>						
Institutional NRSA (T32)	234	1,602	75,478,053	5,975,090	81,453,143*	87.2
Minority Institutional NRSA (T32)	3	19	306,856	42,333	349,189	0.4
Off-Quarter Professional Student Training NRSA (T34, T35)	17	102	1,969,209	191,613	2,160,822	2.3
Short-Term Training for Minority Students (T35M)	6	24	282,643	41,465	324,108	0.3
Subtotal, Graduate Training Programs	260	1,747	78,036,761	6,250,501	84,287,262	90.2
<b>Total, Training Programs</b>	<b>502</b>	<b>1,989</b>	<b>\$88,367,108</b>	<b>\$6,250,501</b>	<b>\$94,617,609</b>	<b>100.0%</b>

\* Excludes assessment of \$1,960,000.

## History of Training Obligations by Activity: Fiscal Years 1999–2009

	Dollars (Thousands)											
	Fiscal Year											
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
<b>Fellowship Programs</b>												
Individual Predoctoral NRSA for M.D./Ph.D. (F30)	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —	\$ 641	\$ 2,191	
Predoctoral Individual NRSA (F31)	346	248	264	478	563	549	794	1,202	1,509	1,888	2,009	
Postdoctoral Individual NRSA (F32)	8,807	8,517	8,515	8,887	7,868	8,128	8,813	8,790	6,684	6,487	6,012	
Senior Fellowships NRSA (F33)	90	92	147	84	112	144	58	53	—	59	118	
Subtotal, Fellowships	9,243	8,857	8,926	9,449	8,543	8,821	9,665	10,045	8,193	9,075	10,330	
<b>Graduate Training Programs</b>												
Institutional NRSA (T32)	45,551 <sup>A</sup>	50,507 <sup>B</sup>	58,516 <sup>C</sup>	62,999 <sup>D</sup>	69,951 <sup>E</sup>	71,229 <sup>F</sup>	70,524 <sup>G</sup>	71,831 <sup>H</sup>	78,343 <sup>I</sup>	80,373 <sup>J</sup>	81,453 <sup>K</sup>	
Minority Institutional NRSA (T32)	901	1,167	996	1,092	1,006	734	1,184	743	780	688	349	
Off-Quarter Professional Student Training NRSA (T34, T35)	1,384	966	1,974	1,987	1,975	1,993	2,233	2,215	2,411	2,021	2,161	
MARC (T36)	5	5	5	—	—	—	—	—	—	—	—	
Short-Term Training for Minority Students (T35M)	2,494	2,570	1,877	2,057	2,594	2,671	2,976	2,527	1,673	804	324	
Subtotal, Training Grants	50,335	55,215	63,368	68,135	75,526	76,627	76,917	77,316	83,207	83,886	84,287	
<b>Total, Training Programs</b>	<b>\$59,578<sup>A</sup></b>	<b>\$64,072<sup>B</sup></b>	<b>\$72,294<sup>C</sup></b>	<b>\$77,584<sup>D</sup></b>	<b>\$84,069<sup>E</sup></b>	<b>\$85,448<sup>F</sup></b>	<b>\$86,582<sup>G</sup></b>	<b>\$87,361<sup>H</sup></b>	<b>\$91,400<sup>I</sup></b>	<b>\$92,961<sup>J</sup></b>	<b>\$94,617<sup>K</sup></b>	

A Excludes Assessment of \$1,216,000.  
 B Excludes Assessment of \$1,280,000.  
 C Excludes Assessment of \$1,424,000.  
 D Excludes Assessment of \$1,584,000.  
 E Excludes Assessment of \$1,716,000.  
 F Excludes Assessment of \$1,744,000.  
 G Excludes Assessment of \$1,764,000.  
 H Excludes Assessment of \$1,818,000.  
 I Excludes Assessment of \$1,916,000.  
 J Excludes Assessment of \$1,912,000.  
 K Excludes Assessment of \$1,960,000.

## Full-Time Training Positions by Activity: Fiscal Years 1999–2009

	Number of Positions										
	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Fellowship Programs</b>											
Individual Predoctoral NRSA for M.D./Ph.D. (F30)	—	—	—	—	—	—	—	—	—	20	63
Predoctoral Individual NRSA (F31)	13	11	12	18	19	18	25	32	44	56	59
Postdoctoral Individual NRSA (F32)	237	225	208	194	164	168	176	171	130	125	118
Senior Fellowships NRSA (F33)	2	2	3	2	2	3	1	2	—	1	2
Subtotal, Fellowships	252	238	223	214	185	189	202	205	174	202	242
<b>Graduate Training Programs</b>											
Institutional NRSA (T32)	1,185	1,368	1,425	1,482	1,542	1,578	1,540	1,512	1,585	1,525	1,602
Minority Institutional NRSA (T32)	53	48	43	39	42	32	35	26	23	18	19
Off-Quarter Professional Student Training NRSA (T34, T35)	—	51	109	179	93	99	95	104	105	93	102
Short-Term Training for Minority Students (T35M)	—	136	93	30	107	119	128	99	77	48	24
Subtotal, Training Grants	1,238	1,603	1,670	1,730	1,784	1,828	1,798	1,741	1,790	1,684	1,747
<b>Total, Training Positions</b>	<b>1,490</b>	<b>1,841</b>	<b>1,893</b>	<b>1,944</b>	<b>1,969</b>	<b>2,017</b>	<b>2,000</b>	<b>1,946</b>	<b>1,964</b>	<b>1,886</b>	<b>1,989</b>

## NHLBI Research Career Programs: Fiscal Years 1999–2009

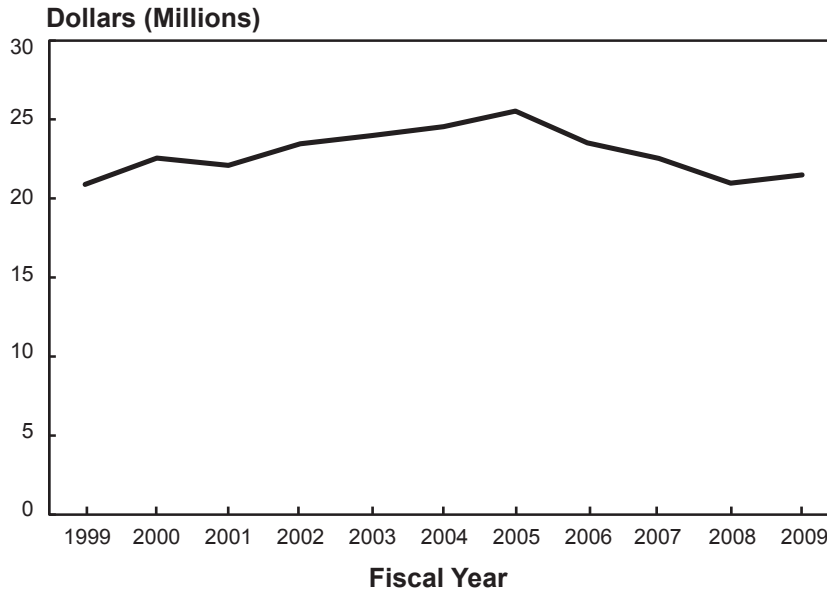
	Number of Awards										
	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Mentored Research Scientist Development Award for Minority Faculty (K01)	30	29	44	54	47	46	45	40	35	35	37
Minority Institution Faculty Mentored Research Scientist Development Award (K01)	—	11	9	2	7	6	4	4	5	7	5
Mentored Scientist Development Award in Research Ethics (K01)	—	—	—	—	2	2	3	3	3	1	1
Independent Scientist Award (K02)	18	27	34	33	32	31	32	24	25	22	19
Research Career Development Award (K04)	6	1	—	—	—	—	—	—	—	—	—
Research Career Award (K06)	2	2	2	2	2	1	1	1	—	—	—
Systemic Pulmonary and Vascular Disease Academic Award (K07)	3	1	—	—	—	—	—	—	—	—	—
Asthma Academic Award (K07)	3	—	—	—	—	—	—	—	—	—	—
Tuberculosis Academic Award (K07)	13	9	5	—	—	—	—	—	—	—	—
Sleep Academic Award (K07)	20	20	12	8	—	—	—	—	—	—	—
Nutrition Academic Award (K07)	10	19	19	19	9	9	—	—	—	—	—
Pediatric Transfusion Medicine Academic Award (K07)	—	—	—	—	—	—	—	—	4	4	4
Cultural Competence and Health Disparities Academic Award (K07)	—	—	—	—	—	8	14	18	18	18	9
Clinical Investigator Development Award (K08)	262	257	241	236	240	229	239	226	214	210	231
Vascular Medicine Research Career Development Program (K12)	—	—	—	—	—	—	—	2	7	7	7
Clinical Hematology Research Career Development Program (K12)	—	—	—	—	—	—	—	6	6	6	6
Genetics and Genomics of Lung Diseases Career Development Program (K12)	—	—	—	—	—	—	—	—	8	8	8
Minority School Faculty Development Award (K14)	—	4	1	—	—	—	—	—	—	—	—
Research Development Award for Minority Faculty (K14)	22	7	—	—	—	—	—	—	—	—	—
Career Enhancement Award for Stem Cell Research (K18)	—	—	—	—	1	5	3	2	4	6	3
NHLBI Career Transition Award (K22)	—	—	—	—	—	1	2	1	1	1	1
Mentored Patient-Oriented Research Career Development Award (K23)	13	36	58	90	110	122	127	122	120	133	149
Midcareer Investigator Award in Patient-Oriented Research (K24)	11	20	27	37	38	32	32	33	29	29	32
Mentored Quantitative Research Career Development Award (K25)	—	—	2	7	9	12	17	16	15	15	14
Clinical Research Curriculum Award (K30)	9	16	55	55	55	55	—*	14	16	—	—
Career Transition Award (K99)	—	—	—	—	—	—	—	—	24	47	46
<b>Total, Research Career Programs</b>	<b>422</b>	<b>459</b>	<b>509</b>	<b>543</b>	<b>552</b>	<b>559</b>	<b>519</b>	<b>512</b>	<b>534</b>	<b>549</b>	<b>572</b>

\* 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 1999–2009

	Dollars (Thousands)										
	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Mentored Research Scientist Development Award for Minority Faculty (K01)	\$ 2,738	\$ 3,650	\$ 5,556	\$ 5,711	\$ 6,156	\$ 6,150	\$ 6,088	\$ 5,453	\$ 4,718	\$ 4,574	\$ 4,745
Minority Institution Faculty Mentored Research Scientist Development Award (K01)	905	1,300	1,143	1,703	991	867	588	567	698	949	663
Mentored Scientist Development Award in Research Ethics (K01)	—	—	—	—	255	253	355	358	357	102	165
Independent Scientist Award (K02)	1,548	2,350	3,202	3,130	3,099	3,079	3,218	2,421	2,511	2,184	1,880
Research Career Development Award (K04)	568	69	—	—	—	—	—	—	—	—	—
Research Career Award (K06)	70	70	70	69	69	34	34	34	—	—	—
Systemic Pulmonary and Vascular Diseases Academic Award (K07)	423	113	—	—	—	—	—	—	—	—	—
Asthma Academic Award (K07)	248	—	—	—	—	—	—	—	—	—	—
Tuberculosis Academic Award (K07)	1,161	745	396	—	—	—	—	—	—	—	—
Sleep Academic Award (K07)	1,736	1,760	1,081	722	—	—	—	—	—	—	—
Nutrition Academic Award (K07)	1,480	2,829	2,869	2,906	1,472	1,516	—	—	—	—	—
Pediatrics Transfusion Medicine Academic Award (K07)	—	—	—	—	—	—	—	—	486	486	486
Cultural Competence and Health Disparities Academic Award (K07)	—	—	—	—	—	925	1,620	2,109	2,232	2,197	1,138
Clinical Investigator Development Award (K08)	29,741	30,189	29,263	29,295	30,288	29,037	30,429	28,973	27,286	27,005	29,706
Vascular Medicine Research Career Development Program (K12)	—	—	—	—	—	—	—	772	3,206	5,499	7,325
Clinical Hematology Research Career Development Program (K12)	—	—	—	—	—	—	—	2,360	2,367	2,364	2,375
Genetics and Genomics of Lung Diseases Career Development Program (K12)	—	—	—	—	—	—	—	—	3,154	3,190	3,190
Minority School Faculty Development Award (K14)	445	862	98	—	—	—	—	—	—	—	—
Research Development Award for Minority Faculty (K14)	2,093	393	—	—	—	—	—	—	—	—	—
Career Enhancement Award for Stem Cell Research (K18)	—	—	—	—	243	980	512	213	652	1,014	477
NHLBI Career Transition Award (K22)	—	—	—	—	—	185	364	178	160	162	162
Mentored Patient-Oriented Research Career Development Award (K23)	1,687	4,619	7,570	11,909	14,571	16,216	17,086	16,720	16,419	18,556	20,831
Midcareer Investigator Award in Patient-Oriented Research (K24)	1,054	2,072	2,877	4,058	4,368	3,815	3,929	4,315	4,037	4,161	5,078
Mentored Quantitative Research Career Development Award (K25)	—	—	272	921	1,195	1,622	2,206	2,184	2,077	2,082	1,996
Clinical Research Curriculum Award (K30)	1,772	3,163	3,073	3,090	3,110	3,115	4,589	3,708	2,520	—	—
Career Transition Award (K99)	—	—	—	—	—	—	—	—	2,074	4,190	4,430
<b>Total, Research Career Program Obligations</b>	<b>\$47,669</b>	<b>\$54,184</b>	<b>\$57,470</b>	<b>\$63,514</b>	<b>\$65,817</b>	<b>\$67,794</b>	<b>\$71,018</b>	<b>\$70,365</b>	<b>\$74,954</b>	<b>\$78,715</b>	<b>\$84,647</b>

**NHLBI Minority Biomedical Research Training, Career Development, and Research Supplements Program Obligations: Fiscal Years 1999–2009**



**NHLBI Minority Biomedical Research Training, Career Development, and Research Supplements Program Obligations: Fiscal Years 1999–2009**

	Dollars (Thousands)										
	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
MARC Summer Research Training Program	\$ 10	\$ 4	\$ 20	\$ 15	\$ 4	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Mentored Research Scientist Development Award for Minority Faculty	2,738	3,650	5,556	5,711	6,156	6,150	6,088	5,453	4,718	4,574	4,745
MARC	—	5	5	—	—	—	—	—	—	—	—
Minority Biomedical Research Support (MBRS)	3,423	3,873	3,165	2,793	3,600	2,806	2,846	2,403	2,475	1,527	2,167
Minority Institution Faculty Mentored Research Scientist Development Award	905	1,300	1,143	1,703	991	867	588	567	698	949	663
Minority Institution Research Training Program	901	1,167	996	1,092	1,006	734	1,184	743	780	688	349
Minority Predoctoral Fellowship	345	248	264	278	308	374	545	1,012	1,115	1,728	1,979
Minority Research Supplements Program	7,440	8,304	8,587	9,822	9,323	10,938	11,214	10,680	10,834	10,303	10,412
Minority School Faculty Development Award	445	862	98	—	—	—	—	—	—	—	—
Reentry Supplements	106	176	384	—	—	—	96	132	245	401	887
Research Development Award for Minority Faculty	2,093	393	—	—	—	—	—	—	—	—	—
Short-Term Training for Minority Students	2,494	2,570	1,876	2,057	2,594	2,671	2,976	2,526	1,673	804	283
<b>Total, Minority Programs</b>	<b>\$20,900</b>	<b>\$22,552</b>	<b>\$22,094</b>	<b>\$23,471</b>	<b>\$23,982</b>	<b>\$24,540</b>	<b>\$25,537</b>	<b>\$23,516</b>	<b>\$22,538</b>	<b>\$20,974</b>	<b>\$21,485</b>



### NHLBI Research Supplements Program by Award Type: Fiscal Years 1999–2009

	Number of Awards										
	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Minority Supplements											
Investigator	32	33	33	46	47	35	29	27	31	25	22
Postdoctoral	47	42	41	33	38	37	52	49	43	42	45
Graduate	53	47	43	45	57	61	80	74	73	69	71
Undergraduate	17	19	12	17	18	17	12	11	16	17	18
High School	6	—	3	3	4	3	7	3	3	3	2
Post-Master/Post-Baccalaureate	—	—	—	2	8	17	16	11	4	9	21
Reentry Supplements	2	1	3	—	—	3	2	1	1	3	9
Disability Supplements	1	5	4	5	4	3	2	2	4	1	—
<b>Total, Research Supplements Program</b>	<b>158</b>	<b>147</b>	<b>139</b>	<b>151</b>	<b>176</b>	<b>176</b>	<b>200</b>	<b>178</b>	<b>175</b>	<b>169</b>	<b>188</b>

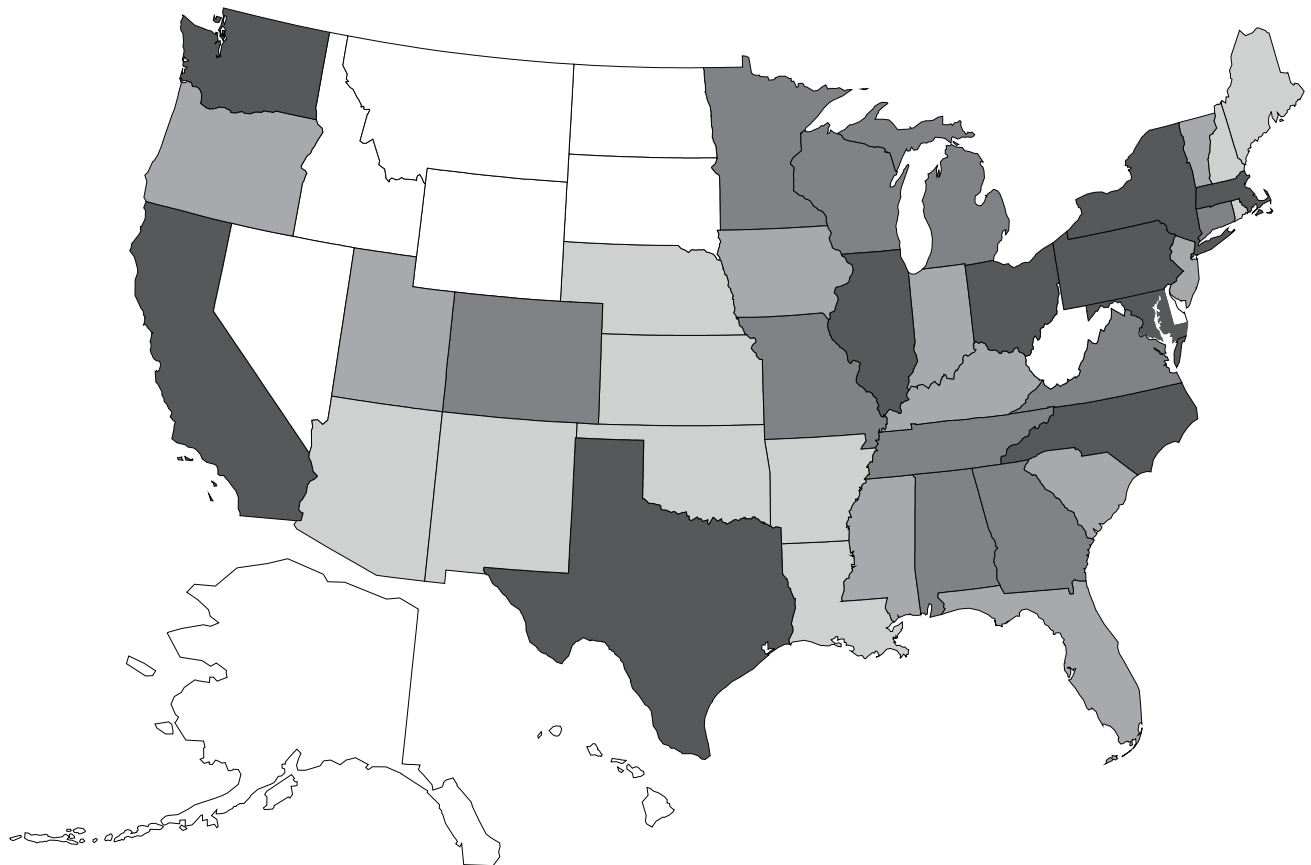
### NHLBI Research Supplements Program Obligations by Award Type: Fiscal Years 1999–2009

	Dollars (Thousands)										
	Fiscal Year										
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Minority Supplements											
Investigator	\$2,331	\$3,262	\$3,430	\$ 5,046	\$3,844	\$ 4,256	\$ 3,552	\$ 3,343	\$ 3,719	\$ 3,285	\$ 2,679
Postdoctoral	3,110	3,053	3,086	2,554	2,655	2,713	3,432	3,542	3,284	3,074	3,284
Graduate	1,806	1,791	1,818	1,864	2,181	2,439	3,208	3,114	3,021	3,029	3,212
Undergraduate	166	198	235	260	301	282	179	178	350	424	386
High School	27	—	18	33	33	13	30	18	16	26	28
Post-Master/Post-Baccalaureate	—	—	—	65	309	597	618	352	156	367	823
Reentry Supplements	106	176	384	—	—	495	96	132	245	401	887
Disability Supplements	72	282	187	474	360	143	99	133	288	98	—
<b>Total, Research Supplements Program</b>	<b>\$7,618</b>	<b>\$8,762</b>	<b>\$9,158</b>	<b>\$10,296</b>	<b>\$9,683</b>	<b>\$10,938</b>	<b>\$11,214</b>	<b>\$10,812</b>	<b>\$11,079</b>	<b>\$10,704</b>	<b>\$11,299</b>



# 14. Geographic Distribution of Awards: Fiscal Year 2009

Geographic Distribution of Awards by State: Fiscal Year 2009



Dollars in Millions	
■	\$91.0 to 303.7 (10)
■	\$36.0 to 90.9 (10)
■	\$14.0 to 35.9 (10)
■	\$4.0 to 13.9 (10)
□	\$0.0 to 3.9 (10)

## Geographic Distribution of Awards by State or Country: Fiscal Year 2009

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
<b>Alabama</b>								
Auburn University	1	\$ 682,071	1	\$ 682,071	—	\$ —	—	\$ —
Elgavish Paramagnetics, Inc.	1	380,811	1	380,811	—	—	—	—
University of Alabama at Birmingham	68	33,351,949	54	24,676,588	8	1,506,784	6	7,168,577
University of South Alabama	16	5,825,475	15	5,630,604	1	194,871	—	—
<b>Total Alabama</b>	<b>87</b>	<b>40,234,020</b>	<b>71</b>	<b>31,370,074</b>	<b>9</b>	<b>1,701,655</b>	<b>7</b>	<b>7,162,291</b>
<b>Alaska</b>								
Norton Sound Health Corporation	1	143,583	1	143,583	—	—	—	—
<b>Total Alaska</b>	<b>1</b>	<b>143,583</b>	<b>1</b>	<b>143,583</b>	—	—	—	—
<b>Arizona</b>								
Arizona State University-Polytechnic Campus	1	402,010	1	402,010	—	—	—	—
Arizona State University-Tempe Campus	1	190,000	1	190,000	—	—	—	—
Carl T. Hayden Medical Research Foundation	1	639,674	1	639,674	—	—	—	—
Mayo Clinic College of Medicine, Arizona	3	1,210,597	3	1,210,597	—	—	—	—
Translational Genomics Research Institute	1	415,103	1	415,103	—	—	—	—
University of Arizona	31	9,610,918	26	8,579,076	4	833,416	1	198,426
<b>Total Arizona</b>	<b>38</b>	<b>12,468,302</b>	<b>33</b>	<b>11,436,460</b>	<b>4</b>	<b>833,416</b>	<b>1</b>	<b>198,426</b>
<b>Arkansas</b>								
Arkansas Children's Hospital Research Institute	3	864,701	3	864,701	—	—	—	—
University of Arkansas	2	495,030	2	495,030	—	—	—	—
University of Arkansas for Medical Sciences, Little Rock	9	2,794,576	8	2,743,298	1	51,278	—	—
<b>Total Arkansas</b>	<b>14</b>	<b>4,154,307</b>	<b>13</b>	<b>4,103,029</b>	<b>1</b>	<b>51,278</b>	—	—
<b>California</b>								
Affymetrix, Inc.	1	5,927,810	—	—	—	—	1	5,927,810
Betastem Therapeutics, Inc.	1	284,989	1	284,989	—	—	—	—
Blood Systems Research Institute	5	3,651,818	4	2,329,495	—	—	1	1,322,323
Burnham Institute for Medical Research	12	8,085,284	12	8,085,284	—	—	—	—
California Institute of Technology	4	1,182,468	3	1,135,258	1	47,210	—	—
California Pacific Medical Center Research Institute	2	2,794,424	2	2,794,424	—	—	—	—
California State University, Los Angeles	1	345,909	1	345,909	—	—	—	—
Capricor, Inc.	1	124,791	1	124,791	—	—	—	—
Catharos Medical Systems, Inc.	1	152,729	1	152,729	—	—	—	—
Cedars-Sinai Medical Center	11	7,422,985	11	7,422,985	—	—	—	—
Ceremed, Inc.	1	99,697	1	99,697	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Children's Hospital and Research Center at Oakland	15	5,486,828	14	5,246,066	1	240,762	—	—
Children's Hospital Los Angeles	9	4,852,654	9	4,852,654	—	—	—	—
City of Hope/Beckman Research Institute	5	1,305,320	5	1,305,320	—	—	—	—
Claremont Graduate University	1	900,000	1	900,000	—	—	—	—
Diagnostics for the Real World, Ltd.	1	19,800	1	19,800	—	—	—	—
Encode Bio, Inc.	1	205,226	1	205,226	—	—	—	—
Fallbrook Engineering, Inc.	—	85,000	—	85,000	—	—	—	—
Ibis Biosciences, Inc.	1	406,757	1	406,757	—	—	—	—
Institute of Critical Care Medicine	1	10,000	1	10,000	—	—	—	—
J. David Gladstone Institutes	11	7,566,564	11	7,566,564	—	—	—	—
Kaiser Foundation Research Institute	10	5,856,379	7	3,703,633	—	—	3	2,152,746
Keck Graduate Institute of Applied Life Sciences	1	378,750	1	378,750	—	—	—	—
LA Biomedical Research Institute/Harbor UCLA Medical Center	5	1,102,590	4	1,002,392	—	—	1	100,198
La Jolla Bioengineering Institute	3	1,324,800	3	1,324,800	—	—	—	—
La Jolla Institute for Allergy and Immunology	1	412,918	1	412,918	—	—	—	—
Larta Institute	2	104,000	—	—	—	—	2	104,000
Loma Linda University	5	1,763,471	5	1,763,471	—	—	—	—
March of Dimes Birth Defects Foundation	—	2,000	—	2,000	—	—	—	—
Maxwell Sensors, Inc.	1	200,021	1	200,021	—	—	—	—
Molecular Express, Inc.	1	625,381	1	625,381	—	—	—	—
Nanovasc, Inc.	1	223,845	1	223,845	—	—	—	—
National Childhood Cancer Foundation	1	194,437	1	194,437	—	—	—	—
Northern California Institute Research and Education	11	4,894,805	11	4,894,805	—	—	—	—
Organovo, Inc.	1	142,511	1	142,511	—	—	—	—
Orthopaedic Hospital	1	330,750	1	330,750	—	—	—	—
Palo Alto Institute for Research and Education, Inc.	3	1,359,667	3	1,359,667	—	—	—	—
Palo Alto Medical Foundation Research Institute	1	812,421	1	812,421	—	—	—	—
Panorama Research, Inc.	2	1,081,859	2	1,081,859	—	—	—	—
Physical Optics Corporation	1	376,507	1	376,507	—	—	—	—
Quasar, Inc.	1	109,208	1	109,208	—	—	—	—
Radical Therapeutix, Inc.	1	142,000	1	142,000	—	—	—	—
Rand Corporation	5	3,310,313	5	3,310,313	—	—	—	—
Salk Institute for Biological Studies	2	462,695	2	462,695	—	—	—	—
San Diego State University	12	7,994,469	10	5,865,045	1	28,852	1	2,100,572
Scripps Research Institute	19	10,718,683	18	10,246,727	1	471,956	—	—
Sidney Kimmel Cancer Center	2	226,734	2	226,734	—	—	—	—
Sri International	1	236,058	1	236,058	—	—	—	—
Stanford University	66	24,558,246	54	23,246,335	11	1,154,225	1	157,686

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Torrey Pines Pharmaceuticals, Inc.	1	274,434	1	274,434	—	—	—	—
Tristan Technologies, Inc.	1	284,109	1	284,109	—	—	—	—
University of California, Berkeley	10	3,417,585	8	3,335,436	2	82,149	—	—
University of California, Davis	34	13,541,309	31	12,711,342	2	686,271	1	143,696
University of California, Irvine	16	6,016,259	15	5,864,029	—	—	1	152,230
University of California, Lawrence Berkeley National Laboratory	2	1,168,945	2	1,168,945	—	—	—	—
University of California, Los Angeles	89	44,572,897	74	39,930,361	12	1,973,138	3	2,669,398
University of California, Merced	4	1,042,163	3	1,000,987	1	41,176	—	—
University of California, Riverside	3	548,923	2	519,107	1	29,816	—	—
University of California, San Diego	89	45,977,626	77	43,253,453	12	2,724,173	—	—
University of California, San Francisco	113	38,832,320	96	36,346,850	15	2,082,738	2	402,732
University of California, Santa Barbara	1	612,574	1	612,574	—	—	—	—
University of California, San Diego	1	787,728	—	—	—	—	1	787,728
University of Southern California	15	5,939,263	14	5,897,788	1	41,475	—	—
Vala Sciences Inc.	1	159,401	—	—	—	—	1	159,401
Veterans Medical Research Foundation, San Diego	7	4,378,157	7	4,378,157	—	—	—	—
<b>Total California</b>	<b>632</b>	<b>287,410,264</b>	<b>552</b>	<b>261,625,803</b>	<b>61</b>	<b>9,603,941</b>	<b>19</b>	<b>16,180,520</b>
<b>Colorado</b>								
Advanced Microlabs, LLC	1	381,961	1	381,961	—	—	—	—
Advanced Refrigeration Technologies, Inc.	1	150,000	1	150,000	—	—	—	—
Aerophase, Inc.	1	775,040	1	775,040	—	—	—	—
Colorado State University, Fort Collins	5	1,153,236	4	1,124,227	1	29,009	—	—
Denver Health and Hospital Authority	1	199,406	1	199,406	—	—	—	—
Kestrel Labs, Inc.	—	79,513	—	79,513	—	—	—	—
Keystone Symposia	3	55,000	3	55,000	—	—	—	—
Klein Buendel, Inc.	1	446,271	1	446,271	—	—	—	—
National Jewish Health	30	21,873,034	29	21,825,824	1	47,210	—	—
PHCC, LP	1	674,617	1	674,617	—	—	—	—
Quest Product Development Corporation	1	455,122	1	455,122	—	—	—	—
Rocky Mountain Biosystems, Inc.	1	865,071	1	865,071	—	—	—	—
University of Colorado at Boulder	6	2,414,753	5	2,175,005	1	239,748	—	—
University of Colorado at Denver and Health Science Center	56	21,934,058	46	18,774,845	8	1,872,412	2	1,286,801
<b>Total Colorado</b>	<b>108</b>	<b>51,457,082</b>	<b>95</b>	<b>47,981,902</b>	<b>11</b>	<b>2,188,379</b>	<b>2</b>	<b>1,286,801</b>
<b>Connecticut</b>								
Connecticut Children's Medical Center	1	132,030	1	132,030	—	—	—	—
Evergen Biotechnologies, Inc.	1	588,734	1	588,734	—	—	—	—
Hartford Hospital	2	879,318	2	879,318	—	—	—	—
John B. Pierce Laboratory, Inc.	2	820,235	2	820,235	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
University of Connecticut School of Medicine and Dental Medicine	11	5,099,842	11	5,099,842	—	—	—	—
University of Connecticut, Storrs	2	248,857	1	217,961	1	30,896	—	—
Yale University	74	30,579,223	63	28,261,714	11	2,317,509	—	—
<b>Total Connecticut</b>	<b>93</b>	<b>38,348,239</b>	<b>81</b>	<b>35,999,834</b>	<b>12</b>	<b>2,348,405</b>	—	—
<b>Delaware</b>								
Alfred I. Du Pont Hospital for Children	1	191,250	1	191,250	—	—	—	—
University of Delaware	3	760,857	2	710,803	1	50,054	—	—
<b>Total Delaware</b>	<b>4</b>	<b>952,107</b>	<b>3</b>	<b>902,053</b>	<b>1</b>	<b>50,054</b>	—	—
<b>District of Columbia</b>								
Academy for Educational Development	2	2,621,056	—	—	—	—	2	2,621,056
American Institutes for Research	1	3,426,515	—	—	—	—	1	3,426,515
American Society of Hematology	1	15,000	1	15,000	—	—	—	—
Children's Research Institute	9	3,284,220	8	3,206,172	—	—	1	78,048
George Washington University	9	3,150,924	7	2,907,904	1	59,402	1	183,618
Georgetown University	9	4,426,533	8	4,366,339	1	60,194	—	—
Hager Sharp, Inc.	1	18,050	—	—	—	—	1	18,050
Howard University	6	1,435,906	4	1,365,286	1	41,176	1	29,444
International Society for Experimental Hematology	—	3,000	—	3,000	—	—	—	—
Medstar Research Institute	1	170,569	—	—	—	—	1	170,569
National Academy of Sciences	2	1,238,854	—	—	—	—	2	1,238,854
Ogilvy Public Relations Worldwide	2	4,069,388	—	—	—	—	2	4,069,388
Porter Novelli, Washington, DC	2	2,557,958	—	—	—	—	2	2,557,958
U.S. Bureau of the Census	1	207,000	—	—	—	—	1	207,000
U.S. Department of Veterans Affairs Medical Center	1	17,846	—	—	—	—	1	17,846
<b>Total District of Columbia</b>	<b>47</b>	<b>26,642,819</b>	<b>28</b>	<b>11,863,701</b>	<b>3</b>	<b>160,772</b>	<b>16</b>	<b>14,618,346</b>
<b>Florida</b>								
Florida Agricultural and Mechanical University	1	212,550	1	212,550	—	—	—	—
H. Lee Moffitt Cancer Center and Research Institute	1	127,440	1	127,440	—	—	—	—
Mount Sinai Medical Center (Miami Beach)	1	2,109,044	1	2,109,044	—	—	—	—
Nemours Children's Clinic	1	168,239	1	168,239	—	—	—	—
Self-Determined Health, Inc.	1	190,449	1	190,449	—	—	—	—
University of Central Florida	2	751,843	2	751,843	—	—	—	—
University of Florida	35	12,865,653	28	12,079,008	6	560,855	1	225,790
University of Miami	1	2,479,019	—	—	—	—	1	2,479,019
University of Miami, Coral Gables	3	3,378,959	2	3,034,854	1	344,105	—	—
University of Miami School of Medicine	26	9,435,188	21	8,721,538	3	474,532	2	239,118



Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
University of South Florida	5	1,158,168	4	892,068	1	266,100	—	—
Winprobe Corporation	1	550,669	1	550,669	—	—	—	—
<b>Total Florida</b>	<b>78</b>	<b>33,427,221</b>	<b>63</b>	<b>28,837,702</b>	<b>11</b>	<b>1,645,592</b>	<b>4</b>	<b>2,943,927</b>
<b>Georgia</b>								
Cardiovascular Specialty Laboratories	1	100,000	1	100,000	—	—	—	—
Emory University	67	28,379,389	56	26,355,544	9	1,340,150	2	683,695
Expression Therapeutics, LLC	1	706,219	1	706,219	—	—	—	—
Georgia Institute of Technology	8	2,656,245	8	2,656,245	—	—	—	—
Georgia State University	1	41,176	—	—	1	41,176	—	—
Medical College of Georgia	31	12,454,687	28	11,977,187	3	477,500	—	—
Medshape Solutions, Inc.	1	159,056	1	159,056	—	—	—	—
Morehouse School of Medicine	9	2,781,275	8	2,568,474	1	212,801	—	—
U.S. Centers for Disease Control and Prevention	3	2,625,239	—	—	—	—	3	2,625,239
University of Georgia	2	727,650	2	727,650	—	—	—	—
<b>Total Georgia</b>	<b>124</b>	<b>50,630,936</b>	<b>105</b>	<b>45,250,375</b>	<b>14</b>	<b>2,071,627</b>	<b>5</b>	<b>3,308,934</b>
<b>Hawaii</b>								
University of Hawaii at Manoa	6	2,714,577	5	2,501,667	—	—	1	212,910
<b>Total Hawaii</b>	<b>6</b>	<b>2,714,577</b>	<b>5</b>	<b>2,501,667</b>	<b>—</b>	<b>—</b>	<b>1</b>	<b>212,910</b>
<b>Illinois</b>								
Academic Pharmaceuticals, Inc.	1	100,188	1	100,188	—	—	—	—
AJ Medical Devices, Inc.	1	988,145	1	988,145	—	—	—	—
Children's Memorial Hospital (Chicago)	6	1,479,206	5	1,451,248	1	27,958	—	—
Coramed Technologies	1	1,027,275	1	1,027,275	—	—	—	—
Illinois Institute of Technology	2	714,257	2	714,257	—	—	—	—
Loyola University Chicago	9	2,983,839	8	2,928,529	1	55,310	—	—
Northshore University Health System Research Institute	2	610,000	2	610,000	—	—	—	—
Northwestern University	72	32,457,064	58	24,076,985	10	1,245,273	4	7,134,806
Rosalind Franklin University of Medicine and Science	1	269,500	1	269,500	—	—	—	—
Rush University Medical Center	15	5,691,115	14	5,508,153	—	—	1	182,962
SonoGene, LLC	1	94,281	1	94,281	—	—	—	—
University of Chicago	68	24,708,746	61	23,045,281	7	1,663,465	—	—
University of Illinois at Chicago	53	25,600,391	48	23,865,221	5	1,735,170	—	—
University of Illinois Urbana-Champaign	11	2,730,759	8	2,602,134	3	128,625	—	—
Vesseltex Biomedical, LLC	1	300,316	1	300,316	—	—	—	—
<b>Total Illinois</b>	<b>244</b>	<b>99,755,082</b>	<b>212</b>	<b>87,581,513</b>	<b>27</b>	<b>4,855,801</b>	<b>5</b>	<b>7,317,768</b>
<b>Indiana</b>								
Indiana University-Purdue University at Indianapolis	54	20,744,679	45	19,849,267	9	895,412	—	—
Predictive Physiology and Medicine, Inc.	1	863,409	1	863,409	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Purdue University, West Lafayette	2	388,314	1	336,604	1	51,710	—	—
University of Notre Dame	5	2,973,928	5	2,973,928	—	—	—	—
<b>Total Indiana</b>	<b>62</b>	<b>24,970,330</b>	<b>52</b>	<b>24,023,208</b>	<b>10</b>	<b>947,122</b>	—	—
<b>Iowa</b>								
Iowa State University	1	648,563	1	648,563	—	—	—	—
Maharishi University of Management Research Institute	1	621,309	1	621,309	—	—	—	—
University of Iowa	71	34,494,763	61	31,643,111	9	2,678,409	1	173,243
<b>Total Iowa</b>	<b>73</b>	<b>35,764,635</b>	<b>63</b>	<b>32,912,983</b>	<b>9</b>	<b>2,678,409</b>	<b>1</b>	<b>173,243</b>
<b>Kansas</b>								
Kansas State University	2	367,500	2	367,500	—	—	—	—
Pinnacle Technology, Inc.	1	133,353	1	133,353	—	—	—	—
University of Kansas Medical Center	12	3,880,015	11	3,851,947	1	28,068	—	—
<b>Total Kansas</b>	<b>15</b>	<b>4,380,868</b>	<b>14</b>	<b>4,352,800</b>	<b>1</b>	<b>28,068</b>	—	—
<b>Kentucky</b>								
Endoprotech, Inc.	1	464,776	1	464,776	—	—	—	—
Northern Kentucky University	1	196,650	1	196,650	—	—	—	—
Pharmacogenetics Diagnostic Laboratories	1	586,737	1	586,737	—	—	—	—
Regenerex, LLC	1	703,541	1	703,541	—	—	—	—
SCR, Inc.	2	1,481,323	2	1,481,323	—	—	—	—
University of Kentucky	29	11,498,322	24	10,875,345	5	622,977	—	—
University of Louisville	26	10,463,130	25	10,238,546	1	224,584	—	—
<b>Total Kentucky</b>	<b>61</b>	<b>25,394,479</b>	<b>55</b>	<b>24,546,918</b>	<b>6</b>	<b>847,561</b>	—	—
<b>Louisiana</b>								
Louisiana State University and Agricultural & Mechanical College, Baton Rouge	1	337,546	1	337,546	—	—	—	—
Louisiana State University Health Science Center, New Orleans	6	1,199,760	4	1,102,398	1	28,599	1	68,763
Louisiana State University Health Science Center, Shreveport	7	1,645,638	6	1,595,584	1	50,054	—	—
Louisiana State University School of Veterinary Medicine	1	337,919	1	337,919	—	—	—	—
Louisiana State University Pennington Biomedical Research Center	2	800,875	2	800,875	—	—	—	—
Ochsner Clinic Foundation	1	270,231	1	270,231	—	—	—	—
Tulane University of Louisiana	17	6,899,046	15	6,676,167	2	222,879	—	—
<b>Total Louisiana</b>	<b>35</b>	<b>11,491,015</b>	<b>30</b>	<b>11,120,720</b>	<b>4</b>	<b>301,532</b>	<b>1</b>	<b>68,763</b>
<b>Maine</b>								
Jackson Laboratory	8	2,718,436	6	2,512,358	2	206,078	—	—
Maine Medical Center	4	1,473,900	4	1,473,900	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Mount Desert Island Biological Laboratory	1	5,000	1	5,000	—	—	—	—
University of Maine, Orono	2	1,345,603	2	1,345,603	—	—	—	—
University of New England	1	51,710	—	—	1	51,710	—	—
<b>Total Maine</b>	<b>16</b>	<b>5,594,649</b>	<b>13</b>	<b>5,336,861</b>	<b>3</b>	<b>257,788</b>	—	—
<b>Maryland</b>								
American Institutes for Research	1	1,825,861	—	—	—	—	1	1,825,861
Aplastic Anemia and MDS International Foundation	1	2,000	1	2,000	—	—	—	—
CIT/NIH	1	200,000	—	—	—	—	1	200,000
Clinical Trials and Surveys Corporation	3	2,103,579	1	747,339	—	—	2	1,356,240
Constella Group, LLC	1	258,605	—	—	—	—	1	258,605
EMMES Corporation	3	1,934,910	1	711,055	—	—	2	1,003,855
Federation of American Society for Experimental Biology	1	3,000	1	3,000	—	—	—	—
GeneCopoeia, Inc.	1	106,998	1	106,998	—	—	—	—
GlycoMimetics, Inc.	1	190,722	1	190,722	—	—	—	—
Henry M. Jackson Foundation for the Advancement Military Medicine	1	551,701	1	551,701	—	—	—	—
HHS Supply Service Center, Perry Point	1	45,450	—	—	—	—	1	45,450
IGI Technologies, Inc.	1	99,978	1	99,978	—	—	—	—
Indian Health Services	1	254,691	—	—	—	—	1	254,691
Information Management Services, Inc.	1	737,718	—	—	—	—	1	737,718
J. Craig Venter Institute, Inc.	1	50,438	—	—	—	—	1	50,438
Johns Hopkins University	163	82,956,680	140	72,203,182	16	3,962,097	7	6,791,401
Johns Hopkins University School of Medicine	1	497,063	—	—	—	—	1	497,063
Key Technologies, Inc.	1	655,134	1	655,134	—	—	—	—
Lockheed Martin	1	69,000	—	—	—	—	1	69,000
Maryland Medical Research Institute, Inc.	1	548,882	1	548,882	—	—	—	—
MaxCyte, Inc.	1	394,406	1	394,406	—	—	—	—
MedStar Research Institute	1	679,411	1	679,411	—	—	—	—
National Cancer Institute, NIH	4	2,937,000	—	—	—	—	4	2,937,000
National Institutes of Health	2	2,509,900	—	—	—	—	2	2,509,900
NCHS/CDC	1	2,201,952	—	—	—	—	1	2,201,952
New Health Sciences, Inc.	1	907,879	1	907,879	—	—	—	—
North American Vascular Biology Organization	2	15,001	2	15,001	—	—	—	—
Palladian Partners, Inc.	—	6,000	—	6,000	—	—	—	—
Quality Biological, Inc.	1	416,684	1	416,684	—	—	—	—
Science Applications International Corporation	1	2,280,248	—	—	—	—	1	2,280,248
Seracare Bioservices	1	4,296,738	—	—	—	—	1	4,296,738
Social and Scientific Systems, Inc.	1	2,734,221	—	—	—	—	1	2,734,221
Suburban Hospital	2	12,191,400	—	—	—	—	2	12,191,400

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
U.S. Department of Health and Human Services, Office of Human Development Services	3	711,100	—	—	—	—	3	711,100
U.S. Food and Drug Administration	1	138,000	—	—	—	—	1	138,000
University of Maryland, Baltimore	40	21,285,782	36	20,506,138	4	779,644	—	—
University of Maryland, College Park	3	978,807	3	978,807	—	—	—	—
Weinberg Medical Physics, LLC	1	929,338	1	929,338	—	—	—	—
Westat, Inc.	3	8,019,341	—	—	—	—	3	8,019,341
<b>Total Maryland</b>	<b>255</b>	<b>156,725,618</b>	<b>196</b>	<b>100,653,655</b>	<b>20</b>	<b>4,741,741</b>	<b>39</b>	<b>51,330,222</b>
<b>Massachusetts</b>								
ABIOMED, Inc.	3	727,712	3	727,712	—	—	—	—
American Red Cross Blood Services, New England	1	1,082,088	—	—	—	—	1	1,082,088
Aphios Corporation	1	344,267	1	344,267	—	—	—	—
Baystate Medical Center	1	568,613	—	—	—	—	1	568,613
Beth Israel Deaconess Medical Center	45	19,341,879	39	17,569,136	6	1,772,743	—	—
BioSurfaces	2	360,527	2	360,527	—	—	—	—
Boston Biomedical Research Institute	4	2,790,319	4	2,790,319	—	—	—	—
Boston Medical Center	11	6,317,337	11	6,317,337	—	—	—	—
Boston University	10	21,115,903	9	5,243,809	—	—	1	15,872,094
Boston University Medical Campus	54	28,626,523	47	26,086,056	7	2,540,467	—	—
Brandeis University	1	342,819	1	342,819	—	—	—	—
Brigham and Women's Hospital	156	81,012,761	138	76,300,410	16	3,243,104	2	1,469,247
Broad Institute, Inc.	2	2,501,490	2	2,501,490	—	—	—	—
Cardiovascular Engineering, Inc.	1	625,124	1	625,124	—	—	—	—
Caritas St. Elizabeth's Medical Center	2	860,593	2	860,593	—	—	—	—
Children's Hospital Boston	51	21,218,058	46	19,587,442	5	1,630,616	—	—
Dana-Farber Cancer Institute	10	3,532,176	10	3,532,176	—	—	—	—
Differential Proteomics, Inc.	1	202,023	1	202,023	—	—	—	—
E.P., Ltd.	1	1,185,803	1	1,185,803	—	—	—	—
Giner, Inc.	1	398,924	1	398,924	—	—	—	—
GL Synthesis, Inc.	1	768,369	1	768,369	—	—	—	—
Gwathmey, Inc.	2	1,754,302	1	1,475,189	—	—	—	279,113
Harvard Pilgrim Health Care, Inc.	4	1,353,822	4	1,353,822	—	—	—	—
Harvard University	3	1,128,948	2	711,017	1	417,931	—	—
Harvard University Medical School	13	5,261,501	10	4,514,839	3	746,662	—	—
Harvard University School of Public Health	18	6,821,347	14	6,044,272	4	777,075	—	—
Immune Disease Institute, Inc.	4	6,068,958	4	6,068,958	—	—	—	—
InfoSciTex Corporation	1	988,068	1	988,068	—	—	—	—
IQuum, Inc.	1	995,942	1	995,942	—	—	—	—
Joslin Diabetes Center	2	1,062,528	2	1,062,528	—	—	—	—
Levitronix, LLC	3	2,175,680	3	2,175,680	—	—	—	—
MagiQ Technologies, Inc.	1	99,992	—	—	—	—	1	99,992

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Marine Biological Laboratory	—	2,000	—	2,000	—	—	—	—
Massachusetts General Hospital	65	34,105,871	60	30,061,779	4	1,440,374	1	2,603,718
Massachusetts Institute of Technology	4	7,556,096	3	3,979,867	—	—	1	3,576,229
Millikelvin Technologies, LLC	1	196,960	1	196,960	—	—	—	—
New England Research Institutes, Inc.	5	15,381,154	4	10,973,590	—	—	—	4,407,564
Physical Sciences, Inc.	2	573,541	2	573,541	—	—	—	—
Radiation Monitoring Devices, Inc.	2	576,294	2	576,294	—	—	—	—
Rhythmia Medical, Inc.	2	401,330	2	401,330	—	—	—	—
Spaulding Rehabilitation Hospital	1	355,006	1	355,006	—	—	—	—
Speech Technology & Applied Research Corp.	1	296,368	1	296,368	—	—	—	—
Springfield College	1	228,939	1	228,939	—	—	—	—
The Board Institute, Inc.	1	623,416	—	—	—	—	1	623,416
TissueVision, Inc.	1	165,646	1	165,646	—	—	—	—
Tufts Medical Center	23	8,108,465	22	7,492,556	1	615,909	—	—
Tufts University, Boston	10	3,749,138	9	3,528,538	1	220,600	—	—
University of Massachusetts Medical School, Worcester	19	8,471,972	18	8,286,583	—	—	1	185,389
University Health Network	1	270,000	1	270,000	—	—	—	—
University of Massachusetts, Boston	1	215,448	1	215,448	—	—	—	—
Vasotech, Inc.	1	102,206	1	102,206	—	—	—	—
Worcester Polytechnic Institute	3	651,149	3	651,149	—	—	—	—
<b>Total Massachusetts</b>	<b>555</b>	<b>303,665,395</b>	<b>495</b>	<b>259,492,451</b>	<b>48</b>	<b>13,405,481</b>	<b>12</b>	<b>30,767,463</b>
<b>Michigan</b>								
Accord Biomaterials, Inc.	2	550,727	2	550,727	—	—	—	—
Altarium Institutes	1	1,775,245	—	—	—	—	1	1,775,245
Henry Ford Health System	12	7,888,050	11	7,834,696	1	53,354	—	—
MC3, Inc.	2	516,377	2	516,377	—	—	—	—
MedArray, Inc.	1	1,000,000	1	1,000,000	—	—	—	—
Michigan State University	6	2,926,945	6	2,926,945	—	—	—	—
Magnetic Resonance Imaging Institute for Biomedical Research	1	428,263	1	428,263	—	—	—	—
Oakland University	1	242,943	1	242,943	—	—	—	—
Phrixus Pharmaceuticals, Inc.	1	379,487	1	379,487	—	—	—	—
Pixel Velocity, Inc.	1	997,506	1	997,506	—	—	—	—
University of Michigan at Ann Arbor	130	<b>55,856,959</b>	<b>118</b>	<b>52,668,591</b>	<b>10</b>	<b>2,480,626</b>	<b>2</b>	<b>707,742</b>
<b>Van Andel Research Institute</b>	<b>1</b>	<b>455,000</b>	<b>1</b>	<b>455,000</b>	—	—	—	—
Wayne State University	14	5,416,655	13	5,280,395	—	—	1	136,260
<b>Total Michigan</b>	<b>173</b>	<b>78,434,157</b>	<b>158</b>	<b>73,280,930</b>	<b>11</b>	<b>2,533,980</b>	<b>4</b>	<b>2,619,247</b>
<b>Minnesota</b>								
Advanced Circulatory Systems, Inc.	1	194,873	1	194,873	—	—	—	—
Gel-Del Technologies, Inc.	1	1,124,655	1	1,124,655	—	—	—	—
HealthPartners Research Foundation	3	2,202,820	3	2,202,820	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Imricor Medical Systems, Inc.	1	1,250	1	1,250	—	—	—	—
Innovative Surface Technologies, LLC	1	99,788	1	99,788	—	—	—	—
Koronis Biomedical Technologies Corporation	2	716,843	2	716,843	—	—	—	—
Mayo Clinic College of Medicine, Rochester	52	22,019,833	51	21,610,366	1	409,467	—	—
Mayo Clinic, Rochester	3	562,963	—	—	—	—	3	562,963
Minneapolis Medical Research Foundation, Inc.	2	4,193,516	1	304,616	—	—	1	3,888,900
Powerscope, Inc.	1	368,711	1	368,711	—	—	—	—
University of Minnesota, Twin Cities	74	40,480,282	63	32,072,098	6	1,422,016	5	6,986,168
<b>Total Minnesota</b>	<b>141</b>	<b>71,965,534</b>	<b>125</b>	<b>58,696,020</b>	<b>7</b>	<b>1,831,483</b>	<b>9</b>	<b>11,438,031</b>
<b>Mississippi</b>								
Jackson Medical Mall Foundation	1	30,000	1	30,000	—	—	—	—
Jackson State University	3	4,269,731	2	214,500	—	—	1	4,055,231
Mississippi State University	1	204,796	1	204,796	—	—	—	—
Tougaloo College	1	923,597	—	—	—	—	1	923,597
University of Mississippi Medical Center	19	8,659,715	16	6,873,775	—	—	3	1,785,940
<b>Total Mississippi</b>	<b>25</b>	<b>14,087,839</b>	<b>20</b>	<b>7,323,071</b>	<b>—</b>	<b>—</b>	<b>5</b>	<b>6,764,768</b>
<b>Missouri</b>								
APT Therapeutics, Inc.	2	626,931	2	626,931	—	—	—	—
Auxagen, Inc.	1	227,692	1	227,692	—	—	—	—
Children's Mercy Hospital, Kansas City	1	278,792	1	278,792	—	—	—	—
Evas Therapeutics, LLC	1	167,481	1	167,481	—	—	—	—
Saint Louis University	8	2,459,004	8	2,459,004	—	—	—	—
University of Missouri, Columbia	30	11,455,226	27	11,341,372	3	113,854	—	—
Vasculox, Inc.	2	400,902	2	400,902	—	—	—	—
Washington University	106	51,796,441	92	48,324,104	14	3,472,337	—	—
<b>Total Missouri</b>	<b>151</b>	<b>67,412,469</b>	<b>134</b>	<b>63,826,278</b>	<b>17</b>	<b>3,586,191</b>	<b>—</b>	<b>—</b>
<b>Montana</b>								
Montana State University, Bozeman	4	1,486,125	4	1,486,125	—	—	—	—
Resodyn Corporation	1	379,228	1	379,228	—	—	—	—
University of Montana	1	296,640	1	296,640	—	—	—	—
<b>Total Montana</b>	<b>6</b>	<b>2,161,993</b>	<b>6</b>	<b>2,161,993</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>
<b>Nebraska</b>								
Creighton University	2	490,850	2	490,850	—	—	—	—
LNKChemSolutions	1	199,997	1	199,997	—	—	—	—
University of Nebraska, Lincoln	2	2,164,480	2	2,164,480	—	—	—	—
University of Nebraska Medical Center	10	4,061,941	10	4,061,941	—	—	—	—
<b>Total Nebraska</b>	<b>15</b>	<b>6,917,268</b>	<b>15</b>	<b>6,917,268</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>



Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
<b>Nevada</b>								
Nevada Cancer Institute	1	476,550	1	476,550	—	—	—	—
University of Nevada, Reno	8	2,397,643	6	2,200,620	1	27,430	1	169,593
<b>Total Nevada</b>	<b>9</b>	<b>2,874,193</b>	<b>7</b>	<b>2,677,170</b>	<b>1</b>	<b>27,430</b>	<b>1</b>	<b>169,593</b>
<b>New Hampshire</b>								
Celdara Medical, LLC	1	199,085	1	199,085	—	—	—	—
Dartmouth College	13	4,412,956	13	4,412,956	—	—	—	—
Xemed, LLC	2	752,038	2	752,038	—	—	—	—
<b>Total New Hampshire</b>	<b>16</b>	<b>5,364,079</b>	<b>16</b>	<b>5,364,079</b>	—	—	—	—
<b>New Jersey</b>								
Angel Medical Systems, Inc.	1	168,483	1	168,483	—	—	—	—
CircuLite, Inc.	1	465,622	1	465,622	—	—	—	—
DVX, LLC	1	218,282	1	218,282	—	—	—	—
FocalCool, LLC	1	499,039	1	499,039	—	—	—	—
Hackensack University Medical Center	1	367,420	1	367,420	—	—	—	—
Menssana Research, Inc.	1	982,644	1	982,644	—	—	—	—
Newark Beth Israel Medical Center	1	151,881	1	151,881	—	—	—	—
PharmaSeq, Inc.	1	913,832	1	913,832	—	—	—	—
Prolong Pharmaceuticals, Inc.	2	1,646,543	1	848,378	—	—	1	798,165
Rutgers, The State University of New Jersey, New Brunswick	5	1,184,508	5	1,184,508	—	—	—	—
University of Medicine & Dentistry of New Jersey, Robert Wood Johnson School of Medicine	26	10,522,029	22	9,930,340	3	410,821	1	180,868
Viocare, Inc.	1	983,857	1	983,857	—	—	—	—
<b>Total New Jersey</b>	<b>42</b>	<b>18,104,140</b>	<b>37</b>	<b>16,714,286</b>	<b>3</b>	<b>410,821</b>	<b>2</b>	<b>979,033</b>
<b>New Mexico</b>								
Lovelace Biomedical and Environmental Research	2	1,038,811	2	1,038,811	—	—	—	—
Lovelace Biomedical Research and Education Institute	1	1,796,880	—	—	—	—	1	1,796,880
Sandia National Laboratories	1	158,209	1	158,209	—	—	—	—
Southwest Sciences, Inc.	1	374,837	1	374,837	—	—	—	—
University of New Mexico	15	4,098,223	13	4,041,634	2	56,589	—	—
<b>Total New Mexico</b>	<b>20</b>	<b>7,466,960</b>	<b>17</b>	<b>5,613,491</b>	<b>2</b>	<b>56,589</b>	<b>1</b>	<b>1,796,880</b>
<b>New York</b>								
Albany Medical College	5	1,283,238	4	1,223,026	1	60,212	—	—
Albert Einstein College of Medicine	31	14,734,125	23	10,091,791	5	403,770	3	4,238,564
Angion Biomedica Corporation	2	2,335,366	2	2,335,366	—	—	—	—
Biomedica Management Corporation	1	619,743	1	619,743	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
City College of New York	3	1,278,590	3	1,278,590	—	—	—	—
Cold Spring Harbor Laboratory	1	4,000	1	4,000	—	—	—	—
Columbia University	84	45,462,714	74	37,990,502	7	1,520,425	3	5,951,787
Cornell University	34	17,159,557	28	16,392,441	6	767,116	—	—
Dawkins Productions, Inc.	1	744,668	1	744,668	—	—	—	—
Feinstein Institute for Medical Research	2	813,539	2	813,539	—	—	—	—
First Wave Technologies, Inc.	1	175,824	1	175,824	—	—	—	—
Herbert H. Lehman College	1	285,250	1	285,250	—	—	—	—
Hospital for Special Surgery	1	444,184	1	444,184	—	—	—	—
Jarvik Heart, Inc.	1	430,329	—	—	—	—	1	430,329
Mohawk Innovative Technology, Inc.	1	369,854	1	369,854	—	—	—	—
Montefiore Medical Center, Bronx	1	314,327	1	314,327	—	—	—	—
Mount Sinai School of Medicine	31	13,125,146	27	12,447,207	4	677,939	—	—
New York Academy of Sciences	2	30,000	2	30,000	—	—	—	—
New York Blood Center	3	1,110,522	3	1,110,522	—	—	—	—
New York Medical College	17	8,822,414	15	8,766,846	2	55,568	—	—
New York University School of Medicine	32	13,576,700	26	12,846,529	6	730,171	—	—
Queens College	2	606,335	2	606,335	—	—	—	—
Regeneron Pharmaceuticals, Inc.	—	1,000,000	—	1,000,000	—	—	—	—
Rensselaer Polytechnic Institute	2	1,157,477	2	1,157,477	—	—	—	—
Rockefeller University	3	1,037,631	2	1,015,611	1	22,020	—	—
Roswell Park Cancer Institute Corp.	2	881,982	2	881,982	—	—	—	—
Sloan-Kettering Institute for Cancer Research	5	1,646,041	5	1,646,041	—	—	—	—
St. Luke's-Roosevelt Institute for Health Sciences	1	656,239	1	656,239	—	—	—	—
State University of New York at Buffalo	20	6,918,522	19	6,698,740	—	—	1	219,782
State University New York at Stony Brook	7	2,324,165	6	2,140,025	—	—	1	184,140
SUNY Downstate Medical Center	4	907,102	3	890,268	—	—	1	16,834
Syracuse University	1	497,784	1	497,784	—	—	—	—
Therasource, LLC	2	1,028,075	2	1,028,075	—	—	—	—
Transonic Systems, Inc.	1	999,996	1	999,996	—	—	—	—
University Health Network	1	303,881	1	303,881	—	—	—	—
University of Rochester	56	21,586,758	50	20,187,831	6	1,398,927	—	—
Upstate Medical University	7	2,645,366	7	2,645,366	—	—	—	—
VentriNova, Inc.	1	249,999	1	249,999	—	—	—	—
Winifred Masterson Burke Medical Research Institute	1	450,844	1	450,844	—	—	—	—
Winthrop-University Hospital	1	91,086	1	91,086	—	—	—	—
<b>Total New York</b>	<b>377</b>	<b>170,729,281</b>	<b>329</b>	<b>154,051,697</b>	<b>38</b>	<b>5,636,148</b>	<b>10</b>	<b>11,041,436</b>
<b>North Carolina</b>								
BioMarck Pharmaceuticals, Ltd.	1	990,000	1	990,000	—	—	—	—
Duke University	101	54,494,731	90	52,208,747	9	1,951,252	2	334,732

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
East Carolina University	3	734,399	2	677,205	1	57,194	—	—
Gramercy Research Group, LLC	1	921,629	1	921,629	—	—	—	—
The Hamner Institutes for Health Sciences	1	210,000	1	210,000	—	—	—	—
Heart Imaging Technologies, LLC	1	578,185	1	578,185	—	—	—	—
LifeSciTech, LLC	1	165,736	1	165,736	—	—	—	—
North Carolina Central University	3	664,400	3	664,400	—	—	—	—
North Carolina State University	5	1,425,904	2	757,073	3	668,831	—	—
Physcient, Inc.	1	141,784	1	141,784	—	—	—	—
Research Triangle Institute	1	501,951	—	—	—	—	1	501,951
Rho Federal Systems Division, Inc.	4	4,928,230	3	4,200,782	—	—	1	727,448
RTI International	2	3,837,221	—	—	—	—	2	3,837,221
TheraLogics, Inc.	1	255,627	1	255,627	—	—	—	—
TriboFilm Research, Inc.	1	229,475	1	229,475	—	—	—	—
University of North Carolina at Chapel Hill	84	41,201,400	70	34,047,068	9	1,952,750	5	5,201,582
University of North Carolina at Charlotte	1	12,240	1	12,240	—	—	—	—
Vascular Pharmaceuticals	1	747,689	1	747,689	—	—	—	—
Wake Forest University Health Sciences	53	34,719,998	41	22,295,637	4	905,113	8	11,519,248
<b>Total North Carolina</b>	<b>266</b>	<b>146,760,599</b>	<b>221</b>	<b>119,103,277</b>	<b>26</b>	<b>5,535,140</b>	<b>19</b>	<b>22,122,182</b>
<b>Ohio</b>								
Case Western Reserve University	57	21,072,882	47	16,379,064	8	816,486	2	3,877,332
Children's Hospital Medical Center, Cincinnati	59	21,056,663	52	20,429,017	7	627,646	—	—
Cleveland Clinic Lerner College of Medicine	43	25,822,977	38	25,004,982	3	292,781	2	525,214
Cleveland Medical Devices, Inc.	1	256,311	1	256,311	—	—	—	—
Cleveland State University	2	299,323	1	268,152	1	31,171	—	—
ElectroSonics Medical Inc.	1	960,170	1	960,170	—	—	—	—
EXCMR, Ltd	1	370,055	1	370,055	—	—	—	—
Great Lakes Pharmaceuticals, Inc.	1	1,354,034	1	1,354,034	—	—	—	—
Kent State University	2	1,028,882	2	1,028,882	—	—	—	—
NeuroWave Systems, Inc.	1	604,356	1	604,356	—	—	—	—
Northeastern Ohio Universities College of Medicine and Pharmacy	1	450,160	1	450,160	—	—	—	—
NovelMed Therapeutics, Inc.	2	795,251	2	795,251	—	—	—	—
Ohio State University	48	15,513,347	43	13,460,151	3	308,259	2	1,744,937
Ohio University	2	576,500	2	576,500	—	—	—	—
Perfusion Solutions, Inc.	1	210,130	1	210,130	—	—	—	—
Peritex Biosciences	1	430,515	1	430,515	—	—	—	—
Research Institute Nationwide Children's Hospital	5	1,208,301	3	1,007,521	2	200,780	—	—
University of Akron	1	348,456	1	348,456	—	—	—	—
University of Cincinnati	34	16,479,523	32	15,757,686	1	536,154	1	185,683
University of Toledo Health Science Campus	3	2,465,813	3	2,465,813	—	—	—	—
Wright State University	5	1,331,546	4	1,297,891	1	33,655	—	—
<b>Total Ohio</b>	<b>271</b>	<b>112,635,195</b>	<b>238</b>	<b>103,455,097</b>	<b>26</b>	<b>2,846,932</b>	<b>7</b>	<b>6,333,166</b>

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
<b>Oklahoma</b>								
Oklahoma Medical Research Foundation	4	2,819,607	4	2,819,607	—	—	—	—
Oklahoma State University, Stillwater	2	707,975	2	707,975	—	—	—	—
Selexys Pharmaceuticals Corporation	1	1,251,579	1	1,251,579	—	—	—	—
University of Oklahoma Health Sciences Center	13	4,546,316	12	4,486,914	1	59,402	—	—
University of Oklahoma, Norman	1	353,706	1	353,706	—	—	—	—
<b>Total Oklahoma</b>	<b>21</b>	<b>9,679,183</b>	<b>20</b>	<b>9,619,781</b>	<b>1</b>	<b>59,402</b>	—	—
<b>Oregon</b>								
Aronora, LLC	1	457,672	1	457,672	—	—	—	—
C/J Media, Inc.	1	387,262	1	387,262	—	—	—	—
Oregon Center for Applied Science, Inc.	2	634,678	2	634,678	—	—	—	—
Oregon Health and Science University	36	12,279,833	29	11,086,028	7	1,193,805	—	—
Oregon Research Institute	1	969,042	1	969,042	—	—	—	—
Oregon State University	1	299,585	1	299,585	—	—	—	—
Portland State University	1	365,625	1	365,625	—	—	—	—
University of Oregon	1	314,507	1	314,507	—	—	—	—
<b>Total Oregon</b>	<b>44</b>	<b>15,708,204</b>	<b>37</b>	<b>14,514,399</b>	<b>7</b>	<b>1,193,805</b>	—	—
<b>Pennsylvania</b>								
Adult Congenital Heart Association	1	41,843	1	41,843	—	—	—	—
Carnegie Mellon University	4	1,629,169	4	1,629,169	—	—	—	—
Cereve, Inc.	1	197,471	1	197,471	—	—	—	—
Children's Hospital of Philadelphia	37	17,590,149	34	15,781,569	2	756,015	1	1,052,565
Children's Hospital of Pittsburgh	1	134,219	—	—	—	—	1	134,219
Drexel University	3	703,552	3	703,552	—	—	—	—
Enson, Inc.	2	1,043,670	2	1,043,670	—	—	—	—
Fox Chase Cancer Center	1	415,103	1	415,103	—	—	—	—
Institute for Cancer Research	1	384,750	1	384,750	—	—	—	—
Institute for Transfusion Medicine	1	170,490	—	—	—	—	1	170,490
Magee-Women's Research Institute and Foundation	1	326,901	1	326,901	—	—	—	—
Microcirculatory Society, Inc.	1	12,500	1	12,500	—	—	—	—
Molecular Targeting Technology, Inc.	1	679,501	1	679,501	—	—	—	—
National Disease Research Interchange	—	155,000	—	155,000	—	—	—	—
Pennsylvania State University, Milton S. Hershey Medical Center	16	8,970,777	15	8,921,249	—	—	1	49,528
Pennsylvania State University, University Park	6	1,611,264	5	1,575,606	1	35,658	—	—
Philadelphia College of Osteopathic Medicine	1	396,250	1	396,250	—	—	—	—
PolyMedix, Inc.	1	553,390	1	553,390	—	—	—	—
RNARx	1	399,305	1	399,305	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Salus University	1	344,395	1	344,395	—	—	—	—
Shifa Biomedical	2	529,109	2	529,109	—	—	—	—
Strategic Polymer Sciences, Inc.	2	475,150	2	475,150	—	—	—	—
Temple University	40	13,457,875	36	12,676,423	4	781,452	—	—
Thomas Jefferson University	18	9,145,494	18	9,145,494	—	—	—	—
University of Pennsylvania	146	83,150,191	127	73,864,377	17	4,011,745	2	5,274,069
University of Pittsburgh at Pittsburgh	127	54,455,323	112	49,745,024	11	2,384,966	4	2,325,333
Wistar Institute	3	2,659,256	3	2,659,256	—	—	—	—
<b>Total Pennsylvania</b>	<b>419</b>	<b>199,632,097</b>	<b>374</b>	<b>182,656,057</b>	<b>35</b>	<b>7,969,836</b>	<b>10</b>	<b>9,006,204</b>
<b>Rhode Island</b>								
Brown University	7	2,855,534	5	2,814,272	2	41,262	—	—
Butler Hospital	1	479,226	1	479,226	—	—	—	—
Foresight Science & Technology	1	23,000	—	—	—	—	1	23,000
Gordon Research Conferences	7	117,000	7	117,000	—	—	—	—
Memorial Hospital of Rhode Island	2	888,019	1	733,424	—	—	1	154,595
Miriam Hospital	5	2,686,178	4	2,347,773	1	338,405	—	—
Pro-Change Behavior Systems, Inc.	1	491,390	1	491,390	—	—	—	—
QualityMetric, Inc.	1	398,754	1	398,754	—	—	—	—
Rhode Island Hospital	10	4,197,732	8	3,575,648	2	622,084	—	—
Roger Williams Hospital	1	402,331	1	402,331	—	—	—	—
University of Rhode Island	1	186,250	1	186,250	—	—	—	—
<b>Total Rhode Island</b>	<b>37</b>	<b>12,725,414</b>	<b>30</b>	<b>11,546,068</b>	<b>5</b>	<b>1,001,751</b>	<b>2</b>	<b>177,595</b>
<b>South Carolina</b>								
Clemson University	4	1,048,266	4	1,048,266	—	—	—	—
Medical University of South Carolina	39	11,232,406	33	10,509,518	5	699,952	1	22,936
University of South Carolina at Columbia	11	3,271,834	11	3,271,834	—	—	—	—
<b>Total South Carolina</b>	<b>54</b>	<b>15,552,506</b>	<b>48</b>	<b>14,829,618</b>	<b>5</b>	<b>699,952</b>	<b>1</b>	<b>22,936</b>
<b>South Dakota</b>								
Black Hills Center/American Indian Health	1	360,091	1	360,091	—	—	—	—
University of South Dakota	4	1,286,987	3	879,532	—	—	1	407,455
<b>Total South Dakota</b>	<b>5</b>	<b>1,647,078</b>	<b>4</b>	<b>1,239,623</b>	<b>—</b>	<b>—</b>	<b>1</b>	<b>407,455</b>
<b>Tennessee</b>								
Cumberland Pharmaceuticals, Inc.	1	111,805	1	111,805	—	—	—	—
East Tennessee State University	6	1,595,971	6	1,595,971	—	—	—	—
Meharry Medical College	4	806,917	2	485,347	2	321,570	—	—
Memphis VA Medical Center	2	7,137,890	—	—	—	—	2	7,137,890
St. Jude Children's Research Hospital	10	9,459,845	9	9,353,219	—	—	1	106,626
University of Memphis	1	373,816	1	373,816	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
University of Tennessee Health Science Center	27	10,565,934	26	10,347,124	—	—	1	218,810
Vanderbilt University	94	40,115,439	85	38,133,910	8	1,667,379	1	314,150
<b>Total Tennessee</b>	<b>145</b>	<b>70,167,617</b>	<b>130</b>	<b>60,401,192</b>	<b>10</b>	<b>1,988,949</b>	<b>5</b>	<b>7,777,476</b>
<b>Texas</b>								
Baylor College of Medicine	59	23,073,230	50	20,773,809	7	1,299,553	2	999,868
Biomedical Development Corporation	1	344,781	1	344,781	—	—	—	—
Methodist Hospital Research Institute	4	1,168,878	4	1,168,878	—	—	—	—
Millar Instruments, Inc.	1	376,593	1	376,593	—	—	—	—
Organizational Wellness and Learning System	1	100,654	1	100,654	—	—	—	—
Rice University	4	946,377	3	912,536	1	33,841	—	—
Scott and White Memorial Hospital	1	136,080	1	136,080	—	—	—	—
Southern Methodist University	1	331,105	1	331,105	—	—	—	—
Southwest Foundation for Biomedical Research	8	10,350,514	8	10,350,514	—	—	—	—
Texas A&M University System	14	3,778,706	14	3,778,706	—	—	—	—
Texas AgriLife Research	2	704,184	2	704,184	—	—	—	—
Texas Engineering Experiment Station	3	1,320,847	3	1,320,847	—	—	—	—
Texas Heart Institute	3	1,900,043	3	1,900,043	—	—	—	—
Texas Southern University	1	361,795	1	361,795	—	—	—	—
Texas Tech University Health Sciences Center	2	276,860	2	276,860	—	—	—	—
University of Houston	2	619,437	2	619,437	—	—	—	—
University of North Texas Health Science Center	4	2,701,811	4	2,701,811	—	—	—	—
University of Texas at Arlington	2	400,450	2	400,450	—	—	—	—
University of Texas at Austin	1	221,250	1	221,250	—	—	—	—
University of Texas at Dallas	2	755,503	2	755,503	—	—	—	—
University of Texas at San Antonio	2	173,601	1	144,500	1	29,101	—	—
University of Texas Health Science Center at Houston	24	15,067,092	24	15,067,092	—	—	—	—
University of Texas Health Science Center at San Antonio	10	3,395,923	7	2,871,722	2	391,972	1	132,229
University of Texas Health Science Center at Tyler	5	3,048,217	5	3,048,217	—	—	—	—
University of Texas M.D. Anderson Cancer Center	4	1,104,904	4	1,104,904	—	—	—	—
University of Texas Medical Branch at Galveston	8	2,740,239	8	2,740,239	—	—	—	—
University of Texas of The Permian Basin	1	211,155	1	211,155	—	—	—	—
University of Texas Southwestern Medical Center	56	23,669,637	48	22,209,085	7	1,288,599	1	171,953
<b>Total Texas</b>	<b>226</b>	<b>99,279,866</b>	<b>204</b>	<b>94,932,750</b>	<b>18</b>	<b>3,043,066</b>	<b>4</b>	<b>1,304,050</b>



Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
<b>Utah</b>								
LDS Hospital	1	206,984	—	—	—	—	1	206,984
Nanoshell Company, LLC	1	357,318	1	357,318	—	—	—	—
University of Utah	43	16,658,823	37	14,974,038	3	262,694	3	1,422,091
Utah Artificial Heart Institute	1	1,055,451	1	1,055,451	—	—	—	—
<b>Total Utah</b>	<b>46</b>	<b>18,278,576</b>	<b>39</b>	<b>16,386,807</b>	<b>3</b>	<b>262,694</b>	<b>4</b>	<b>1,629,075</b>
<b>Vermont</b>								
University of Vermont and State Agricultural College	39	17,359,563	34	14,693,117	4	1,118,241	1	1,548,205
<b>Total Vermont</b>	<b>39</b>	<b>17,359,563</b>	<b>34</b>	<b>14,693,117</b>	<b>4</b>	<b>1,118,241</b>	<b>1</b>	<b>1,548,205</b>
<b>Virginia</b>								
American Psychosomatic Society	1	49,000	1	49,000	—	—	—	—
Barron Associates, Inc.	1	199,989	1	199,989	—	—	—	—
CW Optics, Inc.	1	925,905	1	925,905	—	—	—	—
Eastern Virginia Medical School	1	311,885	1	311,885	—	—	—	—
ISA Associates, Inc.	1	329,613	1	329,613	—	—	—	—
Luna Innovations	2	938,779	—	—	—	—	2	938,779
Mcguire Research Institute, Inc.	1	292,702	1	292,702	—	—	—	—
Molecules for Health, Inc.	1	71,570	1	71,570	—	—	—	—
Old Dominion University	1	377,622	1	377,622	—	—	—	—
Paragon Technology Group	1	12,044,837	—	—	—	—	1	12,044,837
Society of Nuclear Medicine	1	15,000	1	15,000	—	—	—	—
University of Virginia	53	21,664,098	46	20,149,426	7	1,514,672	—	—
Virginia College of Osteopathic Medicine	1	190,875	1	190,875	—	—	—	—
Virginia Commonwealth University	24	6,827,072	19	6,328,553	5	498,519	—	—
Virginia Polytechnic Institute and State University	1	237,750	1	237,750	—	—	—	—
<b>Total Virginia</b>	<b>91</b>	<b>44,476,697</b>	<b>76</b>	<b>29,479,890</b>	<b>12</b>	<b>2,013,191</b>	<b>3</b>	<b>12,983,616</b>
<b>Washington</b>								
Asthma, Inc.	1	74,698	1	74,698	—	—	—	—
Axio Research, LLC	1	376,892	1	376,892	—	—	—	—
Barlow Scientific, Inc.	1	464,382	1	464,382	—	—	—	—
Benaroya Research Institute at Virginia Mason	1	621,746	1	621,746	—	—	—	—
CardioMetrix, Inc.	1	392,917	1	392,917	—	—	—	—
Enertechnix, Inc.	1	100,036	1	100,036	—	—	—	—
Fred Hutchinson Cancer Research Center	29	30,798,506	21	13,104,227	1	31,694	7	17,662,585
Puget Sound Blood Center	3	2,848,370	3	2,848,370	—	—	—	—
Seattle Biomedical Research Institute	1	33,418	—	—	1	33,418	—	—
Seattle Children's Hospital	13	4,828,559	13	4,828,559	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Seattle Institute for Biomedical and Clinical Research	1	254,752	1	254,752	—	—	—	—
Sunnybrook and Women's College Health Sciences Center	1	514,014	1	514,014	—	—	—	—
Talaria, Inc.	1	172,248	1	172,248	—	—	—	—
University of Washington	121	69,765,710	101	55,876,286	16	3,930,570	4	9,958,854
VPDiagnostics, Inc.	1	913,712	1	913,712	—	—	—	—
Washington State University	2	721,732	2	721,732	—	—	—	—
<b>Total Washington</b>	<b>179</b>	<b>112,881,692</b>	<b>150</b>	<b>81,264,571</b>	<b>18</b>	<b>3,995,682</b>	<b>11</b>	<b>27,621,439</b>
<b>West Virginia</b>								
West Virginia University	11	3,352,855	9	3,017,578	2	335,277	—	—
<b>Total West Virginia</b>	<b>11</b>	<b>3,352,855</b>	<b>9</b>	<b>3,017,578</b>	<b>2</b>	<b>335,277</b>	<b>—</b>	<b>—</b>
<b>Wisconsin</b>								
Bellbrook Labs, LLC	1	531,899	1	531,899	—	—	—	—
BloodCenter of Wisconsin, Inc.	9	5,036,894	8	4,866,336	1	170,558	—	—
Marquette University	2	477,541	2	477,541	—	—	—	—
Medical College of Wisconsin	64	34,266,170	58	33,274,814	5	842,867	1	148,489
Platypus Technologies, LLC	1	199,952	1	199,952	—	—	—	—
Quantum Tubers Corporation	1	642,697	1	642,697	—	—	—	—
SpectroCon, LLC	1	724,039	1	724,039	—	—	—	—
SysLogic, Inc.	1	700,471	1	700,471	—	—	—	—
University of Wisconsin, Madison	55	24,706,117	47	22,556,401	7	1,940,664	1	209,052
University of Wisconsin, Milwaukee	1	347,549	1	347,549	—	—	—	—
<b>Total Wisconsin</b>	<b>136</b>	<b>67,633,329</b>	<b>121</b>	<b>64,321,699</b>	<b>13</b>	<b>2,954,089</b>	<b>2</b>	<b>357,541</b>
<b>Wyoming</b>								
Softray, Inc.	1	109,552	1	109,552	—	—	—	—
University of Wyoming	1	334,709	1	334,709	—	—	—	—
<b>Total Wyoming</b>	<b>2</b>	<b>444,261</b>	<b>2</b>	<b>444,261</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>
<b>Puerto Rico</b>								
Universidad Central Del Caribe	1	102,720	1	102,720	—	—	—	—
University of Puerto Rico Mayaguez	—	137,054	—	137,054	—	—	—	—
University of Puerto Rico Medical Sciences	1	217,500	1	217,500	—	—	—	—
<b>Total Puerto Rico</b>	<b>2</b>	<b>457,274</b>	<b>2</b>	<b>457,274</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>
<b>Total U.S.</b>	<b>5,517</b>	<b>2,610,515,447</b>	<b>4,783</b>	<b>2,251,026,634</b>	<b>519</b>	<b>97,819,271</b>	<b>215</b>	<b>261,669,542</b>
<b>Argentina</b>								
IECS - Argentina	1	1,015,864	—	—	—	—	1	1,015,864
<b>Total Argentina</b>	<b>1</b>	<b>1,015,864</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>1</b>	<b>1,015,864</b>

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
<b>Australia</b>								
Baker Heart Research Institute	1	259,063	1	259,063	—	—	—	—
James Cook University of North Queensland	1	256,009	1	256,009	—	—	—	—
Walter and Elizabeth Hall Institute Medical Research	1	183,519	1	183,519	—	—	—	—
<b>Total Australia</b>	<b>3</b>	<b>698,591</b>	<b>3</b>	<b>698,591</b>	—	—	—	—
<b>Bangladesh</b>								
ICDDR - Bangladesh	1	1,323,943	—	—	—	—	1	1,323,943
<b>Total Bangladesh</b>	<b>1</b>	<b>1,323,943</b>	—	—	—	—	<b>1</b>	<b>1,323,943</b>
<b>Canada</b>								
Clinical Research Institute of Montreal	1	281,609	1	281,609	—	—	—	—
Hospital for Sick Children, Toronto	2	331,742	2	331,742	—	—	—	—
International Society for Cellular Therapy	1	8,000	1	8,000	—	—	—	—
McGill University	1	130,635	1	130,635	—	—	—	—
McMaster University	1	476,909	1	476,909	—	—	—	—
Montreal Heart Institute	2	512,170	2	512,170	—	—	—	—
University Health Network	1	185,469	1	185,469	—	—	—	—
University of Alberta	1	131,085	1	131,085	—	—	—	—
University of British Columbia	1	256,009	1	256,009	—	—	—	—
University of Montreal	1	359,303	1	359,303	—	—	—	—
University of Western Ontario	1	212,446	1	212,446	—	—	—	—
<b>Total Canada</b>	<b>13</b>	<b>2,885,377</b>	<b>13</b>	<b>2,885,377</b>	—	—	—	—
<b>China</b>								
The George Institute - China	1	1,206,859	—	—	—	—	1	1,206,859
<b>Total China</b>	<b>1</b>	<b>1,206,859</b>	—	—	—	—	<b>1</b>	<b>1,206,859</b>
<b>Colombia</b>								
Malaria Vaccine Development Center	1	343,157	1	343,157	—	—	—	—
<b>Total Colombia</b>	<b>1</b>	<b>343,157</b>	<b>1</b>	<b>343,157</b>	—	—	—	—
<b>Guatemala</b>								
INCAP - Guatemala	1	1,168,499	—	—	—	—	1	1,168,499
<b>Total Guatemala</b>	<b>1</b>	<b>1,168,499</b>	—	—	—	—	<b>1</b>	<b>1,168,499</b>
<b>Hungary</b>								
Eötvös Loránd University	—	37,927	—	37,927	—	—	—	—
Institute of Enzymology, Biological Research Center	—	27,000	—	27,000	—	—	—	—
<b>Total Hungary</b>	—	<b>64,927</b>	—	<b>64,927</b>	—	—	—	—

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
<b>Iceland</b>								
deCODE Genetics, Inc.	1	646,072	1	646,072	—	—	—	—
<b>Total Iceland</b>	<b>1</b>	<b>646,072</b>	<b>1</b>	<b>646,072</b>	—	—	—	—
<b>India</b>								
Public Health Foundation of India	1	1,164,694	—	—	—	—	1	1,164,694
St. John's Medical College - India	1	1,000,797	—	—	—	—	1	1,000,797
<b>Total India</b>	<b>2</b>	<b>2,165,491</b>	—	—	—	—	<b>2</b>	<b>2,165,491</b>
<b>Kenya</b>								
Moi University - Kenya	1	1,106,324	—	—	—	—	1	1,106,324
<b>Total Kenya</b>	<b>1</b>	<b>1,106,324</b>	—	—	—	—	<b>1</b>	<b>1,106,324</b>
<b>New Zealand</b>								
Auckland Uniservices Limited	2	208,045	2	208,045	—	—	—	—
University of Auckland	1	460,291	1	460,291	—	—	—	—
<b>Total New Zealand</b>	<b>3</b>	<b>668,336</b>	<b>3</b>	<b>668,336</b>	—	—	—	—
<b>Peru</b>								
Universidad Peruana Cayetano Heredia - Peru	1	1,427,451	—	—	—	—	1	1,427,451
<b>Total Peru</b>	<b>1</b>	<b>1,427,451</b>	—	—	—	—	<b>1</b>	<b>1,427,451</b>
<b>South Africa</b>								
University of Cape Town - South Africa	1	1,185,676	—	—	—	—	1	1,185,676
<b>Total South Africa</b>	<b>1</b>	<b>1,185,676</b>	—	—	—	—	<b>1</b>	<b>1,185,676</b>
<b>Switzerland</b>								
École Polytechnique Fédérale de Lausanne	1	270,000	1	270,000	—	—	—	—
<b>Total Switzerland</b>	<b>1</b>	<b>270,000</b>	<b>1</b>	<b>270,000</b>	—	—	—	—
<b>United Kingdom</b>								
St. Mary's Hospital Newport	1	380,848	1	380,848	—	—	—	—
University College London	1	128,388	1	128,388	—	—	—	—
University of Bristol	1	505,770	1	505,770	—	—	—	—
University of Cambridge	1	262,170	1	262,170	—	—	—	—
University of Leeds	1	76,680	1	76,680	—	—	—	—
<b>Total United Kingdom</b>	<b>5</b>	<b>1,353,856</b>	<b>5</b>	<b>1,353,856</b>	—	—	—	—
<b>Total, Other</b>	<b>36</b>	<b>\$ 17,530,423</b>	<b>27</b>	<b>\$ 6,930,316</b>	—	—	<b>9</b>	<b>\$ 10,600,107</b>
<b>Grand Total</b>	<b>5,553</b>	<b>\$2,628,045,870</b>	<b>4,810</b>	<b>\$2,257,956,950</b>	<b>519</b>	<b>\$97,819,271</b>	<b>224</b>	<b>\$272,269,649</b>





## 15. Activities Supported by the American Recovery and Reinvestment Act of 2009

The American Recovery and Reinvestment Act (ARRA), also known as the Recovery Act or the Economic Stimulus Package, was signed into law by President Barack Obama on February 17, 2009. It was an unprecedented effort to jump-start the economy, create or save millions of jobs, and address national challenges so that the Nation can move forward and thrive in the 21st century.

As stated in the legislation, the ARRA has five purposes:

- Preserve and create jobs and promote economic recovery
- Assist those most affected by the recession
- Provide investments needed to increase economic efficiency by spurring technological advances in science and health
- Invest in transportation, environmental protection, and other infrastructure that will provide long-term economic benefits
- Stabilize state and local government budgets to minimize and avoid reductions in essential services and counterproductive state and local tax increases

The ARRA provided the NIH with \$10.4 billion, of which \$763 million was allocated to the NHLBI. The Institute's funding plan strikes a balance between increasing the number of investigator-initiated research grants and supporting signature projects through the following mechanisms: NHLBI research grants (through expansion of FY 2008 and FY 2009 paylines), participation in NIH-wide administrative supplements, and participation in NIH-wide ARRA RFAs.

### NHLBI Research Grants-Expansion of FY 2008 and FY 2009 Paylines

The NHLBI used a portion of the ARRA funds to support investigator-initiated research grant

applications that had just missed the paylines in FY 2008 and FY 2009. The following proposals were funded by the NHLBI:

- Highly meritorious investigator-initiated R01 and R21 applications that ranked from the 15.1 to 25.0 percentile and were viewed as being capable of making significant advances with a 2-year grant.
- Early Stage Investigator-initiated applications up to the 35.0 percentile. The first 2 years will be supported by ARRA funds. The remaining years will be funded by regularly appropriated funds.
- New Investigator-initiated applications that ranked from the 20.1 to 30.0 percentile and were viewed as being capable of making significant advances in 2 years.

### Administrative Supplements

An administrative supplement is an increment in funding to support research that is within the original scope of an active NIH research grant (parent grant). Requests for administrative supplements for NHLBI grant awards do not require evaluation by an initial peer-review group but are subject to review and approval by NHLBI program and grants management staff.

The NHLBI funded administrative supplements to active R01 and R21 grants. The NHLBI's supplements under the ARRA support research employment opportunities for new full-time-equivalent employees who are predoctoral students, postdoctoral trainees or fellows, or recent college and master's degree graduates. Priority was given to requests from investigators who were qualified to receive their current awards as Early Stage Investigators or New Investigators.



The NHLBI also funded administrative supplements under the following NIH-wide initiatives:

- **Administrative Supplements Providing Summer Research Experiences for Students and Science Educators.** The NHLBI used ARRA funds to provide supplements to active research grants to support summer research opportunities for high school and college students and science educators (e.g., elementary, middle, and high school teachers; community college faculty; and faculty from non-research intensive institutions).
- **Research Supplements To Promote Diversity in Health-Related Research.** The NHLBI used ARRA funds to provide supplements to research grants to improve the diversity of the research workforce by supporting and recruiting students, postdoctorates, and eligible investigators from groups that have been shown to be underrepresented in science.
- **Research Supplements To Promote Reentry Into Biomedical and Behavioral Research Careers.** The NHLBI used ARRA funds to provide supplements to research grants to support individuals with high potential to reenter an active research career after a qualifying interruption for family or other responsibilities.

## NHLBI Participation in NIH-Wide ARRA RFAs

### NIH Challenge Grants in Health and Science Research (RC1)

This new program supports research in areas that address specific scientific and health research challenges in biomedical and behavioral research that will benefit from significant 2-year jumpstart funds. The NIH identified Challenge Areas focused on specific knowledge gaps, scientific opportunities, new technologies, data generation, or research methods that would benefit from an influx of funds to advance the area quickly and in significant ways. The NHLBI identified specific Challenge Topics within the broad Challenge Areas that reflect the Institute's views about priority areas for funding.

### Research and Research Infrastructure "Grand Opportunities" (GO) (RC2)

GO grants support projects that address large, specific biomedical and behavioral research endeavors that will benefit from significant 2-year investments without the expectation of continued funding from NIH. Research

supported by this program is expected to provide a high short-term return and offer a high likelihood of enabling growth and investment in biomedical research and development, public health, and health care delivery. The NHLBI identified priority topics for GO grants, including the following:

- Comparative Effectiveness Research
- Novel Methods of Monitoring Health Disparities
- The NHLBI BioResource Program: Creation of Resources Designed To Accelerate Scientific Progress in the Areas of Heart, Lung, and Blood Diseases; Cellular Therapies; and Blood Safety
- Large-scale DNA Sequencing and Molecular Profiling of Well-Phenotyped NHLBI Cohorts
- Next Steps in Gene Discovery: Building Upon GWAS (Genome-wide Association Studies)
- Characterizing Differentiated Heart, Lung, and Blood Cells Derived by Reprogramming Human Embryonic and Induced Pluripotent Stem Cells
- Testing of Mechanistic Hypotheses Generated by Findings From Genetic and Genomic Studies of Heart, Vascular, Lung, and Blood Disorders
- Translation of Fundamental Research Findings Into Clinical Treatments for Heart, Lung, and Blood Diseases (including the NHLBI Translational Research Implementation Program (TRIP); the Phase II Clinical Trials Program of Novel Therapies for Heart, Lung, and Blood Diseases; and the Ancillary Studies Program)

### Supporting New Faculty Recruitment To Enhance Research Resources Through Biomedical Research Core Centers (P30)

These P30 grants enable institutions to augment or expand their biomedical research efforts by hiring newly independent investigators and providing them with appropriate startup packages and the resources needed to develop pilot research projects.

### NHLBI Participation in NIH-Wide ARRA RFAs With Earliest Anticipated Award Date in FY 2010

#### Academic Research Enhancement Awards (AREA) (R15)

The AREA program will stimulate research in educational institutions that provide baccalaureate or advanced

degrees for a significant number of the Nation's research scientists but have not been major recipients of NIH support. AREA grants are intended to support small-scale health-related research projects proposed by faculty members of eligible, domestic institutions.

### **Biomedical Research, Development, and Growth To Spur the Acceleration of New Technologies Pilot Program (BRDG-SPAN) (RC3)**

The BRDG-SPAN is a pilot program that will address the funding gap between promising research and development (R&D) and transition to the market by contributing to critical funding needed by applicants to pursue the next appropriate milestone(s) toward ultimate commercialization. The goal of the BRDG-SPAN is to accelerate the transition of research innovations and technologies toward the development of products or services that will improve human health, help advance the mission of the NHLBI, and create significant value and economic stimulus. This program will also foster partnerships among a variety of R&D collaborators.

### **Small Business Catalyst Awards for Accelerating Innovative Research (R43)**

This program will accelerate innovation through high-risk, high-reward R&D that has commercial potential and is relevant to the mission of the NIH. The award is expected to support entrepreneurs of exceptional creativity who are drawn from scientific and technological environments beyond those usually involved in NIH-supported research and who have proposed pioneering and possibly transformative approaches to addressing major biomedical or behavioral challenges with the potential for downstream commercial development.

## **Other RFAs Funded Under ARRA**

### **Small Grants for Lung Tissue Research (R03)**

This program will enable tissue-based research on two common, yet complex and difficult-to-treat lung diseases: interstitial fibrotic lung disease and COPD. Funds from the ARRA will allow a substantial expansion of the Institute's lung tissue research program by enabling support for nine additional grants that would otherwise have not been funded.

### **Functional Characterization of Genetic Variants and Interactions: The Genes, Environment, and Health Initiative (R21)**

This program—which is part of the NIH Genes, Environment, and Health Initiative—will determine the functional relevance of associated genetic variant(s) to common diseases. It will focus solely on functional characterization of gene variants that are strongly suggested to be associated with common, complex human diseases identified through candidate gene, GWAS, and other approaches.

### **Comparative Effectiveness Research (CER)**

Approximately \$1.1 billion of the ARRA funds were allocated to CER, of which the NIH received \$400 million. The NIH used the funds to support 2-year investigator-initiated projects, including payline expansions, Challenge grants, GO grants, and such other activities as supplements and contracts. The projects supported by the funds met the Federal Coordinating Council definition of CER, that is:

Comparative effectiveness research is the conduct and synthesis of research comparing the benefits and harms of different interventions and strategies to prevent, diagnose, treat, and monitor health conditions in “real world” settings. The purpose of this research is to improve health outcomes by developing and disseminating evidence-based information to patients, clinicians, and other decisionmakers, responding to their expressed needs, about which interventions are most effective for which patients under specific circumstances.

## **Signature Projects**

### **DNA Sequencing of NHLBI's Well-Phenotyped Population Cohorts for the Identification of Disease-Causing Genetic Variants and Understanding of Biological Pathways**

Although genome-wide association studies have been successful in identifying high frequency genetic variants of modest effect size that are associated with numerous common complex traits and diseases—including myocardial infarction, stroke, diabetes, obesity, hypertension, chronic pulmonary disease, and anemia—they are incapable of identifying actual disease-causing genetic

variants, especially those of lower frequency and potentially larger effects. Finding such variants will require large-scale DNA sequencing of thousands of individuals from well-phenotyped populations. With recent technological advances, the feasibility of such a project is now within reach, and a strong argument can be made that the well-phenotyped NHLBI cohorts are the logical place to start.

The NHLBI is supporting six GO (RC2) grants, including two sequencing centers, under this signature program. The NIH Office of the Director is providing funds to help support one of the sequencing centers.

### **Stem Cell Biology and Regenerative Medicine**

The NHLBI is committed to catalyzing basic and clinical stem cell research that will lead to the development of regenerative therapies for the treatment of heart, lung, and blood diseases. Recent advances, including the induction of pluripotent stem cells from adult somatic cells and the directed differentiation of stem cells into a variety of cellular derivatives, hold great promise for future therapeutic application. However, important gaps remain in understanding the characteristics of stem and progenitor cells, the mechanisms of their differentiation, and the unique attributes of resultant differentiated states. In addition, the degree to which differentiation of stem cells in the laboratory recapitulates the *in vivo* characteristics of tissues and organs remains unclear, and fundamental knowledge of cardiovascular and pulmonary stem and progenitor cell biology lags behind that for hematopoietic cells.

To address these gaps, the NHLBI is supporting four GO (RC2) grants under this signature program.

### **Translation of Fundamental Research Findings Into Clinical Treatments for Heart, Lung, and Blood Diseases**

The ultimate goal of biomedical research is to develop new knowledge that will lead to improvements in public

health. Fundamental research studies in cells, tissues, and animal models and investigations of biomarkers and functional genomics have greatly expanded understanding of the pathogenesis of many heart, lung, and blood diseases and have provided a range of potential new approaches for their prevention and treatment. Yet the translation of basic research findings to clinical testing has often been disappointingly slow, with good ideas and new findings sometimes languishing for years before being tested for efficacy in a clinical setting. ARRA funds provide an excellent opportunity to stimulate translational research and thereby hasten the transition of research findings into clinical practice. The NHLBI will fund a total of 10 GO (RC2) grants in two program areas:

- **Stage 1 of the NHLBI Translational Research Implementation Program (TRIP).** The intent of the two-stage TRIP is to accelerate the translation of fundamental research ideas into proof-of-concept efficacy testing in patients. The 2-year Stage 1 TRIP awards will support preliminary studies that culminate in the development of ready-to-conduct clinical trials. The awards will fund the activities required to design clinical trials to evaluate safety and efficacy of new modalities to treat and prevent heart, lung, and blood diseases based on promising ideas that have emerged from basic research. For the Stage 2 TRIP, the NHLBI will use regularly appropriated funds to support the most meritorious trials developed in Stage 1.
- **Phase II Clinical Trials Program of Novel Therapies for Heart, Lung, and Blood Diseases.** This program will support Phase II clinical trials of novel therapies and diagnostic strategies for heart, lung, and blood diseases that offer the potential to change clinical practice and are ready to be tested in patients. It will also support innovative clinical trial designs. The supported research is expected to result in high-quality data that will lead to efficacy or Phase III trials. This program will assess only interventions and strategies that offer high promise for modifying current treatments or diagnostic approaches or altering the course of a disease.

### NHLBI ARRA-Supported Activities Initiated in Fiscal Year 2009

Category	Program and Mechanism*	Estimated Number of Awards	Estimated Funding (Dollars in Millions)**	NIH Support (Dollars in Millions)**
Research Grants-Expanded Paylines	R01/R21s	328	292	21
NIH-Wide Administrative Supplements	Administrative Supplements	382	88	
	Research Supplements To Promote Diversity in Health-Related Research	17	1	
	Research Supplements To Promote Reentry Into Biomedical and Behavioral Research Careers	3	1	
	Administrative Supplements Providing Summer Research Experiences for Students and Science Educators	120	1	3
NIH-Wide ARRA RFAs	Challenge Grants (RC1)	108	102	28
	Grand Opportunities (RC2)	48	199	84
	Supporting New Faculty Recruitment To Enhance Research Resources Through Biomedical Research Core Centers (P30)	35	40	
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	Small Grants for Lung Tissue Research (R03)	22	3.3	

\* Does not include mechanisms with funding received after 2009.

\*\* Two-year total costs.





# **Appendixes**

**Types of Research Activity**

**List of Abbreviations and Acronyms**

**Index**







# Types of Research Activity

## Research Projects

**Research Project Grants (R01):** To support discrete and specific projects to be performed by one or several investigators in areas of the investigator's particular interests and competencies.

**Research Projects (Cooperative Agreements) (U01):** To support discrete, circumscribed projects in areas of an investigator's specific interest and competency involving substantial programmatic participation by the NHLBI during performance of the activity.

**Research Program (Cooperative Agreement) (U10):** To support a research program of multiple projects, requiring a broadly-based, multidisciplinary and often long-term approach, directed toward a specific major objective, common theme, or program goal relevant to the Institute's mission. The award involves substantial programmatic involvement by NHLBI staff to assist investigators during performance of the research activities.

**Research Program Projects (P01):** To support broadly based, multidisciplinary, often long-term research projects that have specific major objectives or basic themes directed toward a well-defined research program goal. Usually, a relatively large, organized group of researchers conducts individual subprojects, the results of which help achieve objectives of the program project.

**Small Research Grants (R03):** To provide limited support for extended analyses of research data generated by clinical trials, population research, and demonstration and education studies.

**Academic Research Enhancement Awards (AREA) (R15):** To support small-scale research projects conducted by faculty in primarily baccalaureate degree-granting domestic institutions. Awards are for up to \$75,000 for direct costs (plus applicable indirect costs) for periods not to exceed 36 months.

**Exploratory/Developmental Grants (R21):** To encourage the development of new research activities in heart, lung, and blood diseases and sleep disorders program areas.

**Exploratory/Developmental Grant (R33):** To provide phase II support for innovative exploratory and developmental research activities initiated under the R21 mechanism.

**Method To Extend Research in Time (MERIT) Award (R37):** To provide long-term research grant support to investigators whose research competency and productivity are distinctly superior and thus are likely to continue to perform in an outstanding manner. Investigators may not apply for a MERIT award; instead, they are selected by the NHLBI on the basis of their current grant applications and their present and past grant support.

**NIH Director's Pioneer Award (DP1):** To support individual scientists of exceptional creativity who propose pioneering approaches to major contemporary challenges in biomedical research.

**NIH Director's New Innovator Award (DP2):** To support exceptionally creative new investigators who propose highly innovative approaches that have the potential to produce an unusually high impact. The New Innovator Award will emphasize the importance and potential impact of the scientific problem, the novelty and innovativeness of the approach, and the applicant's potential for creative and innovative research.

**Small Business Technology Transfer (STTR) Grants—Phase I (R41):** To support cooperative R&D projects between small business concerns and research institutions, limited in time and amount, to establish the technical merit and feasibility of ideas that have potential for commercialization. Awards are made to small business concerns only.

**Small Business Technology Transfer (STTR) Grants—Phase II (R42):** To support in-depth development of cooperative R&D projects between

small business concerns and research institutions, limited in time and amount, whose feasibility has been established in phase I and that have potential for commercialization. Awards are made to small business concerns only.

**Small Business Innovation Research (SBIR) Grants, Phase I (R43):** To support projects, limited in time and amount, to establish the technical merit and feasibility of research and development ideas that may ultimately lead to commercial products or services.

**Small Business Innovation Research (SBIR) Grants, Phase II (R44):** To support research project ideas that have been shown to be feasible in phase I and that are likely to result in commercially marketable products or services.

## Research Centers

**Exploratory Grants (P20):** To support planning for new programs, expansion or modification of existing resources, and feasibility studies to explore various approaches to the development of interdisciplinary programs that offer potential solutions to problems of special significance to the mission of the NHLBI.

**Center Core Grants (P30):** To support shared resources and facilities for basic, clinical, behavioral, and translational research in the prevention, detection, and treatment of HIV infection and AIDS.

**Animal (Mammalian and Nonmammalian) Model and Animal and Material Resource Grant (P40):** To develop and support animal models, or animal or biological materials resources. Nonmammalian resources include nonmammalian vertebrates, invertebrates, cell systems, and nonbiological systems.

**Specialized Centers of Clinically Oriented Research (SCCOR) Grants (P50):** To foster multidisciplinary research on clinically relevant questions enabling basic science findings to be applied more rapidly to clinical problems. Research focuses on clinical and basic scientific issues related to diseases and disorders that are relevant to the mission of the NHLBI. The SCCOR program places more emphasis on clinical research than the SCOR program and requires at least 50 percent of the funded projects to be clinical.

**Comprehensive Specialized Research Center Grants (U54):** To support a large, interrelated biomedical research program focused on a disorder within the Institute's mandate; to initiate and expand community education, screening, and counseling programs; and to educate medical and allied health professionals concerning problems of diagnosis and treatment of specific diseases such as sickle cell anemia.

## Research Career Programs

**Mentored Research Scientist Development Award for Minority Faculty (K01):** To support underrepresented minority faculty members with varying levels of research experience to prepare them for research careers as independent investigators.

**Mentored Scientist Development Award in Research Ethics (K01):** To provide support for training in research ethics for health professionals working at academic and other health-related institutions in biomedical, behavioral, or public health research, particularly research involving human participants.

**Minority Institution Faculty Mentored Research Scientist Development Award (K01):** To support faculty members at minority institutions who have the interest and potential to conduct state-of-the-art research in cardiovascular, pulmonary, or hematologic disease or in sleep disorders.

**Independent Scientist Award (K02):** To enhance the research capability of promising individuals in the formative stages of their careers of independent research in the sciences related to heart, lung, and blood diseases; blood resources; and sleep disorders.

**Research Career Development Award (K04):** To foster the development of young scientists with outstanding research potential for careers of independent research in the sciences related to heart, lung, and blood diseases and blood resources. New grants are no longer awarded.

**Research Career Award (K06):** To assist institutions in supporting established investigators of high competency for the duration of their careers. New grants are no longer awarded.

**Academic Award (K07):** To support an individual with an academic appointment to introduce or improve a

disease curriculum that will enhance the academic or research environment of the applicant institution as well as further the individual's own career. This award series included the Systemic Pulmonary and Vascular Diseases Academic Awards, the Asthma Academic Award, the Tuberculosis Academic Award, the Sleep Academic Award, and the Nutrition Academic Award. Currently, the Cultural Competence and Health Disparities Academic Award and the Pediatric Transfusion Medicine Academic Award programs are being supported.

**Clinical Investigator Development Award (K08):** To provide an opportunity for clinically trained physicians to develop research skills and gain experience in advanced research methods and experimental approaches in basic and applied sciences relevant to cardiovascular, pulmonary, and hematological diseases.

**Research Career Development Program in Vascular Medicine (K12):** To promote comprehensive clinical research training for physicians wanting to specialize in vascular medicine. The goal is to prepare clinicians for academic roles in mentoring and leadership in clinical research in vascular medicine.

**Research Career Development Program in Clinical Hematology (K12):** To develop and evaluate multidisciplinary career development programs in clinical hematology research that will equip new academic researchers with the knowledge and skills to address complex problems in blood diseases, transfusion medicine, and cellular therapies.

**Research Career Development Program in the Genetics and Genomics of Lung Diseases (K12):** To develop multidisciplinary career development programs in genetics and genomics of lung diseases that will equip new investigators with the knowledge and skills to elucidate the etiology and pathogenesis of such diseases.

**Minority School Faculty Development Award (K14):** To develop faculty investigators at minority schools and enhance their research capabilities in areas related to heart, lung, and blood diseases; blood resources; and sleep disorders. New grants are no longer awarded.

**Research Development Award for Minority Faculty (K14):** To encourage the development of minority faculty investigators and enhance their research capabilities in areas related to cardiovascular, lung, and blood

health and disease; transfusion medicine; and sleep disorders. New grants are no longer awarded.

**Career Enhancement Award for Stem Cell Research (K18):** To enable established investigators to acquire new research capabilities in the use of human or animal embryonic, adult, or cord blood stem cells. All candidates must have a sponsor, either within their own or at another institution, who is a well-qualified stem cell expert to serve as a mentor.

**NHLBI Career Transition Award (K22):** To support the postdoctoral research training of an outstanding individual in an NHLBI intramural laboratory for up to 3 years and subsequently, to support the individual's successful transition from postdoctoral research to an extramural environment as an independent researcher.

**Mentored Patient-Oriented Research Career Development Award (K23):** To provide support for career development to investigators who have made a commitment to focus their research endeavors on patient-oriented research.

**Midcareer Investigator Award in Patient-Oriented Research (K24):** To provide support for clinicians to allow them "protected time" to devote to patient-oriented research and to act as mentors for beginning clinical investigators.

**Mentored Quantitative Research Career Development Award (K25):** To provide support to investigators with quantitative science or engineering backgrounds who have made a commitment to focus their research on basic or clinical biomedicine, bioengineering, bioimaging, or behavioral sciences.

**Clinical Research Curriculum Award (CRCA) (K30):** To stimulate inclusion of high-quality, multidisciplinary didactic training in fundamental skills, methodology, theories, and conceptualization as part of the career development of clinical investigators.

**Career Transition Award (K99/R00):** To provide up to 5 years support in two phases to highly promising postdoctoral scientists to pursue research relevant to the Institute. The K99 phase consists of 1 to 2 years mentored support followed by up to 3 years of independent support (R00) contingent on securing an independent research position. Award recipients will be expected to

compete successfully for independent research grant support from the NIH or other Institutions during the independence phase to ensure continued support and a smooth transition to independence.

### **Other Research Grants**

**Scientific Evaluation (R09):** To provide funds to the chairman of an initial review group for operation of the review group.

**Cooperative Clinical Research (R10) (U10):** To support studies and evaluations of relevant clinical problems. These grants usually involve collaborative efforts among several institutions and principal investigators and are conducted under a formal protocol.

**Conference Grants (R13):** To support national and international scientific meetings, conferences, or workshops at which research is discussed.

**Research Demonstration and Education Projects (R18):** To provide support designed to develop, test, and evaluate health-related activities and to foster application of existing knowledge to the control of heart, lung, and blood diseases and sleep disorders.

**Resource-Related Research Projects (R24):** To support research projects that will enhance the capability of resources to serve biomedical research in areas related to cardiovascular, lung, and blood health and diseases; blood resources; and sleep disorders.

**Education Projects (R25):** To provide support for the development and implementation of a program as it relates to a category in one or more of the areas of education, information, training, technical assistance, coordination, or evaluation.

**Minority Biomedical Research Support Grants (S06):** To strengthen the biomedical research and research training capability of minority institutions and to assist in increasing the involvement of minority faculty and students in biomedical research.

**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.

**Scientific Review and Evaluation (U09):** To support an initial Scientific Review Group responsible for the assessment of scientific and technical merit of grant applications.

**Resource-Related Research Projects (U24):** To support research projects contributing to improvement of the capability of resources to serve biomedical research.

**National Swine Research and Resource Center (U42):** To support a National Swine Research and Resource Center that will serve as a resource for depositing, maintaining, preserving, and distributing swine models for studies of human diseases, as well as cryopreservation, storage, and reconstitution of embryos and germplasm.

**Historical Black College and University Scientist Award (UH1):** To strengthen and augment the human resources at historically black colleges and universities (HBCU) by recruiting an established research scientist into their biomedical or behavioral sciences department; to enhance the career of the recruited research scientist; and to strengthen other HBCU resources for the conduct of biomedical or behavioral research in areas related to cardiovascular, lung, and blood health and disease; transfusion medicine; and sleep disorders.

### **Individual National Research Service Awards (NRSA)**

**Individual Predoctoral M.D./Ph.D. NRSA (F30):** To provide predoctoral individuals with supervised research training in areas related to heart, lung, and blood diseases; blood resources; sleep disorders leading toward a combined M.D./Ph.D. degree. Training under this award is designed to provide a foundation for a career as a physician-scientist in the areas of interest to the NHLBI.

**Predocctoral Individual NRSA (F31):** To provide predoctoral individuals with supervised research training in areas related to heart, lung, and blood diseases; blood resources; and sleep disorders leading toward the research degree (e.g., Ph.D.).



**Postdoctoral Individual NRSA (F32):** To provide postdoctoral research training to individuals to broaden their scientific background and extend their potential for research in areas related to heart, lung, and blood diseases and blood resources.

**NRSA for Senior Fellows (F33):** To provide experienced scientists with an opportunity to make major changes in the direction of their research careers, to broaden their scientific background, to acquire new research capabilities, to enlarge their command of an allied research field, or to take time from regular professional responsibilities for the purpose of broadening their research capabilities.

### **Institutional National Research Service Awards (NRSA)**

**Institutional NRSA (T32):** To enable institutions to make awards to individuals selected by them for predoctoral and postdoctoral research training in areas related to heart, lung, and blood diseases; blood resources; and sleep disorders.

**Minority Institutional Research Training Program (T32M):** To support full-time research training for investigative careers at minority schools in areas of cardiovascular, pulmonary, and hematologic diseases and sleep disorders. Graduate students, postdoctoral students, or health professions students may be supported under this program.

**MARC Undergraduate NRSA Institutional Grants (T34):** To support institutional training grants for underrepresented minority undergraduates to obtain research training and improve their preparation for graduate training in the biomedical and behavioral sciences.

**NRSA Short-Term Research Training (T35 and T35M):** To provide individuals with research training

during off-quarters or summer periods to encourage research careers or to encourage research in areas of national need. This program includes the Short-Term Training for Minority Students Program and short-term training for students in health professional schools.

**MARC Visiting Professors for Minority Institutions (T36):** To increase the number of well-trained minority scientists in biomedical disciplines and to strengthen the research and teaching capabilities of minority institutions.

### **Other Support**

**Research and Development Contracts (N01):** To develop or apply new knowledge or test, screen, or evaluate a product, material, device, or component for use by the scientific community.

**Small Business Innovation Research (N43):** To support projects, limited in time and amount, to establish the technical merit and feasibility of R&D ideas that may ultimately lead to a commercial product(s) or service(s).

**NIH Inter-Agency Agreements (Y01):** To provide a source of funds to another Federal Agency to acquire specific products, services, or studies.

**NIH Intra-Agency Agreements (Y02):** To provide a source of funds to another NIH component to acquire specific products, services, or studies.

**Minority Research Supplements Programs:** To provide supplemental funds to active NHLBI grants to support the research of minority high school, undergraduate, and graduate students; postdoctoral trainees; and investigators.





# List of Abbreviations and Acronyms

ACCORD	Action To Control Cardiovascular Risk in Diabetes	CF	cystic fibrosis
ACE	angiotensin-converting enzyme	CHD	coronary heart disease
AHEAD	Action for Health in Diabetes	CHS	Cardiovascular Health Study
AIDS	acquired immunodeficiency syndrome	COPD	chronic obstructive pulmonary disease
ALLHAT	Antihypertensive and Lipid-Lowering Treatment To Prevent Heart Attack Trial	CSCC	Comprehensive Sickle Cell Centers
AMI	acute myocardial infarction	CVD	cardiovascular diseases
ARDS	acute respiratory distress syndrome	DARD	Division for the Application of Research Discoveries
AREA	Academic Research Enhancement Awards	DASH	Dietary Approaches To Stop Hypertension
ARIC	Atherosclerosis Risk in Communities	DBDR	Division of Blood Diseases and Resources
ARRA	American Recovery and Reinvestment Act	DCVD	Division of Cardiovascular Diseases
ATP III	Adult Treatment Panel III	DERA	Division of Extramural Research Affairs
BABY HUG	Pediatric Hydroxyurea Phase III Clinical Trial	DIR	Division of Intramural Research
BARI 2D	Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics	DLD	Division of Lung Diseases
BEE	Board of Extramural Experts	DPPS	Division of Prevention and Population Sciences
BTRP	Basic and Translational Research Program	EDTA	ethylene diamine tetra-acetic acid
CABG	coronary artery bypass graft	FY	fiscal year
CAMP-CS/ Phase II	Childhood Asthma Management Program–Continuation Study/Phase II	GO	Grand Opportunity (ARRA grants)
CARDIA	Coronary Artery Risk Development in Young Adults	GOCADAN	Genetics of Coronary Artery Disease in Alaska Natives
CDC	Centers for Disease Control and Prevention	GTRP	Gene Therapy Resource Program
		HBCU	historically black college and university
		HCHS	Hispanic Community Health Study

HEW	Department of Health, Education, and Welfare (now HHS)	NIA	National Institute on Aging
HHS	Health and Human Services (formerly HEW)	NIAMS	National Institute of Arthritis and Musculoskeletal and Skin Diseases
HIV	human immunodeficiency virus	NICHD	National Institute of Child Health and Human Development
HTLV	human T-lymphotropic virus	NIDDK	National Institute of Diabetes and Digestive and Kidney Diseases
ICD	International Classification of Diseases	NIH	National Institutes of Health
JHS	Jackson Heart Study	NINDS	National Institute of Neurological Disorders and Stroke
JNC V	Fifth Report of the Joint National Committee on the Detection, Evaluation, and Treatment of High Blood Pressure	NRSA	National Research Service Award
MARC	Minority Access to Research Careers	ORTMH	Office of Research Training and Minority Health
MESA	Multi-Ethnic Study of Atherosclerosis	OSA	obstructive sleep apnea
NAEPP	National Asthma Education and Prevention Program	PA	Program Announcement
NCEP	National Cholesterol Education Program	PAD	peripheral artery disease
NCHS	National Center for Health Statistics	PHS	Public Health Service
NCI	National Cancer Institute	POWER	Practice-Based Opportunity for Weight Reduction
NCSDR	National Center on Sleep Disorders Research	RFA	Request for Applications
NHAAP	National Heart Attack Alert Program	RFP	Request for Proposals
NHANES	National Health and Nutrition Examination Survey	RPG	research project grant
NHBPEP	National High Blood Pressure Education Program	SBIR	Small Business Innovation Research
NHI	National Heart Institute	SCD	sickle cell disease
NHLBAC	National Heart, Lung, and Blood Advisory Council	SCCOR	Specialized Center of Clinically Oriented Research
NHLBI	National Heart, Lung, and Blood Institute (formerly NHI and NHLI)	SCOR	Specialized Center of Research
NHLI	National Heart and Lung Institute	SDB	sleep disordered breathing
		SEP	Special Emphasis Panel

SES	socioeconomic status	TB	tuberculosis
SIDS	sudden infant death syndrome	WHI	Women's Health Initiative
STAN	Study of Asthma and Nasal Steroids	WLM	Weight Loss Maintenance
STTR	Small Business Technology Transfer		
SWITCH	Stroke With Transfusions Changing to Hydroxyurea		



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