

Factbook.

Fiscal Year 2004.

For administrative use.

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National Institutes of Health.

National Heart, Lung, and Blood Institute.

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1. Directory of Personnel

Current as of October 15, 2004. 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.

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

Notes: MSC—Mail Stop Code. RKL1—Rockledge I Building. RKL2—Rockledge II Building.

	Bldg.	Room	Phone	MSC
Office of the Director				
Acting Director, Barbara M. Alving, MD	31	5A52	496-5166	2486
Acting Deputy Director, Lawrence Friedman, MD	31	5A47	496-1078	2490
Assistant to the Director, Sheila Pohl	31	5A52	496-6471	2486
Special Assistant to the Director (NHLBI AIDS Coordinator), Elaine Sloand, MD	31	4A35	496-3245	2490
Assistant Director for Ethics and Clinical Research, Lawrence Friedman, MD	31	5A20	496-9899	2490
Associate Director for Administrative Management, Donald P. Christoferson	31	5A46	496-2411	2490
Associate Director for Scientific Program Operation, Carl A. Roth, PhD, LLM	31	5A03	496-6331	2482
Associate Director for Prevention, Education, and Control, Gregory J. Morosco, PhD, MPH	31	4A10	496-5437	2480
Associate Director for International Programs, Ruth J. Hegyeli, MD	31	4A29	496-5375	2490
Office of Work Force Development and Recognition Director, Mishyelle I. Croom	31	5A28	496-1763	2490
Office of Minority Health Affairs Director, Helena Mishoe, PhD, MPH	RKL2	8188	451-5081	7913
Office of Administrative Management				
Director/Executive Officer, Donald P. Christoferson	31	5A46	496-2411	2490
Administrative Officer, Valery D. Gheen	31	5A33	496-5931	2490
Management Policy and Administrative Services Branch Chief, Marilyn Jackson	31	5A33	496-5931	2490
Freedom of Information/Privacy Act Coordinator, Suzanne Freeman	31	5A33	496-9737	2490
Financial Management Branch Chief, Sandra Gault	31	5A46	496-4653	2490
Extramural Administrative Management Branch Chief, Loretta L. Barnes	RKL2	7026	435-6373	7921
Intramural Administrative Management Branch Chief, Gary Unger	10	7N220	402-3646	1670
National Center on Sleep Disorders Research Director, Carl E. Hunt, MD	RKL1	6022	435-0199	7993
Administrative Officer, Stacey Long	RKL2	7026	435-6373	7921

	Bldg.	Room	Phone	MSC
Women's Health Initiative Director, Barbara M. Alving, MD	31	5A52	496-5166	2486
Administrative Officer, Charlotte M. Wiltshire	RKL2	7026	435-6373	7921
Office of Prevention, Education, and Control Director, Gregory J. Morosco, PhD, MPH	31	4A10	496-5437	2480
Program Operations Coordinator, Nancy J. Poole, MBA	31	4A10	496-5437	2480
Administrative Officer, Rebecca Tener	31	5A33	496-5931	2490
Health Communications and Information Science Senior Manager, Terry C. Long	31	4A10	496-0554	2480
Public Health Program Development Senior Manager, Robinson Fulwood, PhD, MSPH	31	4A10	496-0554	2480
NHLBI Nutrition Coordinator, Darla E. Danford, DSc, MPH	31	4A10	496-0554	2480
National High Blood Pressure Education Program Coordinator, Edward J. Roccella, PhD, MPH	31	4A10	496-1051	2480
National Cholesterol Education Program Coordinator, James I. Cleeman, MD	31	4A10	496-1051	2480
National Asthma Education and Prevention Program Coordinator, Diana K. Schmidt, MPH	31	4A10	496-1051	2480
National Heart Attack Alert Program Coordinator, Mary McDonald Hand, MSPH, RN	31	4A10	496-1051	2480
National Obesity Education Initiative Coordinator, Karen Donato, MS, RD	31	4A10	496-1051	2480
NHLBI Women's Heart Health Education Initiative Coordinator, Ann Taubenheim, PhD, MSN	31	4A10	496-4236	2480
Office of Science and Technology				
Director, Carl A. Roth, PhD, LLM	31	5A03	496-6331	2482
Deputy Director, Barbara Liu, SM	31	5A06	496-9899	2482
Administrative Officer, Rebecca E. Tener	31	5A33	496-5931	2490
Office of International Programs Director, Ruth Hegyeli, MD	31	4A29	496-5375	2490
Program Studies and Reports Program Director, Carl A. Roth, PhD, LLM	31	5A03	496-6331	2482
Science and Special Issues Program Director, Barbara Liu, SM	31	5A06	496-9899	2482
Office of Public Liaison Coordinator, Jonelle Drugan, PhD, MPH	31	5A07	496-9899	2482
Information Resources and Technology Program Director, Ralph Van Wey	RKL1	6210	435-0119	7994
Administrative Officer, Amy W. Sheetz	RKL2	7026	435-6367	7921
Office of Technology Transfer and Development Director, Lili M. Portilla	RKL1	6018	402-5579	7992
Administrative Officer, Stacey A. Long	RKL2	7026	435-6373	7921
Division of Heart and Vascular Diseases				
Director, Stephen C. Mockrin, PhD	RKL2	9160	435-0466	7940
Deputy Director, Sonia Skarlatos, PhD	RKL2	9158	435-0477	7940

	Bldg.	Room	Phone	MSC
Special Assistant for Clinical Studies, David J. Gordon, MD	RKL2	9152	435-0466	7940
Research Training and Special Programs Scientific Research Group Leader, Beth Schucker, MS	RKL2	9140	435-0535	7940
Administrative Officer, Lisa A. Freeny	RKL2	7026	435-6373	7921
Clinical and Molecular Medicine Program Director, Alice Mascette, MD	RKL2	9132	435-0555	7940
Associate Director, Susan Old, PhD	RKL2	9137	435-1802	7940
Cardiovascular Medicine Scientific Research Group Leader, Patrice Desvigne-Nickens, MD	RKL2	9178	435-0515	7940
Bioengineering and Genomic Applications Scientific Research Group Leader, Sunil Pandit, PhD	RKL2	9144	435-1802	7940
Heart Research Program Director, John L. Fakunding, PhD	RKL2	9170	435-0494	7940
Associate Director, Denis Buxton, PhD	RKL2	9188	435-0504	7940
Arrhythmias, Ischemia, and Sudden Cardiac Death Scientific Research Group Leader, David A. Lathrop, PhD	RKL2	9120	435-0507	7940
Heart Development, Function, and Failure Scientific Research Group Leader, Gail D. Pearson, MD, ScD	RKL2	9200	435-0510	7940
Vascular Biology Research Program Director, Eser Tolunay, PhD	RKL2	10198	435-0545	7956
Acting Associate Director, Deborah Applebaum-Bowden, PhD	RKL2	10190	435-0545	7956
Atherosclerosis Scientific Research Group Leader, Momtaz Wassef, PhD	RKL2	10196	435-0558	7956
Hypertension Scientific Research Group Leader, Paul A. Velletri, PhD	RKL2	10202	435-0560	7956
Division of Lung Diseases				
Director, James P. Kiley, PhD	RKL2	10122	435-0233	7952
Deputy Director, Carol E. Vreim, PhD	RKL2	10120	435-0233	7952
Administrative Officer, Amy W. Sheetz	RKL2	7026	435-6373	7921
Airway Biology and Disease Program Director, Gail G. Weinmann, MD	RKL2	10210	435-0202	7952
Senior Scientific Advisor, Susan P. Banks-Schlegel, PhD	RKL2	10220	435-0202	7952
Asthma Scientific Research Group Leader, Patricial Noel, PhD	RKL2	10222	435-0202	7952
Chronic Obstructive Pulmonary Disease/Environment Scientific Research Group Leader, Thomas Croxton, MD, PhD	RKL2	10208	435-0202	7952
Cystic Fibrosis Scientific Research Group Leader, Susan P. Banks-Schlegel, PhD	RKL2	10220	435-0202	7952
Sleep and Neurobiology Scientific Research Group Leader, Michael J. Twery, PhD	RKL2	10116	435-0202	7952
Training and Special Programs Scientific Research Group Leader, J. Sri Ram, PhD	RKL2	10206	435-0202	7952
Lung Biology and Disease Program Director, Dorothy B. Gail, PhD	RKL2	10100	435-0222	7952
Senior Scientific Advisor, Andrea Harabin, PhD	RKL2	10108	435-0222	7952
Acquired Immunodeficiency Syndrome/Tuberculosis Scientific Research Group Leader, Hannah H. Peavy, MD	RKL2	10110	435-0222	7952

	Bldg.	Room	Phone	MSC
Acute Lung Injury/Critical Care Scientific Research Group Leader, Andrea Harabin, PhD	RKL2	10108	435-0222	7952
Lung Developmental Biology and Pediatric Pulmonary Diseases Scientific Research Group Leader, Mary Anne Berberich, PhD	RKL2	10102	435-0222	7952
Immunology/Fibrosis Scientific Research Group Leader, Herbert Y. Reynolds, MD	RKL2	10112	435-0222	7952
Lung Cell and Vascular Biology Scientific Research Group Acting Leader, Dorothy B. Gail, PhD	RKL2	10100	435-0222	7952
Training and Special Programs Scientific Research Group Leader, Sandra Hatch, MD	RKL2	10104	435-0222	7952
Division of Blood Diseases and Resources				
Director, Charles Peterson, MD, MBA	RKL2	10160	435-0080	7950
Deputy Director, Liana Harvath, PhD	RKL2	10170	435-0080	7950
Senior Program Analyst, Susan Pucie	RKL2	10166	435-0079	7950
Special Assistant, Henry Chang, MD	RKL2	10158	435-0080	7950
Administrative Officer, Kathryn Lightbody	RKL2	7158	435-6373	7921
Blood Diseases Program				
Director, Blaine Moore, PhD	RKL2	10162	435-0050	7950
Hemoglobinopathies and Genetics Scientific Research Group Leader, Greg Evans, PhD	RKL2	10152	435-0055	7950
Thrombosis and Hemostasis Scientific Research Group Leader, Pankaj Ganguly, PhD	RKL2	10176	435-0070	7950
Research Training, Ellen Werner, PhD	RKL2	10156	435-0061	7950
Blood Resources Program				
Director, Jean Henslee-Downey, MD.	RKL2	10138	435-0065	7950
Transfusion Medicine and Cell Therapies Scientific Research Group Leader, George J. Nemo, PhD.	RKL2	10142	435-0075	7950
Research Training, Traci Mondoro, PhD	RKL2	10135	435-0075	7950
Small Business Research, Phyllis Mitchell, MS	RKL2	10163	435-0075	7950
Division of Epidemiology and Clinical Applications				
Director, Peter Savage, MD	RKL2	8100	435-0422	7938
Deputy Director, Diane Bild, MD	RKL2	8104	435-0422	7938
Senior Advisor, Jeffrey Cutler, MD	RKL2	8102	435-0433	7938
Administrative Officer, Charlotte Wiltshire	RKL2	7026	435-6373	7921
Office of Biostatistics Research Director, Nancy L. Geller, PhD	RKL2	8210	435-0434	7938
Clinical Applications and Prevention Program Director, Denise Simons-Morton, MD, PhD	RKL2	8130	435-0414	7936
Clinical Prevention and Translation Scientific Research Group Leader, Lawrence Fine, MD, Dr PH.	RKL2	8138	435-0377	7936
Clinical Trials Scientific Research Group Leader, Michael Domanski, MD	RKL2	8146	435-0399	7936

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Behavioral Medicine and Prevention Scientific Research Group Leader, Peter G. Kaufmann, PhD	RKL2	8118	435-0404	7936
Epidemiology and Biometry Program Director, Teri Manolio, MD, PhD	RKL2	8160	435-0707	7934
Analytical Resources Scientific Research Group Leader, Paul D. Sorlie, PhD	RKL2	8176	435-0707	7934
Genetic Epidemiology Scientific Research Group Leader, Richard Fabsitz, MA	RKL2	8178	435-0444	7934
Field Studies and Clinical Epidemiology Scientific Research Group Leader, Jean Olson, MD, MPH	RKL2	8154	435-0701	7934
Framingham Epidemiology Research Unit Leader, Daniel Levy, MD	73 Mt. Wayte Avenue, Suite 2 Framingham, MA 01702-5827 508-935-3458			
Jackson Heart Study Leader, Evelyn Walker, MD	Jackson Medical Mall 350 West Woodrow Wilson Drive Jackson, MS 39213 601-368-4654			
Division of Extramural Affairs				
Director, Deborah P. Beebe, PhD	RKL2	7100	435-0260	7922
Deputy Director, Robert Musson, PhD	RKL2	7216	435-0266	7924
Committee Management Officer, Kathryn M. Valeda	RKL2	7220	435-0255	7922
Administrative Officer, Veronica M. Vanwagner	RKL2	7112	435-6373	7921
Review Branch Chief, Valerie Prenger, PhD	RKL2	7214	435-0270	7924
Referral Officer, Roy White, PhD	RKL2	7192	435-0287	7924
Heart/Lung Scientific Review Group Leader, William Johnson, PhD	RKL2	7178	435-0725	7924
Vascular/Blood Scientific Review Group Leader, Jeffrey H. Hurst, PhD	RKL2	7208	435-0303	7924
Clinical Studies and Training Scientific Review Group Leader, Patricia Haggerty, PhD	RKL2	7194	435-0288	7924
Contracts Operations Branch				
Chief, Robert Best	RKL2	6100	435-0330	7902
Deputy Chief, Douglas W. Frye	RKL2	6224	435-0330	7902
Blood Diseases and Resources Contracts Section Chief, Patricia E. Davis	RKL2	6136	435-0355	7902
Heart, Lung, and Vascular Diseases Contracts Section Chief, Pamela Lew	RKL2	6106	435-0340	7902
Epidemiology and Clinical Applications Section Chief, John C. Taylor	RKL2	6126	435-0345	7902
Procurement Section Chief, Debra C. Hawkins	RKL2	6150	435-0366	7902
Grants Operations Branch Chief, Suzanne A. White	RKL2	7160	435-0144	7926
Deputy Chief, Raymond Zimmerman	RKL2	7174	435-0144	7926
Heart and Vascular Diseases Grants Management Section Chief, David Reiter	RKL2	7172	435-0177	7926

	Bldg.	Room	Phone	MSC
Lung Diseases Grants Management Section Chief, Robert A. Pike	RKL2	7154	435-0166	7926
Division of Intramural Affairs Blood Diseases and Resources Grants Management Section Chief, Robert Vinson, Jr.	RKL2	7156	435-0166	7926
Epidemiology and Clinical Application Grants Management Section Chief, Holly Atherton	RKL2	7152	435-0177	7926
Office of the Director Clinical Research Program Director, Elizabeth G. Nabel, MD	10	8C103	496-1518	1754
Clinical Director, Richard O. Cannon III, MD	10	7B15	496-9985	1650
Laboratory Research Program Director, Robert S. Balaban, PhD	10	7N214	496-2116	1061
Intramural Administrative Management Branch Chief, Gary Unger	10	7N220	401-3646	1670
Clinical Research Program Bioinformatics Core Facility Head, Eric Billings, PhD	10	4A17	496-6520	1412
Flow Cytometry Core Facility				
Head, Philip McCoy, PhD	10	4A07	451-8824	1412
Office of Clinical Affairs Chief, Maria Stagnitto, MSN, RN	10	8C104	496-2295	1754
Office of Education Chief, Herbert Geller, PhD	10	8C213	435-6719	1755
Cardiothoracic Surgery Branch Chief, Keith Horvath, MD	10	6-5152	402-1875	1454
Cardiovascular Branch Chief, Toren Finkel, MD, PhD	10	7B14	402-4081	1650
Cardiovascular Intervention Program Chief, Robert J. Lederman, MD	10	2C713	402-6769	1538
Clinical Cardiology Section Chief, Richard O. Cannon III, MD	10	7B15	496-9985	1650
Experimental Atherosclerosis Section Chief, Howard S. Kruth, MD	10	5N113	496-4826	1422
Molecular Biology Section Chief, Toren Finkel, MD, PhD	10	7B14	402-4081	1650
Vascular Biology Section Chief, Elizabeth G. Nabel, MD	10	8C103	496-1518	1754
Hematology Branch Chief, Neal Young, MD	10	7C103	496-5093	1652
Laboratory of Animal Medicine and Surgery Chief, Robert Hoyt, DVM.	14E	106B	496-9673	5570
Molecular Disease Branch Chief, H. Bryan Brewer, MD	10	7N115	496-5095	1666
Molecular Biology Section Chief, Silvia Santamarina-Fojo, MD, PhD	10	7N108	496-6050	1666
Peptide Chemistry Section Chief, H. Bryan Brewer, MD	10	7N115	496-5095	1666
Pulmonary Critical Care Medicine Branch Chief, Joel Moss, MD, PhD	10	6D03	496-1597	1590
Deputy Chief, Martha Vaughan, MD	10	5N307	496-4554	1434
Biochemical Physiology Section Chief, Vincent Manganiello, MD, PhD	10	5N307	496-1770	1434
Clinical Studies Section Chief, Joel Moss, MD, PhD	10	6D03	496-1597	1590
Metabolic Regulation Section Chief, Martha Vaughan, MD	10	5N307	496-4554	1434
Molecular Mechanisms Section Chief, Joel Moss, MD, PhD	10	6D03	496-1597	1590
Pulmonary and Cardiac Assist Devices Section Chief, Theodor Kolobow, MD	10	5D07	496-2057	1590

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Laboratory Research Program iRNA Core Facility Head, Yongsok Kim, PhD	10	8N228	496-3672	1762
Light Microscopy Core Facility Head, Christian Combs, PhD	10	6N309	496-3236	1412
Pathology Core Facility Head, Zu-Xi Yu, PhD	10	2N240	435-4011	1650
Proteomics Core Facility Head, Rong Fong Shen, PhD	10	6C208	594-1060	1597
Transgenics Core Facility Head, Chengyu Liu, PhD	50	3305	435-5034	8018
Biochemistry and Biophysics Center Chief, Boon Chock, PhD	50	2134	496-2073	8012
Laboratory of Biochemistry Chief, Boon Chock, PhD	50	2134	496-2073	8012
Laboratory of Biophysical Chemistry Chief, James Ferretti, PhD	50	3517	496-3341	8013
Laboratory of Cell Signaling Chief, Sue Goo Rhee, PhD	50	3523	594-7225	8015
Cell Biology and Physiology Center Chief, Edward D. Korn, PhD	50	2523	496-1616	8017
Laboratory of Cardiac Energetics Chief, Robert S. Balaban, PhD	10	B1D416	496-3658	1061
Laboratory of Cell Biology Chief, Edward D. Korn, PhD	50	2523	496-1616	8017
Laboratory of Kidney and Electrolyte Metabolism Chief, Mark A. Knepper, MD, PhD	10	6N260	496-3187	1603
Laboratory of Molecular Cardiology Chief, Robert S. Adelstein, MD	10	8N202	496-1865	1762
Genetics and Development Biology Center Chief, Cecilia Lo, PhD	50	4537	451-8041	8019
Laboratory of Biochemical Genetics Chief, Marshall Nirenberg, PhD	10	7N315	496-5208	4036
Laboratory of Developmental Biology Chief, Cecilia Lo, PhD	50	4537	451-8041	8019
Immunology Center Chief, Warren Leonard, MD	10	7N252	496-0098	1674
Laboratory of Molecular Immunology Chief, Warren Leonard, MD	10	7N252	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 14E	Full Name NHLBI, NIH Building 14E, Room # 14 Service Road South MSC* # Bethesda, MD 20892–MSC**
Building 31	Full Name NHLBI, NIH Building 31, Room # 31 Center Drive MSC*# Bethesda, MD 20892–MSC**
Building 50	Full Name NHLBI, NIH Building 50, Room # 50 South Drive MSC# Bethesda, MD 20892–MSC**
Rockledge II Building	Full Name NHLBI, NIH Two Rockledge Center, Room # 6701 Rockledge Drive MSC* # Bethesda, MD 20892–MSC**
Rockledge I Building	Full Name NHLBI, NIH One Rockledge Center, Room # 6705 Rockledge Drive MSC* # Bethesda, MD 20892–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, these areas of interest have grown to encompass genetic research, sleep disorders, and the Women’s Health Initiative (WHI).

The mission of the NHLBI is to provide leadership for a national program in diseases of the heart, blood vessels, lung, and blood; sleep disorders; and blood resources management. The Institute:

- Plans, conducts, fosters, and supports an integrated and coordinated program of basic research, clinical investigations and trials, observational studies, and demonstration and education projects related to the causes, prevention, diagnosis, and treatment of heart, blood vessel, lung, and blood diseases, and sleep disorders conducted in its own laboratories and by other scientific institutions and individuals supported by research grants and contracts.
- Plans and directs research in development and evaluation of interventions and devices related to the prevention of diseases and the treatment and rehabilitation of patients suffering from such diseases and disorders.
- Conducts research on the clinical use of blood and all aspects of the management of blood resources.
- Supports career training and development of new and established researchers in fundamental sciences and clinical disciplines to enable them to conduct basic and clinical research related to heart, blood vessel, lung, and blood diseases; sleep disorders; and blood resources through individual and institutional research training awards and career development awards.
- Coordinates relevant activities with other research institutes and all Federal health programs in the above areas, including the causes of stroke.
- Conducts educational activities, including development and dissemination of materials for health professionals and the public in the above areas, with emphasis on prevention.
- Maintains continuing relationships with institutions and professional associations, and with international, national, state, and local officials, as well as voluntary agencies and organizations working in the above areas.
- Oversees management of the WHI.

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.

The programs of the NHLBI, as shown on page 10, are implemented through five extramural units: the Division of Heart and Vascular Diseases (DHVD), the Division of Lung Diseases (DLD), the Division of Blood Diseases and Resources (DBDR), the Division of Epidemiology and Clinical Applications (DECA), and the National Center on Sleep Disorders Research (NCSDR); and one intramural unit, the Division of Intramural Research (DIR). Although the NHLBI has primary responsibility for the WHI, it is run by a consortium that includes the National Cancer Institute (NCI), the National Institute on Aging (NIA), and the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS). The Divisions and the Center pursue their own scientific missions but cooperate in areas of common interest. The extramural Divisions and the NCSDR use a variety of funding mechanisms, such as research grants, cooperative agreements, program project grants, Small Business Innovation Research grants, Small Business Technology Transfer grants, Specialized Centers of Research (SCOR) and Specialized Centers of Clinically Oriented Research (SCCOR) grants, comprehensive center grants, contracts, and research training and career development programs. Descriptions of the Division and Center programs, as well as the WHI, follow.

National Heart, Blood Vessel, Lung, and Blood Diseases and Blood Resources Program

Heart and Vascular Diseases

Heart Research

Heart Development

Cardiac Function and Heart Failure

Ischemic Heart Disease

Arrhythmias and Sudden Cardiac Death

Vascular Biology Research

Atherosclerosis

Hypertension Biology and Pathophysiology of Blood Vessels

Gene Therapy for Prevention and Treatment of Vascular Diseases

Clinical and Molecular Medicine

Cardiovascular Medicine

Bioengineering/Systems

Genomic and Proteomic Applications Imaging/Nanotechnology

Bioinformatics

Lung Diseases

Airway Biology and Disease

Asthma

Chronic Obstructive Pulmonary Disease (COPD) and Environmental Lung Diseases

Cystic Fibrosis (CF) Neurobiology and Sleep

Lung Biology and Disease

Lung Cell and Vascular Biology

Developmental Biology and Pediatric Lung Disease

Critical Care and Acute Lung Injury

Acquired Immunodeficiency Syndrome (AIDS) and Tuberculosis (TB)
Immunology and Fibrosis

Blood Diseases and Resources

Blood Diseases

Sickle Cell Disease (SCD)
Thalassemia
Erythropoiesis
Red Cells
Thrombosis and Hemostasis
Hemophilia and Other Bleeding Disorders
Hematologic Immune Disorders

Blood Resources

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

Epidemiology and Clinical Applications

Clinical Applications and Prevention

Clinical Prevention and Translation
Clinical Trials
Behavioral Medicine and Prevention

Epidemiology and Biometry

Field Studies and Clinical Epidemiology
Analytical Resources
Genetic Epidemiology

National Center on Sleep Disorders Research

Sleep
Sleep Disorders and Related Conditions

Women's Health Initiative

Intramural Research

Clinical Research Program

Cardiovascular
Hematology
Molecular Disease
Pulmonary/Critical Care Medicine
Animal Medicine and Surgery

Laboratory Research Program

Biochemical Genetics
Biochemistry
Biophysical Chemistry
Cardiac Energetics
Cell Biology
Cell Signaling
Developmental Biology
Kidney and Electrolyte Metabolism
Molecular Cardiology
Molecular Immunology

Division of Heart and Vascular Diseases

The DHVD plans and directs a coordinated research program on the causes of heart and vascular diseases and on their prevention, diagnosis, and treatment. Fundamental biomedical research, including cutting-edge areas such as genomics, proteomics, nanotechnology, cell-based therapeutics, and gene therapy, is emphasized. Multidisciplinary programs are supported to advance basic knowledge of disease and to generate the most effective methods of clinical management and prevention. Clinical trials are an important part of the research program; they provide an opportunity to test and apply promising preventive or therapeutic measures.

The Division is organized into three major research programs:

- Heart Research Program
- Vascular Research Program
- Clinical and Molecular Medicine Program

and the Research Training and Special Programs Scientific Research Group (SRG).

Heart Research Program

The Heart Research Program supports basic and clinical research in cardiac diseases, from embryonic life through adulthood. Targeted areas include heart development, cardiac disorders, inflammation and infectious disorders of the heart, heart transplantation, and myocardial preservation. Individual studies focus on normal and abnormal cardiac development, diabetic cardiomyopathy, gene–nutrient interactions in the pathogenesis of congenital heart defects, pathogenesis of heart failure, electrical remodeling, and various aspects of HIV infection as it relates to the heart. SCORs support collaborative studies in ischemic heart disease, sudden cardiac death, heart failure, pediatric CVD and ischemic heart disease in blacks. The Program comprises the two SRGs described below.

Heart Development, Function, and Failure SRG

The Heart Development, Function, and Failure SRG oversees a research program in heart development, cardiac function, and heart failure. It includes basic studies examining normal functional and structural development of the heart and major blood vessels, as well as the genetic, molecular, environmental, and mechanical etiology of congenital cardiovascular malformations. Clinical research networks are used to evaluate new treatment methods and

management strategies for congenital malformations and acquired pediatric heart disease. Research on cardiac function and failure focuses on fundamental mechanisms associated with the structure, function, mechanics, and bioenergetics of normal and diseased myocardium; the role of contractile proteins in the cardiovascular system; and causes of cardiac hypertrophy and the subsequent transition from hypertrophy to heart failure. Individual projects include molecular, cellular, and physiological studies of diabetic cardiomyopathy; pathogenesis of heart failure, with emphasis on apoptosis (programmed cell death), myocyte division and growth, and cell transplantation; and studies to identify modifiers of gene defects leading to hypertrophic cardiomyopathy and heart failure.

Arrhythmias, Ischemia, and Sudden Cardiac Death SRG

The Arrhythmias, Ischemia, and Sudden Cardiac Death SRG oversees a research program on cardiac arrhythmias that focuses on elucidating the mechanisms involved in control of cardiac electrical activity; determining the contribution of cardiac membrane biophysics, membrane structure and organization, ion pumps and channels, and transport and gap junction proteins to electrogenesis; and understanding the long-term control of cardiovascular function as it relates to the onset or maintenance of arrhythmias. Investigators are seeking knowledge that will lead to the development of new approaches to diagnosis, treatment, and prevention of arrhythmias.

The SRG also oversees a research program on the etiology and pathophysiology of ischemic heart disease and its consequences and control and treatment of cardiac electrical activity, rhythm, and rate, especially as they relate to sudden cardiac death. Researchers are seeking ways to improve the diagnosis and treatment of myocardial ischemia. Special attention is directed toward understanding the pathophysiology of ischemic heart disease in blacks, a population that is disproportionately affected by the disorder.

Vascular Biology Research Program

The Vascular Biology Research Program supports research in atherosclerosis, hypertension, basic vascular biology, and gene therapy for prevention and treatment of vascular diseases. Other targeted areas focus on the etiology, pathogenesis, and treatment of excess CVD in diabetes mellitus and cardiovascular complications of HIV/AIDS. SCORs support collaborative studies on molecular medicine and atherosclerosis, molecular genetics of hypertension, and basic and clinical gene therapy. The Program comprises the two SRGs described below.

Atherosclerosis SRG

The Atherosclerosis SRG oversees a comprehensive research program on the etiology, pathogenesis, diagnosis, prevention, and treatment of atherosclerosis. Areas of emphasis include pathobiology and genetics of the vasculature; vascular growth and angiogenesis; interactions of the vascular wall with systemic and humoral factors promoting atherogenesis; and lesion progression, complication, and regression. Individual studies focus on characterization of vulnerable atherosclerotic plaque, pathogenesis of abdominal aortic aneurysms, role of homocysteinemia in atherosclerosis, mechanisms of atherosclerosis in various vascular beds, and research on atherosclerotic lesions. Additional projects target pathobiological determinants of atherosclerosis, cardiovascular complications of diabetes mellitus, vessel-wall calcification, the role of infectious agents in atherosclerosis, immunobiology of the vessel wall, obesity-associated CVD, exercise physiology, peripheral artery disease (PAD), and effect of protease inhibitors on

atherosclerosis development in HIV infection. Of special interest is understanding atherosclerosis risk among minorities.

Hypertension SRG

The Hypertension SRG directs a research program to identify and characterize genes and their corresponding phenotypes involved with hypertension; elucidate regulation mechanisms associated with blood pressure control; clarify functional control of the cerebrovasculature; and identify causative factors of essential hypertension and rare forms of high blood pressure. It also seeks to determine the mechanisms by which high blood pressure increases the risk of, or occurs concomitantly with, other diseases such as kidney failure, stroke, metabolic syndrome X, obesity, diabetes mellitus, atherosclerosis, preeclampsia, and left ventricular hypertrophy. Further, it fosters studies to develop preventive strategies and interventions for hypertension, understand the biological underpinnings of salt sensitivity and the basis of target-organ damage in hypertension, and identify neurological mechanisms responsible for long-term control of blood pressure and functional neurological changes that result in essential hypertension. Attention is directed to eliminating health disparities among minorities and between men and women.

Clinical and Molecular Medicine Program

The Clinical and Molecular Medicine Program supports clinical, basic, engineering, and quantitative research on CVD and health. Areas of interest include genetics, genomics, and proteomics; engineering theory and practice applied to cardiovascular biology and medicine; informatics and simulation; computational systems; and cohort, case-control, and randomized clinical trials. Individual projects focus on heart failure, revascularization, the implantable artificial heart, and understanding minority and women's health. The program comprises the two SRGs described below.

Cardiovascular Medicine SRG

The Cardiovascular Medicine SRG directs a research program on CVD in adult and pediatric patients. It examines the role of lipid interventions, nutrition, and exercise in preventing heart disease. Areas of emphasis include development of treatments or new applications of existing medical and surgical strategies for acute and chronic ischemic heart disease; dietary and medical management of dyslipidemia; quantitative measurement of atherosclerosis; diagnosis and management of arrhythmias; resuscitation; cardiomyopathies of different etiologies (e.g., ischemic, valvular, metabolic, HIV-related, other infectious); congenital malformations; peripheral vascular disease; restenosis after revascularization procedures; cardiovascular applications of radiotherapy; and cardiovascular dysfunction in long-term pediatric cancer survivors.

Bioengineering and Genomic Applications SRG

The Bioengineering and Genomic Applications SRG directs an interdisciplinary research program that applies engineering theory and practice to increase knowledge at the genetic, molecular, cellular, tissue, and organ level and examines materials, processes, and devices for the cardiovascular system. Individual projects focus on innovative ventricular assist systems, implantable total artificial hearts, genetically enhanced cardiovascular implants, nanotechnology, magnetic resonance angiography, physical stress and strain, micromechanics, self-assembly,

mathematical models, simulation and systems, imaging, biomaterials, tissue engineering, and therapeutic devices

Division of Lung Diseases

The DLD plans and directs a coordinated research program on the causes and progression of lung diseases and on their prevention, diagnosis, and treatment. Areas of interest include the biology and function of the respiratory system, fundamental mechanisms associated with specific pulmonary disorders, and development of new treatment strategies for patients. SCORs support collaborative studies on asthma, CF, the pathobiology of lung development, and the pathobiology of fibrotic lung disease; a SCCOR supports collaborative studies on acute lung injury. Demonstration and education projects to transfer basic research and clinical findings to health care professionals and patients, as well as training and career development programs for individuals interested in furthering their professional abilities in lung diseases research, also are important activities.

The Division is organized into two major research programs:

- Airway Biology and Disease Program
- Lung Biology and Disease Program.

Airway Biology and Disease Program

The Airway Biology and Disease Program supports basic and clinical research, education, and training related to asthma, COPD, CF, control of breathing, bronchiolitis, respiratory neurobiology, sleep, and other adult airway diseases. It comprises the four research SRGs described below and a Training and Special Programs SRG, which manages training and career development in lung diseases research for individuals at all stages of their professional development.

Asthma SRG

The Asthma SRG oversees a broad research program in asthma. Basic research focuses on elucidating the etiology and pathophysiology of the disease. Studies include elucidating the cellular and molecular mechanisms associated with development, exacerbation, and persistence of asthma and the impact of the environment on these mechanisms; identifying susceptibility genes that influence development, progression, outcome, and response to treatment in different racial groups; determining the differences between the pathophysiology of severe asthma and mild-to-moderate asthma; and investigating the role of the immune system, its function in early life, and its influence on asthma development.

Clinical research focuses on improving asthma management and reducing health disparities in asthma that exist between whites and other ethnic groups, as well as economically disadvantaged populations. Two asthma networks have been established to assess new treatment strategies and ensure rapid dissemination of research findings to health care professionals. The Division has established cooperative partnerships between minority-serving institutions and research-intensive institutions to examine factors that contribute to health disparities and to develop strategies for their elimination. The purpose of the partnerships is to conduct collaborative research on asthma

disparities and provide reciprocal training experiences to enhance research opportunities and capabilities and enrich the cultural sensitivity at both institutions.

Chronic Obstructive Pulmonary Disease/Environment SRG

The COPD/Environment SRG oversees research on the underlying causes of COPD and improving disease treatment and management. Studies include examining the role of inflammation in the pathogenesis of COPD; searching for genes that may make some individuals more susceptible to the development of the disorder; identifying and characterizing biomarkers of COPD presence, severity, and exacerbation; evaluating treatment strategies (i.e., lung volume reduction surgery, long-term smoking cessation intervention, and retinoic acid therapy); and applying gene therapy to correct the defective gene or to introduce the functional gene for alpha-1 antitrypsin in deficient individuals with familial emphysema.

A Clinical Research Network has been established to conduct clinical trials of promising therapies for COPD that may reduce the frequency and severity of disease exacerbation. Additionally, a program was initiated to provide researchers with lung tissue specimens that were removed for medical reasons and are not needed for diagnostic purposes.

Cystic Fibrosis SRG

The CF SRG oversees basic and clinical research related to the origins and control of infections and inflammatory and immune responses in the lungs of CF patients, loss of CF transmembrane conductance regulation on development of CF, effects of other genes on its manifestation, and genetic and metabolic defects underlying pulmonary complications associated with CF. Developing new genetic, pharmacologic, and nonpharmacologic (e.g., gene transfer) treatments also is an area of emphasis.

Sleep and Neurobiology SRG

The Sleep and Neurobiology SRG oversees sleep research on the neurobiology, health consequences, and treatment of sleep disorders, sleep disordered breathing, and ventilatory control.

Lung Biology and Disease Program

The Lung Biology and Disease Program supports research, education, and training programs in lung cell and vascular biology; developmental biology and pediatric lung diseases; acute lung injury and critical care medicine; interstitial lung diseases, including pulmonary fibrosis; and AIDS and TB. It comprises the five research SRGs described below and a Training and Special Programs SRG that manages training and career development in lung diseases research for individuals at all stages of their professional development.

Acquired Immunodeficiency Syndrome/Tuberculosis SRG

The AIDS/TB SRG oversees a research program that investigates the basic pathogenetic mechanisms involved in HIV-related lung disorders and develops animal and mathematical models to gain information that may lead to new treatment strategies. Many of the studies employ genetic, molecular, and cellular approaches. Additional areas of interest include cardiopulmonary complications of HIV infection in infants, children, and adults; pathobiology of TB and *Pneumocystis carinii* and basic cell biology of pulmonary manifestation of AIDS; lung-

specific drug delivery systems for enhanced TB treatment; behavioral interventions for control of TB; and educational programs to improve training in TB.

Acute Lung Injury/Critical Care SRG

The Acute Lung Injury/Critical Care SRG oversees research on the etiology and molecular and cellular pathogenesis of acute respiratory distress syndrome (ARDS). It supports an ARDS clinical network to evaluate therapeutic strategies such as pulmonary artery catheterization, fluid management, and use of antiinflammatory agents, including corticosteroids, in patients with the disorder and those at risk. Studies to improve the diagnosis, treatment, and outcome of critically ill patients with lung injury also are supported.

Developmental Biology and Pediatrics SRG

The Developmental Biology and Pediatrics SRG oversees research on normal lung development and on factors that may contribute to its abnormal development such as prenatal and postnatal infections and reactive inflammation. Additional areas of emphasis include understanding the regulation of lung alveoli development in order to design new treatments for lung diseases, creating a molecular profile of bronchopulmonary dysplasia to advance understanding of the condition and lead to effective clinical intervention, evaluating the safety and efficacy of nitric oxide in preventing and treating chronic lung disease in newborn infants, and evaluating the efficacy of nasal continuous positive airway pressure compared with conventional ventilation, with and without surfactant, in the management of premature newborns. Issues at the core of lung developmental biology also are relevant to therapeutic interventions using cell-based therapies.

Immunology/Fibrosis SRG

The Immunology/Fibrosis SRG oversees research on interstitial lung diseases, such as sarcoidosis, idiopathic pulmonary fibrosis (IPF), and lymphangioleiomyomatosis (LAM), which are characterized by chronic inflammation and progressive fibrosis of the lung alveolar walls and surrounding tissue. Specific projects focus on elucidating the cellular and molecular mechanisms of lung inflammation and fibrosis; identifying potential targets and agents for IPF therapy; identifying genetic factors that influence sarcoidosis in blacks and genes that increase susceptibility to pulmonary fibrosis; translating basic research findings into clinical applications for LAM; and improving allograft function after lung transplantation.

Lung Cell and Vascular Biology SRG

The Lung Cell and Vascular Biology SRG oversees research on the molecular and cellular biology of epithelial and endothelial cells of the alveoli and the lung surfactant system. Additional areas of interest encompass studies on regulation of the pulmonary vasculature, including cell growth and signaling; cellular and molecular mechanisms of primary pulmonary hypertension; identification of genes related to lung function; and development of new methods to deliver drugs via lung epithelial cells.

Division of Blood Diseases and Resources

The DBDR plans and directs a coordinated research program on the causes and prevention of blood diseases and disorders. Areas of interest encompass a broad spectrum of research from

stem cell biology to medical management of blood diseases, with a focus on nonmalignant and premalignant processes. The Division also has a major responsibility to improve the adequacy and safety of the Nation's blood supply. It has recently taken a leading role in developing cell-based therapies, combining the expertise of transfusion medicine and stem cell technology with the exploration of repair and regeneration of human tissues and biological systems.

The Division is organized into two major programs:

- Blood Diseases Program
- Blood Resources Program.

Blood Diseases Program

The Blood Diseases Program supports research and training in nonmalignant disorders, including anemias, SCD, and thalassemia; premalignant processes such as myelodysplasia and myeloproliferative disorders; hemophilia and other abnormalities of hemostasis and thrombosis; and immune dysfunction. It comprises the two SRGs described below and a Research Training Group that manages training and career development in blood diseases research for individuals at all stages of their professional development.

Hemoglobinopathies and Genetics SRG

The Hemoglobinopathies and Genetics SRG oversees a comprehensive program focusing on reducing morbidity and mortality caused by disorders of the hematopoietic system and preventing their occurrence. Diseases include SCD, thalassemia, Fanconi anemia, and Diamond Blackfan anemia.

Research in SCD and thalassemia ranges from elucidating their etiology and pathophysiology to improving disease treatment and management. Areas of emphasis include genetics, regulation of hemoglobin synthesis, iron chelation, development of drugs to increase fetal hemoglobin production, and gene therapy. Developing animal models for preclinical studies is another area of interest. Clinical studies in SCD are investigating stroke prevention and the long-term effects of hydroxyurea therapy. A Phase III clinical trial is determining whether hydroxyurea is effective in preventing chronic end organ damage in children with SCD.

The SRG oversees a program of Comprehensive Sickle Cell Centers, which collectively form a SCD clinical research network—and which individually conduct basic and clinical research—and provide state-of-the-art patient care, educational activities for patients and health professionals, community outreach, and genetic counseling services.

A thalassemia clinical network is evaluating new treatment strategies and ensuring that research findings on optimal management of the disease are rapidly disseminated to practitioners and health care professionals.

Thrombosis and Hemostasis SRG

The Thrombosis and Hemostasis SRG oversees a comprehensive program of basic research, clinical studies, and technology development in hemostasis, thrombosis, and endothelial cell biology, with a focus on understanding the pathogenesis of both arterial and venous thrombosis

in order 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 that will improve specificity and reduce side effects when used in treatment of thrombotic and thromboembolic disorders. SCORs support collaborative studies on hemostatic and thrombotic disorders.

Finding an effective treatment for hemophilia is another priority. Bleeding disorders associated with defects in coagulation proteins or abnormal platelet function, such as the immune thrombocytopenias, also are being studied. Other emerging areas being supported are gene transfer, clinical proteomics, inflammation and thrombosis, coagulation activation, autoimmune disease, and thrombotic complications of obesity, diabetes, and cancer.

Blood Resources Program

Transfusion Medicine Cell Therapies SRG

The Blood Resources Program, through its Transfusion Medicine Cell Therapies SRG, plans and directs research and training in transfusion medicine, stem cell biology and disease, and clinical cellular medicine. Areas of interest in transfusion medicine include transmission of disease through transfusion, development of methods to detect and inactivate viruses in donated blood, improvement of blood donor screening procedures, and emerging diseases that may be transmitted by blood transfusions. Also supported are basic and clinical investigations related to transfusion immunobiology, focusing on graft versus host disease, graft versus leukemia effect, and dendritic cell therapies.

The SRG oversees research on hematopoiesis, stem cell biology and diseases, and cellular therapies. Determining the factors that cause stem cells to start and stop dividing, move throughout the body, and lodge in a specific place, and understanding the fundamentals of stem cell biology that will lead to cell-based therapies are areas of major focus.

The Program also supports two clinical research networks to promote efficient comparison of innovative treatment strategies—one for patients undergoing blood or marrow transplantation and the other for patients with hemostatic disorders, such as idiopathic thrombocytopenia and thrombotic thrombocytopenic purpura. SCORs support collaborative studies on hematopoietic stem cell biology and transfusion biology and medicine.

Division of Epidemiology and Clinical Applications

The DECA supports clinical research on the causes, prevention, and treatment of cardiovascular, lung, and blood diseases. It oversees a broad array of epidemiological studies, including field studies, genetic epidemiology, and clinical epidemiology; clinical trials on prevention and treatment of disease, particularly chronic CVD; demonstration and education research; and basic and applied behavioral studies. Research often focuses on defined populations (e.g., minorities, occupational groups, school children, and health professionals) and community settings. For planning and evaluation purposes, the Division provides statistics on cardiovascular, lung, and blood diseases from national data and cohort studies.

The Division is organized into two major research programs:

- Clinical Applications and Prevention Program
- Epidemiology and Biometry Program

and an Office of Biostatistics Research. Research training and career development opportunities are included within each program.

Clinical Applications and Prevention Program

The Clinical Applications and Prevention Program supports research on the effects of specific clinical and behavioral interventions for preventing and treating heart and vascular disease. Research includes efficacy studies to determine whether specific interventions improve disease outcomes under rigorously controlled and ideal circumstances, effectiveness studies to determine whether specific interventions result in positive outcomes in more applied settings, and translational studies that test interventions to improve the delivery of proven approaches in clinical or public health settings. The Program comprises the three SRGs described below.

Behavioral Medicine and Prevention SRG

The Behavioral Medicine and Prevention SRG oversees research that examines psychological, social, cultural, lifestyle, and other behavioral factors that influence disease etiology, pathophysiology, prevention, and treatment. Included are studies that investigate basic behavioral principles related to health; relationships between psychosocial and lifestyle factors and CVD risk; effects of psychosocial factors in prevention, treatment, and rehabilitation; efficacy and effectiveness of behavioral, psychosocial, or lifestyle interventions to reduce disease risk and to lower risk factors; effects of health-promotion interventions in community settings; and methods to disseminate effective lifestyle programs to communities. Key topics include stress, depression, social support, adherence, quality of life, diet, physical activity, and obesity.

Clinical Trials SRG

The Clinical Trials SRG oversees multicenter, randomized trials to evaluate new therapies for CVD and to study disease mechanisms for future interventions. Areas of emphasis include heart failure, coronary artery disease, sudden cardiac death, and supraventricular arrhythmias, particularly atrial fibrillation.

Clinical Prevention and Translation SRG

The Clinical Prevention and Translation SRG oversees research to determine the efficacy of interventions for CVD prevention, particularly those that would be delivered in outpatient clinical settings. Included are studies that examine pharmacologic treatments of known or suspected CVD risk factors for primary prevention and lifestyle interventions for primary and secondary prevention. Additional studies investigate effective methods for disseminating and implementing preventive or treatment interventions consistent with evidence-based guidelines as an integral part of routine medical care.

Epidemiology and Biometry Program

The Epidemiology and Biometry Program supports research and research training in epidemiological studies of heart and vascular, lung, and blood diseases in defined populations.

Research includes examining trends and population patterns in prevalence, incidence, morbidity and mortality from the diseases; risk factors for disease development and progression; genetic and environmental influences and their interactions in the development of subclinical and clinical heart, lung, and blood diseases; and design and analysis of long-term observational studies. The Program is organized into three SRGs and two Research Units.

Analytical Resources SRG

The Analytical Resources SRG conducts research on biometric and epidemiologic methods and their application to studies involving the incidence of and mortality from cardiovascular, lung, and blood diseases. Using family, longitudinal, and demographic information and vital statistics, it studies the natural history, etiology, and epidemiology of cardiovascular, lung, and blood diseases. Other activities include providing the Program and the Institute with statistical and epidemiological consultation, including national trends in cardiovascular, lung, and blood diseases; advising the Program, the Institute, and outside investigators on design and analysis of large prospective epidemiological studies; and compiling, cataloging, maintaining, and distributing data sets and files from epidemiological studies.

Field Studies and Clinical Epidemiology SRG

The Field Studies and Clinical Epidemiology SRG conducts multicenter cohort studies on the development and progression of CVD and their risk factors in various segments of the U.S. population. It convenes working groups to determine critical new research areas, proposes epidemiological research with appropriate study designs, initiates epidemiological studies, manages large and complex field studies, evaluates study proficiency and productivity, and collaborates on scientific research. The SRG advises the Program and other Divisions on clinical epidemiology, measurements of subclinical CVD, and management of complex and large, field-based epidemiology studies.

Genetic Epidemiology SRG

The Genetic Epidemiology SRG conducts research studies on twins, sibling pairs, and families to determine genetic and environmental contributors to heart, lung, and blood diseases and to characterize gene–gene and gene–environment interactions. It advises the Program, the Institute, and outside investigators on the design and analysis of epidemiological studies associated with genetically characterized individuals, and promotes the collection, storage, and maintenance of blood samples in existing studies to allow genotypic characterization of study cohort members for analyses in relation to phenotypic data.

Framingham Epidemiology Research Unit

The Framingham Epidemiology Research Unit (FERU) oversees research in cardiovascular, lung, and blood diseases in the Framingham Cohort and Offspring Studies. FERU staff are involved in all aspects of protocol development; clinic operations; event review; research training; and development of research hypotheses, analyses, reports, and publications.

Jackson Epidemiology Research Unit

The Jackson Epidemiology Research Unit (JERU) oversees research in cardiovascular, lung, and blood diseases in the Jackson Heart Study. JERU staff members are involved in all aspects of protocol development; clinic operations; event review; research training; and development of research hypotheses, analyses, reports, and publications.

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. It has primary responsibility for providing objective, statistically sound, and medically relevant solutions to problems arising in NHLBI-sponsored studies. The OBR is concerned with designing efficient studies and monitoring data from ongoing studies.

The methodological interests of the OBR concern survival analysis, longitudinal data analysis, and efficient study designs, including monitoring ongoing clinical studies for efficacy and safety. Recently the OBR has made contributions to statistical genetics and has extended its expertise to bioinformatics.

National Center on Sleep Disorders Research

The NCSDR plans, directs, and supports basic, clinical, and applied research, health education, training, and prevention research in sleep, chronobiology, and sleep disorders. It oversees developments in its program areas; assesses the national needs for research on causes, diagnosis, treatment, and prevention of sleep disorders and sleepiness; and coordinates sleep research activities across the Federal Government and with professional, voluntary, and private organizations. The Center promotes information sharing and coordinates implementation of interagency programs.

The NHLBI sleep research program seeks to understand the molecular, genetic, and physiological regulation of sleep and the relationship of sleep disorders to CVD. It also supports efforts to understand the relationships of sleep restriction and sleep-disordered breathing to the metabolic syndrome, including obesity, high blood pressure, dyslipidemia, insulin resistance, and vascular inflammation. Ongoing NHLBI-funded research projects include elucidating the etiology and pathogenesis of sleep disorders, particularly sleep apnea; determining the role of sleep apnea in CVD and cerebrovascular disease; examining sleep and sleep disorders in children; and identifying new animal models of sleep disorders.

In 2004, the NCSDR and other Federal and non-Federal cosponsors conducted the first national sleep conference entitled “Frontiers of Knowledge in Sleep and Sleep Disorders: Opportunities for Improving Health and Quality of Life” to focus on sleep and sleep disorders and to determine ways to disseminate relevant information at the community level to improve sleep-related public health. A conference summary, the remarks of Dr. Richard Carmona, U.S. Surgeon General, and other information can be accessed via the NCSDR Web site at www.nhlbi.nih.gov/sleep.

Multidisciplinary research training programs in sleep biology and sleep disorders are being supported to ensure that highly trained scientists are available to address important gaps in the current biomedical and biological understanding of sleep, including those outlined in the 2003 National Sleep Disorders Research Plan. The Sleep Academic Award Program is designed to develop comprehensive curricula on sleep and sleep disorders for enhanced learning by medical students, residents, and practicing physicians, and other health care professionals. The Web site supported by the American Academy for Sleep Medicine (MedSleep) provides direct public access to more than 50 curriculum resources for basic science and clinical educators in the health sciences.

The NCSDR continues to work closely with the NHLBI Office of Prevention, Education, and Control (OPEC) on education pertaining to sleep problems and sleep disorders for physicians, other health care providers, and the general public. A video program, "Sleep Apnea: Is Your Patient at Risk," was developed for clinicians and hospital staff as part of a continuing medical education series.

Reaching children and adolescents with messages about sleep and sleep disorders is a priority. Educational activities for 2003 included disseminating a new high school supplemental curriculum on the biology of sleep, preparing a manuscript on the etiology, consequences, recognition, and treatment of sleepiness in adolescents by the NCSDR Working Group on Sleepiness in Adolescents/Young Adults, and making additional refinements in the Garfield Star Sleeper Web site.

Women's Health Initiative

The WHI, which was established by the NIH in 1991, was transferred to the NHLBI on October 1, 1997. Its mission is to address the most common causes of death, disability, and impaired quality of life in postmenopausal women. These include heart disease, breast and colorectal cancer, and osteoporosis.

The WHI is a 15-year project consisting of three major components: a randomized, controlled, clinical trial of promising but unproven approaches to prevention; an observational study to identify predictors of disease; and a study of community approaches to developing healthful behaviors.

The clinical trial and the observational study enrolled more than 161,000 women aged 50 to 79, 18.5 percent of whom are minorities. More than 68,000 women were enrolled in one of three clinical trials for 8.5 years with the goal of assessing the preventive use of hormone therapy, diet modification, and calcium and vitamin D supplements.

Hormone Therapy: Investigate risks and benefits of combined estrogen (conjugated equine estrogen) and progestin (medroxyprogesterone acetate) on CHD, breast cancer, and osteoporosis risk in women with a uterus, and estrogen alone in women without a uterus.

Dietary Modification: Determine whether a diet low in fat but high in fruits, vegetables, and grains can prevent breast and colorectal cancers and heart disease.

Calcium and Vitamin D Supplements: Determine whether two nutrients can prevent fractures and reduce the risk of colorectal cancer.

Women who were ineligible or unwilling to participate in the clinical trial were encouraged to enroll in a concurrent long-term observational study that involves no specific intervention, but is tracking their medical history and health habits for 8.5 years. The study is looking for predictors and biological markers—including genetic markers—for disease.

A key aim of the observation study is to assess the health effect of other forms of hormone therapy that are not studied in the clinical trials. Investigators will compare the data from the clinical trials with the data from the observational study to determine the benefits and risks of various forms of estrogen.

Forty clinical centers have recruited postmenopausal women for the clinical trial and the observational study. Ten of the centers recruited primarily minority populations: blacks, Hispanics, Asian Americans, Pacific Islanders, and American Indians.

Unlike the the clinical trial and observation study components, the Community Prevention Study component of the WHI focuses on community-based strategies to persuade women, especially those of different races, ethnic groups, and socioeconomic strata, to adopt healthful behaviors. Its goal is to conduct prevention research that translates into model intervention programs, which, in turn, can be widely disseminated to communities throughout the United States. Areas of emphasis include reduction of CVD, especially among black women; peer support among minority women; environmental factors and physical activity; osteoporosis prevention, education, and outreach; diabetes care in minority women; methods to enhance physical activity; and a survey of women's attitudes regarding surgical menopause and hormone therapy.

On July 9, 2002, after an average of 5.6 years of follow-up, the NHLBI announced an early end to the estrogen plus progestin trial, which was scheduled to run until 2005, because the risks outweighed the benefits. Specifically, investigators discovered increased risks of invasive breast cancer, heart attacks, strokes, and blood clots in study participants on combined hormone therapy of conjugated equine estrogen and medroxyprogesterone compared with women taking placebo pills. They also found decreases in hip fractures and colon cancer in the treatment group compared with the control group. Although the actual increased risk of breast cancer or CVD for women on long-term estrogen plus progestin was small—less than one-tenth of 1 percent per year—applied to the entire population of women over several years, its potential public health impact could be significant.

In 2003, a memory substudy of the WHI found that older women taking combination hormone therapy had twice the rate of dementia, including Alzheimer's disease, compared with women who did not take the medication. The study also found that the combined therapy did not protect against development of mild cognitive impairment, a form of cognitive decline less severe than dementia.

The study of estrogen-alone hormone therapy among women who have had a hysterectomy was halted at the end of February 2004 because of safety issues. Investigators found that conjugated equine estrogen resulted in no reduction in coronary heart disease (CHD) risk, but increased the risk of stroke in postmenopausal women who had been followed an average of 6.8 years. The study, which was scheduled to run until March 2005, also found that estrogen-alone therapy significantly increased the risk of deep vein thrombosis, had no significant effect on the risk of breast or colorectal cancer, and reduced the risk of hip and other fractures.

The memory substudy of these women, aged 65 to 79 at the beginning of the trial, showed that older women using estrogen-alone hormone therapy could be at a slightly greater risk of developing dementia, including Alzheimer's disease, than women who do not use any menopausal hormone therapy. In addition, scientists found that estrogen alone did not prevent cognitive decline.

Division of Intramural Research

The NHLBI DIR conducts clinical research on normal and pathophysiologic functioning of the heart, lung, blood, and vascular systems, and basic research on normal and abnormal cellular behavior at the molecular level. In FY 2003, the Laboratory Research Program was modified to consolidate some of the research effort. Four Centers—the Genetics and Development Biology Center, the Cell Biology and Physiology Center, the Biochemistry and Biophysics Center, and the Immunology Center—were established, and all Sections were abolished. The new organizational structure of the Program can be found under Division of Intramural Research in Chapter 1, Directory of Personnel.

In FY 2004, the Cardiovascular Intervention Program was established within the Cardiovascular Branch of the Clinical Research Program.

Research foci of the DIR range from structural organic chemistry to cardiology. Major areas of interest include mechanisms of gene regulation, stem cell biology, gene transfer, and gene therapy; molecular basis of lipoprotein dysfunctions and atherogenic process; molecular basis of vascular diseases; molecular basis of diseases of alveolar structures of the lung and design of new therapeutic modalities; cellular and molecular events underlying ischemic heart disease and myocardial hypertrophy; biochemical events associated with aging and certain pathologic processes; molecular, structural, and developmental aspects of muscle and nonmuscle contractile systems; biochemistry and physiology of calcium channels; molecular and cellular processes for conversion of metabolic energy into useful work; molecular basis of transmembrane signaling and signal transduction pathways; pathophysiology of renal function at cellular and molecular levels; biochemistry of trace nutrients; enzyme kinetics, metabolic regulation, and protein chemistry; and cellular and molecular basis of toxicity induced by drugs and other foreign compounds.

Office of Prevention, Education, and Control

The Institute's OPEC coordinates the translation and dissemination of research findings and scientific consensus to health professionals, patients, and the public, so that information can be adapted for and integrated into health care practice and individual health behavior. NHLBI health education programs and initiatives established through the OPEC address high blood pressure, high blood cholesterol, asthma, early warning signs of heart attack, obesity, sleep disorders, women's heart health, PAD, and COPD. For reducing high blood pressure, high blood cholesterol, and obesity, two approaches are used: one focuses on individuals at high risk and the other on the general public. Special attention is given to minority populations that are disproportionately affected by disorders within the Institute's mandate

The four largest education programs have coordinating committees consisting of national medical, public health, and voluntary organizations and other Federal agencies. The committees help to plan, implement, and evaluate the Institute's professional, patient, and public education programs.

The National High Blood Pressure Education Program (NHBPEP) was initiated in 1972 to reduce death and disability related to high blood pressure. It employs a comprehensive strategy to mobilize, educate, and coordinate groups concerned with hypertension prevention and control.

In 2004, the *Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents* was released. It identifies hypertension and prehypertension as significant health issues in the young due to the marked increase in the prevalence of overweight children. The report recommends lifestyle changes, including weight management, physical activity, and dietary changes for children with high blood pressure and drug therapy if needed.

The National Cholesterol Education Program (NCEP) was initiated in 1985 to educate health professionals and the public about high blood cholesterol as a risk factor for CHD and about the benefits of lowering cholesterol levels to reduce illness and deaths from CHD. Its goal is to reduce the prevalence of elevated blood cholesterol in the United States, and thereby contribute to reducing CHD morbidity and mortality.

An update to the *Third Report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults* (ATP III) was published in 2004. Based on the findings of five major clinical trials of statin therapy conducted since the 2001 release of the ATP III Report, it offers physicians the option to consider more intensive treatment for people identified at high and moderately high risk for a heart attack.

The National Asthma Education and Prevention Program (NAEPP) was initiated in 1989 to raise awareness of asthma as a serious, chronic disease; to promote more effective management of asthma through professional, patient, and public education; and to provide up-to-date information on asthma care. The Program works with schools, health care professionals, and patients to improve asthma care, prevent disruptions of daily routine, limit hospitalizations, and reduce deaths caused by uncontrolled asthma.

The NAEPP employs a number of outreach strategies. Major emphasis is placed on developing, disseminating, and implementing national guidelines on the diagnosis and management of asthma. In 2004, the NAEPP convened an Expert Panel to update the NHLBI clinical practice guidelines for asthma. The NAEPP also is developing a basic guide on asthma for patients and the public.

The National Heart Attack Alert Program (NHAAP) was initiated in June 1991 to reduce morbidity and mortality from heart attack, including out-of-hospital cardiac arrest, through education of health care providers (e.g., physicians, nurses, and emergency medical services personnel), patients, and the public about the importance of rapid identification and treatment of individuals with heart attack symptoms. In 1997, the Program's scope was broadened to include early identification and treatment of individuals with unstable angina.

In 2004, the NHAAP continued to promote the "Act in Time to Heart Attack Signs," a campaign that creates national and local partnerships to urge physicians, in collaboration with allied health care providers, to educate their patients about heart attack risk, warning signs, and survival. Educational materials for the public and for health care providers are available from the NHLBI Web site.

The NHLBI Obesity Education Initiative (OEI) was launched in January 1991 to inform the public and health professionals about the health risks associated with overweight and obesity. Obesity is not only an independent risk factor for CVD, but also a contributor to high blood pressure and high blood cholesterol and is related to sleep apnea.

The OEI employs a comprehensive strategy to mobilize, educate, and coordinate groups interested in preventing and treating overweight and obesity. One of the major OEI prevention activities is “Hearts N’ Parks,” a national community-based program located in 50 at-risk communities in 11 magnet center States. The program, conducted in collaboration with the National Recreation and Park Association, is designed to reduce the growing trend of obesity and risk of CHD in the United States by encouraging Americans of all ages to seek a healthy weight, follow a heart-healthy eating plan, and engage in regular physical activity while participating in local park and recreation department programs.

In 2004, the OEI convened a strategy development workshop for the NHLBI Healthy Weight Community Outreach Initiative to begin in FY 2005. The national public education outreach initiative will focus on reducing overweight and obesity in children and adolescents.

The NHLBI Women’s Heart Health Education Initiative was begun in 2001 to coordinate research and educational programs related to CVD in women. In 2002, it started *The Heart Truth* campaign to raise awareness of heart disease among women, 40 to 60 years old. A creative element of the campaign is The Red Dress Project, which uses the red dress as a symbol for women and heart disease awareness. In 2003 and 2004, the Institute promoted the symbol in partnership with top fashion designers who contributed to a collection of *Heart Truth* red dresses.

In 2004, the NHLBI directed its attention to raising public awareness about PAD. Together with the newly formed PAD Coalition, it will initiate planning for a 3-year public awareness campaign in FY 2005. The NHLBI also is continuing its collaboration with the Vascular Disease Foundation and other interested organizations to identify short- and long-term goals associated with raising awareness of PAD, educating health care providers and others about PAD, and addressing other vascular diseases.

COPD is another new area of education emphasis for the NHLBI. In 2004, the Institute convened a strategy development workshop to identify awareness and educational activities related to COPD prevention, diagnosis, and treatment that can form the basis of an action plan over the next few years, beginning in FY 2005.

Educational activities associated with von Willebrand disease also were initiated in 2004. The NHLBI convened an expert panel to review current literature on the diagnosis and treatment of von Willebrand disease and to formulate clinical recommendations. The Institute will disseminate the panel’s report to relevant health care providers.

The OPEC also is responsible for coordinating the Institute’s nutrition program. The NHLBI Nutrition Coordinator serves as a major source of nutrition policy and nutrition science knowledge and advises the NHLBI Director on nutrition program policies and priorities. The Coordinator also is the Institute’s representative to other relevant components of the NIH, the Department of Health and Human Services (DHHS), and the Federal Government on nutrition research and policy. Major activities in 2004 include contributing to the revision of the *Dietary Guidelines for Americans* to be released jointly with the DHHS and the USDA in 2005, joining in the DHHS/USDA dialogue on revising the Food Guide Pyramid, and working with the FDA on changes to consumer education efforts around food labels.

The Institute convened a think tank to develop research recommendations on addressing obesity and its effects on chronic diseases. The *Think Tank on Enhancing Obesity Research at the National Heart, Lung, and Blood Institute* was published in 2004. Its recommendations will serve as a guide to the NIH Obesity Research Task Force and the Institute as they develop a strategic plan for enhancing obesity research.

As a key part of its response to the Healthy People 2010 Objectives for the Nation, the NHLBI initiated a new funding mechanism in 2001 to establish CVD educational outreach programs in high-risk communities. The program—Enhanced Dissemination and Utilization Centers (EDUCs)—is a partnership between the NHLBI and local communities to eliminate cardiovascular health disparities and improve the health of underserved populations. Since its inception, two sets of six EDUCs have been awarded that served more than 30 communities in 10 States. In 2004, the first set of EDUCs were completed; the findings and insights from the first and second sets will be used to develop a framework for the next EDUC solicitation.

One EDUC, the Baltimore City Cardiovascular Health Partnership, was started in 2003 to eliminate health disparities and improve the cardiovascular health of public housing residents. Several public housing residents have been trained as community health workers to spread heart health information throughout the public housing community. Encouraging preliminary results from the Partnership have led the Institute to consider developing chronic disease prevention and health promotion activities in public housing nationally. In 2004, the NHLBI convened a planning workshop, the Education Strategy Development Workshop—Public Health in Public Housing: Improving Health, Changing Lives, to share lessons learned from working in the Baltimore public housing community and hear from experts in relevant fields regarding opportunities and needs for addressing chronic diseases in public housing nationally.

The Institute's "Salud para su Corazón" (Health for Your Heart) Initiative, a community-based heart health program for Latinos, has expanded across the United States to include communities along the Texas/Mexico border and along the southern border areas of California and New Mexico. Trained local lay health workers (promotores), applying the values and culture of the communities and mobilizing partners, teach people how to reduce their risk of developing CVD. As advocates for change, they have increased the number of Latinos in their communities who are engaging in heart healthy behaviors.

The NHLBI and the Indian Health Service (IHS) have worked together since 2000 to bring heart health to American Indian and Alaska Native (AI/AN) communities. Initial steps were focused on identifying the unique needs and issues that affect tribal communities. The NHLBI developed a training manual, *Honoring the Gift of Heart Health*, for community instructors to enable them to provide a culturally appropriate 10-session course on heart health. In 2003, a national training workshop was held for key tribal leaders and health practitioners in AI/AN communities across the United States. As a result, trainers will be available to conduct future training sessions. In 2004, a regional skills-building training workshop was conducted to build local tribal capacity and to extend the reach to include other nearby tribes.

The NHLBI's Asian American and Pacific Islander (AAPI) Cardiovascular Health Outreach effort focuses on four underserved groups with high levels of CVD risk factors such as high blood pressure, obesity, and physical inactivity. Individuals of Philippine, Vietnamese, Cambodian, and Native Hawaiian heritage comprise the targeted audience. To date, cardiovascular health educational materials have been developed for those of Filipino and

Vietnamese heritage. A school-based intergenerational cardiovascular health education curriculum to be used to educate Native Hawaiian elementary school children is under way.

International Activities

The Institute is a world leader in research and policy development in heart, lung, and blood diseases, sleep disorders, and blood resources. Through its international programs, the NHLBI contributes to and benefits from the rapidly developing global knowledge base in medicine, science, and technology related to its mission. The Director and senior NHLBI staff serve as consultants to and partners with the Pan American Health Organization (PAHO) and the World Health Organization (WHO).

The Institute's international activities are conducted through multiple mechanisms, including government-to-government and institute-to-institute agreements; joint research projects; joint symposia and workshops; and joint documents, publications, grants, contracts, and fellowships. In addition, the Institute is providing training in its laboratories to international research fellows from approximately 30 countries. Canada, India, Italy, Japan, Korea, Poland, Russia, and Vietnam are among the countries that maintain a collaborative working relationship with the NHLBI. The partnerships extend the benefits of the Institute's prevention and treatment programs to other countries.

The NHLBI contributes to worldwide health plans by working through international organizations in areas within its mandate. In recognition of its leadership and contributions to global and international health, the NHLBI was redesignated as a WHO Collaborating Center for Research and Training in 2004.

At the regional level, the NHLBI is addressing the pandemic of CVD in North, Central, and South America and the Caribbean through support of the Pan American Hypertension Initiative (PAHI), a public/private partnership initiated by the NHLBI and the PAHO in collaboration with seven international scientific organizations—the World Heart Federation, the Inter-American Heart Foundation, the Inter-American Society of Cardiology, the Inter-American Society of Hypertension, the Pan American Network of CARMEN Programs, the Latin American Society of Nephrology and Hypertension, and the World Hypertension League (WHL). The initiative seeks to reduce morbidity and mortality from CVD by controlling hypertension, a major risk factor for the disease, in an estimated 160 million people who already have the condition and by preventing it in millions more at risk because of their unhealthy lifestyles. In 2003, the Institute and PAHO began a 5-year collaboration in CVD prevention and control based on PAHI and the Institute's "Salud para su Corazón" Initiative.

The NHLBI and the Institute of Circulatory and Respiratory Health, Canadian Institutes of Health Research (CIHR), continue their collaborative effort in cardiovascular, pulmonary, and blood diseases research that began in 2003. Three joint programs were implemented in the following areas:

- Clinical Research Consortium To Improve Resuscitation Outcomes
- Cellular and Molecular Imaging of the Cardiovascular, Pulmonary, and Hematopoietic Systems
- Inflammation and Thrombosis.

The NHLBI supports a substantial effort to encourage collaboration and new research endeavors for rare diseases. In the area of blood diseases, the Institute supports a collaborative effort with Ghana to compare the differences in epidemiology and etiology of infections in SCD in Africa with that in the United States. It supports clinical studies in the Cooley's anemia in the United Kingdom and has initiated research into the genetics and basic mechanisms of Diamond-Blackfan anemia and other rare inherited bone marrow failure syndromes with Australia, Canada, and Sweden.

In 2004, a working group of national and international experts in Transfusion Medicine met to develop the NHLBI Strategic Plan on Global Blood Safety. Their task was to identify research areas that would lead to the strengthening of national blood programs and transfusion services in developing countries. Additionally, the working group was requested to provide recommendations to the NHLBI on effective interventions to prevent transmission of HIV/AIDS and other blood-borne infections through blood products.

Understanding malarial anemia is a primary concern in many parts of the world, especially in sub-Saharan Africa, where severe anemia is one of the deadliest complications in children infected with malaria. The Institute is supporting research in Kenya to identify the pathogenesis of severe malarial anemia in children who live in an area that is endemic for malaria.

All of these activities strengthen the Institute's international partnerships and coalitions and extend the benefits of the Institute's national prevention and treatment programs to other countries.

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 one of the National Institutes of Health (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, Division of Lung Diseases, Division of Blood Diseases and Resources, Division of Intramural Research, Division of Technological Applications, and Division of Extramural Affairs.

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 Public Health Service 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 HDFFP, “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 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 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. In NHLBI-NIH Clinical Center interagency agreement for studies on the transmission of human immunodeficiency virus (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.

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 entitled “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 MI 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 MI.

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

August 1991. The NHLBI sponsors the first national workshop, “Physical Activity and Cardiovascular Health: Special Emphasis on Women and Youth,” 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 National Center on Sleep Disorders Research 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 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 risk factors low HDL cholesterol, high LDL cholesterol, and cigarette smoking affect the progression of atherosclerosis equally in women and men, regardless of race.

February 24, 1997. The 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 Women's Health Initiative, 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 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 Acute Respiratory Distress Syndrome (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 CDC, the National Institute of Neurological Disorders and Stroke, 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 new Adult Treatment Panel III (ATP III) guidelines for the detection, evaluation, and treatment of high blood cholesterol in adults.

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 a national campaign, “Act in Time to Heart Attack Signs,” 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 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 African Americans.

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 (MRI) 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 1 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 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 further safeguards the Nation's blood supply.

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 2002, cardiovascular, lung, and blood diseases accounted for 1,162,000 deaths and 48 percent of all deaths in the United States (p. 37). The projected economic cost in 2005 for these diseases is expected to be \$545 billion, 23 percent of the total economic costs of illness, injuries, and death (p. 53). Of all diseases, heart disease is the leading cause of death, cerebrovascular disease is third (behind cancer), and COPD (including asthma) ranks fourth (p. 40). Cardiovascular and lung diseases account for 3 of the 4 leading causes of death (p. 40) and 5 of the 10 leading causes of infant death (p. 46). Hypertension, heart disease, asthma, and chronic bronchitis are especially prevalent and account for substantial morbidity in Americans (p. 49). Increases in prevalence have been greatest for asthma and CHF.

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

Cardiovascular Diseases

- In 2002, CVD caused 927,000 deaths—38 percent of all deaths.
- Heart disease is the leading cause of death; the main form, CHD, caused 495,000 deaths in 2002.
- The annual number of deaths from CVD increased substantially between 1900 and 1970 and remains high.
- The death rate (not age-adjusted) for CVD increased from 1920 until it peaked in 1968. Since then, the trend has been downward. In 2002, the rate was similar to the rate in 1930.
- Cerebrovascular disease, the third leading cause of death, accounted for 163,000 deaths in 2002.
- Heart disease is second only to all cancers combined in years of potential life lost.
- Among minority groups, heart disease ranks first, and stroke ranks fifth or higher as the leading causes of death.
- The rapid increase in deaths due to CHF between 1968 and 2002 is a major exception to the mortality decline in CVD.
- Between 1985 and 2002, death rates for heart disease and stroke declined in men and women of all racial/ethnic groups with one exception— the death rate for stroke in American Indian females.

- Because of the rapid decline in mortality from CHD since the peak in 1968, there were 900,000 fewer deaths from CHD in 2002 than would have occurred if there had been no decline.
- Substantial improvements have been made in the treatment of CVD. Since 1975, case-fatality rates from hospitalized acute myocardial infarction (AMI) stroke, cardiac dysrhythmia, and CHF patients declined appreciably.
- The decline in CHD mortality began earlier in the United States than in most countries and outpaced that in most countries (only selected countries are shown).
- Between 1992 and 2002, the percent decline in death rates for CHD was greatest among white males and least among black females.
- In 2002, an estimated 70.1 million persons in the United States had some form of CVD; 65 million had hypertension, and 13 million had CHD.
- 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 decline in prevalence of hypertension ceased in 1990; since then the prevalence has increased.
- Between 1976–80 and 1999–2002, the percent of persons with hypertension that were aware of their condition, on treatment for it, and having their blood pressure under control increased substantially.
- A 1999–2002 national survey showed only about one-third of hypertensive patients (systolic BP > 140 mm Hg or diastolic BP > 90 mm Hg or on antihypertensive medication) had their condition under control.
- Hospitalization rates for CHF increased between 1971 and 2000.
- The estimated economic cost of CVD for 2005 is approximately \$393 billion:
 - \$242 billion in direct health expenditures
 - \$35 billion in indirect cost of morbidity
 - \$117 billion in indirect cost of mortality.

Lung Diseases

- Lung diseases, excluding lung cancer, caused an estimated 239,000 deaths in 2002.
- COPD caused 121,000 deaths in 2002 and is the fourth leading cause of death.
- Between 1992 and 2002, death rates for COPD increased substantially in women and decreased slightly in men; mortality for asthma decreased appreciably.
- Between 1980 and 2002, infant death rates for various lung diseases declined markedly.
- Of the seven leading causes of infant mortality, four are lung diseases or have a lung disease component. Between 1992 and 2002, changes in mortality for the causes were:
 - Congenital anomalies (-17 percent)
 - Disorders of short gestation (-3 percent)
 - Sudden infant death syndrome (-57 percent)
 - Respiratory distress syndrome (-54 percent).
- Lung diseases accounted for 21 percent of all deaths under 1 year of age in 2002.
- The COPD death rate for women in the United States is increasing significantly compared with the rates in several other countries.
- Between 1985 and 2002, death rates for COPD increased for women in all racial/ethnic groups. For men, they increased in blacks, American Indians, and Hispanics, and were essentially flat in whites and Asians.
- Sleep disorders are increasingly being recognized as an important health problem. The number of physician office visits for sleep apnea, insomnia, restless legs syndrome,

narcolepsy, and other major sleep disorders increased from 1,046,927 in 1990 to 6,216,000 in 2001.

- Asthma is a common chronic condition, particularly in children.
- The economic cost of lung diseases is expected to be \$140 billion in 2005—\$81 billion in direct health expenditures and \$59 billion in indirect cost of morbidity and mortality.

Blood Diseases

- An estimated 251,000 deaths, 10 percent of all deaths, were attributed to blood diseases in 2002. These include the following:
 - 241,000 due to blood-clotting disorders
 - 10,000 to diseases of the red blood cell and bleeding disorders.
- A large proportion of deaths from acute MI and cerebrovascular disease involve blood-clotting problems.
- In 2005, blood-clotting disorders are expected to cost the Nation’s economy \$92 billion, and other blood diseases will cost \$12 billion.
- The mean age at death for persons with sickle cell anemia increased from about 28 years in 1979 to 37.7 years in 2001 (not shown).

Deaths From All Causes and Deaths From Cardiovascular, Lung, and Blood Diseases, U.S., 1982 and 2002

Number of Cause of Death	1982		2002	
	Deaths	Percent of Total	Number of Deaths	Percent of Total
All Causes	1,975,000	100	2,443,000	100
All Cardiovascular, Lung, and Blood Diseases	1,121,000	57	1,162,000	48
Cardiovascular Diseases	979,000	50	927,000	38
Blood	335,000*	17	251,000*	10
Lung	147,000**	7	239,000**	10
All Other Causes	854,000	43	1,281,000	52

* Includes 329,000 CVD deaths involving blood clotting disease.

** Includes 246,000 CVD deaths involving blood-clotting disease.

*** Includes 10,000 CVD deaths due to pulmonary heart disease in 1981 and 14,000 in 2001.

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

Deaths by Major Causes, U.S., 2002

Major Causes	Percent
Other	52.4
Blood**	0.4
CVD	37.9
Lung*	9.2

* Excludes deaths from pulmonary heart disease (14,000).

** Excludes deaths from blood-clotting disorders and pulmonary embolism (241,000).

Deaths From Cardiovascular, Lung, and Blood Diseases, U.S., 2002

Disease	Percent
Lung	19.4
Blood	0.9
CVD*	79.8

* CVD involving blood clotting (20.7%).

Deaths From Specific Cardiovascular, Lung, and Blood Diseases, U.S., 2002

Deaths (Thousands)

Cause of Death	Cardiovascular	Lung	Blood
Acute Myocardial Infarction	180		122*
Other Coronary Heart Disease	315		
Congestive Heart Failure	56		
Cerebrovascular Diseases (Stroke)	163		106*
Other Atherosclerosis	39		4*
Pulmonary Embolism	9	9*	9*
Other Cardiovascular Diseases	165	5*	
Bleeding and Red Blood Cell Diseases			10
Chronic Obstructive Pulmonary Disease		121	
Asthma		4	
Other Airway Diseases		1	
Pneumonia		65	
Neonatal Pulmonary Disorders		5	
Interstitial Lung Diseases		5	
Lung Diseases Due to External Agents		18	
Other Lung Diseases		6	
Total	927	239	251

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

Note: Total, excluding overlap, is 1,162,000.

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

Deaths From Cardiovascular Diseases, U.S., 2002

Disease	Percent
Stroke	17.6
AMI	19.4
Other CHD	34
CHF	6.0
Other CVD*	17.8
Pulmonary Embolism	1
Other Atherosclerosis	4.2

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

Deaths From Lung Diseases, U.S., 2002

Disease	Percent
Airway Diseases	52.7
Pulmonary Circulation	5.9
Neonatal	2.1
Pneumonia	27.2
Interstitial/Other	12.1

Deaths From Blood Diseases, U.S. 2002

Disease	Percent
Other Atherosclerosis	1.6
Pulmonary Embolism	3.6
Stroke	42.2
Bleeding and Red Cell Diseases	4.0
AMI	48.6

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

Deaths From Cardiovascular Diseases, U.S., 1900–2002

Deaths per 100,000 Population

Year	Total CVD	Heart Disease	CHD	Stroke
1900	52.766	27.427		21.353
1910	136.357	75.429		45.461
1920	243.18	137.374		80.019
1930	384.765	251.153		104.345
1940	538.47	385.191		119.753
1950	745.074	537.629	396.055	156.751
1960	923.635	661.712	546.366	193.588
1970	1024.501	735.542	666.665	207.166
1980	993.348	761.085	635.677	170.225
1990	920.245	720.058	558.291	144.088
2000	941.526	710.76	515.203	167.661
	929	710	503	154
	923	697	494	163

Source: Vital Statistics of the United States, NCHS.

Death Rates* for Cardiovascular Diseases, U.S., 1900–2002

Deaths per 100,000 Population

Year	CVD	Heart Disease	CHD	Stroke
1900	264.3	137.4		106.9
1910	287.2	158.9		95.8
1920	282.5	159.6		93
1930	327.8	214.2		89
1940	406.6	292.5		90.9
1950	494.4	356.8	262.8	104
1960	515.1	369	304.7	108
1970	504.2	362	328.1	101.9
1980	438.5	336	280.5	75.1
1990	370	289.5	224.3	57.9
2000	342	258.2	187.2	60.9

* Not age-adjusted.

Source: Vital Statistics of the United States, NCHS.

Ten Leading Causes of Death: Death Rates, U.S., 2002

Cause of Death	Deaths per 100,000 Population	Years of Potential Life Lost (millions)***
1 = Heart*	70.3	3.3
2 = Cancer	193.2	4.3
3 = Cerebrovascular	56.4	0.5
4 = COPD**	43.3	0.5
5 = Accidents	37	2.9
6 = Diabetes	25.4	0.5
7 = Influenza and Pneumonia	22.8	0.2
8 = Alzheimer's Disease	20.4	<0.1
9 = Nephritis	14.2	0.2
10 = Septicemia	11.7	0.2

* Includes 177.4 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 75 years.

Source: Vital Statistics of the United States, NCHS (preliminary).

Ten Leading Causes of Death Among Minority Groups, U.S., 2002

Black	
Septicemia	2.1
Nephritis	2.6
COPD	2.7
HIV Infection	2.7
Homicide	2.8
Diabetes	4.3
Accidents	4.4
Stroke	6.5
Cancer	21.6
Heart	27.8
Hispanic	
Perinatal	2
Pneumonia	2.4
COPD	2.6
Cirrhosis	2.7
Homicide	2.9
Diabetes	5.1
Stroke	5.5
Accidents	8.6
Cancer	19.8
Heart	23.9
Asian*	
Homicide	1.1
Nephritis	1.7
Suicide	1.7
Pneumonia	3
COPD	3
Diabetes	3.5
Accidents	4.9
Stroke	9.2
Cancer	26
Heart	26.1
American Indian**	
Nephritis	2.2
Pneumonia	2.4
Suicide	2.6
COPD	3.6

Cirrhosis	4.4
Stroke	4.6
Diabetes	6
Accidents	12
Cancer	17.5
Heart	19.9

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

** Includes deaths among Aleuts and Eskimos.

Note: Bolded causes of death are those addressed in institute programs

Source: Vital Statistics of the United States, NCHS.

Death Rates* for Cardiovascular and Noncardiovascular Diseases, U.S., 1982 and 2002

Cause of Death	Rate*		Rate Change	Percent Change
	1982	2002		
All Causes	985	845	-140	-14
Cardiovascular Diseases	505	319	-186	-37
Coronary Heart Disease	320	171	-149	-47
Stroke	89**	56	-33	-37
Other	95	92	-3	-8
Noncardiovascular Diseases	480	526	+46	+10

* Age-adjusted; rate per 100,000 population.

** Comparability ratio (1.0588) applied.

Source: Vital Statistics of the United States, NCHS.

Deaths From Congestive Heart Failure, U.S., 1968–2002

Deaths (Thousands)

Year	Amount
1968	10.318
1969	11.007
1970	11.425
1971	12.176
1972	13.47
1973	14.499
1974	14.599
1975	15.048
1976	16.046
1977	16.979
1978	18.374
1979	19.936
1980	21.804
1981	23.297
1982	25.09
1983	27.274
1984	29.429
1985	31.807
1986	34.271
1987	35.387
1988	37.371
1989	34.348
1990	34.156
1991	35.393
1992	36.387
1993	41.819
1994	41.406
1995	43.01
1996	43.837
1997	45.419
1998	46.98
1999	50.824
2000	51.546
2001	52.8
2002	52.42

Note: The sharp drop occurring in 1989 is attributed to the revision of the death certificate.
Source: Vital Statistics of the United States, NCHS.

Death Rates* for Heart Disease by Gender, Race, and Ethnicity, U.S., 1985–2002

Deaths per 100,000 Population

Male

Year	Black	White**	American Indian	Hispanic	Asian
1985	111.40	71.50	50.00	52.20	65.00
1986	109.57	70.48	49.54	51.95	64.41
1987	107.73	69.46	49.08	51.71	63.83
1988	105.90	68.44	48.62	51.46	63.24
1989	104.07	67.42	48.16	51.21	62.65
1990	102.23	66.40	47.70	50.97	62.07
1991	100.40	65.38	47.24	50.72	61.48
1992	98.57	64.36	46.78	50.47	60.89
1993	96.73	63.34	46.32	50.23	60.31
1994	94.90	62.32	45.86	49.98	59.72
1995	93.07	61.30	45.40	49.73	59.13
1996	91.23	60.28	44.94	49.49	58.55
1998	89.40	59.26	44.48	49.24	57.96
1999	87.57	58.24	44.02	48.99	57.37
2000	85.73	57.22	43.56	48.75	56.79
2002	83.90	56.20	43.10	48.50	56.20

Female

Year	Black	White**	American Indian	Hispanic	Asian
1985	93	64.9	40.6	43.8	53.2
1986	91.51334	64.2	40.94666	43.56	52.80667
1987	90.02668	63.5	41.29332	43.32	52.41334
1988	88.54002	62.8	41.63998	43.08	52.02001
1989	87.05336	62.1	41.98664	42.84	51.62668
1990	85.5667	61.4	42.3333	42.6	51.23335
1991	84.08004	60.7	42.67996	42.36	50.84002
1992	82.59338	60	43.02662	42.12	50.44669
1993	81.10672	59.3	43.37328	41.88	50.05336
1994	79.62006	58.6	43.71994	41.64	49.66003
1995	78.1334	57.9	44.0666	41.4	49.2667
1996	76.64674	57.2	44.41326	41.16	48.87337
1998	75.16008	56.5	44.75992	40.92	48.48004
1999	73.67342	55.8	45.10658	40.68	48.08671
2000	72.18676	55.1	45.45324	40.44	47.69338
2002	70.7001	54.4	45.8	40.2	47.3

* Age-adjusted.

** Non-Hispanic.

Note: Each line is a log linear regression derived from the actual rates.

Source: Vital Statistics of the United States, NCHS.

Death Rates* for Stroke by Gender, Race, and Ethnicity, U.S., 1985–2000

Deaths per 100,000 Population

Male

Year	Black	White***	American Indian	Hispanic	Asian
1985	111.40	71.50	50.00	52.20	65.00
	109.57	70.48	49.54	51.95	64.41
	107.73	69.46	49.08	51.71	63.83
	105.90	68.44	48.62	51.46	63.24
	104.07	67.42	48.16	51.21	62.65
1990	102.23	66.40	47.70	50.97	62.07
	100.40	65.38	47.24	50.72	61.48
	98.57	64.36	46.78	50.47	60.89
	96.73	63.34	46.32	50.23	60.31
	94.90	62.32	45.86	49.98	59.72
1995	93.07	61.30	45.40	49.73	59.13
	91.23	60.28	44.94	49.49	58.55
	89.40	59.26	44.48	49.24	57.96
	87.57	58.24	44.02	48.99	57.37
	85.73	57.22	43.56	48.75	56.79
2002	83.90	56.20	43.10	48.50	56.20

Female

Year	Black	White***	American Indian	Hispanic	Asian
1985	93.0	64.9	40.6	43.8	53.2
	91.5	64.2	40.9	43.6	52.8
	90.0	63.5	41.3	43.3	52.4
	88.5	62.8	41.6	43.1	52.0
	87.1	62.1	42.0	42.8	51.6
1990	85.6	61.4	42.3	42.6	51.2
	84.1	60.7	42.7	42.4	50.8
	82.6	60.0	43.0	42.1	50.4
	81.1	59.3	43.4	41.9	50.1
	79.6	58.6	43.7	41.6	49.7
1995	78.1	57.9	44.1	41.4	49.3
	76.6	57.2	44.4	41.2	48.9
	75.2	56.5	44.8	40.9	48.5
	73.7	55.8	45.1	40.7	48.1
	72.2	55.1	45.5	40.4	47.7
2002	70.7	54.4	45.8	40.2	47.3

* Age-adjusted.

*** Non-Hispanic.

Note: Each line is a log linear regression derived from the actual rates.

Source: Vital Statistics of the United States, NCHS.

Death Rates* for Coronary Heart Disease, U.S., 1950–2002

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

Year	Actual Rate	Rate if Rise Continued	Peak Rate
1950	439.5		
1951	433.6		
1952	431.2		
1953	439.5		
1954	426		
1955	440.1		
1956	446.7		
1957	457.6		
1958	458.2		
1959	455.8		
1960	463.8		
1961	455.9		
1962	469.7		
1963	478.4		
1964	463.2		
1965	466.4		
1966	465.1		
1967	453.9		
1968	482.6		
1969	469.8	469.8	482.6
1970	448	479	482.6
1971	448.5	481.4	482.6
1972	445.5	483.8	482.6
1973	437	486.2	482.6
1974	415	489	483
1975	388.1	491.1	482.6
1976	382.2	493.5	482.6
1977	368.5	496	482.6
1978	362	498.5	482.6
1979	339.1	501	482.6
1980	345.2	503.5	482.6
1981	329.5	506	482.6
1982	320.4	508.5	482.6
1983	316.1	511	482.6
1984	304.1	513.6	482.6
1985	296.2	516.2	482.6
1986	283.3	518.7	482.6
1987	273.9	521.3	482.6
1988	268.5	524	482.6

Year	Actual Rate	Rate if Rise Continued	Peak Rate
1989	257.5	526.6	482.6
1990	249.6	529.2	482.6
1991	241.5	531.8	482.6
1992	234.2	534.5	482.6
1993	234.6	537.2	482.6
1994	226	540	483
1995	219.7	542.6	482.6
1996	214	545.3	482.6
1997	205.6	548	482.6
1998	197.9	550.7	482.6
1999	195.8	553.5	482.6
2000	186.6	556.3	482.6

* Age-adjusted.

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 2002

Percent Discharged Dead

Disease	2002	1985	1975
Cardiac Dysrhythmia	2.9	7.9	
Pneumonia	4.9	7.6	6.4
Congestive Heart Failure	3.6	8.1	
Stroke	6.4	8.7	16.4
AMI	8.2	15.5	19.3

Source: National Hospital Discharge Survey, NCHS.

Death Rates* for Coronary Heart Disease in Men Ages 35–74 Years, Selected Countries, 1970–2002

Deaths per 100,000 Population

Year	Finland	Australia	USA	England	Poland	France	Japan
1970	701.7	652.3	651.5	509.3	177.4	148.7	93.5
1971	727.8	636.1	636.5	514.3	194.3	156.5	88.3
1972	680.1	623.3	633.5	539.3	204.8	159.6	83.7
1973	695.2	609.7	618.2	532.6	210.3	158.1	85.6
1974	699.5	609.1	587.3	535.8	212.3	163.9	84.5
1975	679.9	565.1	557.5	530.7	230.6	167.2	80.1
1976	699.8	553.4	540.5	526.3	244.4	160.5	77.6
1977	693.2	527.8	519.8	521.2	253.4	152.5	76.5
1978	664.1	499.2	504.1	535.9	262.8	153.8	74
1979	638.5	477.5	473.2	522.6	255.6	149.6	71.7

Year	Finland	Australia	USA	England	Poland	France	Japan
1980	616.1	449.1	465	508.8	277.2	148.3	74.5
1981	602.8	442.6	448	491.9	261.9	145	69.6
1982	598.6	427.6	433.7	484.1	265.5	145.5	66.6
1983	573.6	402.2	420.6	489.4	261.4	144.4	65
1984	561.5	380.3	401.1	477.3	283.6	143	62.5
1985	575.7	376.6	388.2	475.8	297.5	142.4	59.8
1986	530.7	347.9	367.7	455.7	306.8	140.1	54.5
1987	506.4	333.1	351.3	439.9	316.6	127.1	52.2
1988	477.2	318.7	337.4	420.3	310	118.5	52.2
1989	471	304.6	322.7	394.4	324	109.7	48.4
1990	434.5	274.9	310.5	382.7	326.4	105.7	48.9
1991	416.9	256.7	301.1	368.5	343.9	104.6	46.6
1992	407	242.6	290.3	353.1	326	100.5	44.7
1993	377.3	230.3	286.9	346.3	304.2	98.7	44.5
1994	346.4	217	276.7	315.1	280.6	94.4	48.7
1995	339.7	202.4	269	304.5	273.1	92	48.7
1996	319.9	195.5	259.1	288.1	266.7	90.7	57.7
1997	292.3	183.2	247.8	267	274.8	86.6	56.8
1998	287.5	171.5	236.4	257.5	282.9	85.3	56
1999	276.4	160.9	229.9	241	291	81.7	56.7
2000	250.1	143.6	218.1	225.1	272.1	81.7	56.7
2001	238.1	138.4	203.9	211.1	255.2		
2002	230.9		129.4	196.3	235.7		

* Age-adjusted to the European Standard Population.

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

Death Rates* for Coronary Heart Disease in Women Ages 35–74 Years, Selected Countries, 1970–2002

Deaths per 100,000 Population

Year	Finland	Australia	USA	England	Poland	France	Japan
1970	193	255.4	252.2	164.5	54.9	50.2	46.9
1971	205.4	249.1	244.3	164.4	58.3	51.7	42.9
1972	193	235.2	241	175.1	58.6	52.1	41.3
1973	187.9	225.9	231.8	175.8	62	50.1	43
1974	184.3	234.3	218.6	176.4	61.4	49.6	42.2
1975	179.1	213.5	205.4	173.2	66.3	51	38.1
1976	188.2	199.9	197.2	173.8	69.2	47.6	37.3
1977	171.3	199.2	190.2	169.8	70.8	44.7	35.4
1978	177	185.6	185	173.4	75.6	43.8	33.5

Year	Finland	Australia	USA	England	Poland	France	Japan
1989	176	169.6	170.8	170.6	71.9	41.7	31.8
1980	161.3	159.6	172.9	165.8	73.9	41	32.3
1981	166.1	159.2	166.9	162.5	70.5	41.6	31.7
1982	162.5	155.4	162.3	161.8	70.8	42	29.3
1983	154.6	149.6	159.8	164.6	70.2	40.2	28.6
1984	155	141.6	154.6	165.9	96.6	41.2	26.9
1985	154.9	138.9	148.4	164.6	79.8	39.8	25.2
1986	151.2	137.4	142.2	160.1	83	37.7	23.2
1987	153	126.2	137.8	154.8	87.6	34	21.4
1988	140.8	118.1	133.2	148	83.3	30.4	21.2
1989	129.8	113.4	126.2	143	89.5	28.2	19.5
1990	125.6	105.6	122	138.5	83.3	26.7	18.9
1991	113.9	95.9	118.5	134.9	94.4	25.6	17.9
1992	109.4	91.8	114.8	128.4	93.8	25.5	16.8
1993	104.9	85.4	114.3	125	89	24.6	16.7
1994	98.4	78.9	110.1	114.4	83	23.6	17.6
1995	92.7	72.8	107.9	109.1	82.2	22.4	17.6
1996	84.1	68.7	105.4	103.1	78.5	21.9	20.8
1997	74	65.8	100.2	96	82.6	20.3	19.7
1998	81.1	60.5	96.7	92.8	86.7	20.6	18.6
1999	69.6	53.9	95.4	85.1	90.8	19.1	18.9
2000	65.1	52.4	90.1	79.5	85.5	18.1	17.2
2001	59.5	46.9	84.4	73.3	80.5		
2002	57.7		73.6	67.9	70.3		

* Age-adjusted to the European Standard Population.

Source: World Health Statistics Annual, WHO

Change in Death Rates* for Selected Causes by Race and Gender, U.S., 1992–2002

Percent

	COPD	Asthma	CHD	Stroke
White Men	-8.7	-39	-29.2	-21.1
Black Men	-6.9	-14.2	-22	-22.4
White Women	25.8	-22.6	-26.8	-14.4
Black Women	28.3	-11	-19.2	-17

* Age-adjusted.

Source: Vital Statistics of the United States, NCHS.

Death Rates for Lung Diseases in Infants, U.S., 1980–2002

Deaths per 100,000 Population

Year	Respiratory Distress Syndrome	Sudden Infant Death Syndrome	Other Neonatal Respiratory Disorder	Hypoxia	Pneumonia
1980	138.1	152.5	102.3	41.4	28
1981	119	145.9	99.4	38.7	21.9
1982	109.7	143.4	95.5	40.5	20.5
1983	101.2	145.8	94.5	32.9	21.1
1984	96.9	142.9	95.3	31.9	18.7
1985	98.2	141.3	99.6	30.8	18.6
1986	90.6	140.5	95.2	26.2	17.5
1987	86.2	137.3	93.3	20.8	17.7
1988	81.4	140.1	91.8	19.9	16.2
1989	89.9	139.4	82.8	17.9	15.7
1990	68.5	130.3	71.1	18.3	15.2
1991	62.5	130.1	65.6	14.6	14.8
1992	50.8	120.3	60.2	15.1	14.8
1993	45.4	116.7	55.5	13.7	13.2
1994	39.6	103	53.1	13.6	14.1
1995	37.3	87.1	47.6	12.2	12.6
1996	34.9	74.2	46.8	11	12.4
1997	33.5	77.1	44.7	11.6	10.8
1998	32.9	71.6	43.2	11.7	11.2
1999	27.3	64.6	51.3	10.7	10.6
2000	24.4	51	43.2	10.9	8.4
2001	24.5	53.6	44.1	9.2	9.7
2002	22.8	55.1	36.7	10	8.5

Source: Vital Statistics of the United States, NCHS.

Ten Leading Causes of Infant Mortality, U.S., 2002

Cause of Mortality	Deaths Under Age 1 per 100,000 Live Births	Percent Change 1992–2002
Congenital Anomalies*	80.9	-17**
Disorders Relating to Short Gestation	115.3	-3
Sudden Infant Death Syndrome	57.1	-57
Newborns Affected By Maternal Complications Of Pregnancy	42.5	+11
Newborns Affected By Complications Of Placenta, Cord, And Membrane	26.6	+1
Respiratory Distress Syndrome	23.5	-54
Accidents And Adverse Effects	23.4	+6
Bacterial Sepsis Of Newborn	18.6	NA
Diseases Of The Circulatory System	16.6	-5
Intrauterine Hypoxia	14.5	-34

* Congenital CVD and congenital anomalies of the respiratory system represented 42 percent of all infant deaths due to congenital anomalies.

** Between 1992 and 2002, congenital CVD declined 35 percent; congenital anomalies of the respiratory system declined 41 percent; other congenital anomalies declined 17 percent.

NA: Not available.

Note: Capitalization indicates diseases 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., 2002

Cause of Death	Deaths Under Age 1
All Causes	28,034
Cardiovascular Diseases	2,400*
Congenital Anomalies	1,733
Other	667
Lung Diseases	5,922
Sudden Infant Death Syndrome	2,295*
Respiratory Distress Syndrome	943*
Pneumonia	263
Bronchopulmonary Dysplasia (BPD)	296
Atelectasis of Newborn	400
Congenital Anomalies	638*
Other Lung Diseases	1,087
Other Diseases	19,712

* NHLBI programs address these diseases.

Source: Vital Statistics of the United States, NCHS.

By Percent

Congenital Anomalies of the Respiratory System	2.3
Atelectasis and Other Lung Diseases	5.3
BPD	1
RDS	3.4
Pneumonia	0.9
SIDS	8.2
Other CVD	2.4
Congenital Anomalies of the CV System	6.2
Other Diseases	70.39

Death Rates* for Chronic Obstructive Pulmonary Disease in Men Ages 35+ Years, Selected Countries, 1980–2002

Deaths per 100,000 Population

Year	England	Australia	Poland	Germany	USA	Finland	France	Japan
1980	146.5	136.4	121.2		83.6		56.9	44.3
1981	137.6	131.3	113.1		84.1		60.7	42.9
1982	144.3	150.4	110.8		82.3		57.8	42.3
1983	140.8	129.2	124.6		88.4		60.9	44.1
1984	144	129.5	128.8		88.3		61.3	42.1
1985	155.6	139	139.9		91.7		65	44.1
1986	147.9	119.6	126.4		90.8		66.8	40.5
1987	131.7	123.9	115.1		88.9	75.8	56.7	38.4
1988	133	125.5	100.7		91	74.1	54.9	39.2
1989	137.1	136	100.3		86.6	73.8	56.6	36.6
1990	122.9	110.8	93.8	96.2	89.25	69.4	56.1	37.5
1991	124.4	105.3	90	95.6	88.7	63.6	55.5	36.8
1992	118.5	112.9	76.7	93.1	86.8	67.7	55.6	35.6
1993	118.8	99.4	78.4	95.4	91.7	68.6	59.4	36.1
1994	104.6	102.6	67.3	90	88.7	57.2	56.1	36
1995	110	92.8	67.9	91.7	87.1	63.3	57.5	43.9
1996	100.5	88.3	67.9	88.6	85.9	67.4	50.1	36.5
1997	99.2	83.7	68.4	76.8	86.6	67.8	43.1	35.6
1998	97.9	79.2	69	71.4	86	72.2	38.5	33.5
1999	96.6	76.3	69.5	69.6	92.5	65.3	34.1	35.2
2000	95.3	71.8	66.1	67.4	89.1	63.5	33.1	31.4
2001	84.2	66.5	61.6	59.7	85.2	60.8		
2002	82.5		61.9		85	58.3		

* Age-adjusted to the European Standard Population.

Source: World Health Statistics Annual, WHO.

Death Rates* for Chronic Obstructive Pulmonary Disease in Women Ages 35+ Years, Selected Countries, 1980–2002

Deaths per 100,000 Population

Year	England	Australia	Poland	Germany	USA	Finland	France	Japan
1980	38.5	33.8	30.4		26.7		18.5	18.1
1981	37.8	33.8	26.6		28.5		18.9	17.6
1982	41.5	37	26.7		29.4		18.4	17
1983	40.7	37.7	30.7		33.2		19.9	17.7
1984	43.1	37.5	32.7		35		20.1	16.4

Year	England	Australia	Poland	Germany	USA	Finland	France	Japan
1985	50.5	44.6	34.2		38.4		22.1	16.6
1986	48.1	38.9	30		39.6		23.3	15.6
1987	45	43.4	26.5		41.1	14.9	20.2	14.4
1988	48.5	45.8	22.8		43.6	14.3	20.3	14.4
1989	51.4	52.4	23.7		45.6	13.3	21.8	13.4
1990	48	42.6	22.3	27.2	46.1	11	22.2	13.9
1991	50.4	41.5	22	28.3	48.7	12.9	21.9	13.5
1992	51.4	48.9	18.5	27	49	14.9	23.1	13.1
1993	52.6	44.4	19.3	29.7	54.3	14.8	25.8	13.2
1994	48	47.7	16.7	29	54.6	13.6	23.3	12.5
1995	53.1	44.8	16.1	30.1	54.8	14.8	24.7	15.2
1996	51.2	43.7	16.3	29.8	56.6	13.9	20.1	12.7
1997	52.3	42.7	17.1	26.4	57.4	16.3	18.1	12.1
1998	51.5	41.6	17.9	26.6	58.8	17.8	17	11.3
1999	51.2	39.7	18.7	26.4	64.2	16.7	15.1	11.4
2000	51	38.5	17.5	25.3	63.7	16	13	9.8
2001	50.9	38.3	16.3	23.6	63.1	15.8		
2002	51.7		15.2		63.1	14.9		

* Age-adjusted to the European Standard Population.

Source: World Health Statistics Annual, WHO.

Death Rates* for Chronic Obstructive Pulmonary Disease by Gender, Race, and Ethnicity, U.S., 1985–2002

Deaths per 100,000 Population

Male

Year	Black	White**	American Indian	Hispanic	Asian
1985	45.0	57.0	31.3	27.3	27.7
1986	45.2	57.1	32.1	27.5	27.7
1987	45.5	57.1	32.8	27.8	27.7
1988	45.7	57.2	33.6	28.0	27.7
1989	45.9	57.3	34.4	28.3	27.6
1990	46.2	57.3	35.2	28.5	27.6
1991	46.4	57.4	35.9	28.8	27.6
1992	46.6	57.5	36.7	29.0	27.6
1993	46.9	57.5	37.5	29.3	27.6
1994	47.1	57.6	38.3	29.5	27.6
1995	47.3	57.7	39.0	29.8	27.6
1996	47.6	57.7	39.8	30.0	27.6
1997	47.8	57.8	40.6	30.3	27.5
1998	48.0	57.9	41.4	30.5	27.5

Year	Black	White**	American Indian	Hispanic	Asian
1999	48.3	57.9	42.1	30.8	27.5
2000	48.5	58.0	42.9	31.0	27.5
2001					
2002					

Female

Year	Black	White**	American Indian	Hispanic	Asian
1985	14.2	24.1	12.2	11.9	10.0
1986	14.9	25.3	13.4	12.3	10.1
1987	15.6	26.6	14.7	12.7	10.2
1988	16.2	27.8	15.9	13.1	10.3
1989	16.9	29.0	17.1	13.5	10.4
1990	17.6	30.2	18.3	13.9	10.5
1991	18.3	31.5	19.6	14.3	10.6
1992	18.9	32.7	20.8	14.7	10.7
1993	19.6	33.9	22.0	15.1	10.9
1994	20.3	35.1	23.2	15.4	11.0
1995	21.0	36.4	24.5	15.8	11.1
1996	21.6	37.6	25.7	16.2	11.2
1997	22.3	38.8	26.9	16.6	11.3
1998	23.0	40.0	28.1	17.0	11.4
1999	23.7	41.3	29.4	17.4	11.5
2000	24.3	42.5	30.6	17.8	11.6
2001	25.0	43.7	31.8	18.2	11.7
2002					

* Age-adjusted.

** Non-Hispanic.

Note: Each line is a log linear regression derived from the actual rates.

Source: Vital Statistics of the United States, NCHS.

Physician Office Visits for Sleep Disorders, U.S., 1990–2002

Year	Visits (Millions)
1990	1,046,927
1991	1,331,879
1992	1,418,702
1993	1,234,703
1994	1,587,218
1995	2,386,158
1996	2,752,231
1997	3,244,039

Year	Visits (Millions)
1998	3,974,866
1999	3,378,591
2000	4,689,916
2001	5,287,835
2002	6,215,688

Source: National Ambulatory Medical Care Survey, NCHS.

Prevalence of Common Cardiovascular, Lung, and Blood Diseases, U.S., 2002

Disease	Number
Total Cardiovascular Diseases	70,100,000
Hypertension*	65,000,000
Coronary Heart Disease	13,000,000
Congestive Heart Failure	4,900,000
Stroke	5,400,000
Congenital Heart Disease	1,000,000
Asthma	20,600,000
COPD	10,800,000
Chronic Bronchitis only (age 25+)	8,200,000
Emphysema only (age 25+)	1,700,000
Chronic Bronchitis and Emphysema (age 25+)	900,000
Anemias (all forms)***	3,500,000

* Systolic blood pressure > 140 mm Hg, diastolic blood pressure > 90 mm Hg, on antihypertensive medication, or told twice of having hypertension.

Note: Some persons are included in more than one diagnostic group, and persons with more than one form of anemia are counted more than once.

Sources: Extrapolated to United States from National Health and Nutrition Examination Survey (NHANES), 1999–2002, and National Health Interview Survey

Prevalence of Cardiovascular Diseases* in Adults by Age, U.S., 1999–2002

Age	Percent
20–34	8.7
35–44	20
45–54	35.7
55–64	54.5
64–74	71.8
75+	83

* Hypertension, CHD, cerebrovascular disease, CHF, rheumatic heart disease, or congenital CVD.

Hypertension = systolic blood pressure \geq 140 mm Hg, diastolic blood pressure \geq 90, or on antihypertensive medication.

Source: NHANES, 1992–2002.

Prevalence of Common Cardiovascular and Lung Diseases by Age, U.S., 2002

Age	Percent
Age <18 Years	
Asthma	8.7
Age 18-44 Years	
Anemias	2
CHD	1.2
COPD	3.6
Asthma	7.1
Hypertension	13
Age 45-64 Years	
Stroke	2.2
CHF	2.5
COPD	6.5
Asthma	7.2
CHD	8.4
Hypertension	40.5
Age 65+ Years	
Anemias	2
Asthma	5.9
Congestive Heart Failure	7.6
Stroke	8.4
COPD	8.7
Coronary Heart Disease	20.5
Hypertension	72.4

Note: Numbers depicted in bars are not additive by disease because some persons have more than one disease.

Source: NHIS 1996 for amnmias, 2002 for lung disease, and NHANES, 1999-2002 for CVD.

Prevalence of Cardiovascular Disease Risk Factors* in Adults, U.S., 1961–2001

Year	Hypertension	Smoking	High Cholesterol	Overweight
1961	38.1		33.6	44.8
1962				
1963				
1964				
1965		41.9		
1966				
1967				
1968				
1969				
1970				

Year	Hypertension	Smoking	High Cholesterol	Overweight
1971				
1972	39.8		28.6	47.7
1973				
1974		37		
1975				
1976				
1977				
1978	40.4		27.8	47.4
1979		33.3		
1980				
1981				
1982				
1983		31.9		
1984				
1985		29.9		
1986				
1987				
1988				
1989				
1990		25.3		
1991	23.9		19.7	56
1992		26.3		
1993				
1994		25.3		
1995		24.6		
1996				
1997		24.6		
1998	28.7	24	18	
1999		23.3		
2000		23.1		64
2001	65.2	28.7	22.7	17

* Age-adjusted.

Note: Hypertension is systolic blood pressure > 140, diastolic blood pressure is > 90 mmHg, or on antihypertensive medication. High cholesterol is 240+ mg/dl. Overweight is BMI 25+ kg/m².

Source: NHIS for smoking (age 18+) and NHANES for the other risk factors (ages 20–74).

Hypertensive Population Aware, Treated, and Controlled, Age 18+, U.S., 1971–72 to 1999–2002

Percent of Hypertensive Population*

	1988–94	1999–02
Aware	73.5	72.7
Treated	60.5	63.3
Controlled	37.9	39

Percent of Hypertensive Population**

	1976–80	1988–91	1991–94	1999–02
Aware	51	73	68	69.09
Treated	31	55	53	59.6
Controlled	10	29	27	32.9

* Systolic blood pressure \geq 160 mmHg, diastolic blood pressure \geq 95 mmHg, or on antihypertensive medication.

** Systolic blood pressure \geq 140 mmHg, diastolic blood pressure \geq 90 mmHg, or on antihypertensive medication.

Source: NHANES, NCHS.

Adult Population With Hypertension* by Age, Gender, and Race, U.S., 1999–2002

Percent of Population

Age	Mexican-American Men	Black Men	White Men	Mexican-American Women	Black Women	White Women
20–39	-9.2	-17.8	-13.1	7.2	14.7	6.8
40–59	-29.1	-44	-29.1	31.3	52.6	31.3
60+	-57.7	-79.1	-60.3	68.2	86.4	72

* Systolic blood pressure \geq 140 mmHg, diastolic blood pressure $>$ 90 mmHg, or on antihypertensive medication.

Source: NHANES, NCHS, and personal communication.

Hospitalization Rates for Congestive Heart Failure, Ages 45–64 Years and 65+ Years, U.S., 1971–2002

Deaths per 100,000 Population

Year	Ages 45–64 Years	Ages 65+ Years
1971	9.5	60.1
1972	11.3	73.3
1973	12	78.2
1974	12.8	82.7
1975	13.2	88.4

Year	Ages 45-64 Years	Ages 65+ Years
1976	13.7	97.4
1977	14.2	106.4
1978	14.9	112.5
1979	15.5	127.7
1980	14.3	133.5
1981	15.6	130.8
1982	16.2	132.6
1983	20.1	132.7
1984	20.6	151.7
1985	21.4	156.3
1986	23.1	158.2
1987	22.7	161.8
1988	24.4	175.5
1989	25.6	168.5
1990	26	182
1991	27	193.6
1992	31.5	206.4
1993	34.1	207.7
1994	29.8	210
1995	27.2	208.1
1996	28.5	202.7
1997	31.3	223.2
1998	30.6	226.7
1999	29.4	221.1
2000	31.9	220.2
2001		
2002	32.9	201.4

Source: National Hospital Discharge Survey, NCHS.

Persons Experiencing Asthma Episodes in Previous 12 Months by Age, U.S., 1997–2003

	1997	1998	1999	2000	2001	2002	2003
<15	5.39	5.42	5.19	5.52	5.54	5.83	5.44
15–34	4.43	3.76	4.23	4.0	4.5	4.32	3.86
35+	3.47	3.41	3.8	3.36	3.56	3.59	3.2

Source: NHIS, NCHS.

Direct and Indirect Economic Costs of Illness by Major Diagnosis, U.S., 2005

	Amount (Dollars in Billions) Indirect Costs				Percent Distribution Indirect Costs			
	Direct Costs*	Morbidity**	Mortality***	Total	Direct Costs	Morbidity	Mortality	Total
Cardiovascular Disease	241.8	34.8	116.8	393.4	15.0	17.0	20.6	16.5
(including Blood Clotting) ****	(56.8)	(7.7)	(27.2)	(91.7)	(3.5)	(3.7)	(4.8)	(3.8)
Lung Diseases****	80.7	26.8	32.1	139.6	5.0	13.1	5.7	5.9
Blood Diseases	8.4	0.7	3.1	12.2	0.6	0.4	0.5	0.5
Subtotal	330.9	62.4	152.0	545.3	20.6	30.4	26.8	22.9
Diseases of the Digestive System	168.5	10.6	25.4	204.5	10.5	5.2	4.5	8.6
Neoplasms	74.0	17.5	118.4	209.9	4.6	8.5	20.9	8.8
Mental Disorders	133.2	27.0	8.6	168.8	8.3	13.1	1.5	7.1
Diseases of the Nervous System	137.5	8.0	12.5	158.0	8.5	3.9	2.2	6.6
Diseases of the Musculoskeletal System	94.4	20.9	3.0	118.3	5.9	10.2	0.5	5.0
Diseases of the Genitourinary System	70.1	5.4	6.4	81.9	4.4	2.6	1.1	3.4
Endocrine, Nutritional, and								
Metabolic Diseases	66.2	6.7	19.4	92.3	4.1	3.3	3.4	3.9
Infectious and Parasitic Diseases	33.9	12.4	28.1	74.4	2.1	6.1	5.0	3.1
Diseases of the Skin	37.2	1.6	0.6	39.4	2.3	0.8	0.1	1.6
Other Respiratory Diseases	47.1	8.3	3.2	58.6	2.9	4.0	0.6	2.5
Other and Unallocated to Diseases	415.7	24.2	188.5	628.4	25.8	11.8	33.3	26.4
Total	1,608.7	205.0	566.1	2,379.8	100%	100%	100%	100%

* 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 2005 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 2005 total by type of direct cost.

** Morbidity costs were estimated for 2005 by multiplying NCHS estimates for 1980 by a 1980–2005 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 2005 by first multiplying the number of deaths in 2001 in each age- and sex-specific group by the 2001 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 2001–2005 inflation factor (1.20) 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.

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

Total Economic Costs, U.S., 2005

	Percent
Blood	0.5
Cardiovascular	16.5
Lung	5.9
Other	77.1

Economic Costs: Cardiovascular, Lung, and Blood Diseases, U.S., 2005

	Percent
Direct	60.7
Mortality	27.9
Morbidity	11.4

Indirect 39.3%

5. Institute-Initiated Programs Starting in FY 2004

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 or special emphasis panels (SEPs), the Board of Extramural Advisors (BEA), and the National Heart, Lung, and Blood Advisory Council (NHLBAC). The advisory committees, SEPs, and the BEA, 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 competing 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. A smaller number of 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 BEA, which reviews and prioritizes them. The concepts, along with the comments from the BEA, 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 weekly publication, 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 2004 are presented below according to NHLBI scientific program. Also described are trans-NIH and interagency initiatives in which the NHLBI is participating.

Heart and Vascular Diseases Program

Initiative Being Renewed

Coronary Artery Risk Development in Young Adults (CARDIA) Study

The purpose of this renewal is to continue support for research that examines the development of atherosclerosis in adults in their forties, an age when the earliest detectable subclinical disease appears to accelerate. Scientists will use the CARDIA study's 15 years of data and stored

samples and the Year 20 exam to address questions pertaining to subclinical disease development that cannot be determined in older cohorts.

New Initiatives

Interventions To Improve Hypertension Control Rates in African Americans

The purpose of this RFA is to evaluate interventions to improve medical care delivery so that a greater proportion of black patients will have their blood pressure controlled to below 140/90 mm Hg as specified in the JNC 7. The study will focus on patients; clinicians; the interactions between them; and physical, social, and administrative environments in which the interactions occur.

Partnership Programs To Reduce Cardiovascular Disparities

The purpose of this RFA is to encourage research that improves CVD outcomes in racial and ethnic minorities by establishing partnerships between minority-serving health care systems that lack a strong research program and research-intensive medical centers that have a track record of NIH-supported research and patient care. The partnership will conduct collaborative research on the causes and resolution of health disparities that exist among minority populations and provide culturally sensitive, reciprocal educational and skills development programs to enhance the research potential and CVD management capabilities at the collaborating organizations.

Pediatric Circulatory Support

The purpose of this RFP is to develop circulatory assist devices such as left and right ventricular assist devices, extracorporeal gas exchange systems, and other bioengineered systems for infants and children with congenital and acquired CVD who experience cardiopulmonary failure and circulatory collapse.

Specialized Centers of Clinically Oriented Research (SCCOR) in Pediatric Heart Development and Disease

The purpose of this SCCOR is to conduct interdisciplinary studies of the etiology, pathophysiology, and diagnosis of congenital and acquired pediatric heart disease. The goal is to translate research findings into more effective methods of treatment and prevention.

Lung Diseases Program

Initiative Being Renewed

Childhood Asthma Research and Education (CARE) Network

The purpose of this closed-competition renewal is to continue support for a network of clinical centers and a data coordinating center to evaluate new treatment approaches and management strategies for children with asthma, assess available medications, and disseminate findings rapidly to the health care community.

New Initiatives

Granulomatous Lung Inflammation in Sarcoidosis

The purpose of this RFA is to elucidate the mechanisms involved in the development of pulmonary sarcoidosis, an autoimmune disease characterized by granulomatous inflammation in the lungs. Research will focus on determining the etiology of the disease and its susceptibility factors and identifying components in the innate and adaptive immune pathways that affect lung lymph nodes and tissues in the early stage of the disease.

Immune System Development and the Genesis of Asthma

The purpose of this RFA is to stimulate research on immune function early in life in order to determine its impact on the development of asthma. Research findings will be used to devise preventive strategies that will not compromise the integrity of the immune system.

Lung Tissue Research Consortium

The purpose of this RFP is to facilitate studies of pulmonary disease by establishing a program for standardized processing, storage, and distribution of lung tissues and their associated clinical data. This resource will enable investigators to perform studies correlating molecular histopathology of lung with pulmonary function and clinical status.

Blood Diseases and Resources Program

Initiative Being Renewed

Retrovirus Epidemiology Donor Study (REDS)

The purpose of this renewal is to continue support for studies on volunteer blood donors to ensure the safety and availability of the Nation's blood supply. Research includes monitoring known blood-borne infectious agents, evaluating rapidly the impact of emerging pathogens, assessing the safety implication of changes in laboratory and blood donor screening protocols, and examining blood supply availability issues.

New Initiative

Molecular Mechanisms Underlying Diamond-Blackfan Anemia and Other Congenital Bone Marrow Failure Syndromes

The purpose of this RFA is to encourage research associated with the genetics and basic mechanisms of Diamond-Blackfan anemia and other rare inherited bone marrow failure syndromes. Scientists are seeking to understand the molecular pathways that are disrupted in these syndromes.

Trans-NHLBI

Initiatives Being Renewed

NHLBI Competitive Supplements for Human Embryonic Stem Cell Research

The purpose of this renewal is to enable NHLBI grantees with little or no prior experience working with human embryonic stem cell lines to incorporate the lines into their experimental plan when the research falls within the original scope of the parent grant and is a logical extension of its goals and objectives.

NHLBI Innovative Research Grant Program

The purpose of this renewal is to support investigators with innovative hypotheses pertaining to heart, lung, and blood diseases and sleep disorders by relaxing the stringent criteria for preliminary data and demonstration of concept feasibility during standard NIH research project (R01) reviews. The initiative will provide limited R21 awards, not to exceed \$100,000 in direct cost per year for up to 2 years.

NHLBI Mentored Minority Faculty Development Award

The purpose of this renewal is to provide minority faculty members with varying levels of research experience the opportunity to acquire the skills needed to become independent investigators. Selected candidates will undertake 3 to 5 years of special study and supervised research under an established scientist.

NHLBI Minority Institution Research Scientist Development Award

The purpose of this renewal is to enhance NHLBI-relevant research skills of faculty members with doctoral degrees in biomedical or behavioral science at minority institutions. Awardees will be mentored by an accomplished investigator at a nearby institution and are required to develop a program of up to 5 years of intensive, full-time training during the summer and part-time training during the academic year.

NHLBI Minority Institutional Research Training Program

The purpose of this renewal is to provide full-time research training to graduate, postdoctoral, or health professional students at minority schools for investigative careers in cardiovascular, pulmonary, and blood diseases and sleep disorders.

NHLBI Short-Term Training for Minority Students

The purpose of this renewal is to provide research training for minority students to encourage them to participate in cardiovascular, pulmonary, hematologic, and sleep disorders research. The awardees will receive 2 to 3 months of research training with experienced investigators.

Programs for Genomic Application (PGAs) for Heart, Lung, and Blood Research

The purpose of this renewal is to advance functional genomic research related to heart, lung, blood, and sleep health and disorders. Areas of emphasis include production and biological validation of resources and tools, education, and increased interactions between the PGA groups.

SBIR/STTR Technologies for Monitoring and Performing Resuscitation

The purpose of this renewal is to develop innovative approaches, tools, devices, and biomaterials related to bioengineering-based methodologies for monitoring and performing resuscitation. The goal is to reduce morbidity and mortality from circulatory, hypoxemic, and traumatic arrest by fostering improved systems and methods for out-of-hospital and basic resuscitation.

New Initiatives

Aldosterone Antagonists for the Treatment of Heart Failure With Preserved Systolic Function

The purpose of this RFP is to evaluate the effectiveness of aldosterone antagonist therapy to reduce mortality in patients who have heart failure with preserved systolic function.

Cultural Competence and Health Disparities Academic Award

The purpose of this RFA is to develop core curricula and other educational materials at U.S. medical institutions that will increase the overall knowledge and skills of medical students, house staff, and other professionals on the ethnic, cultural, religious, socioeconomic, and linguistic factors that contribute to health disparities and on culturally competent approaches to mitigate them.

DNA Resequencing and Genotyping Centers

The purpose of this RFP is to establish high-volume DNA resequencing and genotyping centers to discover and type DNA variations needed to elucidate genomic components involved in the cause, variable outcome, and progression of heart, lung, blood, and sleep disorders.

Interrelationships of Sleep, Fatigue, and HIV/AIDS

The purpose of this RFA is to elucidate the etiology of sleep disturbances and fatigue associated with HIV and AIDS. Research findings will be used to develop approaches to improve sleep and quality of life in patients with HIV and will contribute to our understanding of the relationship between sleep and chronic diseases.

Mentored Quantitative Research Career Development Award (K25)

The purpose of this PA is to support the career development of investigators with quantitative scientific and engineering backgrounds outside biology or medicine who have made a commitment to focus their research endeavors on behavioral or biomedical research.

NHLBI Exploratory and Developmental Research Grants for Investigations in Rare Diseases

The purpose of this PA is to encourage new exploratory and developmental research to understand, treat, and prevent rare diseases in areas of heart, lung, and blood diseases and sleep disorders. The R21 awards will enable investigators to test innovative ideas without the need for substantial preliminary data.

Overweight and Obesity Control at Worksites

The purpose of this RFA is to assess the effectiveness of worksite interventions for preventing or controlling overweight and obesity in adults. Environmental approaches include programs and policies that increase physical activity during and after work hours and that improve diet by offering healthier, lower-calorie foods in cafeterias and vending machines. The study population will consist of employees of varying socioeconomic status and from diverse racial/ethnic groups.

Trans-NIH Initiative Being Renewed

Immune Tolerance: Innovative Grants

The purpose of this renewal is to support high-risk, novel, or speculative research on molecular mechanisms and applications of antigen-specific immune tolerance. Scientists will investigate selective long-term inactivation of immune responses—a promising approach for the treatment of allergies, asthma, autoimmune diseases, and transplant rejection.

New Initiatives

Career Enhancement Award for Stem Cell Research

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

Progression of Cardiovascular Disease in Type 1 Diabetes

The purpose of this RFA is to elucidate the mechanisms involved in the development of accelerated CVD in type 1 diabetes. Areas of interest include the vascular wall, endothelial dysfunction, and the role of inflammation and the immune system in the onset and progression of cardiovascular complications in type 1 diabetes.

Interagency

New Initiatives

Cellular and Molecular Imaging of the Cardiovascular, Pulmonary, and Hematopoietic Systems

The purpose of this RFA is to develop in vivo molecular and cellular imaging methods to image the cardiovascular, pulmonary, and hematopoietic systems. Specifically, the goals are to detect and quantify the cellular pathways that regulate heart, lung, and blood function and the abnormalities in these pathways that lead to disease and to develop methods for cell tracking to monitor the movement and location of specific cell populations in vivo for application in cell-based therapeutics.

Clinical Research Consortium To Improve Resuscitation Outcomes

The purpose of this RFA is to establish a clinical research consortium to conduct collaborative trials that will facilitate the rapid translation of promising scientific and clinical advances to improve resuscitation outcomes in patients who experience cardiopulmonary or traumatic arrest leading to cardiopulmonary collapse.

Exploratory/Developmental Bioengineering Research Grants

The purpose of this PA is to encourage high-risk, high-impact bioengineering research in new areas that lack preliminary testing or development and fall within the purview of the NHLBI.

Hypovolemic Circulatory Collapse: Mechanisms and Opportunities To Improve Resuscitation Outcomes

The purpose of this RFA is to improve resuscitation outcomes from severe blood volume loss (hypovolemia) and subsequent irreversible and fatal circulatory collapse. Research will focus on identifying the molecular, cellular, and pathophysiologic response of the whole organism to hypovolemia and translating research findings into innovative approaches for out-of-hospital resuscitation following severe trauma and hemorrhage.

Human Embryonic Stem Cell Research Resource Infrastructure Enhancement Award

The purpose of this PA is to enhance the availability of human embryonic stem cells (hESC) for preclinical investigations. Studies will address the expansion, testing, quality assurance, cryopreservation, and distribution of the existing hESC lines that are registered in the NIH Human Embryonic Stem Cell Registry and approved for Federal Government-supported research.

Inflammation and Thrombosis

The purpose of this RFA is to identify molecular targets and develop new therapeutic agents for better management of thrombotic disorders such as heart attack, stroke, deep vein thrombosis, and pulmonary embolism. Research will focus on molecular and cellular interactions between the hemostatic and inflammatory systems to identify novel therapeutic agents for preclinical studies.

6. Institute Public Advisory Committees

National Heart, Lung, and Blood Advisory Council

Structure

Chair: Barbara M. Alving, MD, Acting Director, NHLBI

Executive Secretary: Deborah P. Beebe, PhD, Director, Division of Extramural Affairs, NHLBI, National Institutes of Health, Bethesda, MD 20892; 301-435-0260

The Secretary of Health and Human Services (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, and methods of diagnosis and treatment of diseases and resources within the purview of the Institute. As stated in its charter, 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 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 2501 of the Public Health Service Act.

Meetings

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

National Heart, Lung, and Blood Advisory Council Membership

Current as of October 2004. 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>

Barbara M. Alving, MD
Chair
National Heart, Lung, and Blood Institute

Melissa A. Austin, PhD (2004)
University of Washington

Gordon R. Bernard, MD (2006)
Vanderbilt University School of Medicine

Roberto Bolli, MD (2007)
University of Louisville

Richard C. Boucher, Jr., MD (2007)
University of North Carolina at Chapel Hill

Carolyn Sue Byrnes (2004)
LAM Foundation

Maria R. Costanzo, MD (2006)
Edward Cardiovascular Institute

Mary H. Deer, R.N. (2007)
National Indian Women's Health Resource Center

Jeffrey M. Drazen, MD (2004)
New England Journal of Medicine

Kim A. Eagle, MD (2006)
University of Michigan

Frances C. Henderson, EdD (2006)
Alcorn State University

Robert F. Lemanske, Jr., MD (2007)
University of Wisconsin Hospital

Robert J. Mason, MD (2005)
University of Colorado

Jane W. Newburger, MD (2005)
Children's Hospital Boston

Ngai X. Nguyen, MD (2006)
Private Practitioner

Ananda S. Prasad, MD, PhD (2004)
Wayne State University

George Thomas, MD (2005)
Bradenton Cardiology Center

Pearl T. Toy, MD (2004)
University of California, San Francisco

Linda V. Van Horn, PhD (2005)
Northwestern University Medical School

Ex Officio Members

Arn H. Eliasson, MD
Walter Reed Army Medical Center

Robert C. Jesse, MD
McGuire Veterans Affairs Medical Center

Tommy G. Thompson
Department of Health and Human Services

Elias A. Zerhouni, Jr., MD
National Institutes of Health

Program Advisory and Review Committee

Sickle Cell Disease Advisory Committee

Chair: Theodore Wun, MD, University of California, Davis Cancer Center

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

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

Membership (current as of October 2004)

Gilda A. Barabino, PhD (2004)
Northeastern University

Oswaldo Castro, MD (2004)
Howard University

Michael R. DeBaun, MD (2007)
Washington University School of Medicine

Paul S. Frenette, MD (2007)
Mount Sinai Medical Center

Johnson Haynes, Jr., MD (2007)
University of South Alabama College of Medicine

J. Hoxi Jones (2004)
Texas Department of Human Services

Dorothy Moore, MD (2007)
University of Medicine and Dentistry of New Jersey

Russell E. Ware, MD (2006)
Duke University Medical Center

Ex Officio Members

Joseph Desimone, PhD
Department of Veterans Administration, Chicago

William H. Hannon, PhD
Centers for Disease Control and Prevention

Marie Y. Mann, MD
Health Resources and Services Administration

Robert L. Sheffler, MD
Brooke Army Medical Center

Elias A. Zerhouni, Jr., MD
National Institutes of Health

Sleep Disorders Research Advisory Board

Chair: Stuart F. Quan, MD, University of Arizona College of Medicine

Executive Secretary: Carl E. Hunt, MD, Director, National Center on Sleep Disorders Research, NHLBI, National Institutes of Health, Bethesda, MD 20892; 301-435-0199

The Sleep Disorders Research Advisory Board advises the Directors of the NIH, the NHLBI, and the National Center on Sleep Disorders Research 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 (current as of October 2004)

Sarah J. Caddick, PhD (2005)
Wadsworth Foundation

Sheila C. Connolly, R.N. (2007)
Restless Legs Syndrome Foundation

Elizabeth M. Johns (2008)
Patient Advocate for Sleep-Disordered Breathing

Kathryn A. Lee, PhD (2006)
University of California, San Francisco

Rafael Pelayo, MD (2006)
Stanford University

Gina R. Poe, PhD (2007)
University of Michigan Medical Center

Susan Redline, MD (2006)
Case Western Reserve University

Clifford B. Saper, MD, PhD (2005)
Harvard Medical School

Michael J. Sateia, MD (2006)
Dartmouth Medical School

Michael H. Smolensky, PhD (2008)
University of Texas

Lorraine L. Wearley, PhD (2007)
Johnson & Johnson

Ex Officio Members

Barbara M. Alving, MD
NHLBI, National Institutes of Health

Cristina Beato, MD
Department of Health and Human Services

Colonel Gregory Belenky, MD
Walter Reed Army Institute of Research

Robert W. Greene, MD, PhD
Veterans Administration Medical Center

Carl E. Hunt, MD
NCSDR, National Institutes of Health

Israel Lederhendler, PhD
NIMH, National Institutes of Health

Merrill M. Mitler, PhD
NINDS, National Institutes of Health

Andrew Monjan, PhD, MPH
NIA, National Institutes of Health

Marian Willinger, PhD
NICHD, National Institutes of Health

Elias A. Zerhouni, Jr., MD
National Institutes of Health

Heart, Lung, and Blood Initial Review Group

Scientific Review Administrator: Jeffery H. Hurst, PhD, Health Science Administrator,
Division of Extramural Affairs, 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 two subcommittees: the Heart, Lung, and Blood Program Project Review Committee and the Clinical Trials Review Committee.

Heart, Lung, and Blood Program Project Review Committee

Chair: Joe G. Garcia, MD, The Johns Hopkins University

Scientific Review Administrator: Jeffery H. Hurst, PhD, Health Scientist Administrator,
Division of Extramural Affairs, 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 (current as of October 2004)

Louis J. Dell'Italia, MD (2008)
University of Alabama

Jeffrey J. Fredberg, PhD (2006)
Harvard University

Kathy K. Griendling, PhD (2008)
Emory University

Joseph R. Haywood, PhD (2007)
Michigan State University

Cheryl A. Hillery, MD (2005)
The Blood Center of Southeastern Wisconsin

Timothy T. Hla, PhD (2008)
University of Connecticut School of Medicine

K. J. Koa, MD, PhD (2005)
Synpac North Carolina

Renee C. LeBoeuf, PhD (2007)
University of Washington

Brooke T. Mossman, PhD (2006)
University of Vermont

Jose M. Ordovas, PhD (2007)
Tufts University

Donna Przepiorka, MD, PhD (2007)
University of Tennessee

Howard A. Rockman, MD (2008)
Duke University Medical Center

Roy L. Silverstein, MD (2006)
Cornell University

Julian Solway, MD (2006)
University of Chicago

Kurt R. Stenmark, MD (2005)

University of Colorado Health Sciences Center

Michiko Watanabe, PhD (2006)
Case Western Reserve University

Clinical Trials Review Committee

Chair: James E. Fish, MD, Aventis Pharmaceuticals

Scientific Review Administrator: Patricia A. Haggerty, PhD, Health Science Administrator,
Division of Extramural Affairs, NHLBI, National Institutes of Health, Bethesda, MD 20892;
301-435-0288

The Clinical Trials Review Committee provides initial technical merit review for the National Heart, Lung, and Blood Advisory Council 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 (current as of October 2004)

Shelly L. Carter, Sc.D. (2006)
The EMMES Corporation

John E. Connett, PhD (2007)
University of Minnesota

Robert M. Elashoff, PhD (2007)
University of California, Los Angeles

John M. Fontaine, MD (2005)
Hahnemann University

Judith S. Hochman, MD (2006)
Columbia University

Marilyn J. Manco-Johnson, MD (2005)
University of Colorado Health Sciences Center

Ileana L. Pina, MD (2007)
Case Western Reserve University

Lynda H. Powell, PhD (2007)
Rush-Presbyterian-St. Luke's Medical Center

David M. Reboussin, PhD (2006)
Wake Forest University School of Medicine

Marilyn J. Telen, MD (2005)
Duke University Medical Center

National Heart, Lung, and Blood Institute Special Emphasis Panel

The Institute has established the NHLBI 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: Pamela B. Davis, MD, Case Western Reserve University

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

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

Membership (current as of October 2004)

Ivor J. Benjamin, MD (2007)
University of Utah Health Sciences Center

Nancy Berliner, MD (2007)
Yale University

Nelson J. Chao, MD (2006)
Duke University Medical Center

Kevin J. Foskett, PhD (2005)
University of Pennsylvania

Sally E. Wenzel-Morganroth, MD (2007)
National Jewish and Medical Research Center

Edwin W. Taylor (2008)
University of Chicago

Stephen G. Young, MD (2005)
University of California, San Francisco

7. Fiscal Year 2004 Budget Overview

NHLBI Obligations by Funding Mechanism: Fiscal Year 2004

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Total NHLBI Budget
Research Project Grants (includes \$71,530 for Small Business Innovation Research (SBIR) Grants/Small Business Technology Transfer Grants (STTR).)	\$2,003,769	69.5%
SCORs/SCCORs	116,945	4.1
Sickle Cell Centers	21,010	0.7
Centers for AIDS Research	2,645	0.1
Other Research Grants	112,785	3.9
Research Careers Programs (Research Career Programs are a subset of Other Research Grants and are not added as a distinct funding mechanism)	67,794	2.4
Training Programs	87,192	3.0
Research and Development Contracts	285,472	9.9
Intramural Laboratory and Clinical Research	164,244	5.7
Research Management and Support (excludes OD and DIR research contracts, which are included in R&D contracts)	88,539	3.1
Research Facilities Construction Grants	0	0
Total Obligations	\$2,882,601	100%

Note: Obligated dollars excludes funds provided by other agencies by means of a reimbursable agreement.

NHLBI Total Obligations by Budget Category

Program	Percent of Total NHLBI Budget
Heart and Vascular Diseases (includes Heart and Vascular Diseases and Epidemiology and Clinical Applications)	53.6%
Lung Diseases	18.9%
Blood Diseases and Resources	14.9%
Sleep Disorders Research	1.8%
Women's Health Initiative	2.0%
Intramural Laboratory and Clinical Research	5.7%
Research Management Support	3.1%

NHLBI Extramural Obligations by Program

Program	Percent of NHLBI Extramural Budget
Heart and Vascular Diseases (includes Heart and Vascular Diseases and Epidemiology and Clinical Applications)	58.8%
Lung Diseases	20.7%
Blood Diseases and Resources	16.3%
Sleep Disorders Research	2.0%
Women's Health Initiative	2.2%

NHLBI Extramural Obligations by Division

Program	Percent
Heart and Vascular Diseases (includes Heart and Vascular Diseases and Epidemiology and Clinical Applications)	43.7%
Epidemiology and Clinical Applications	11.5%
Lung Diseases	20.7%
Blood Diseases and Resources	16.3%
Sleep Disorders Research	2.0%
Women's Health Initiative	2.2%

For detailed data on FY 2004:

- 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 2004

Program	Obligated Dollars (Thousands)	Percent of NHLBI Extramural Budget
Heart and Vascular Diseases (includes Heart and Vascular Diseases and Epidemiology and Clinical Applications)	\$1,545,774	58.8%
Lung Diseases	544,066	20.7
Blood Diseases and Resources	429,219	16.3
Sleep Disorders Research	51,921	2.0
Women's Health Initiative	58,838	2.2
Total, Extramural Obligations	\$2,629,818	100%

NHLBI Heart and Vascular Diseases Program (includes Heart and Vascular Diseases only) Obligations by Funding Mechanism: Fiscal Year 2004

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Program Budget
Research Project Grants	\$1,007,940	81.1%
SCORs/SCCORs	49,818	4.0
Other Research Grants	35,306	2.8
Research Career Programs (Research Career Programs are a subset of Other Research Grants and are not added as a distinct funding mechanism)	24,045	1.9
Training Programs	43,501	3.5
Research and Development Contracts	105,961	8.5
Total, Heart and Vascular Diseases	\$1,242,526	100%

NHLBI Epidemiology and Clinical Applications Program Obligations by Funding Mechanism: Fiscal Year 2004

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Program Budget
Research Project Grants	\$205,425	67.7%
SCORs/SCCORs	0	0
Other Research Grants	11,069	3.7
Research Career Programs (Research Career Programs are a subset of Other Research Grants and are not added as a distinct funding mechanism)	9,634	3.2
Training Programs	5,671	1.9
Research and Development Contracts	81,083	26.7
Total, Epidemiology and Clinical Applications	\$303,248	100%

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

NHLBI Lung Diseases Program Obligations by Funding Mechanism: Fiscal Year 2004

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Program Budget
Research Project Grants	\$419,698	77.1%
SCORs/SCCORs	43,686	8.0
Other Research Grants	45,073	8.3
Research Career Programs (Research Career Programs are a subset of Other Research Grants and are not added as a distinct funding mechanism)	21,404	3.9
Training Programs	21,479	3.9
Research and Development Contracts	14,130	2.6
Total, Lung Diseases	\$544,066	100%

NHLBI Blood Diseases and Resources Program Obligations by Funding Mechanism: Fiscal Year 2004

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Program Budget
Research Project Grants	\$328,155	76.5%
SCORs/SCCORs	17,369	4.0
Sickle Cell Centers	21,010	4.9
Centers for AIDS Research	2,645	0.6
Other Research Grants	19,731	4.6
Research Career Programs (Research Career Programs are a subset of Other Research Grants and are not added as a distinct funding mechanism)	11,128	2.6
Training Programs	14,849	3.5
Research and Development Contracts	25,460	5.9
Total, Blood Diseases and Resources Program	\$429,219	100%

**National Center on Sleep Disorders Research Program Obligations by Budget Mechanism:
Fiscal Year 2004**

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Program Budget
Research Project Grants	\$42,551	82.0%
SCORs/SCCORs	6,072	11.7
Other Research Grants	1,606	3.1
Research Career Programs (Research Career Programs are a subset of Other Research Grants and are not added as a distinct funding mechanism)	1,583	3.0
Training Programs	1,692	3.3
Research and Development Contracts	0	0
Total, Sleep Disorders Research	\$51,921	100%

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

Women's Health Initiative Obligations by Funding Mechanism: Fiscal Year 2004

Funding Mechanism	Obligated Dollars (Thousands)	Percent of Program Budget
Research Project Grants	\$0	0%
SCORs/SCCORs	0	0
Other Research Grants	0	0
Research Career Programs (Research Career Programs are a subset of Other Research Grants and are not added as a distinct funding mechanism)	0	0
Training Programs	0	0
Research and Development Contracts	58,838	100
Total, Women's Health Initiative	\$58,838	100%

8. Long-Term Trends

Budget History of the NHLBI: Fiscal Years 1950-2004

Dollars (Thousands)

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation	Obligations	Cumulative Fiscal Year Obligations
1950	\$34,630	\$11,575	\$29,117	\$16,075	\$15,768	\$15,768
1951	8,800	8,800	9,400	9,400	8,497	24,265
1952	10,237	10,074	10,156	10,083	9,850	34,115
1953	9,779	9,623	12,000	12,000	11,398	45,513
1954	11,040	12,000	15,418	15,168	14,952	60,465
1955	14,570	16,168	17,168	16,668	16,595	77,060
1956	17,454	17,398	23,976	18,808	18,838	95,898
1957	22,106	25,106	33,396	33,396	32,392	128,290
1958	33,436	33,436	38,784	35,936	35,973	164,263
1959	34,820	36,212	49,529	45,613	45,468	209,731
1960	45,594	52,744	89,500	62,237	61,565	271,296
1961	63,162	71,762	125,166	86,900	86,239	357,535
1962	97,073	105,723	160,000	132,912	110,849	468,384
1963	126,898	143,398	149,498	147,398	120,597	588,981
1964	130,108	129,325	130,545	132,404	117,551	706,532
1965	125,640	124,521	125,171	124,824	124,412	830,944
1966	141,412	146,212	143,462	141,462	141,171	972,115
1967	148,407	154,770	164,770	164,770	164,342	1,136,457
1968	167,954	167,954	177,954	167,954	162,134	1,298,591
1969	169,735	164,120	172,120	166,928	161,834	1,460,425
1970	160,513	160,513	182,000	171,257	160,433	1,620,858
1971	171,747	178,479	203,479	194,901	194,826	1,815,684
1972	195,492	211,624	252,590	232,627	232,577	2,048,261
1973	255,280	300,000	350,000	300,000	255,722	2,303,983
1974	265,000	281,415	320,000	302,915	327,270	2,631,253
1975	309,299	321,196	330,000	327,996	327,953	2,959,206
1976	324,934	329,079	379,059	370,096	368,648	3,327,854
TQA	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

Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation	Obligations	Cumulative Fiscal Year Obligations
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	1,320,254B	1,355,866	1,351,422C	20,821,930
1997	1,320,555D	1,438,265	1,344,742D	1,432,529E	1,431,821	22,253,751
1998	1,467,189	1,513,004	1,531,898	1,531,061F	1,526,276	23,780,027
1999	1,709,328G	1,720,344	1,793,697	1,793,697F	1,788,008	25,568,035
2000	1,759,806	1,937,404	2,001,185	2,040,291F	2,027,286	27,595,321
2001	2,069,582	2,328,102	2,328,105	2,299,866H	2,298,035	29,893,356
2002	2,567,429	2,547,675	2,618,966	2,576,125I	2,569,794	32,463,150
2003	2,791,411	2,812,011	2,818,684	2,812,011J	2,793,681	35,256,831
2004	2,867,995	2,867,995	2,867,595	2,882,715K	2,882,601	38,139,432

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.

NHLBI Total Obligations by Budget Category: Fiscal Years 1994-2004

Current Dollars

Year	Total	Heart	Lung	Blood	Sleep Disorders Research	Women's Health Initiative	Intramural Research	Research Management and Support
1994	1227.90	651.7	238.7	227.4			101.7	58.4
1995	1314.90	668.9	243	244.6			98.9	59.5
1996	1351.50	693	262	224	16		102	55
1997	1431.70	738	273	243	19		104	55
1998	1526.30	795.6	281.7	257.5	22.3		111.6	57.6
1999	1788.00	898	346.2	266.1	31.2	63.1	119.5	63.9
2000	2298.00	1058	380.4	305.9	35.1	57.7	122.3	67.9
2001	2298.00	1186.0	444	364	37	59.2	133.7	73.5
2002	2569.80	1353.40	490.5	396	44.7	59.0	146.7	79.4
2003	2793.80	1475.6	541.1	419.3	49.4	63.2	157.8	87.3
2004	2882.80	1545.90	545.1	492.2	51.8	58.8	162.2	88.5

NHLBI Total Obligations by Budget Category: Fiscal Years 1994-2004

Constant 1994 Dollars

Year	Total	Heart	Lung	Blood	Sleep Disorders Research	Women's Health Initiative	Intramural Research	Research Management and Support
1994	1229.9	627.2	229.7	218.9	0	0	97.9	56.2
1995	1270.9	646.5	234.9	236.4	0	0	95.6	57.5
1996	1273.6	652.9	246.8	211.4	15	0	95.9	51.6
1997	1312.7	676.6	250.7	222.5	17.1	0	95.7	50.1
1998	1353.7	705.6	249.8	228.4	19.8	0	99	51.1
1999	1529.3	768.0	296.1	227.6	26.7	54	102.2	54.7
2000	1662.0	867.30	311.8	250.8	28.8	47.3	100.3	55.7
2001	1807.9	933.5	349.3	286.4	29.1	46.6	105.2	57.8
2002	1951.1	1027.6	372.4	286.4	29.1	46.6	105.2	60.3
2003	2026.9	1070.6	392.6	304.2	35.8	45.9	114.5	63.3
2004	2015.0	1808.6	383.3	300	36.3	41.1	114.8	61.9

NHLBI Total Obligations by Budget Category: Fiscal Years 1994-2004

Current Dollars (Millions)

Budget Category	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Extramural Research											
Heart	651.7	668.9	692.8	737.9	795.6	898.0	1,058.0	1,186.6	1,353.4	1,475.6	1545.9
Lung	238.7	243.0	261.9	273.4	281.7	346.2	380.4	444.0	490.5	541.1	544.1
Blood	227.4	244.6	224.3	242.7	257.5	266.1	305.9	364.0	396.0	419.3	429.2

Budget Category	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Sleep Disorders Research			15.9	18.7	22.3	31.2	35.1	37.0	44.7	49.4	51.9
Women's Health Initiative						63.1	57.7	59.2	59.0	63.2	58.8
Intramural Research	101.7	98.9	101.8	104.4	111.6	119.5	122.3	133.7	146.7	157.8	164.2
Research Management and Support	58.4	59.5	54.8	54.6	57.6	63.9	67.9	73.5	79.4	87.3	88.5
Total	1,277.9	1,314.9	1,351.5	1,431.7	1,526.3	1,788.0	2,027.3	2,298.0	2,569.8	2,793.7	2,882.6

NHLBI Total Obligations by Budget Category: Fiscal Years 1994-2004

Constant 1994 Dollars (Millions)

Budget Category	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Extramural Research											
Heart	627.2	622.2	628.7	651.3	679.4	739.1	835.0	898.9	989.3	1,045.8	1,080.6
Lung	229.7	226.0	237.7	241.3	240.6	284.9	300.2	336.4	358.6	383.5	380.3
Blood	218.9	227.5	203.5	214.2	219.9	219.0	241.4	275.8	289.5	297.2	300.0
Sleep Disorders Research			14.4	16.5	19.0	25.7	27.7	28.0	32.7	35.0	36.3
Women's Health Initiative						51.9	45.5	44.8	43.2	44.8	41.1
Intramural Research	97.9	92.0	92.4	92.1	95.3	98.4	96.5	101.3	107.2	111.8	114.8
Research Management and Support (RMS)	56.2	55.3	49.7	48.2	49.2	52.6	53.6	55.7	58.0	61.9	61.9
Total	1,229.9	1,223.0	1,226.4	1,263.6	1,303.4	1,471.6	1,599.9	1,740.9	1,878.5	1,980.0	2,015.0

This table is based on the Biomedical Research & Development Price Index (January 2003).

NHLBI Total Obligations by Budget Mechanism: Fiscal Years 1994-2004

Year	Research Grants	Research and Development (R&D) Contracts	Training Programs	Intramural Research and Research Management and Support
1994	951	118.3	48.3	160
1995	983	125.9	48	158
1996	1025	120.9	48.5	157
1997	1101	121.9	49.8	159
1998	1189.8	116.7	50.6	169.2
1999	1346.6	197.2	60.8	183.4

Year	Research Grants	Research and Development (R&D) Contracts	Training Programs	Intramural Research and Research Management and Support
2000	1570.5	201.3	65.4	190.1
2001	1796.5	220.1	73.7	207.3
2002	2006.2	258.3	79.2	226.1
2003	2172.3	290.5	85.8	245.1
2004	2257.3	285.5	87.1	252.7

NHLBI Total Obligations by Budget Mechanism: Fiscal Years 1994-2004

Current Dollars (Millions)

Funding Mechanism	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Research Grants (includes Research Career Programs)	951.2	982.6	1,025.4	1,100.9	1,189.8	1,346.6	1,570.5	1,796.9	2,006.2	2,172.3	2,257.3
Research and Development (R&D) Contracts	118.3	125.9	120.9	121.9	116.7	197.2	201.3	220.1	258.3	290.5	285.5
Training Programs	48.3	48.0	48.5	49.8	50.6	60.8	65.4	73.7	79.2	85.8	87.1
Intramural Research and Research Management and Support (excludes Office of the Director and DIR research contracts, which are included in R&D contracts)	160.1	158.4	156.6	159.1	169.2	183.4	190.1	207.3	226.1	245.1	252.7
Total	1,277.9	1,314.9	1,351.4	1,431.7	1,526.3	1,788.0	2,027.3	2,298.0	2,569.8	2,793.7	2,882.6

NHLBI Employment: Fiscal Years 1994-2004

Staff	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Full-time equivalents	854	822	834	829	840	847	865	868	880	880	861

NHLBI Institute-Initiated and Investigator-Initiated Awards: Fiscal Years 1994-2004

Percent of Extramural Funds

Year	Investigator-Initiated Grants (includes Research Career Programs)	Institute-Initiated Awards (Grants and R&D Contracts)
1994	63.9	31.7
1995	64.9	30.9
1996	68.9	27.2
1997	67.9	28.2
1998	71.3	25
1999	66.7	29.5

Year	Investigator-Initiated Grants (includes Research Career Programs)	Institute-Initiated Awards (Grants and R&D Contracts)
2000	67.6	28.9
2001	69.2	27.3
2002	67.6	29
2003	66.0	30.6
2004	67.9	28.8

NHLBI Grants and Research and Development Contracts as Subsets of Institute-Initiated Awards: Fiscal Years 1994-2004

Percent of Extramural Funds

Year	Institute-Initiated Awards (Grants and R&D Contracts)	Grants	R&D Contracts
1994	31.7	20.8	10.9
1995	31	20.1	10.9
1996	27.2	17.7	9.5
1997	28.2	18.6	9.6
1998	25	16.4	8.6
1999	29.5	17.2	12.3
2000	28.9	17.9	11
2001	27.3	16.8	10.5
2002	29	18	11
2003	30.6	19.2	11.4
2004	28.8	18	10.9

NHLBI Extramural Programs: Fiscal Years 1994-2004

Dollars (Millions)

Funding Mechanism	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Investigator-Initiated Awards											
Investigator-Initiated Grants (includes all R18s)	669.7	725.0	815.5	835.3	930.5	1,023.6	1,188.6	1,388.8	1,521.4	1,616.1	1,716.8
Research Career Programs	25.1	25.7	28.9	28.9	36.1	46.3	53.0	57.5	63.5	65.8	67.8
Subtotal, Investigator-Initiated Awards	694.8	750.7	844.4	864.2	966.6	1,069.9	1,241.6	1,446.3	1,584.9	1,681.9	1,784.6
Institute-Initiated Awards											
Institute-Initiated Grants (RFA)	226.4	231.9	216.8	236.8	223.2	276.7	328.9	350.7	421.3	490.4	472.5
Centers (Centers are a subset of Institute-Initiated Grants (RFAs), and are not added to the Institute-Initiated Awards subtotal as a distinct category)	101.5	107.0	87.5	87.7	114.4	119.9	123.8	127.2	128.2	138.9	140.6
R&D Contracts (RFP)	118.3	125.9	116.7	121.9	116.7	197.2	201.3	220.1	258.3	290.5	285.5
Subtotal, Institute-Initiated Awards	344.7	357.8	333.5	358.7	339.9	473.9	530.2	570.8	679.6	780.9	758.0
Training											
Individual Awards	7.2	7.1	7.3	6.8	7.6	9.2	8.9	8.9	9.5	8.6	8.8

Funding Mechanism	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Institutional Awards	40.0	40.0	40.2	42.0	42.0	50.3	55.2	63.4	69.7	75.5	76.6
Subtotal, Training (numbers do not add to subtotal because line-items exclude NIH assessments)	48.2	48.0	48.5	49.8	50.6	60.8	65.4	73.7	79.2	85.8	87.2
Total, Extramural	1,087.7	1,156.5	1,226.4	1,272.7	1,357.1	1,604.6	1,837.2	2,090.8	2,343.7	2,548.6	2,629.8

NHLBI Extramural Programs: Fiscal Years 1994-2004

Percent of Total Extramural Budget

Funding Mechanism	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Investigator-Initiated Awards											
Investigator-Initiated Grants (includes all R18s)	61.6%	62.7%	66.5%	65.6%	68.6%	63.8%	64.7%	66.4%	64.9%	63.4%	65.3%
Research Career Programs (K04, K06)	2.3	2.2	2.4	2.3	2.7	2.9	2.9	2.8	2.7	2.6	2.6
Subtotal, Investigator-Initiated Awards	63.9	64.9	68.9	67.9	71.2	66.7	67.6	69.2	67.6	66.0	67.9
Institute-Initiated Awards											
Institute-Initiated Grants (RFA)	20.8	20.1	17.7	18.6	16.4	17.2	17.9	16.8	18.0	19.2	18.0
Centers (Centers are a subset of Institute-Initiated Grants (RFAs), and are not added to the Institute-Initiated Awards subtotal as a distinct category)	9.3	9.3	7.1	6.9	8.4	7.5	6.7	6.1	5.5	5.5	5.3
R&D Contracts (RFP)	10.9	10.9	9.5	9.6	8.6	12.3	11.0	10.5	11.0	11.4	10.9
Subtotal, Institute-Initiated Awards	31.7	30.9	27.2	28.2	25.0	29.5	28.9	27.3	29.0	30.6	28.8
Training											
Individual Awards	0.7	0.6	0.6	0.5	0.6	0.6	0.5	0.4	0.4	0.4	0.3
Institutional Awards	3.7	3.5	3.3	3.3	3.1	3.1	3.0	3.0	3.0	3.0	2.9
Subtotal, Training (numbers do not add to subtotal because line items exclude NIH assessments)	4.4	4.2	4.0	3.9	3.7	3.8	3.6	3.5	3.4	3.4	3.3
Total, Extramural	100%										

NHLBI Extramural Research Funding Mechanism: Fiscal Years 1994-2004

Dollars (Millions)

Funding Mechanism	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Research Grants (includes Research Career Programs; does not include Centers)	849.7	875.7	918.7	992.3	1,075.4	1,226.7	1,446.7	1,669.8	1,878.0	2,033.4	2,116.6
Centers	101.5	107.0	106.7	108.7	114.4	119.9	123.8	127.2	128.2	138.9	140.63
R&D Contracts	118.3	125.9	120.9	121.9	116.7	197.2	201.3	220.1	258.3	290.5	285.5
Research Training	48.2	48.0	48.5	49.8	50.6	60.8	65.4	73.7	79.2	85.8	87.1
Total, Extramural	1,117.7	1,156.6	1,194.8	1,272.7	1,357.1	1,604.6	1,837.2	2,090.8	2,343.7	2,548.6	2,548.6

NHLBI Extramural Research Funding Mechanism: Fiscal Years 1994-2004

Percent of Total Extramural Budget

Funding Mechanism	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Research Grants (includes Research Career Programs; does not include Centers)	76.0%	75.7%	76.9%	78.0%	79.2%	76.4%	78.7%	79.9%	80.1%	79.8%	80.5%
Centers	9.1	9.3	8.9	8.5	8.4	7.5	6.7	6.1	5.5	5.5	5.3
R&D Contracts	10.6	10.9	10.1	9.6	8.6	12.3	11.0	10.5	11.0	11.4	10.9
Research Training	4.3	4.2	4.1	3.9	3.7	3.8	3.6	3.5	3.4	3.4	3.3
Total, Extramural	100%										

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

9. Research Grants

NHLBI Research Grants by Funding Mechanism: Fiscal Year 2004

	Number of Grants	Total Cost (Dollars in Thousands)	Percent of Total NHLBI Research Grant Dollars
Research Project Grants (RPGs)			
Research Project Grants (excluding Small Business RPGs)			
Regular Research Grants (R01)	3,572	\$1,328,958	58.88%
Small Research Grants (R03)	1	80	0.00
Program Project Grants (P01)	194	361,903	16.03
Cooperative Agreements (U01)	235	185,602	8.22
Area Grants (R15)	19	3,838	0.17
Explorative Developmental Grant (R21)	93	18,165	0.80
Method to Extend Research in Time (R37)	83	32,891	1.46
Exploratory/Developmental Grants Phase II (R33)	2	802	0.04
Subtotal, Research Project Grants (excluding Small Business RPGs)	4,199	1,932,239	85.60
Small Business Research Project Grants			
Small Business Technology Transfer (STTR Phase I) (R41)	37	5,142	0.23
Small Business Technology Transfer (STTR Phase II) (R42)	8	2,761	0.12
Small Business Innovation Research (SBIR Phase I) (R43)	115	15,239	0.68
Small Business Innovation Research (SBIR Phase II) (R44)	115	48,388	2.14
Subtotal, Small Business Research Project Grants	275	71,530	3.17
Subtotal, Research Project Grants	4,474	2,003,769	88.77
Research Center Grants			
Specialized Centers of Research (SCOR)	58	115,304	5.11
Animal Model and Animal and Biological Material Resource Grants (P40)	0	125	0.01
Sickle Cell Centers (U54)	11	21,010	0.93
Center for AIDS Research (P30)	0	2,646	0.12
Specialized Centers (Cooperative Agreements) (U54)	1	1,215	0.05
National Swine Research and Resource Center (U42)	0	300	0.01
Subtotal, Research Center Grants	70	140,600	6.23
Research Career Programs			
Mentored Research Development Award for Minority Faculty (K01)	46	6,150	0.27
Minority Institution Faculty Mentored Research Scientist Award (K01)	6	867	0.04
Mentored Scientist Development Award in Research Ethics (K01)	2	253	0.01
Independent Scientist Award (K02)	31	3,079	0.14
Research Career Award (K06)	1	34	0.00
Nutrition Academic Award (K07)	9	1,516	0.07
Cultural Competence and Health Disparities Academic Award (K07)	8	925	0.04
Clinical Investigator Scientist Award (K08)	229	29,037	1.29
Career Enhancement Award for Stem Cell Research (K18)	5	980	0.04

	Number of Grants	Total Cost (Dollars in Thousands)	Percent of Total NHLBI Research Grant Dollars
Mentored Patient-Oriented Research Career Development Award (K23)	122	16,216	0.72
Midcareer Investigator Award in Patient-Oriented Research (K24)	32	3,815	0.17
Mentored Quantitative Research Career Development Award (K25)	12	1,622	0.07
Clinical Research Curriculum Award (K30)	55	3,115	0.14
Career Transition Award (K22)	1	185	0.01
Subtotal, Research Career Programs	559	67,794	3.01
Other Research Grants			
Cooperative Clinical Research (U10, R10)	26	20,565	0.91
Minority Biomedical Research Support (S06, S14, R25)	0	2,806	0.12
Other (R09, R13, R18, R24, R25, T15, U09, U24, UH1)	64	21,620	0.96
Subtotal, Other Research Grants	90	44,991	1.99
Total, NHLBI Research Grants	5,193	\$2,257,154	100%

NHLBI Total Research Grants by Category

Percent

Research Project Grants	88.8
Research Centers Grants	6.2
Research Career Programs	3.03
Other Research Grants	2

NHLBI Research Project Grant,* Research Centers Grant, and Other Research Grant Obligations: Fiscal Years 1994-2004

Dollars (Thousands)

	Fiscal Year										
	1994	1995	1996***	1997	1998	1999	2000	2001	2002	2003	2004
Research Project Grants*	\$797,092	\$819,674	\$862,027	\$935,322	\$1,009,152	\$1,142,473	\$1,356,034	\$1,580,751	\$1,779,573	\$1,920,201	\$2,003,769
Research Centers Grants	101,535	106,980	106,688	108,665	114,397	119,889	123,803	127,232	128,161	138,941	140,600
Other Research Grants**	52,576	55,974	56,692	56,993	66,234	84,219	90,666	88,958	98,460	113,172	112,785
Total	\$951,203	\$982,628	\$1,025,407***	\$1,100,980	\$1,189,783	\$1,346,581	\$1,570,503	\$1,796,941	\$2,006,194	\$2,172,314	\$2,257,154

* Includes R01, U01, P01, R29, R37, R43, and R44; R03 and R41 beginning in 1994; R55 in 1995-1996; R15 and R42 beginning in 1996; R21 beginning in 1997; and R33 beginning in 2001.

** Includes Program Evaluation and IMPAC II Assessment of \$4,435,000.

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

NHLBI Competing Research Project Grant Applications*: Fiscal Years 1994-2004

Total Cost Dollars (Millions)

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004**
Applications Reviewed	\$715.0	\$710.3	\$699.2	\$802.1	\$687.1	\$867.1	\$809.8	\$851.7	\$1,221.7	\$1,262.5	\$1,277.6
Awarded	180.4	207.5	182.1	240.1	252.4	330.4	418.4	424.3	437.4	463.7	477.3

* Includes R01, R03, U01, P01, and R37; R29 in 1994-2002; R55 in 1995-1996; R15 beginning in 1996; R21 beginning in 1997; and R33 beginning in 2001.

** The number for applications reviewed is based on preliminary data.

NHLBI Competing Research Project Grant Applications*: Fiscal Years 1994-2004

Number Reviewed and Awarded and Percent Funded

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004**
Applications Reviewed	2,801	2,744	2,605	2,771	2,657	2,704	2,893	2,895	3,064	3,098	3,548
RPGs Awarded	655	740	652	821	837	959	1,003	1,033	1,018	1,064	1,034
Success Rate (percent)	23.4	27.0	25.0	29.6	31.5	35.5	34.7	35.7	33.2	34.3	29.1

* Includes R01, R03, U01, P01, and R37; R29 in 1994-2002; R55 in 1995-1996; R15 beginning in 1996; R21 beginning in 1997; and R33 beginning in 2001.

** The number for applications reviewed is based on preliminary data.

Percent of Reviewed Applications Funded (Success Rate)

Year	Awarded
1994	23.4
1995	27
1996	25
1997	29.6
1998	31.5
1999	35.5
2000	34.7
2001	35.7
2002	33.2
2003	34.3
2004	29.1

NHLBI Investigator-Initiated and Institute-Initiated Grant Obligations: Fiscal Years 1994-2004

Dollars (Millions)

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Investigator-Initiated (includes R01, U01, P01, R29, R37, R43, and R44; R03 and R41 beginning in 1994; R55 in 1995-1996; R15 and R42 beginning in 1996; R21 beginning in 1997; and R33 beginning in 2001)	\$724.8	\$750.7	\$804.1	\$867.9	\$966.6	\$1,069.9	\$1,241.6	\$1,446.2	\$1,584.9	\$1,681.9	\$1,773.4
Institute-Initiated (includes Centers Grants and Cooperative Agreement RFAs)	226.4	231.9	216.8	233.0	223.2	276.7	328.9	350.7	421.3	490.4	438.8
Total	\$951.2	\$982.6	\$1,020.9*	\$1,100.9	\$1,189.8	\$1,346.6	\$1,570.5	\$1,796.9	\$2,006.2	\$2,172.3	\$2,257.2

* Excludes Program Evaluation Assessment of \$4,435,000.

NHLBI Research Project Grants*: Amount Funded by Type of Award, Fiscal Years 1994-2004

Dollars (Millions)

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Competing											
New Competing	\$99.7	\$111.1	\$90.5	\$135.8	\$147.5	\$202.0	\$266.4	\$280.0	\$291.2	\$285.5	\$290.5
Renewal Competing	79.6	94.5	90.4	104.0	103.9	127.2	152.0	143.9	143.9	177.2	185.5
Competing Supplements	1.1	1.9	1.2	0.3	1.0	1.2	0.9	0.4	2.3	1.0	1.3
Subtotal, Competing	180.4	207.5	182.1	240.1	252.4	330.4	419.3	424.3	437.4	463.7	477.3
Noncompeting											
Subtotal, Noncompeting	599.9	588.4	649.9	662.4	721.3	770.6	889.3	1,101.5	1,281.3	1,390.3	1,454.9
Total, Competing and Noncompeting	\$780.3	\$795.9	\$832.0	\$902.5	\$973.7	\$1,101.0	\$1,308.6	\$1,525.8	\$1,718.7	\$1,854.0	\$1,932.2

* Includes R01, U01, P01, R29, and R37; R03 beginning in 1994; R55 in 1995-1996; R15 beginning in 1996; R21 beginning in 1997; and R33 beginning in 2001.

Facility and Administrative (F&A)* Costs of NHLBI Research Project Grants***: Fiscal Years 1994-2004

Dollars (Thousands)

Fiscal Year	Direct Cost	F&A Cost*	Total Cost	F&A Cost as a Percent of Direct Cost
1994	534,374	245,965	780,339	46.0
1995	543,502	252,423	795,925	46.4
1996	564,219	267,785	832,004	47.5
1997	611,576	290,915	902,491	47.6

Fiscal Year	Direct Cost	F&A Cost*	Total Cost	F&A Cost as a Percent of Direct Cost
1998	660,009	313,765	973,774	47.5
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	1,385,567	618,202	2,003,769	44.6

* Previously called Indirect Cost.

** Includes R01, U01, P01, R29, and R37; R03 beginning in 1994; R55 in 1995-1996; R15 beginning in 1996; R21 beginning in 1997; and R33 beginning in 2001.

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

NHLBI Research Project Grants*: Average Costs, Fiscal Years 1994-2004

Dollars (Thousands)

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Noncompeting	\$294.8	\$312.8	\$317.5	\$323.0	\$322.6	\$323.4	\$346.6	\$390.7	\$418.8	\$444.4	\$458.7
Competing	275.5	280.4	279.3	292.5	301.6	344.5	418.0	410.8	409.1	406.7	419.7
Total	\$290.1	\$303.7	\$308.3	\$314.2	\$316.9	\$329.4	\$366.6	\$396.1	\$416.2	\$433.8	\$447.9

* Includes R01, U01, P01, R29, R37, R43, and R44; R03 and R41 beginning in 1994; R55 in 1995-1996; R15 and R42 beginning in 1996; R21 beginning in 1997; and R33 beginning in 2001.

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 2004	Total FY 2004 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
A CHF Trial Investigating Outcomes of Exercise (ACTION)	\$17,071,082	\$7,973,471	\$25,044,553
Atherosclerosis, Plaque, and CVD in Communities	0	4,099,685	4,099,685
Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics (BARI 2D)	27,288,936	8,265,037	35,553,973
Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL)	0	4,343,389	4,343,389
Center for Fetal Monkey Gene Transfer for Heart, Lung, and Blood Diseases	1,857,162	969,939	2,827,101
Dynamic Evaluation of Percutaneous Coronary Intervention	3,971,722	742,499	4,714,221
Family Blood Pressure Program	76,405,079	8,433,080	84,838,159
Family Heart Study-Subclinical Atherosclerosis Network (FHS-SCAN)	8,864,463	1,696,913	10,561,376
Genetics of Coronary Artery Disease in Alaskan Natives (GOCADAN)	7,218,810	652,865	7,871,675
Girls Health Enrichment Multisite Studies (GEMS)	12,698,544	2,399,948	15,098,492
Hematocrit Strategy in Infant Heart Surgery	2,215,845	492,411	2,708,256
Home Automatic External Defibrillator Trial (HAT)	8,999,887	4,263,755	13,263,642
IMMEDIATE Trial: Immediate Myocardial Metabolic Enhancement During Initial Assessment and Treatment in Emergency Care	0	5,170,411	5,170,411
Interaction of Genes and Environment in Shaping Risk Factors for Heart, Lung, Blood, and Sleep Disorders	25,116,214	10,409,084	35,525,298
Multidisciplinary Study of Right Ventricular Dysplasia	4,778,935	1,473,384	6,252,319
Partnership Programs To Reduce Cardiovascular Health Disparities	0	6,468,544	6,468,544
Pediatric Cardiovascular Clinical Research Network	13,650,229	4,947,982	18,598,211
Pharmacogenetics Research Network	25,021,286	8,185,611	33,206,897
Preventing Overweight Using Novel Dietary Strategies (POUNDS LOST)	1,211,724	1,687,588	2,899,312
Programs of Excellence in Gene Therapy	49,160,962	11,979,088	61,140,050
Programs of Genomic Applications (PGAs) for Heart, Lung, and Blood Diseases	147,177,847	18,604,345	165,782,192
Resuscitation Outcome Improvement Consortium	0	6,886,109	6,886,109
Stop Atherosclerosis in Native Diabetics Study (SANDS)	4,574,684	2,106,653	6,681,337
Strong Heart Study	43,283,445	3,154,859	46,438,304
Surgical Treatment for Ischemic Heart Failure (STICH)	12,251,409	1,613,238	13,864,647
Trial of Activity for Adolescent Girls (TAAG)	21,853,035	6,349,902	28,202,937
Weight Loss Maintenance (WLM)	3,686,738	4,367,750	8,054,488
Women's Ischemia Syndrome Evaluation (WISE)	4,314,911	1,302,449	5,617,360
Subtotal, Heart and Vascular Diseases	522,672,949	139,039,989	661,712,938
Lung Diseases			
Asthma Clinical Research Network (ACRN), Phase II	8,181,429	8,424,129	16,605,558
Centers for Reducing Asthma Disparities	12,051,824	5,217,367	17,269,191

	Total Obligations Prior to FY 2004	Total FY 2004 Obligations	Total Obligations to Date
Childhood Asthma Management Program-Continuation Study (CAMP-CS)/Phase 2	1,489,491	2,043,311	3,532,802
Childhood Asthma Research and Education (CARE) Network	26,106,032	5,292,305	31,398,337
Collaborative Programs in Bronchopulmonary Dysplasia	21,135,687	5,166,906	26,302,593
COPD Clinical Research Network	6,843,405	6,848,345	13,691,750
Early Antipseudomonal Therapy in Cystic Fibrosis	0	1,064,237	1,064,237
Inhaled Nitric Oxide for the Prevention of Chronic Lung Disease	6,968,259	1,245,274	8,213,533
Inhaled Nitric Oxide in Prevention of Chronic Lung Disease	6,732,859	903,335	7,636,194
Linkage Study in Familial Pulmonary Fibrosis	2,755,951	714,001	3,469,952
Pharmacogenetics of Asthma Treatment	10,847,376	0	10,847,376
Subtotal, Lung Diseases	103,112,313	36,919,210	140,031,523
Blood Diseases and Resources			
Blood and Marrow Transplant Clinical Research Network	\$17,209,287	\$5,972,521	\$23,181,808
Functional Outcomes in Cardiovascular Patients Undergoing Surgical Hip Fracture Repair (FOCUS)	1,639,478	1,795,724	3,435,202
Induction of Stable Chimerism for Sickle Cell Anemia	1,541,037	550,666	2,091,703
Reference Laboratory to Evaluate Therapies for Sickle Cell Disease	1,437,153	409,694	1,846,847
Sibling Donor Cord Blood Banking and Transplantation	3,731,256	1,352,571	5,083,827
Stroke Prevention in Sickle Cell Anemia (STOP 2)	13,147,352	2,366,346	15,513,698
Thalassemia (Cooley's Anemia) Clinical Research Network	8,999,883	2,374,805	11,374,688
Transfusion Medicine/Hemostasis Clinical Research Network	12,293,630	6,092,846	18,386,476
Subtotal, Blood Diseases and Resources	59,999,076	20,915,173	80,914,249
National Center on Sleep Disorders Research			
Apnea Positive Pressure Long-Term Efficacy Study (APPLES)	6,244,439	3,109,570	9,354,009
Sleep Heart Health Study	16,631,681	1,477,676	18,109,357
Subtotal, National Center on Sleep Disorders Research	22,876,120	4,587,246	27,463,366
Total, NHLBI Cooperative Agreements	\$708,660,458	\$201,461,618	\$910,122,076

Heart and Vascular Diseases Program

A CHF Trial Investigating Outcomes of Exercise (ACTION), Initiated in Fiscal Year 2002

The purpose of this trial is to determine the long-term safety and effectiveness of exercise training for patients with heart failure. Patients receiving the exercise regimen also will receive standard care and will be compared with patients receiving standard care alone.

Obligations

Funding History:

Fiscal Year 2004—\$7,973,471

Fiscal Years 2002-2003—\$17,071,082

Total Funding to Date—\$25,044,553

Current Active Organizations and Grant Numbers

1. Duke University
Durham, North Carolina —HL-063747
2. Case Western Reserve University Henry Ford Health System
Detroit, Michigan —HL-064250
3. Oregon Health & Science
University Portland, Oregon —HL-064257
4. Washington University
St. Louis, Missouri —HL-064264
5. University of Colorado Health Sciences Center
Denver, Colorado —HL-064265
6. Duke University
Durham, North Carolina —HL-066461
7. Emory University
Atlanta, Georgia —HL-066482
8. Wake Forest University Winston-Salem,
North Carolina —HL-066491
9. Ohio State University
Columbus, Ohio —HL-066494
10. University of Alabama at Birmingham
Birmingham, Alabama —HL-066497
11. Case Western Reserve
University Cleveland, Ohio —HL-066501
12. Boston Medical Center
Boston, Massachusetts —HL-068973
13. University of California, Los Angeles
Los Angeles, California —HL-068980

Atherosclerosis, Plaque, and CVD in Communities, Initiated in Fiscal Year 2004

The purpose of this study is to identify correlates of atherosclerotic plaque characteristics and early changes in the vascular wall in a subset of the bi-ethnic Atherosclerosis Risk in

Communities (ARIC) cohort. Investigators will use stored DNA samples to test genomic correlates of plaque characteristics and their ability to predict coronary heart disease and stroke.

Obligations

Funding History:

Fiscal Year 2004—\$4,099,685

Total Funding to Date—\$4,099,685

Current Active Organizations and Grant Numbers

1. University of Texas Health Science Center
Houston, Texas —HL-075572

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 Type 2 diabetic patients with angiographically proven coronary artery disease and stable angina or ischemia. Revascularization combined with aggressive medical anti-ischemia treatment will be compared to aggressive medical anti-ischemia treatment alone; simultaneously, researchers will determine whether insulin-sensitizing drugs like metformin and the glitazones for controlling blood sugar levels offer any survival advantage over drugs that increase insulin levels. Twenty percent of the patients are from minority populations.

Obligations

Funding History:

Fiscal Year 2004—\$8,265,037

Fiscal Years 2000-2003—\$27,288,936

Total Funding to Date—\$35,553,973

Current Active Organizations and Grant Numbers

1. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-061744
2. St. Louis University
St. Louis, Missouri —HL-061746
3. Stanford University
Stanford, California —HL-061748
4. University of Vermont
Burlington, Vermont —HL-063804

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

The purpose of this study is to determine whether revascularization of a stenotic renal artery plus medical therapy is associated with improved clinical outcomes compared with medical therapy alone. Thirty percent of the participants will be black.

Obligations

Funding History:

Fiscal Year 2004—\$4,343,389

Total Funding to Date—\$4,343,389

Current Active Organizations and Grant Numbers

1. Medical College of Ohio
Toledo, Ohio —HL-071556
2. University of Minnesota,
Twin Cities Minneapolis, Minnesota —HL-072734
3. University of Virginia
Charlottesville, Virginia —HL-072735
4. Beth Israel Deaconess Medical Center
Boston, Massachusetts —HL-072736
5. Brigham and Women's Hospital
Boston, Massachusetts —HL-072737

Center for Fetal Monkey Gene Transfer for Heart, Lung, and Blood Diseases, Initiated in Fiscal Year 2001

The purpose of this Center is to provide expertise, sources, and resources to NHLBI-supported investigators who wish to evaluate viral and nonviral gene transfer strategies in nonhuman primates.

Obligations

Funding History:

Fiscal Year 2004—\$969,939

Fiscal Years 2001-2003—\$1,857,162

Total Funding to Date—\$2,827,101

Current Active Organization and Grant Number

1. University of California,
Davis Davis, California —HL-069748

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 2004—\$742,499

Fiscal Years 1997-2003—\$3,971,722

Total Funding to Date—\$4,714,221

Current Active Organization and Grant Number

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

Family Blood Pressure Program, Initiated in Fiscal Year 1995

The objectives of this program are to identify major genes associated with high blood pressure and to investigate the interactions between genetic and environmental determinants of hypertension in defined populations, many of which consist of specific minority groups. The study consists of collaborative networks that share technology, data, skills, biological materials, and population resources.

Obligations

Funding History:

Fiscal Year 2004—\$8,433,080

Fiscal Years 1995-2003—\$76,405,079

Total Funding to Date—\$84,838,159

Current Active Organizations and Grant Numbers

1. University of Michigan at Ann Arbor
Ann Arbor, Michigan —HL-054457
2. University of Mississippi Medical Center
Jackson, Mississippi —HL-054463
3. Mayo Foundation
Rochester, Minnesota —HL-054464
4. The Johns Hopkins University
Baltimore, Maryland —HL-054466

5. University of Utah
Salt Lake City, Utah —HL-054471
6. University of Minnesota,
Twin Cities Minneapolis, Minnesota —HL-054472
7. Washington University
St. Louis, Missouri —HL-054473
8. University of Texas Health Science Center
Houston, Texas —HL-054481
9. Loyola University Medical Center
Maywood, Illinois —HL-054485
10. University of Alabama at Birmingham
Birmingham, Alabama —HL-054495
11. University of Minnesota,
Twin Cities Minneapolis, Minnesota —HL-054496
12. Boston University
Boston, Massachusetts —HL-054497
13. Staub Pacific Health Foundation Health Research Institute
Honolulu, Hawaii —HL-054498
14. University of Texas Health Science Center
Houston, Texas —HL-054504
15. Medical College of Wisconsin
Milwaukee, Wisconsin —HL-054508
16. University of North Carolina at Chapel Hill
Chapel Hill, North Carolina —HL-054509
17. University of Michigan at Ann Arbor
Ann Arbor, Michigan —HL-054512
18. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-054526
19. Stanford University
Stanford, California —HL-054527
20. University of California,
San Diego La Jolla, California —HL-064777

Family Heart Study-Subclinical Atherosclerosis Network (FHS-SCAN),* Initiated in Fiscal Year 2001

The purpose of this program is to examine vascular calcification and inflammation in patients who have previously been examined and extensively genotyped by the NHLBI Family Heart Study, in order to identify genetic factors influencing susceptibility to coronary and aortic atherosclerosis and individual variability in the inflammatory response. The study includes approximately 600 blacks.

* Formerly called Genetics of Coronary and Aortic Calcification (GENCAC).

Obligations

Funding History:

Fiscal Year 2004—\$1,696,913

Fiscal Years 2001-2003—\$8,864,463

Total Funding to Date—\$10,561,376

Current Active Organizations and Grant Numbers

1. University of North Carolina at Chapel Hill
Chapel Hill, North Carolina —HL-067893
2. University of Utah
Salt Lake City, Utah —HL-067894
3. Wake Forest University
Winston-Salem, North Carolina —HL-067895
4. Boston University
Boston, Massachusetts —HL-067896
5. Wake Forest University
Winston-Salem, North Carolina —HL-067897
6. University of Alabama at Birmingham
Birmingham, Alabama —HL-067898
7. Washington University
St. Louis, Missouri —HL-067899
8. University of Minnesota,
Twin Cities Minneapolis, Minnesota —HL-067900
9. University of Minnesota,
Twin Cities Minneapolis, Minnesota —HL-067901
10. University of Texas Health Science Center
Houston, Texas —HL-067902

Genetics of Coronary Artery Disease in Alaskan 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 2004—\$652,865

Fiscal Years 2000-2003—\$7,218,810

Total Funding to Date—\$7,871,675

Current Active Organization and Grant Number

1. MedStar Research Institute
Washington, DC —HL-064244

Girls Health Enrichment Multisite Studies (GEMS), Initiated in Fiscal Year 1999

The objective of this project is to develop and test interventions to prevent obesity by decreasing weight gain during the high-risk transitional period from prepuberty to puberty in black girls who are at risk for developing obesity. Phase 1 (developmental and pilot studies) was completed in FY 2002. Two sites began Phase 2 trials in FY 2003.

Obligations

Funding History:

Fiscal Year 2004—\$2,399,948

Fiscal Years 2001-2003—\$12,698,544

Total Funding to Date—\$15,098,492

Current Active Organizations and Grant Numbers

1. University of Memphis
Memphis, Tennessee —HL-062662

2. Stanford University
Stanford, California —HL-062663

Hematocrit Strategy in Infant Heart Surgery, Initiated in Fiscal Year 2000

The purpose of this study is to determine which hematocrit level—30 or 20 percent—provides the optimal degree of hemodilution during infant open heart surgery to repair congenital heart defects. Scientists will compare the effects of the two hematocrit levels with respect to cardiovascular and neurodevelopmental outcomes in the infants during the immediate postoperative period and at 1 year of age.

Obligations

Funding History:

Fiscal Year 2004—\$492,411

Fiscal Years 2000-2003—\$2,215,845

Total Funding to Date—\$2,708,256

Current Active Organization and Grant Number

1. Children's Hospital, Boston

Boston, Massachusetts

—HL-063411

Home Automatic External Defibrillator Trial (HAT), Initiated in Fiscal Year 2002

The purpose of this trial is to compare standard response (call 911 and give cardiopulmonary resuscitation) to sudden cardiac arrest to standard response augmented with automatic external defibrillator use provided by a spouse or other family member in 7,000 survivors of an anterior wall MI. The primary end point is mortality.

Obligations

Funding History:

Fiscal Year 2004—\$4,263,755

Fiscal Years 2002-2003—\$8,999,887

Total Funding to Date—\$13,263,642

Current Active Organization and Grant Number

1. Seattle Institute for Cardiac Research

Seattle, Washington

—HL-067972

IMMEDIATE Trial: Immediate Myocardial Metabolic Enhancement During Initial Assessment and Treatment in Emergency Care, Initiated in Fiscal Year 2004

The purpose of this program is to study the effects of early administration of glucose, insulin, and potassium (GIK) in reducing mortality in patients from acute coronary syndrome (ACS). Patients experiencing an ACS (including acute MI and unstable angina pectoris) will be treated with GIK as soon as possible in prehospital emergency medical service settings (EMS), or immediately upon arrival for those presenting to emergency departments (EDs).

Obligations

Funding History:

Fiscal Year 2004—\$5,170,411

Total Funding to Date—\$5,170,411

Current Active Organizations and Grant Numbers

1. New England Medical Center Hospitals
Boston, Massachusetts —HL-077821
2. New England Medical Center Hospitals
Boston, Massachusetts —HL-077823
3. New England Medical Center Hospitals
Boston, Massachusetts —HL-077826

Interaction of Genes and Environment in Shaping Risk Factors for Heart, Lung, Blood, and Sleep Disorders, Initiated in Fiscal Year 2002

The purpose of this study is to identify novel genes that interact with specific environmental exposures to modify risk factors for heart, lung, blood, and sleep disorders. The genetic aspects of response to environmental change and related biological mechanisms will be studied using short-term, focused interventions in families. Subgroups will be identified based on genotype that are most likely to benefit from targeted environmental changes designed to reduce the development or progression of heart, lung, blood, or sleep diseases.

Obligations

Funding History:

Fiscal Year 2004—\$10,409,084
Fiscal Years 2002-2003—\$25,116,214
Total Funding to Date—\$35,525,298

Current Active Organizations and Grant Numbers

1. Tulane University
New Orleans, Louisiana —HL-072507
2. LSU Pennington Biomedical Research Center
Baton Rouge, Louisiana —HL-072510
3. The Johns Hopkins University
Baltimore, Maryland —HL-072518
4. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HL-072524
5. University of Maryland Baltimore Professional School
Baltimore, Maryland —HL-072525

Multidisciplinary Study of Right Ventricular Dysplasia, Initiated in Fiscal Year 2001

The purpose of this multidisciplinary, multicenter study is to investigate the cardiac, clinical, and genetic aspects of arrhythmogenic right ventricular dysplasia (ARVD). A North American

ARVD registry of patients and their families will be established. Researchers seek to identify chromosomal loci and specific genetic mutations associated with this disorder.

Obligations

Funding History:

Fiscal Year 2004—\$1,473,384

Fiscal Years 2001-2003—\$4,778,935

Total Funding to Date—\$6,252,319

Current Active Organizations and Grant Numbers

1. University of Arizona
Tucson, Arizona —HL-065594
2. Baylor College of Medicine
Houston, Texas —HL-065652
3. University of Rochester
Rochester, New York —HL-065961

Partnership Programs To Reduce Cardiovascular Health Disparities, Initiated in Fiscal Year 2004

The objectives of this study are to improve the provider and patient approaches to treatment of hypertension and diabetes, modify physician related barriers to minority enrollment in clinical trials, and improve patient adherence to treatment plans.

Obligations

Funding History:

Fiscal Year 2004—\$6,468,544

Total Funding to Date—\$6,468,544

Current Active Organizations and Grant Numbers

1. Bon Secours Hospital Baltimore, Inc.
Baltimore, Maryland —HL-079150
2. University of Maryland Baltimore Professional School
Baltimore, Maryland —HL-079151
3. Queen's Medical Center
Honolulu, Hawaii —HL-079152
4. Cooper Green Hospital (Birmingham)
Birmingham, Alabama —HL-079153
5. Emory University
Atlanta, Georgia —HL-079156

6. Denver Health and Hospital Authority
Denver, Colorado —HL-079160
7. University of Hawaii at Manoa
Honolulu, Hawaii —HL-079163
8. University of Alabama at Birmingham
Birmingham, Alabama —HL-079171
9. University of Colorado Health Sciences Center
Denver, Colorado —HL-079208
10. Morehouse School of Medicine
Atlanta, Georgia —HL-079214
11. Jackson Hinds Comprehensive Health Center
Jackson, Mississippi —HL-079378
12. University of Mississippi Medical Center
Jackson, Mississippi —HL-079458

Pediatric Cardiovascular Clinical Research Network, Initiated in Fiscal Year 2001

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 50 percent minority participation.

Obligations

Funding History:

Fiscal Year 2004—\$8,185,611

Fiscal Years 2001-2003—\$25,021,286

Total Funding to Date—\$33,206,897

Current Active Organizations and Grant Numbers

1. Vanderbilt University
Nashville, Tennessee —HL-065962
2. Children's Hospital and Research Center at Oakland
Oakland, California —HL-069757
3. University of California,
San Diego La Jolla, California —HL-069758

Preventing Overweight Using Novel Dietary Strategies (POUNDS LOST), Initiated in Fiscal Year 2003

The purpose of this study is to compare the effects of four diets low in saturated fat and differing in macronutrient composition on weight loss and its maintenance in 800 overweight or obese adults. The diet consists of moderate fat (35 percent energy) or low fat (20 percent energy) with two different protein levels (15 and 25 percent). Approximately 20 percent of the participants will be minority.

Obligations

Funding History:

Fiscal Year 2004—\$1,687,588

Fiscal Year 2003—\$1,211,724

Total Funding to Date—\$2,899,312

Current Active Organization and Grant Number

1. Harvard School of Public Health
Boston, Massachusetts —HL-073286

Programs of Excellence in Gene Therapy, Initiated in Fiscal Year 2000

The objective of these programs is to create an environment that will enable rapid translation of preclinical studies in cardiovascular, pulmonary, and hematologic diseases into human pilot experiments. In addition, the programs are offering training at the interface between basic science and clinical application. Six national cores provide access to specialized services, such as generating vectors for clinical use, performing morphologically based studies, producing and processing hematopoietic stem cells, and performing primate transplantation studies.

Obligations

Funding History:

Fiscal Year 2004—\$11,979,088

Fiscal Years 2000-2003—\$49,160,962

Total Funding to Date—\$61,140,050

Current Active Organizations and Grant Numbers

1. University of Washington
Seattle, Washington —HL-066947

2. Stanford University
Stanford, California —HL-066948

3. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-066949

4. Weill Medical College of Cornell University
New York, New York —HL-066952

5. Weill Medical College of Cornell University
New York, New York —HL-067738

Programs of Genomic Applications (PGAs) for Heart, Lung, and Blood Diseases, Initiated in Fiscal Year 2000

The goal of this program is to develop information, tools, and resources to link genes to biological function. Specifically, researchers seek to identify human genes relevant to heart, lung, blood, and sleep functions. In addition, the PGAs will establish training programs for NHLBI-supported investigators in the use of genomic information and technologies.

Obligations

Funding History:

Fiscal Year 2004—\$18,604,345

Fiscal Years 2000-2003—\$147,177,847

Total Funding to Date—\$165,782,192

Current Active Organizations and Grant Numbers

1. Medical College of Wisconsin
Milwaukee, Wisconsin —HL-066579
2. Institute for Genomic Research
Rockville, Maryland —HL-066580
3. Harvard University School of Medicine
Boston, Massachusetts —HL-066582
4. The Johns Hopkins University
Baltimore, Maryland —HL-066583
5. University of California, San Francisco
San Francisco, California —HL-066600
6. Jackson Laboratory
Bar Harbor, Maine —HL-066611
7. Institute for Genomic Research
Rockville, Maryland —HL-066619
8. J. David Gladstone Institutes
San Francisco, California —HL-066621
9. Fred Hutchinson Cancer Research Center
Seattle, Washington —HL-066642
10. Massachusetts General Hospital
Boston, Massachusetts —HL-066678

11. University of California, Berkley Lawrence Berkeley Laboratory
Berkeley, California —HL-066681
12. University of Washington
Seattle, Washington —HL-066682
13. Brigham and Women’s Hospital
Boston, Massachusetts —HL-066795
14. University of Arizona
Tucson, Arizona —HL-066801
15. Brigham and Women’s Hospital
Boston, Massachusetts —HL-066804
16. Brigham and Women’s Hospital
Boston, Massachusetts —HL-066805
17. University of Arizona
Tucson, Arizona —HL-066806
18. University of Texas Southwestern Medical Center
Dallas, Texas —HL-066880

Resuscitation Outcome Improvement Consortium, Initiated in Fiscal Year 2004

The purpose of this program is to establish a resuscitation research consortium to conduct clinical research in the areas of cardiopulmonary arrest and traumatic injury leading to arrest. The consortium will enable investigators to conduct multiple collaborative trials to expedite the translation of promising scientific and clinical advances to improve resuscitation outcomes.

Obligations

Funding History:

Fiscal Year 2004—\$6,886,109

Total Funding to Date—\$6,886,109

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 & 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

Stop Atherosclerosis in Native Diabetics Study (SANDS), Initiated in Fiscal Year 2002

This study will address the high incidence of cardiovascular disease in a population with a high prevalence of diabetes, but relatively low levels of LDL cholesterol and blood pressure. It will compare aggressive lowering of LDL cholesterol and blood pressure to the usual care standard.

Obligations

Funding History:

Fiscal Year 2004—\$2,106,653

Fiscal Year 2003—\$4,574,684

Total Funding to Date—\$6,681,337

Current Active Organization and Grant Number

1. MedStar Research Institute
Washington, DC —HL-067031

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. The purpose of Phase IV is to enlarge the family study to 120 families comprising 3,600 members to investigate genetic and environmental contributors of CVD.

Obligations

Funding History:

Fiscal Year 2004—\$3,154,859

Fiscal Years 1988-2003—\$43,283,445

Total Funding to Date—\$46,438,304

Current Active Organizations and Grant Numbers

1. MedStar Research Institute
Washington, DC —HL-041642
2. Missouri Breaks Research, Inc.
Timberlake, South Dakota —HL-041652
3. University of Oklahoma Health Sciences Center
Oklahoma City, Oklahoma —HL-041654
4. Southwest Foundation for Biomedical Research
San Antonio, Texas —HL-065520
5. Weill Medical College of Cornell University
New York, New York —HL-065521

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 2004—\$1,613,238

Fiscal Years 2002-2003—\$12,251,409

Total Funding to Date—\$13,864,647

Current Active Organizations and Grant Numbers

1. Thomas Jefferson University
Philadelphia, Pennsylvania —HL-069009
2. Mayo Clinic
Rochester, Minnesota —HL-069010
3. Duke University
Durham, North Carolina —HL-069011

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|---|------------|
| 4. Northwestern University
Chicago, Illinois | —HL-069012 |
| 5. Duke University
Durham, North Carolina | —HL-069013 |
| 6. Duke University
Durham, North Carolina | —HL-069015 |
| 7. University of Southern California
Los Angeles, California | —HL-072683 |

Trial of Activity for Adolescent Girls (TAAG), Initiated in Fiscal Year 2000

See Chapter 11. Clinical Trials.

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 2½ years in approximately 800 overweight or obese adults. Individuals who are taking medication for hypertension or dyslipidemia or who are diabetic will enter a 6-month weight program. Those who lose at least 9 pounds will be randomized into one of three groups: one that provides monthly personal contacts with a trained interventionist, primarily by telephone; one that provides frequent contacts through an interactive Web-based program; or usual care. Forty percent of the participants will be black.

Obligations

Funding History:

Fiscal Year 2004—\$4,367,750

Fiscal Year 2003—\$3,686,738

Total Funding to Date—\$8,054,488

Current Active Organizations and Grant Numbers

- | | |
|--|------------|
| 1. Center for Health Research
Portland, Oregon | —HL-068676 |
| 2. Duke Hypertensive Center
Durham, North Carolina | —HL-068734 |
| 3. Center for Health Research
Portland, Oregon | —HL-068790 |
| 4. The Johns Hopkins University
Baltimore, Maryland | —HL-068920 |
| 5. LSU Pennington Biomedical Research Center
Baton Rouge, Louisiana | —HL-068955 |

Women’s Ischemia Syndrome Evaluation (WISE), Initiated in Fiscal Year 2001

The purpose of this study is to extend the follow-up of WISE patients to determine the incremental long-term prognostic value of novel testing developed in WISE, develop sex-specific incremental outcome models to evaluate the prognostic value of female reproductive variables, and maintain a WISE database and infrastructure to facilitate further investigations into the mechanisms underlying ischemic syndromes in women.

Obligations

Funding History:

Fiscal Year 2004—\$1,302,449

Fiscal Years 2001-2003—\$4,314,911

Total Funding to Date—\$5,617,360

Current Active Organizations and Grant Numbers

1. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-064829
2. University of Florida
Gainesville, Florida —HL-064924

Lung Diseases Program

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

The objective of ACRN Phase I was to establish a network of interactive asthma clinical research groups to assess novel treatment methods and to ensure that findings on optimal management of patients with asthma are rapidly disseminated to practitioners and health care professionals. A new program was funded in 2003 as a result of a national competition for participation in the successful 10-year-old asthma clinical research network. The minority patient population will be approximately 33 percent for each protocol.

Obligations

Funding History:

Fiscal Year 2004—\$8,424,129

Fiscal Year 2003—\$8,181,429

Total Funding to Date—\$16,605,558

Current Active Organizations and Grant Numbers

1. National Jewish Medical and Research Center
Denver, Colorado —HL-074073
2. University of California, San Francisco
San Francisco, California —HL-074204

- | | |
|--|------------|
| 3. University of Pittsburgh
Pittsburgh, Pennsylvania | —HL-074206 |
| 4. Washington University
St. Louis, Missouri | —HL-074208 |
| 5. University of Wisconsin
Madison, Wisconsin | —HL-074212 |
| 6. University of California,
San Diego La Jolla, California | —HL-074218 |
| 7. Wake Forest University
Winston-Salem, North Carolina | —HL-074225 |
| 8. Brigham and Women’s Hospital
Boston, Massachusetts | —HL-074227 |
| 9. Pennsylvania State University
Hershey, Pennsylvania | —HL-074231 |

Centers for Reducing Asthma Disparities, Initiated in Fiscal Year 2002

The purpose of this study is to establish cooperative centers of research to reduce asthma disparities between whites and minorities and economically disadvantaged populations. The mission of the centers, comprising partnerships between minority servicing medical institutions and research-intensive institutions, is to promote interdisciplinary investigation of factors that contribute to disparities in asthma, accelerate development and evaluation of strategies to promote effective asthma management among minority and economically disadvantaged populations, encourage training and career development for minority clinical research investigators, and improve the effectiveness of NHLBI-supported research-intensive institutions in developing and sustaining culturally appropriate research and demonstration activities on reducing disparities.

Obligations

Funding History:

Fiscal Year 2004—\$5,217,367

Fiscal Years 2002-2003—\$12,051,824

Total Funding to Date—\$17,269,191

Current Active Organizations and Grant Numbers

- | | |
|--|------------|
| 1. Meharry Medical College
Nashville, Tennessee | —HL-072431 |
| 2. Howard University
Washington, DC | —HL-072433 |
| 3. Rhode Island Hospital
Providence, Rhode Island | —HL-072438 |

4. The Johns Hopkins University
Baltimore, Maryland —HL-072455
5. Vanderbilt University
Nashville, Tennessee —HL-072471
6. Northwestern University
Chicago, Illinois —HL-072478
7. Hektoen Institute for Medical Research
Chicago, Illinois —HL-072496
8. University of Puerto Rico Medical Sciences
San Juan, Puerto Rico —HL-072519

Childhood Asthma Management Program-Continuation Study (CAMP-CS)/Phase 2, Initiated in Fiscal Year 2003

The objectives of this observational study are to follow the original CAMP cohort for 4 more years into early adulthood to determine the effects of long-term (3.5 to 5.5 years) corticosteroid therapy, started at ages 5 to 12, on outcomes of pulmonary function, height, bone density, and clinical course of asthma; 31 percent of the participants are from minority groups.

Obligations

Funding History:

Fiscal Year 2004—\$2,043,311

Fiscal Year 2003—\$1,489,491

Total Funding to Date—\$3,532,802

Current Active Organizations and Grant Numbers

1. Washington University
St. Louis, Missouri —HL-075232
2. Hospital for Sick Children
Toronto, Ontario —HL-075407
3. The 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. The 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

Childhood Asthma Research and Education (CARE) Network, Initiated in Fiscal Year 1999

See Chapter 11. Clinical Trials.

Collaborative Program in Bronchopulmonary Dysplasia, Initiated in Fiscal Year 1999

The objectives of this program are to support a multi-institutional collaborative research effort, by providing a well-defined model of prematurity and bronchopulmonary dysplasia to investigators, and to study mechanisms of lung pathobiology that underlie development of chronic lung disease of prematurity.

Obligations

Funding History:

Fiscal Year 2004—\$5,166,906

Fiscal Years 1999-2003—\$21,135,687

Total Funding to Date—\$26,302,593

Current Active Organizations and Grant Numbers

1. Southwest Foundation for Biomedical Research
San Antonio, Texas —HL-052636
2. Brigham and Women's Hospital
Boston, Massachusetts —HL-052638
3. University of California, San Francisco
San Francisco, California —HL-056061
4. National Jewish Medical and Research Center
Denver, Colorado —HL-056263
5. Barnes Jewish Hospital
St. Louis, Missouri —HL-063387
6. National Jewish Medical and Research Center
Denver, Colorado —HL-063397

7. University of Texas Southwestern Medical Center
Dallas, Texas —HL-063399

8. University of Rochester
Rochester, New York —HL-063400

9. Children's Hospital of Philadelphia
Philadelphia, Pennsylvania —HL-075900

10. Children's Hospital
Boston, Massachusetts —HL-075904

COPD Clinical Research Network, Initiated in Fiscal Year 2003

See Chapter 11. Clinical Trials.

Early Antipseudomonal Therapy in Cystic Fibrosis, Initiated in Fiscal Year 2004

The purpose of this study is to determine a safe, effective, and systematic approach for treating young children (1 to 12 years) with cystic fibrosis who are found to be infected with *Pseudomonas aeruginosa* (Pa). The goal is to intervene with antipseudomonal therapy at the first isolation of Pa to delay or prevent chronic infections that lead to irreversible lung destruction.

Obligations

Funding History:

Fiscal Year 2004—\$1,064,237

Total Funding to Date—\$1,064,237

Current Active Organization and Grant Number

1. Children's Hospital and Regional Medical Center
Seattle, Washington —HL-080310

Inhaled Nitric Oxide for the Prevention of Chronic Lung Disease, Initiated in Fiscal Year 2000

The objective of this clinical trial is to determine whether low-dose inhaled nitric oxide (NO), administered within the first 48 hours of life to premature newborns (weighing between 500 and 1,250 grams) with respiratory failure requiring mechanical ventilation, will prevent development of chronic lung disease.

Obligations

Funding History:

Fiscal Year 2004—\$1,245,274

Fiscal Years 2000-2003—\$6,968,259

Total Funding to Date—\$8,213,533

Current Active Organization and Grant Number

1. The Children's Hospital University of Colorado
Denver, Colorado —HL-064857

Inhaled Nitric Oxide in Prevention of Chronic Lung Disease, Initiated in Fiscal Year 2000

The objective of this clinical trial is to determine whether low-dose inhaled NO, administered to preterm infants (weighing between 500 and 1,250 grams) who continue to require mechanical ventilation at 14 days of age, will reduce the incidence of chronic lung disease.

Obligations

Funding History:

Fiscal Year 2004—\$903,335

Fiscal Years 2000-2003—\$6,732,859

Total Funding to Date—\$7,636,194

Current Active Organization and Grant Number

1. Children's Hospital of Philadelphia,
Philadelphia, Pennsylvania —HL-062514

Linkage Study in Familial Pulmonary Fibrosis, Initiated in Fiscal Year 2000

The purpose of this study is to identify a group of genetic loci that may subsequently prove to contain novel genes involved in the development of familial pulmonary fibrosis. Investigators will use standard genetic methodology (linkage analysis) to determine the distribution of polymorphisms for genetic markers in families with familial pulmonary fibrosis.

Obligations

Funding History:

Fiscal Year 2004—\$714,001

Fiscal Years 2000-2003—\$2,755,951

Total Funding to Date—\$3,469,952

Current Active Organization and Grant Number

1. Duke University
Durham, North Carolina —HL-067467

Pharmacogenetics of Asthma Treatment, Initiated in Fiscal Year 2000

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

Obligations

Funding History:

Fiscal Year 2004—\$0

Fiscal Years 2000-2003—\$10,847,376

Total Funding to Date—\$10,847,376

Current Active Organization and Grant Number

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

Blood Diseases and Resources

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

See Chapter 11. Clinical Trials.

Functional Outcomes in Cardiovascular Patients Undergoing Surgical Hip Fracture Repair (FOCUS), Initiated in Fiscal Year 2003

The purpose of this trial is to test whether a more aggressive transfusion strategy that maintains postoperative Hgb levels above 10 g/dl improves functional outcome in cardiovascular patients who are over age 50 and undergoing surgical hip fracture surgery compared to a more conservative strategy that withholds blood transfusion until the patient develops symptoms of anemia.

Obligations

Funding History:

Fiscal Year 2004—\$1,795,724

Fiscal Year 2003—\$1,639,478

Total Funding to Date—\$3,435,202

Current Active Organizations and Grant Numbers

1. Robert Wood Johnson Medical School, University of Medicine and Dentistry of New Jersey
Piscataway, New Jersey —HL-073958
2. Maryland Medical Research Institute, Inc.
Baltimore, Maryland —HL-074815

Induction of Stable Chimerism for Sickle Cell Anemia, Initiated in Fiscal Year 2001

The purpose of this study is to investigate a transplant procedure for SCD that significantly reduces the toxicity of allogeneic hematopoietic cell transplantation while retaining its therapeutic benefit.

Obligations

Funding History:

Fiscal Year 2004—\$550,666

Fiscal Years 2001-2003—\$1,541,037

Total Funding to Date—\$2,091,703

Current Active Organization and Grant Number

1. Children's Hospital Oakland
Oakland, California —HL-068091

Reference Laboratory to Evaluate Therapies for Sickle Cell Disease, Initiated Fiscal Year 1997

The purpose of this study is to establish a reference laboratory that will evaluate potentially useful compounds for the treatment of SCD.

Obligations

Funding History:

Fiscal Year 2004—\$409,694

Fiscal Years 1997-2003*—\$1,437,153

Total Funding to Date—\$1,846,847

* Became U01 in 2001.

Current Active Organization and Grant Number

1. Children's Hospital of Philadelphia
Philadelphia, Pennsylvania —HL-058930

Sibling Donor Cord Blood Banking and Transplantation, Initiated in Fiscal Year 2001

The purpose of this study is to establish a cord blood bank for collecting sibling donor cord blood in families that currently have a child with sickle cell anemia or thalassemia with the intent of future transplantation.

Obligations

Funding History:

Fiscal Year 2004—\$1,352,571

Fiscal Years 2001-2003—\$3,731,256

Total Funding to Date—\$5,083,827

Current Active Organization and Grant Number

1. Children's Hospital Oakland
Oakland, California —HL-061877

Stroke Prevention in Sickle Cell Anemia (STOP 2), Initiated in Fiscal Year 2000

The purpose of this study is to optimize, in high-risk patients with sickle cell anemia, the primary prevention strategy proven effective in STOP. Ninety-eight percent of the patients are expected to come from minority populations.

Obligations

Funding History:

Fiscal Year 2004—\$2,366,346

Fiscal Years 2000-2003—\$13,147,352

Total Funding to Date—\$15,513,698

Current Active Organizations and Grant Numbers

1. New England Research Institutes, Inc.
Watertown, Massachusetts —HL-052016
2. Medical College of Georgia
Augusta, Georgia —HL-052193

Thalassemia (Cooley's Anemia) Clinical Research Network

See Chapter 11. Clinical Trials.

Transfusion Medicine/Hemostasis Clinical Research Network

See Chapter 11. Clinical Trials.

National Center on Sleep Disorders Research

Apnea Positive Pressure Long-Term Efficacy Study (APPLES), Initiated in Fiscal Year 2002

The purpose of this study is to evaluate the effectiveness of continuous positive airway pressure (CPAP) therapy to provide significant, stable, and long-term neurocognitive or other benefits to patients with obstructive sleep apnea (OSA). Investigators will identify specific neurocognitive deficits associated with OSA and determine which ones are reversible and most sensitive to the effects of CPAP therapy.

Obligations

Funding History:

Fiscal Year 2004—\$3,109,570

Fiscal Year 2002-2003—\$6,244,439

Total Funding to Date—\$9,354,009

Current Active Organization and Grant Number

1. Stanford University
Stanford, California —HL-068060

Sleep Heart Health Study, Initiated in Fiscal Year 1999

The purpose of this multicenter observational study is to determine the degree to which sleep apnea is an independent or contributing risk factor for the development of cardiovascular or cerebrovascular disease.

Obligations

Funding History:

Fiscal Year 2004—\$1,477,676

Fiscal Years 1999-2003—\$16,631,681

Total Funding to Date—\$18,109,357

Current Active Organizations and Grant Numbers

1. University of California, Davis
Davis, California —HL-053916

2. New York University Medical Center
New York, New York —HL-053931

3. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HL-053934

4. The Johns Hopkins University
Baltimore, Maryland —HL-053937

5. University of Arizona
Tucson, Arizona —HL-053938

6. Boston University
Boston, Massachusetts —HL-053941

7. Missouri Breaks Research, Inc.
Timberlake, South Dakota —HL-063429

8. Case Western Reserve University
Cleveland, Ohio —HL-063463

9. The Johns Hopkins University
Baltimore, Maryland —HL-064360

10. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-077813

NHLBI Research Centers (P50, U54, P30) Programs

Specialized Centers of Research (P50) and Specialized Centers of Clinically Oriented Research (P50) Programs

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 emphasizes 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 newly developed 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. Listed below is the funding history for the individual SCORs/SCCORs supported by the Institute.

Obligations (Dollars in Thousands)

Area of Concentration	Period of Operation	Prior to FY 2004	FY 2004	Total to Date
Heart and Vascular Diseases Program				
Ischemic Heart Disease in Blacks	1995-	\$24,334	\$3,083	\$27,417
Ischemic Heart Disease, Sudden Cardiac Death, Heart Failure	1995-	128,615	14,473	143,088
Molecular Genetics of Hypertension	1996-	72,661	9,973	82,634
Molecular Medicine and Atherosclerosis	1997-	51,852	8,383	60,235
Pediatric Heart Development and Disease (SCCOR)	2004-	0	13,245	13,245
Subtotal, Heart and Vascular Diseases Program		277,462	49,157	326,619
Lung Diseases Program				
Airway Biology and Pathogenesis of Cystic Fibrosis	1988-	55,246	3,512	58,758
Cellular and Molecular Mechanisms of Asthma	1996-	87,237	15,650	102,887
Pathobiology of Fibrotic Lung Disease	1997-	33,727	5,296	39,023
Pathobiology of Lung Development	1996-	55,268	7,404	62,672
Translational Research in Acute Lung Injury (SCCOR)	2003-	11,502	11,824	23,326
Subtotal, Lung Diseases Program		242,980	43,686	286,666
Blood Diseases and Resources Program				
Hematopoietic Stem Cell Biology	1995-	40,026	5,742	45,768
Hemostatic and Thrombotic Disorders	1996-	162,439	7,393	169,832
Transfusion Biology and Medicine	1996-	58,839	3,256	62,095
Subtotal, Blood Diseases and Resources Program		261,304	16,391	277,695
National Center on Sleep Disorders Research Neurobiology of Sleep and Sleep Apnea	1998-	29,030	6,072	35,102
Subtotal, National Center on Sleep Disorders Research		29,030	6,072	35,102
Total, Specialized Centers of Research (P50)		\$810,776	\$115,306	\$926,082

Heart and Vascular Diseases Program

Ischemic Heart Disease in Blacks

The purpose of this SCOR is to promote interdisciplinary study of issues surrounding ischemic heart disease in blacks. Investigators are using molecular, cellular, and genetic studies; animal experiments; and human studies to advance knowledge in this area.

Obligations

Fiscal Year 2004—\$3,083,183

Current Active Organizations and Grant Numbers

1. Boston University
Boston, Massachusetts —HL-055993
2. Medical College of Wisconsin
Milwaukee, Wisconsin —HL-065203

Ischemic Heart Disease, Sudden Cardiac Death, Heart Failure

The purpose of this SCOR is to elucidate the etiology and pathophysiology of these diseases at the molecular, cellular, and tissue levels and to translate research findings into improved diagnosis, treatment, and prevention.

Obligations

Fiscal Year 2004—\$14,473,066

Current Active Organizations and Grant Numbers

1. The Johns Hopkins University
Baltimore, Maryland —HL-052307
2. University of Cincinnati
Cincinnati, Ohio —HL-052318
3. University of California, Los Angeles
Los Angeles, California —HL-052319
4. Brigham and Women's Hospital
Boston, Massachusetts —HL-052320
5. University of Utah
Salt Lake City, Utah —HL-052338
6. University of California, San Diego
La Jolla, California —HL-053773
7. Baylor College of Medicine
Houston, Texas —HL-054313

8. New England Medical Center
Boston, Massachusetts —HL-063494

9. Harvard University
Boston, Massachusetts —HL-063609

Molecular Genetics of Hypertension

The purpose of this SCOR is to elucidate the etiology and pathogenesis of hypertension and to translate the knowledge into improved diagnosis and management of the disease.

Obligations

Fiscal Year 2004—\$9,972,655

Current Active Organizations and Grant Numbers

1. Medical College of Wisconsin
Milwaukee, Wisconsin —HL-054998

2. Brigham and Women's Hospital
Boston, Massachusetts —HL-055000

3. Boston University Medical Center
Boston, Massachusetts —HL-055001

4. University of Iowa Hospitals
Iowa City, Iowa —HL-055006

5. Yale University School of Medicine
New Haven, Connecticut —HL-055007

Molecular Medicine and Atherosclerosis

The goal of this SCOR is to advance understanding of the etiology and pathobiology of the atherosclerotic lesion at the molecular level through modern methods and approaches of molecular medicine. Some of the subprojects have a large minority patient population.

Obligations

Fiscal Year 2004—\$8,382,971

Current Active Organizations and Grant Numbers

1. Columbia University
New York, New York —HL-056984

2. Brigham and Women's Hospital
Boston, Massachusetts —HL-056985

3. University of California, San Diego
La Jolla, California —HL-056989

4. University of Pennsylvania
Philadelphia, Pennsylvania —HL-070128

Pediatric Heart Development and Disease

The purpose of this SCCOR is to foster multidisciplinary collaborations so that basic research advances can be translated rapidly to clinical care for children with heart disease. Research focus ranges from the genetic basis of heart valve disease to clinical trials of novel surgical strategies for congenital heart disease repair and immune modulation in pediatric heart transplantation. Two of the centers will have Clinical Research Skills Development Cores to train fellows and junior faculty in clinical research methods.

Obligations

Fiscal Year 2004—\$13,244,817

Current Active Organizations and Grant Numbers

1. Children's Hospital Medical Center
Cincinnati, Ohio —HL-074728
2. Children's Hospital of Philadelphia
Philadelphia, Pennsylvania —HL-074731
3. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-074732
4. Children's Hospital
Boston, Massachusetts —HL-074734

Lung Diseases Program

Airway Biology and Pathogenesis of Cystic Fibrosis

The goals of this SCOR are to investigate the basic mechanisms underlying cystic fibrosis, develop new hypotheses, and apply innovative strategies for approaching clinical and fundamental issues.

Obligations

Fiscal Year 2004—\$3,512,149

Current Active Organizations and Grant Numbers

1. University of North Carolina at Chapel Hill
Chapel Hill, North Carolina —HL-060280
2. University of Iowa
Iowa City, Iowa —HL-061234

Cellular and Molecular Mechanisms of Asthma

The objective of this SCOR is to apply critical science and technology to increase understanding of cellular and molecular mechanisms of asthma, including those mechanisms underlying the biological impact of environmental factors.

Obligations

Fiscal Year 2004—\$15,649,934

Current Active Organizations and Grant Numbers

1. University of New Mexico
Albuquerque, New Mexico —HL-056384
2. University of California, San Francisco
San Francisco, California —HL-056385
3. University of Wisconsin
Madison, Wisconsin —HL-056396
4. University of Chicago
Chicago, Illinois —HL-056399
5. Washington University
St. Louis, Missouri —HL-056419
6. University of Pennsylvania
Philadelphia, Pennsylvania —HL-067663
7. Beth Israel Deaconess Medical Center
Boston, Massachusetts —HL-067664
8. University of Arizona
Tucson, Arizona —HL-067672
9. Stanford University
Stanford, California —HL-067674

Pathobiology of Fibrotic Lung Disease

The purpose of this SCOR is to study cellular and molecular mechanisms involved in transition from inflammatory events associated with early fibrotic disease to later processes involving wound healing, repair, and fibrosis.

Obligations

Fiscal Year 2004—\$5,295,879

Current Active Organizations and Grant Numbers

1. University of Michigan at Ann Arbor
Ann Arbor, Michigan —HL-056402
2. University of California, Los Angeles
Los Angeles, California —HL-067665
3. National Jewish Center for Immunology and Respiratory Diseases,
Denver, Colorado —HL-067671

Pathobiology of Lung Development

The objective of this SCOR is to foster multidisciplinary research enabling basic science findings to be rapidly applied to clinical problems related to lung development. The program focuses on identification of the molecular variables involved in lung development and assessment of the impact of injury during critical periods.

Obligations

Fiscal Year 2004—\$7,403,692

Current Active Organizations and Grant Numbers

1. Children's Hospital Medical Center
Cincinnati, Ohio —HL-056387
2. Children's Hospital of Philadelphia
Philadelphia, Pennsylvania —HL-056401
3. University of Colorado Health Sciences Center
Denver, Colorado —HL-057144
4. Children's Hospital of Boston
Boston, Massachusetts —HL-067669

Translational Research in Acute Lung Injury

The purpose of this SCCOR is to foster multidisciplinary research to improve the prevention, diagnosis, and treatment of acute lung injury and its more severe form—adult respiratory distress syndrome. This program includes phase II clinical trials and studies of molecular mechanisms of inflammation and coagulation, gene and protein expression, and cell and animal models of lung injury.

Obligations

Fiscal Year 2004—\$11,824,005

Current Active Organizations and Grant Numbers

1. The Johns Hopkins University
Baltimore, Maryland —HL-073994
2. University of Washington
Seattle, Washington —HL-073996
3. University of California, San Francisco
San Francisco, California —HL-074005
4. University of Michigan at Ann Arbor
Ann Arbor, Michigan —HL-074024

Blood Diseases and Resources Program

Hematopoietic Stem Cell Biology

The goal of this SCOR is to advance knowledge of basic stem cell biology in areas of stem cell isolation, quantitation by in vivo assay, in vitro and in vivo growth and replication, gene insertion, and engraftment.

Obligations

Fiscal Year 2004—\$5,741,924

Current Active Organizations and Grant Numbers

1. Dana Farber Cancer Institute
Boston, Massachusetts —HL-054785
2. Children's Hospital
Los Angeles, California —HL-054850
3. Fred Hutchinson Cancer Research Center
Seattle, Washington —HL-054881

Hemostatic and Thrombotic Disorders

The purpose of this SCOR is to investigate pathogenic mechanisms involved in human thrombotic disease and to develop improved methods for its diagnosis and treatment. One of the studies has a large minority patient population.

Obligations

Fiscal Year 2004—\$7,392,619

Current Active Organizations and Grant Numbers

1. Mt. Sinai School of Medicine
New York, New York —HL-054469

2. University of Pennsylvania
Philadelphia, Pennsylvania —HL-054500
3. University of Oklahoma
Oklahoma City, Oklahoma —HL-054502
4. Baylor College of Medicine
Houston, Texas —HL-065967

Transfusion Biology and Medicine

The purpose of this SCOR 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 2004—\$3,255,812

Current Active Organizations and Grant Numbers

1. New York Blood Center
New York, New York —HL-054459
2. University of California, San Francisco
San Francisco, California —HL-054476

National Center on Sleep Disorders Research

Neurobiology of Sleep and Sleep Apnea

The objective of this SCOR is to integrate molecular, cellular, and genetic approaches to sleep control with clinical investigations on the etiology and pathogenesis of sleep disorders, particularly sleep apnea.

Obligations

Fiscal Year 2004—\$6,071,676

Current Active Organizations and Grant Numbers

1. University of Pennsylvania
Philadelphia, Pennsylvania —HL-060287
2. Brigham and Women's Hospital
Boston, Massachusetts —HL-060292
3. University of California, Los Angeles
Los Angeles, California —HL-060296

Comprehensive Sickle Cell Centers (U54) Program

The Comprehensive Sickle Cell Centers (CSCC) were instituted in FY 1972 to bridge the gap between research and service by combining basic and clinical research, clinical trials and applications training, and community service projects into one program. The patients recruited for the clinical studies are primarily from minority populations.

Obligations

Fiscal Year 2004—\$21,010,342

Current Active Organizations and Grant Numbers

1. Children's Hospital and Research Center
Oakland, California —HL-070583
2. Thomas Jefferson University
Philadelphia, Pennsylvania —HL-070585
3. Rho Federal Systems Division, Inc.
Chapel Hill, North Carolina —HL-070587
4. University of Texas Southwestern Medical Center
Dallas, Texas —HL-070588
5. St. Jude Children's Research Hospital
Memphis, Tennessee —HL-070590
6. University of Southern California
Los Angeles, California —HL-070595
7. Children's Hospital of Philadelphia
Philadelphia, Pennsylvania —HL-070596
8. Duke University
Durham, North Carolina —HL-070769
9. Boston Medical Center
Boston, Massachusetts —HL-070819
10. Children's Hospital Research Center
Cincinnati, Ohio —HL-070871
11. Yeshiva University
New York, New York —HL-070994

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 2004—\$2,645,483

Current Active Organizations and Grant Numbers

1. New York University School of Medicine
New York, New York —AI-27742
2. University of Washington
Seattle, Washington —AI-27757
3. University of California, San Francisco
San Francisco, California —AI-27763
4. University of Alabama at Birmingham
Birmingham, Alabama —AI-27767
5. University of California, Los Angeles
Los Angeles, California —AI-28697
6. Baylor University
Houston, Texas —AI-36211
7. University of California, San Diego
La Jolla, California —AI-36214
8. Case Western Reserve University
Cleveland, Ohio —AI-36219
9. University of Massachusetts Medical School
Worcester, Massachusetts —AI-42845
10. Miriam Hospital
Providence, Rhode Island —AI-42853
13. The Johns Hopkins University
Baltimore, Maryland —AI-42855
12. University of Pennsylvania
Philadelphia, Pennsylvania —AI-45008
13. Emory University
Atlanta, Georgia —AI-50409
14. University of North Carolina at Chapel Hill
Chapel Hill, North Carolina —AI-50410

15. Yeshiva University
New York, New York —AI-51519
16. University of Colorado Health Sciences Center
Denver, Colorado —AI-54907
17. Vanderbilt University
Nashville, Tennessee —AI-54999
18. Harvard Medical School
Boston, Massachusetts —AI-60354

10. Research and Development Contracts

NHLBI Research and Development Contract Obligations*: Fiscal Years 1994-2004

Dollars in Millions

Year	Major Contract-Supported Clinical Trials*	Other R&D Contracts
1994	42.2	76.1
1995	48.4	77.5
1996	52.9	68
1997	63.3	58.6
1998	65.8	50.9
1999	109.5	87.8
2000	115.4	85.9
2001	87.4	132.7
2002	91.8	166.5
2003	105.3	185.1
2004	107.5	177.9

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

NHLBI Total Research and Development Contract Obligations: Fiscal Years 1994-2004

Dollars (Thousands)

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Heart	\$ 67,173	\$ 70,178	\$ 80,373	\$ 84,820	\$ 77,886	\$ 93,270	\$ 98,715	\$125,291	\$155,971	\$195,425	\$187,043
Lung	21,957	15,414	21,032	18,183	13,123	25,432	23,341	10,993	16,578	11,745	14,131
Blood	29,122	40,324	19,522	18,934	25,695	15,436	21,538	24,572	26,751	20,082	25,460
Women's Health Initiative						63,100	57,700	59,200	59,000	63,222	58,838
Total	\$118,252	\$125,916	\$120,927A	\$121,937B	\$116,704C	\$197,238D	\$201,294E	\$220,056F	\$258,300G	\$290,474H	\$285,472I

A Includes Program Evaluation Assessment of \$4,250,000.

B Includes Program Evaluation and IMPAC II Assessments of \$8,986,000.

C Includes Program Evaluation and IMPAC II Assessments of \$12,589,000.

D Includes Program Evaluation and IMPAC II Assessments of \$14,904,000.

E Includes Program Evaluation and IMPAC II Assessments of \$17,944,000.

F Includes Program Evaluation and IMPAC II Assessments of \$24,579,000.

G Includes Program Evaluation and IMPAC II Assessments of \$35,827,000.

H Includes Program Evaluation and IMPAC II Assessments of \$54,550,000

I Includes Program Evaluation Assessment of \$57,545,722.

Major NHLBI Research and Development Contracts by Program

	Total Obligations Prior to FY 2004	Total FY 2004 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
Atherosclerosis Risk in Communities (ARIC)	\$118,463,152	\$162,979	\$118,626,131
Cardiovascular Health Study (CHS)	72,602,830	1,557,410	74,160,240
Coronary Artery Risk Development in Young Adults (CARDIA)	60,197,437	10,373,960	70,571,397
Framingham Study	0	4,000,000	4,000,000
Jackson Heart Study (JHS)	56,148,221	6,018,417	62,166,638
Mammalian Genotyping Service (MGS)	14,291,000	378,854	14,669,854
Multi-Ethnic Study of Atherosclerosis (MESA)	21,519,750	3,600,000	25,119,750
Proteomics Initiative	48,741,999	5,528,000	54,269,999
Translational Behavioral Science Research Consortium	0	4,808,544	4,808,544
Lung Diseases			
Lung Tissue Research Consortium	0	3,999,995	3,999,995
Tuberculosis Curriculum Coordinating Center	2,700,000	300,000	300,000
Blood Diseases and Resources			
Hemochromatosis and Iron Overload Screening Study (HEIRS)	23,932,652	2,046,635	25,979,287
Maintenance of NHLBI Biological Specimen Repository	5,603,820	0	5,603,820
Refinement of New Assays for Direct Detection of Viral Nucleic Acids in Donated Organs	11,221,950	4,300,029	15,521,979
Retrovirus Epidemiology Donor Study (REDS)	68,774,125	5,000,000	73,774,125
Somatic Cell Therapy Processing Facilities	4,095,764	5,638,502	9,734,266

Heart and Vascular Diseases Program

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

The ARIC program is a large-scale, long-term program that is measuring associations of CHD risk factors with atherosclerosis by race, gender, and geographic location. It focuses on early detection of CVD before symptoms, heart attacks, or strokes occur. The project consists of two groups: a community surveillance component and a cohort component from four communities. Three of the cohort components represent the racial mix of their community, whereas the fourth is exclusively black.

Obligations

Funding History:

Fiscal Year 2004—\$162,979

Fiscal Years 1985-2003—\$118,463,152

Total Funding to Date—\$118,626,131

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. The Johns Hopkins University
Baltimore, Maryland —HC-55020
6. Mississippi Medical Center
Jackson, Mississippi —HC-55021
7. University of Texas Health Science Center
Houston, Texas —HC-55022

Cardiovascular Health Study (CHS), Initiated in Fiscal Year 1988

The CHS is a population-based, longitudinal study of risk factors for the development and progression of CHD and stroke in elderly adults. Specific objectives for this phase of the project include identifying risk association with clinical disease by accumulation of events; determining whether presence or progression of subclinical disease (abnormalities detected noninvasively without signs or symptoms) are better predictors of clinical disease than traditional risk factors; identifying determinants of change in subclinical disease; and identifying characteristics of subgroups at low risk for developing CVD (in whom preventive measures may be unnecessary). Minority representation is sufficient to assess black-white differences.

Obligations

Funding History:

Fiscal Year 2004—\$1,557,410

Fiscal Years 1988-2003—\$72,602,830

Total Funding to Date—\$74,160,240

Current Active Organizations and Contract Numbers

1. The Johns Hopkins University
Baltimore, Maryland —HC-15103
2. University of Wisconsin
Madison, Wisconsin —HC-75150
3. University of Washington
Seattle, Washington —HC-85079

4. Wake Forest University
Winston-Salem, North Carolina —HC-85080
5. The Johns Hopkins University
Baltimore, Maryland —HC-85081
6. University of Pittsburgh
Pittsburgh, Pennsylvania —HC-85082
7. University of California, Davis
Davis, California —HC-85083
8. University of Vermont
Burlington, Vermont —HC-85086

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

The purpose of this study is to increase understanding of contributors to changes in CVD risk factors that occur during the critical years of transition from adolescence through young adulthood to middle age in a cohort of black and white young adults, aged 18 to 30 years in 1985-1986. Currently, CARDIA is addressing questions about lifestyle/psychosocial/socioeconomic risk factors, race, genes, and inflammation in relation to subclinical CVD.

Obligations

Funding History:

Fiscal Year 2004—\$10,373,960

Fiscal Years 1984-2003—\$60,197,437

Total Funding to Date—\$70,571,397

Current Active Organizations and Contract Numbers

1. Harbor-UCLA Research and Education Institute
Torrance, California —HC-05187
2. University of California at Irvine
Irvine, California —HC-45134
3. New England Medical Center Hospitals, Inc.
Boston, Massachusetts —HC-45204
4. Wake Forest University Health Sciences
Winston-Salem, North Carolina —HC-45205
5. University of Alabama at Birmingham
Birmingham, Alabama —HC-48047
6. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HC-48048

7. Northwestern University
Chicago, Illinois —HC-48049
8. Kaiser Permanente Division of Research
Oakland, California —HC-48050
9. 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 2004—\$4,000,000

Total Funding to Date—\$4,000,000

Current Active Organizations and Contract Numbers

1. Constella Group, Inc.
Bethesda, Maryland —HV-48193
2. University of Washington
Seattle, Washington —HV-48194
3. The Johns Hopkins University
Baltimore, Maryland —HV-48195
4. Center for the Advancement of Genetics, Inc.
Rockville, Maryland —HV-48196

Framingham Study

The original Framingham 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 500 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 3,500 grandchildren has been added to permit examination of numerous hypotheses about the familial clustering of 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 2004—\$6,018,417

Fiscal Years 1983-2003—\$56,148,221

Total Funding to Date—\$62,166,638

Current Active Organizations and Contract Numbers

1. Boston University Medical Center
Boston, Massachusetts —HC-25195

2. Boston University Medical Center
Boston, Massachusetts —HC-38038

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 recruitment, cohort retention, and scientific productivity of the existing Jackson site of the ARIC study; building research capabilities at minority institutions; developing partnerships between minority and majority institutions; and expanding minority investigator participation in large-scale epidemiologic studies.

* Additional funding is provided by the National Center on Minority Health and Health Disparities (NCMHD).

Obligations

Funding History:

Fiscal Year 2004—\$378,854*

Fiscal Years 1998-2003—\$14,291,000

Total Funding to Date—\$14,669,854

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

Mammalian Genotyping Service (MGS), Initiated in Fiscal Year 1994

The MGS provides genotyping to meritorious projects involving humans, mice, rats, zebrafish, and dogs in all disease areas. It provides genome-wide screens, using short tandem repeat polymorphisms, to assist in finding genes associated with health and disease. Currently, the capacity of the MGS is 7.7 million genotypes per year.

Obligations

Funding History:

Fiscal Year 2004—\$3,600,000

Fiscal Years 1994-2003—\$21,519,750

Total Funding to Date—\$25,119,750

Current Active Organization and Contract Number

1. Marshfield Medical Research and Educational Foundation
Marshfield, Wisconsin —HV-48141

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.

Obligations

Funding History:

Fiscal Year 2004—\$5,528,000

Fiscal Years 1999-2003—\$48,741,999

Total Funding to Date—\$54,269,999

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. The 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. The Johns Hopkins University
Baltimore, Maryland —HC-95168
- 11. Harbor-UCLA Research and Education Institute
Los Angeles, California —HC-95169

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 2004—\$4,808,544

Total Funding to Date—\$4,808,544

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, blood, and sleep disorders and identifying targets for therapeutic interventions.

Obligations

Funding History:

Fiscal Year 2004—\$0

Fiscal Year 2002-2003—\$72,997,890
Total Funding to Date—\$72,997,890

Current Active Organizations and Contract Numbers

1. Boston University
Boston, Massachusetts —HV-28178
2. Institute for Systems Biology
Seattle, Washington —HV-28179
3. The 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

Translational Behavioral Science Research Consortium, Initiated in Fiscal Year 2002

The purpose of this program is to establish a consortium of interdisciplinary basic and applied social scientists to conduct research related to developing and testing theories from the behavioral or social sciences concerning cognitive, affective, motivational, developmental, and other factors and processes underlying human behavior. Acquired knowledge will be used to develop and test methods to encourage individuals to adopt and maintain a healthy lifestyle and manage behavioral risk factors for heart, lung, and blood diseases and sleep disorders.

Obligations

Funding History:

Fiscal Year 2004—\$4,312,876
Fiscal Year 2002-2003—\$10,000,000
Total Funding to Date—\$14,312,876

Current Active Organizations and Contract Numbers

1. Weill Medical College of Cornell University
New York, New York —HC-25196
2. Mount Sinai School of Medicine
New York, New York —HC-25197

Lung Diseases Program

Lung Tissue Resource Consortium, Initiated in Fiscal Year 2004

The purpose of this program is to establish a resource 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 will be on COPD and idiopathic pulmonary fibrosis.

Obligations

Funding History:

Fiscal Year 2004—\$3,999,995

Total Funding to Date—\$3,999,995

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. University of Colorado Health Science Center
Denver, Colorado —HR-46160
4. Mayo Clinic College of Medicine
Rochester, New York —HR-46161
5. University of Michigan
Ann Arbor, Michigan —HR-46162
6. University of Pittsburgh
Pittsburgh, Pennsylvania —HR-46163
7. Clinical Trials and Survey Corporation
Baltimore, Maryland —HR-46164

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 2004—\$300,000

Fiscal Year 2003—\$2,700,000

Total Funding to Date—\$3,000,000

Current Active Organization and Contract Number

1. University of California, San Diego
La Jolla, California —HR-36157

Blood Diseases and Resources Program

Hemochromatosis and Iron Overload Screening Study (HEIRS), Initiated in Fiscal Year 2000

The purpose of this project is to determine the prevalence of iron overload and hereditary hemochromatosis and to study genetic and environmental determinants and potential clinical, personal, and societal impact of the disorder.

Obligations

Funding History:

Fiscal Year 2004—\$2,046,635

Fiscal Years 2000-2003—\$23,932,652

Total Funding to Date—\$25,979,287

Current Active Organizations and Contract Numbers

1. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HC-05185
2. Howard University
Washington, DC —HC-05186
3. University of Alabama at Birmingham
Birmingham, Alabama —HC-05188
4. Kaiser Foundation Research Institute
Oakland, California —HC-05189
5. University of California at Irvine
Irvine, California —HC-05190

6. London Health Science Centre
Ontario, Canada —HC-05191

7. Wake Forest University
Winston-Salem, North Carolina —HC-05192

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 2004—\$0

Fiscal Years 1998-2003—\$5,603,820

Total Funding to Date—\$5,603,820

Current Active Organization and Contract Number

1. BBI-Biotech Research Laboratories, Inc.
Gaithersburg, Maryland —HB-87144

Refinement of New Assays for Direct Detection of Viral Nucleic Acids in Donated Organs, Initiated in Fiscal Year 2000

The objective of this program is to refine for clinical and blood bank use, one or more nucleic acid-based techniques to detect blood-borne viruses (HIV-1, hepatitis B virus, and hepatitis C virus) in donors of organs for transplantation. The goal is to reduce the antibody-negative window between infectivity and detection to the shortest possible time.

Obligations

Funding History:

Fiscal Year 2004—\$4,300,029

Fiscal Years 2000-2003—\$11,221,950

Total Funding to Date—\$15,521,979

Current Active Organization and Contract Number

1. Gen-Probe, Inc.
San Diego, California —HB-07148

Retrovirus Epidemiology Donor Study (REDS), Initiated in Fiscal Year 1989

This program was established to determine the prevalence of retrovirus positivity in blood donors, a majority of whom are minority. Researchers are evaluating the demographic, risk

factor, and behavioral characteristics of blood donors with high risks who continue to donate. A blood specimen repository also is being established as a mechanism for evaluating new tests for known viruses and as a sentinel for as-yet-unrecognized viruses.

Obligations

Funding History:

Fiscal Year 2004—\$5,000,000

Fiscal Years 1989-2003—\$68,774,125

Total Funding to Date—\$73,774,125

Current Active Organizations and Contract Numbers

1. University of California, San Francisco
San Francisco, California —HB-47114
2. Oklahoma Blood Institute
Oklahoma City, Oklahoma —HB-97078
3. Blood Center of Southeastern Wisconsin
Milwaukee, Wisconsin —HB-47168
4. American Red Cross Blood Services
Dedham, Massachusetts —HB-47169
5. Emory University
Atlanta, Georgia —HB-47170
6. University of Cincinnati
Cincinnati, Ohio —HB-47171
7. Institute for Transfusion Medicine
Pittsburgh, Pennsylvania —HB-47172
8. University of California, San Francisco
San Francisco, California —HB-47174
9. Westat, Inc.
Rockville, Maryland —HB-47175
10. American Red Cross Greater Chesapeake and Potomac Region
Baltimore, Maryland —HB-97079
11. American Red Cross Southern California
Los Angeles, California —HB-97080
12. American Red Cross Southeastern Michigan
Region Detroit, Michigan —HB-97081
13. Westat, Inc.
Rockville, Maryland —HB-97082

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 2004—\$5,638,502

Fiscal Year 2003—\$4,095,764

Total Funding to Date—\$9,734,266

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

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 1994–2004

Research Grants and Cooperative Agreements (Dollars in Thousands)

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Heart and Vascular Diseases											
Program on Surgical Control of Hyperlipidemias (POSCH)	500	538	566	294							
Emory Angioplasty Versus Surgery Trial (EAST)	288	296	296								
Asymptomatic Carotid Artery Plaque Study (ACAPS)		66	70								
Infant Heart Surgery: Central Nervous System Sequelae of Circulatory Arrest	516	598	699	685	582	584	392	75			
Prevention of Early Readmission in Elderly Congestive Heart Failure Patients	77										
MRFIT Follow-up and Analysis	418										
Multicenter Unsustained Tachycardia Trial*	2,095	1,958	504								
Trial of Aspirin and Vitamin E in Nurses	1,488	1,426	1,434	1,473	1,536	1,530	1,594				
Diet and Exercise for Elevated Risk (DEER)	703										
Cardiovascular Risk Factors and the Menopause	601	451	478	494	528	186					
Sodium Sensitivity in African Americans	97	249									
Montreal Heart Attack Readjustment Trial (M-HART)	340										
Stress Reduction in Elderly Blacks With Hypertension	338	321									
Trial of Nonpharmacologic Intervention in the Elderly (TONE)	796	729									
CABG Patch Trial*	3,117	1,344	988	1,171							

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Women's Antioxidant and Cardiovascular Study (WACS)	612	620	643	501	525	540	556	572	598	592	599
Oral Calcium in Pregnant Women With Hypertension	290	306	320	332							
Stress Reduction and Atherosclerotic CVD in Blacks	219	330	403	407	40	326	339	360	376	394	
Enalapril After Anthracycline Cardiotoxicity	587	647	707	724	789						
Stress and Anger Management for Blacks With Hypertension	221	232	241	250							
Estrogen Replacement and Atherosclerosis (ERA) Trial*	1,123	260	1,213	965	1,668	1,017					
Shock Trial: Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock?	1,070	1,022	1,008	826	874		440	362	298	291	296
HDL-Atherosclerosis Treatment Study	484	480	427	445	340		326				
Influence of Cardiopulmonary Bypass (CPB) Temperature on CABG Morbidity	118	107	118								
Women's Estrogen/Progestin Lipid Lowering Hormone Atherosclerosis Regression Trial (WELL-HART)*		798	508	1,196	1,269	1,131		32			
Mode Selection Trial in Sinus Node Dysfunction (MOST)*		2,163	1,857	2,096	1,700	2,879	1,136	154			
Antioxidants and Prevention of Early Atherosclerosis*		793	240	603							
Postmenopausal Hormone Therapy In Unstable Angina		253	258	264	271	276					
Estrogen and Graft Atherosclerosis Research Trial (EAGER)*			476	488	305		361	371			
Soy Estrogen Alternative Study (SEA)			219	217	221						
REMATCH Trial*				1,258	1,798	1,333	825	750			
Dietary Patterns, Sodium Intake, and Blood Pressure (DASH Sodium)* **				2,233	3,693	3,646	1,247	151	387	376	395
Sudden Cardiac Death in Heart Failure Trial (SCD-HeFT)*				1,571	1,667	1,709	1,698	1,798	1,412	1,930	
CVD Risk and Health in Post-Menopausal Phytoestrogen Users				631	662	574	244		304	152	

	Fiscal Year											
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	
Treatment of Hypertension With Two Exercise Intensities				359	474	473	481	420				
Prevention of Recurrent Venous Thromboembolism (PREVENT)					1,242	894	521	543	1,272			
PREMIER: Lifestyle Interventions for Blood Pressure Control*					2,234	3,425	3,595	2,925	1,505	0	0	
Azithromycin and Coronary Events Study (ACES)*					847	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		
Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics (BARI 2D)*							3,942	6,515	9,342	8,189	8,265	
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	
Reduction of Triglycerides in Women on HRT								708	746	555	544	
Women's Ischemia Syndrome Evaluation (WISE)* **								1,502	1,506	1,306	1,303	
ACE Inhibition and Novel Cardiovascular Risk Factors									694	656	602	
A CHF Trial Investigating Outcomes of Exercise (Action)*									7,471	9,582	7,973	
Clinical Trial of Dietary Protein on Blood Pressure*									655	610	612	
Home Automatic External Defibrillator Trial (HAT)*									3,567	5,433	4,264	
Perioperative Interventional Neuroprotection Trial (POINT)									553	553	562	
Stop Atherosclerosis in Native Diabetics Study (SANDS)*									2,410	2,165	2,107	
Surgical Treatment for Ischemic Heart Failure (STICH)*									5,709	4,495	1,613	

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Girls Health Enrichment Multisite Studies (GEMS)										2,461	2,400
Treatment of Depression Following Bypass Surgery										964	1,132
Heart and Vascular Diseases (continued)											
Weight Loss Maintenance (WLM)*										3,687	4,368
Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL)*											4,343
FREEDOM Trial: Future Revascularization Evaluation in Patients with Diabetes Mellitus: Optional Management of Multivessel Disease											3,663
IMMEDIATE Trial: Immediate Myocardial Metabolic Enhancement During Initial Assessment and Treatment in Emergency Care*											5,170
Subtotal, Heart and Vascular Diseases	16,098	15,987	13,673	19,483	23,265	29,111	26,578	22,996	45,253	50,163	52,377
Lung Diseases											
Emphysema: Physiologic Effects of Nutritional Support	155										
Cardiopulmonary Effects of Ibuprofen in Human Sepsis*	683										
Inhaled Beclomethasone to Prevent Chronic Lung Disease*	690	738	551	436							
Lung Health Study II* **	3,307	4,434	3,183	3,508	980						
Lung Health Study III* **					1,997	1,986	1,616	1,672	927		
Asthma Clinical Research Network (ACRN)* **					4,934	5,399	5,686	5,705	5,863		8,424
Fetal Tracheal Occlusion for Severe Diaphragmatic Hernia*						419	429	181			
Scleroderma Lung Study*						1,040	1,501	1,761	1,501	1,055	
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	0

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Randomized Trial to Reduce ETS in Children With Asthma							555	545	468	277	0
Apnea Positive Pressure Long-Term Efficacy Study (APPLES)*									3,224	3,021	3,110
Childhood Asthma Management Program—Continuation Study (CAMP—CS)/Phase 2* **										1,489	2,043
Clinical Trial of Acid Reflux Therapy in Asthma*										736	783
Impact of CPAP on Functional Outcomes in Milder Obstructive Sleep Apnea (CATNAP)										682	612
Outcomes of Sleep Disorders in Older Men										4,163	4,262
Supplemental Selenium and Vitamin E and Pulmonary Function										698	610
Early Antipseudomonal Therapy in Cystic Fibrosis*											1,064
Improving Asthma Care in Minority Children in Head Start											721
Subtotal, Lung Diseases	4,835	5,172	3,734	3,944	7,911	8,844	15,484	17,076	18,974	15,639	23,777
Blood Diseases and Resources											
Multicenter Study of Hydroxyurea in Patients With Sickle Cell Anemia—Phase II*	3,271	1,238									
Trial to Reduce Alloimmunization to Platelets (TRAP)—Extension***	2,510	1,246	263								
Stroke Prevention in Sickle Cell Anemia (STOP)*	2,751	3,257	2,435	2,584	2,036		293				
Pediatric Hydroxyurea in Sickle Cell Anemia (PED HUG)	146	250	260	270							
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

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Subtotal, Blood Diseases and Resources	8,678	5,991	2,958	2,854	2,036	0	4,493	4,877	4,917	5,772	6,066
Total, NHLBI	29,611	27,150	20,365	26,281	33,212	37,955	46,555	44,949	69,144	71,574	\$82,220

* Paid by U01/U10.

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

NHLBI Investigator-Initiated Clinical Trials, Fiscal Year 2004: Summary by Program

	Total Obligations Prior to FY 2004	FY 2004 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
A CHF Trial Investigating Outcomes of Exercise (ACTION)*	\$17,052,481	\$7,973,471	\$25,025,952
ACE Inhibition and Novel Cardiovascular Risk Factors	1,349,463	602,458	1,951,921
Angiotensin-II Blockade in Mitral Regurgitation	1,793,146	499,427	2,292,573
Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics (BARI 2D)*	27,988,936	8,265,037	36,253,973
Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL)*	0	4,343,389	4,343,389
Clinical Trial of Dietary Protein on Blood Pressure	1,265,418	611,758	1,877,176
Dietary Patterns, Sodium Intake, and Blood Pressure (DASH Sodium)*	11,732,933	395,068	12,128,001
FREEDOM Trial:Future Revascularization Evaluation in Patients with Diabetes Mellitus:Optimal Management of Multivessel Disease	0	3,663,095	3,663,095
Girls Health Enrichment Multi-Site Studies*	2,461,487	2,399,948	4,861,435
Heart Failure Adherence and Retention Trial (HART)	3,864,646	1,173,937	5,038,583
Hematocrit Strategy in Infant Heart Surgery*	2,215,845	492,411	2,708,256
Home Automatic External Defibrillator Trial (HAT)*	8,999,887	4,263,755	13,263,642
IMMEDIATE Trial:Immediate Myocardial Metabolic Enhancement During Initial Assessment and Treatment in Emergency Care*	0	5,170,411	5,170,411
Perioperative Interventional Neuroprotection Trial (POINT)	1,105,701	562,346	1,688,047
Reduction of Triglycerides in Women on HRT	2,010,214	544,281	2,554,495
Shock Trial:Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock?	6,189,213	295,949	6,485,162
Stop Atherosclerosis in Native Diabetics Study (SANDS)*	4,574,684	2,106,653	6,681,337
Surgical Treatment for Ischemic Heart Failure (STICH)*	10,204,028	1,613,058	11,817,086
Treatment of Depression Following Bypass Surgery	963,830	1,132,182	2,096,012
Weight Loss Maintenance (WLM)*	3,686,738	4,367,750	8,054,488
Women's Antioxidant and Cardiovascular Study (WACS)	6,344,116	598,635	6,942,751
Women's Ischemia Syndrome Evaluation (WISE)* **	4,314,911	1,302,449	5,617,360

	Total Obligations Prior to FY 2004	FY 2004 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
Subtotal, Heart and Vascular Diseases	129,488,841	52,377,468	181,866,309
Lung Diseases			
Apnea Positive Pressure Long-Term Efficacy Study (APPLES)*	6,244,439	3,109,570	9,354,009
Asthma Clinical Research Network (ACRN)*	27,584,539	8,424,129	36,008,668
Childhood Asthma Management Program II (CAMP II)*	1,489,491	2,043,311	3,532,802
Clinical Trial of Acid Reflux Therapy in Asthma*	736,466	783,078	1,519,544
Early Antipseudomonal Therapy in Cystic Fibrosis*	0	1,064,237	1,064,237
Impact of CPAP on Functional Outcomes in Milder Obstructive Sleep Apnea (CATNAP)	681,633	612,378	1,294,011
Improving Asthma Care for Minority Children in Head Start	0	721,025	721,025
Inhaled Nitric Oxide for Prevention of Chronic Lung Disease*	6,968,259	1,245,274	8,213,533
Inhaled Nitric Oxide in Prevention of Chronic Lung Disease*	6,732,859	903,335	7,636,194
Outcomes of Sleep Disorders in Older Men	4,162,661	4,261,833	8,424,494
Supplemental Selenium and Vitamin E and Pulmonary Function	698,489	609,585	1,308,074
Subtotal, Lung Diseases	55,298,836	23,777,755	79,076,591
Blood Diseases and Resources			
FOCUS*	1,639,478	1,795,724	3,435,202
Induction of Stable Chimerism for Sickle Cell Anemia*	1,541,037	550,666	2,091,703
Sibling Donor Cord Blood Banking and Transplantation*	3,731,256	1,352,571	5,083,827
Stroke Prevention in Sickle Cell Anemia (STOP 2)*	12,854,790	2,366,346	15,221,136
Subtotal, Blood Diseases and Resources	19,766,561	6,065,307	25,831,868
Total, NHLBI	\$204,554,238	\$82,220,530	\$286,774,768

* Paid by U01/U10

** Previously an Institute-Initiated Clinical Trial.

Institute-Initiated Clinical Trials: Fiscal Years 1994–2004 Contracts Dollars (Thousands)

Dollars (Thousands)

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Heart and Vascular Diseases											
Lipid Research Clinics	622	583	660	650	685						
Cardiac Arrhythmia Suppression Trial (CAST)	29										
Effects of Digitalis on Survival in Patients With Congestive Heart Failure	270	2,235									

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Asymptomatic Cardiac Ischemia Pilot Study (ACIP)	210	7									
Psychophysiological Investigations of Myocardial Ischemia (PIMI)	433	165									
Arterial Disease Multifactorial Intervention Trial (ADMIT)	2,341	395									
Raynaud's Treatment Study	2,532	1,664	221	19							
Antiarrhythmic vs. Implantable Defibrillator (AVID)	1,068	5,348	2,475		871	548					
Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT)	10,914	3,412	9,676	5,943	7,119		6,259	7,000	3,980	2,761	3,346
Activity Counseling Trial (ACT)	1,260	5,000		2,167	2,439						
Postmenopausal Estrogen/Progestin Interventions (PEPI)	600	1,305		3	170						
Enhancing Recovery in Coronary Heart Disease Patients (ENRICHED)		1,871	6,993	6,837	5,904	3,303	3,487	596	425	70	
Atrial Fibrillation Follow-up: Investigation in Rhythm Management (AFFIRM)		883	2,510	6,330		3,785	1,239	2,401	802		
Beta-Blocker Evaluation Survival Trial (BEST)		2,500	1,435	2,300	2,448						
Women's Angiographic Vitamin and Estrogen Trial (WAVE)			731	2,891	1,917	3,878	886	756		32	
Women's Ischemia Syndrome Evaluation (WISE)			1,577	133	2,932	856	1,424	10	50		
Prevention of Events With Angiotensin Converting Enzyme Inhibitor Therapy (PEACE)			3,632	2,838	2,836	2,850	5,988		2,849	558	
Magnesium in Coronaries (MAGIC)					1,169	2,009	1,243		238		
Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness (ESCAPE)					0	1,750	1,820		1,129		
Action to Control Cardiovascular Risk in Diabetes (ACCORD)						4,130	6,590		1,750	18,521	33,779
Public Access Defibrillation (PAD) Community Trial						2,923	2,414	3,058	1,101		
Aldosterone Antagonist for Treatment of Heart Failure											837
Subtotal, Heart and Vascular Diseases	20,279	25,368	29,910	40,111	38,490	26,032	31,350	13,821	12,324	21,942	37,962

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Lung Diseases											
Lung Health Study I	3,398	650	350								
Pediatric Pulmonary and Cardiac Complications of HIV Infection (P2C2)	10,550	2,627	4,033	668	1,979		315		113		
Institute-Initiated Clinical Trials: Fiscal Years 1994–2004											
Childhood Asthma Management Program (CAMP)	9,745	5,096	7,977	5,695		6,551	729	1,330	2,786	2,287	1,475
Acute Respiratory Distress Syndrome Clinical Network (ARDSNET)	1,800	4,170	4,337	4,510	4,880	6,837	5,587	2,667	1,502	4,402	5,517
National Emphysema Treatment Trial (NETT)				2,710	3,367	7,545	4,047	6,989	7,910	1,630	1,648
Feasibility of Retinoid Treatment in Emphysema (FORTE)						884	7,711		2,429	725	507
Subtotal, Lung Diseases	25,493	12,543	16,697	13,583	10,226	21,817	18,389	10,986	14,740	9,044	9,147
Blood Diseases and Resources											
Clinical Course of Sickle Cell Disease	2,390	4,375	376	205	2,144	350	106				
Penicillin Prophylaxis in Sickle Cell Disease (PROPS II)	226										
Anti-HIV Immunoglobulin (HIVIG) in Prevention of Maternal-Fetal HIV Transmission	3,016	1,819	706								
T-Cell Depletion in Unrelated Donor Marrow Transplantation	1,310	1,917	1,461	639	2,228	690	1,085	1,144	557	774	164
Viral Activation Transfusion Study (VATS)		5,000	5,647	2,353	1,668		339				
Cord Blood Stem Cell Transplantation Study (COBLT)			1,419	6,573	2,530	1,456	5,122	1,846	2,166	588	707
Multicenter Study of Hydroxyurea (MSH) in Sickle Cell Anemia Adult Follow-up			703	472	475	469			588	994	1,136
Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG)							1,606	405	3,100	1,112	1,964
Subtotal, Blood Diseases and Resources	6,942	3,111	10,312	10,242	9,045	2,965	8,258	3,395	6,411	3,468	3,971
Women's Health Initiative											
Subtotal, Women's Health Initiative						59,100	57,700	59,200	59,010	63,222	57,483
Total, NHLBI Clinical Trials Contracts	52,714	51,022	56,919	63,936	67,761	109,914	115,697	87,402	92,485	97,676	108,563

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Cooperative Agreements											
Heart and Vascular Diseases											
Trials of Hypertension Prevention (TOHP)	4,385	1,240	649								
Dietary Intervention Study in Children (DISC)	1,615	1,625	1,625	746							
Bypass Angioplasty Revascularization Investigation (BARI)	3,965	3,882	2,757	2,894	1,360	1,609	1,634	1,549	1,456		
Postmenopausal Estrogen/Progestin Interventions (PEPI)	1,109	584	331								
Child and Adolescent Trial for Cardiovascular Health (CATCH)	2,586	2,342	2,682	3,956	572	210					
Dietary Effects on Lipoproteins and Thrombogenic Activity (DELTA)	3,121	2,485	132	290							
Obesity Prevention in Young American Indians (PATHWAYS)	1,814	2,150	3,432	4,119	3,945	4,196	2,459				
Dietary Approaches to Stop Hypertension (DASH)	2,350	2,513	899								
Rapid Early Action for Coronary Treatment (REACT)	2,609	5,091	4,992	2,866	496						
Girls Health Enrichment Multisite Studies (GEMS)						2,282	2,365	2,877	2,713	2,461	
Trial of Activity for Adolescent Girls (TAAG)							5,274	4,831	5,919	5,828	6,350
Pediatric Cardiovascular Clinical Research Network								3,447	4,822	5,381	4,948
Clinical Research Consortium to Improve Resuscitation Outcome											6,886
Dynamic Assessment of Patient-Reported Chronic Disease Outcomes											1,010
Subtotal, Heart and Vascular Diseases	23,554	21,912	17,499	14,871	6,373	8,297	11,732	12,704	14,910	13,670	19,194
Lung Diseases											
Asthma Clinical Research Network (ACRN)*	3,694	3,640	4,526	4,479						8,181	8,424
Asthma and Pregnancy Studies	1,000	991	1,000	913							
Childhood Asthma Research and Education (CARE) Network						4,175	5,002	5,314	6,005	5,610	5,292
COPD Clinical Research Network										6,843	6,848

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Subtotal, Lung Diseases	4,694	4,631	5,526	5,392	0	4,175	5,002	5,314	6,005	20,634	20,564
Blood Diseases and Resources											
Thalassemia (Cooley's Anemia) Clinical Research Network							2,192	2,219	2,269	2,320	2,375
Blood and Marrow Transplant Clinical Research Network								5,360	5,899	5,950	5,292
Transfusion Medicine/Hemostasis Clinical Research Network									6,053	6,241	6,093
Subtotal, Blood Diseases and Resources							2,192	7,579	14,221	14,511	14,440
Total, NHLBI-Initiated Clinical Trials, Cooperative Agreements	28,248	26,543	23,025	20,263	6,373	12,472	18,926	25,597	35,136	48,815	54,198
Total, NHLBI-Initiated Clinical Trials	80,962	77,565	79,944	84,199	74,134	122,386	134,623	112,999	127,621	146,491	162,761

Institute-Initiated Clinical Trials, Fiscal Year 2004: Summary by Program

	Total Obligations Prior to FY 2004	Total FY 2004 Obligations	Total Obligations to Date
Contracts			
Heart and Vascular Diseases			
Action to Control Cardiovascular Risk in Diabetes (ACCORD)	30,990,133	33,779,345	64,769,478
Aldosterone Antagonists for Treatment of Heart Failure		837,227	837,227
Antihypertensive and Lipid-Lowering Treatment To Prevent Heart Attack Trial (ALLHAT)	79,824,059	3,346,000	83,170,059
Enhancing Recovery in Coronary Heart Disease Patients (ENRICHD)	29,486,924		29,486,924
Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness (ESCAPE)	4,699,537		4,699,537
Prevention of Events With Angiotensin Converting Enzyme Inhibitor Therapy (PEACE)	21,550,000		21,550,000
Subtotal, Heart and Vascular Diseases	166,550,653	37,962,572	204,513,225
Lung Diseases			
Acute Respiratory Distress Syndrome Clinical Network (ARDSNET)	40,692,155	5,516,811	46,208,966
Childhood Asthma Management Program (CAMP)	54,845,605	1,475,006	56,320,611
Feasibility of Retinoid Treatment in Emphysema (FORTE)	11,749,283	506,758	12,256,041
National Emphysema Treatment Trial (NETT)	34,198,310	1,648,000	35,846,310
Subtotal, Lung Diseases	141,485,353	9,146,575	150,631,928

	Total Obligations Prior to FY 2004	Total FY 2004 Obligations	Total Obligations to Date
Blood Diseases and Resources			
Cord Blood Stem Cell Transplantation Study (COBLT)	31,699,365	707,000	32,406,365
Multicenter Study of Hydroxyurea (MSH) in Sickle Cell Anemia Adult Follow-up	3,700,743	1,136,093	4,836,836
Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG)	6,223,568	1,963,630	8,187,198
T-Cell Depletion in Unrelated Donor Marrow Transplantation	11,804,918	163,598	11,968,516
Subtotal, Blood Diseases and Resources	53,428,594	3,970,321	57,398,915
Women's Health Initiative			
Subtotal, Women's Health Initiative	615,132,161	57,483,316	672,615,477
Total, NHLBI-Initiated Clinical Trials, Contracts	976,596,761	108,562,784	1,085,159,545
Cooperative Agreements			
Heart and Vascular Diseases			
Clinical Research Consortium to Improve Resuscitation Outcome		6,886,109	6,886,109
Dynamic Assessment of Patient-Reported Chronic Disease Outcomes		1,009,694	1,009,694
Pediatric Cardiovascular Clinical Research Network	13,650,229	4,947,982	18,598,211
Trial of Activity for Adolescent Girls (TAAG)	21,853,035	6,349,902	28,202,937
Subtotal, Heart and Vascular Diseases	35,503,264	19,193,687	54,696,951
Lung Diseases			
Asthma Clinical Research Network	8,181,429	8,424,129	16,605,558
Childhood Asthma Research and Education (CARE) Network	26,106,032	5,292,305	31,398,337
COPD Clinical Research Network	6,843,405	6,848,345	13,691,750
Subtotal, Lung Diseases	41,130,866	20,564,779	61,695,645
Blood Diseases and Resources			
Blood and Marrow Transplant Clinical Research Network	17,209,287	5,972,521	23,181,808
Thalassemia (Cooley's Anemia) Clinical Research Network	8,999,883	2,374,805	11,374,688
Transfusion Medicine/Hemostasis Clinical Research Network	12,293,630	6,092,846	18,386,476
Subtotal, Blood Diseases and Resources	38,502,800	14,440,172	52,942,972
Total, NHLBI-Initiated Clinical Trials, Cooperative Agreements	115,136,930	54,198,638	169,335,568
Total, NHLBI-Initiated Clinical Trials	1,091,733,691	162,761,422	1,254,495,113

Heart and Vascular Diseases Program

Action to Control Cardiovascular Risk in Diabetes (ACCORD), Initiated in Fiscal Year 1999

The purpose of this study is to evaluate 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 patients with Type 2 diabetes mellitus. The primary outcome measure is CVD mortality or major morbidity (MI and stroke). A vanguard phase of about 1,000 participants was completed in FY 2002, and the main trial proceeded in FY 2003.

Obligations

Funding History:

Fiscal Year 2004—\$33,779,345

Fiscal Years 1999–2003—\$30,990,133

Total Funding to Date—\$64,769,478

Current Active Organizations and Contract Numbers

1. Veteran Affairs Medical Center, Albuquerque
Albuquerque, New Mexico —HC-10100
2. Veteran 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

Aldosterone Antagonists for Treatment of Heart Failure, 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 2004—\$837,227

Total Funding to Date—\$837,227

Current Active Organization and Contract Number

1. New England Research Institutes, Inc.
Watertown, Massachusetts —HC-45207

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

The ALLHAT is a practice-based, randomized clinical trial to determine whether combined incidence of fatal CHD and nonfatal MI differs between diuretic-based and newer antihypertensive treatments (ACE inhibitor, calcium channel blocker, alpha blocker) in high-risk hypertensive patients. The objective of the lipid-lowering component of the study is to determine whether lowering serum cholesterol with an HMG CoA reductase inhibitor reduces the total mortality in a subset of hypertensive patients with moderately elevated LDL cholesterol. Because blacks and Hispanics are at high risk for hypertension and CHD, investigators recruited a high percentage of minorities into the study.

In February 2000, the alpha blocker arm of the study was discontinued at the recommendation of the Data Safety Monitoring Committee and an independent expert review committee because the CVD event rate was significantly greater among those patients compared to the control group.

Obligations

Funding History:

Fiscal Year 2004—\$3,346,000

Fiscal Years 1993–2003—\$79,824,059

Total Funding to Date—\$83,170,059

Current Active Organization and Contract Number

1. University of Texas Health Science Center
Houston, Texas —HC-35130

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 2004—\$6,886,109

Total Funding to Date—\$6,886,109

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

Dynamic Assessment of Patient-Reported Chronic Disease Outcomes, Initiated in Fiscal Year 2004

The purpose of this study, which emanates from a NIH Roadmap Initiative, is to develop a computerized system of patient-reported outcomes that will meet the needs of clinical researchers across a wide variety of chronic disorders and diseases. Investigators will develop and test a large bank of items measuring patient-reported outcomes; create a computerized adaptive testing system that will allow for efficient assessment of patient-reported outcomes in clinical research; and create a publicly available system that can be added to and modified periodically for clinical researchers.

Obligations

Funding History:

Fiscal Year 2004—\$1,009,694

Total Funding to Date—\$1,009,694

Current Active Organizations and Grant Numbers

1. University of Pittsburgh
Pittsburgh, Pennsylvania —AR-52155
2. Stanford University
Stanford, California —AR-52158
3. State University New York, Stony Brook
Stony Brook, New York —AR-52170
4. University of Washington
Seattle, Washington —AR-52171
5. Evanston Northwestern Healthcare
Evanston, Illinois —AR-52177
6. University of North Carolina at Chapel Hill
Chapel Hill, North Carolina —AR-52181
7. Duke University
Durham, North Carolina —AR-52186

Enhancing Recovery in Coronary Heart Disease Patients (ENRICHD), Initiated in Fiscal Year 1995

The objective of this multicenter, randomized clinical trial was to test whether treating symptoms of depression and low social support with cognitive behavior therapy and selective serotonin reuptake inhibitors immediately after MI reduces morbidity and mortality. The primary endpoint was a combination of reinfarction and death. Secondary outcomes included changes in cardiovascular mortality, depression, social support, and quality of life. The cohort included 34 percent minorities. Results showed that the treatment did not lower mortality or the risk of a

second heart attack. However, the intervention reduced patients' depression and increased their level of social support.

Obligations

Funding History:

Fiscal Year 2004—\$0

Fiscal Years 1995–2003—\$29,486,924

Total Funding to Date—\$29,486,924

Current Active Organizations and Contract Numbers

1. University of North Carolina at Chapel Hill
Chapel Hill, North Carolina —HC-55140
2. Duke University
Durham, North Carolina —HC-55142
3. Washington University
St. Louis, Missouri —HC-55146

Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness (ESCAPE), Initiated in Fiscal Year 1999

The purpose of this study was to compare the efficacy of pulmonary artery catheterization (PAC)-directed treatment strategy to a noninvasive treatment strategy on morbidity and mortality in patients with severe CHF. The results of the study showed that PAC did not significantly increase or decrease deaths or the number of days patients were hospitalized with severe heart failure.

Obligations

Funding History:

Fiscal Year 2004—\$0

Fiscal Years 1999–2003—\$4,699,537

Total Funding to Date—\$4,699,537

Current Active Organization and Contract Number

1. Duke University
Durham, North Carolina —HV-98177

Pediatric Cardiovascular Clinical Research 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 2004—\$4,947,982

Fiscal Years 2001–2003—\$13,650,229

Total Funding to Date—\$18,598,211

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

Prevention of Events With Angiotensin Converting Enzyme Inhibitor Therapy (PEACE), Initiated in Fiscal Year 1996

The purpose of this multicenter, randomized trial was to determine whether addition of an ACE inhibitor to standard therapy in patients with known coronary artery disease and preserved left ventricular function would prevent CVD mortality and reduce risk of MI and the need for revascularization. The results of the study showed that patients with coronary diseases and normal or mildly reduced heart function do not benefit from ACE inhibitors unless the drug is being used to treat another condition.

Obligations

Funding History:

Fiscal Year 2004—\$0

Fiscal Years 1996–2003—\$21,550,000

Total Funding to Date—\$21,550,000

Current Active Organization and Contract Number

1. The George Washington University Biostatistics Center
Rockville, Maryland —HC-65149

Trial of Activity for Adolescent Girls (TAAG), Initiated in Fiscal Year 2000

This community-based study is testing the effects of a school–community-linked intervention to prevent decline in physical activity and cardiorespiratory fitness seen during adolescence in girls. The study is being conducted in 36 schools; 43 percent of the population are minorities.

Obligations

Funding History:

Fiscal Year 2004—\$6,349,902

Fiscal Years 2000–2003—\$21,853,035

Total Funding to Date—\$28,202,937

Current Active Organizations and Grant Numbers

1. University of Minnesota, Twin Cities,
Minneapolis, Minnesota —HL-066845
2. University of South Carolina
Columbia, South Carolina —HL-066852
3. University of North Carolina at Chapel Hill
Chapel Hill, North Carolina —HL-066853
4. Tulane University
New Orleans, Louisiana —HL-066855
5. San Diego State University
San Diego, California —HL-066856
6. The Johns Hopkins University
Baltimore, Maryland —HL-066857
7. University of Arizona
Tucson, Arizona —HL-066858

Lung Diseases Program

Acute Respiratory Distress Syndrome Clinical Network (ARDSNET), Initiated in Fiscal Year 1994

The objective of this network is to test new therapeutic agents with a potential for improving the outcome of patients with ARDS and those at risk of developing ARDS.

Obligations

Funding History:

Fiscal Year 2004—\$5,516,811

Fiscal Years 1994–2003—\$40,692,155

Total Funding to Date—\$46,208,966

Current Active Organizations and Contract Numbers

1. Vanderbilt University
Nashville, Tennessee —HR-46054
2. University of Washington
Seattle, Washington —HR-46055
3. Duke University Medical Center
Durham, North Carolina —HR-46056
4. University of Michigan at Ann Arbor
Ann Arbor, Michigan —HR-46057
5. University of Pennsylvania Hospital
Philadelphia, Pennsylvania —HR-46058
6. University of California, San Francisco
San Francisco, California —HR-46059
7. Cleveland Clinic Foundation
Cleveland, Ohio —HR-46060
8. University of Colorado
Denver, Colorado —HR-46061
9. Latter Day Saints Hospital
Salt Lake City, Utah —HR-46062
10. University of Maryland
Baltimore, Maryland —HR-46063
11. Coordinating Center Massachusetts General Hospital
Boston, Massachusetts —HR-46064
12. Baylor College of Medicine
Houston, Texas —HR-16146
13. Baystate Medical Center
Springfield, Massachusetts —HR-16147
14. University of British Columbia
Vancouver, Canada —HR-16148

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| 15. University of Chicago
Chicago, Illinois | —HR-16149 |
| 16. Louisiana State University
New Orleans, Louisiana | —HR-16150 |
| 17. University of Pittsburgh
Pittsburgh, Pennsylvania | —HR-16152 |
| 18. University of Texas
San Antonio, Texas | —HR-16153 |
| 19. University of Virginia
Charlottesville, Virginia | —HR-16154 |
| 20. Wake Forest University
Winston-Salem, North Carolina | —HR-16155 |

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

The purpose of this network is to evaluate current and novel therapies and management strategies for adult asthma and to ensure that findings are rapidly disseminated to the medical community. Approximately 33 percent of the participants will be minorities.

Obligations

Funding History:

Fiscal Year 2004—\$8,424,129

Fiscal Year 2003—\$8,181,429

Total Funding to Date—\$16,605,558

Current Active Organizations and Grant Numbers

- | | |
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| 1. National Jewish Medical and Research Center
Denver, Colorado | —HL-074073 |
| 2. University of California, San Francisco
San Francisco, California | —HL-074204 |
| 3. University of Pittsburgh
Pittsburgh, Pennsylvania | —HL-074206 |
| 4. Washington University
St. Louis, Missouri | —HL-074208 |
| 5. University of Wisconsin
Madison, Wisconsin | —HL-074212 |
| 6. University of California, San Diego
La Jolla, California | —HL-074218 |

7. Wake Forest University Health Sciences
Winston-Salem, North Carolina —HL-074225

8. Brigham and Women's Hospital
Boston, Massachusetts —HL-074227

9. Pennsylvania State University Hershey Medical Center
Hershey, Pennsylvania —HL-074231

Childhood Asthma Management Program (CAMP), Initiated in Fiscal Year 1991

The purpose of this study is to evaluate the long-term effects of anti-inflammatory therapy compared to bronchodilator therapy on the course of asthma, particularly on lung function and bronchial hyperresponsiveness, and on physical and psychosocial growth and development. Results showed that 4 ½ to 6 years of daily treatment with inhaled corticosteroids was safe and provided superior control of asthma compared to a different antiinflammatory medication or treatment only when symptoms occurred. The CAMP study will continue to observe the children for 5 years to determine the effect of early treatment on maximum lung growth and on height.

Obligations

Funding History:

Fiscal Year 2004—\$1,475,006

Fiscal Years 1991–2003—\$54,845,605

Total Funding to Date—\$56,320,611

Current Active Organizations and Contract Numbers

1. The Johns Hopkins University
Baltimore, Maryland —HR-16044

2. University of California, San Diego
La Jolla, California —HR-16045

3. University of New Mexico
Albuquerque, New Mexico —HR-16046

4. Hospital for Sick Children
Toronto, Ontario —HR-16047

5. National Jewish Medical and Research Center
Denver, Colorado —HR-16048

6. Brigham and Women's Hospital
Boston, Massachusetts —HR-16049

7. Asthma, Inc.
Seattle, Washington —HR-16050

8. Washington University
St. Louis, Missouri —HR-16051

9. The Johns Hopkins University
Baltimore, Maryland —HR-16052

Childhood Asthma Research and Education (CARE) Network, Initiated in Fiscal Year 1999

The purpose of this clinical network is to evaluate current and novel therapies and management strategies for children with asthma. Emphasis is on clinical trials that help identify optimal therapy for children with different asthma phenotypes, genotypes, and ethnic backgrounds and children at different developmental stages.

Obligations

Funding History:

Fiscal Year 2004—\$5,292,305

Fiscal Years 1999–2003—\$26,106,032

Total Funding to Date—\$31,398,337

Current Active Organizations and Grant Numbers

1. Washington University
St. Louis, Missouri —HL-064287

2. National Jewish Medical and Research Center
Denver, Colorado —HL-064288

3. University of California, San Diego
La Jolla, California —HL-064295

4. University of Wisconsin
Madison, Wisconsin —HL-064305

5. University of Arizona
Tucson, Arizona —HL-064307

6. Pennsylvania State University
Hershey, Pennsylvania —HL-064313

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 2004—\$6,848,345

Fiscal Year 2003—\$6,843,405
Total Funding to Date—\$13,691,750

Current Active Organizations and Grant Numbers

1. Harbor-UCLA Research and Education Institute
Torrance, California —HL-074407

2. Denver Health and Hospital Authority
Denver, Colorado —HL-074409

3. Minnesota Veterans Research Institute
Minneapolis, Minnesota —HL-074416

4. University of Alabama at Birmingham
Birmingham, Alabama —HL-074418

5. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HL-074424

6. Brigham and Women's Hospital
Boston, Massachusetts —HL-074428

7. University of California, San Francisco
San Francisco, California —HL-074431

8. University of Maryland Baltimore Professional School
Baltimore, Maryland —HL-074441

Feasibility of Retinoid Treatment in Emphysema (FORTE), Initiated in Fiscal Year 1999

The purpose of this program is to conduct preliminary studies to identify optimal patient populations, drugs and dosing schedules, and outcome measures before conducting a larger clinical trial on retinoid treatment for emphysema.

Obligations

Funding History:

Fiscal Year 2004—\$506,758
Fiscal Years 1999–2003—\$11,749,283
Total Funding to Date—\$12,256,041

Current Active Organizations and Contract Numbers

1. University of Minnesota, Twin Cities,
Minneapolis, Minnesota —HR-96140

2. Boston University
Boston, Massachusetts —HR-96141

3. University of Pittsburgh
Pittsburgh, Pennsylvania —HR-96142
4. University of California, Los Angeles
Los Angeles, California —HR-96143
5. University of California, San Diego
La Jolla, California —HR-96144
6. Columbia University
New York, New York —HR-96145

National Emphysema Treatment Trial (NETT), Initiated in Fiscal Year 1997

The NETT is a multicenter trial designed to evaluate the efficacy and role of lung volume reduction surgery (a procedure in which part of the lung is removed in an attempt to improve breathing) in the treatment of severe emphysema. If surgery proves to be effective, a major secondary objective is to determine which patients are most likely to benefit.

Obligations

Funding History:

Fiscal Year 2004—\$1,648,000

Fiscal Years 1997–2003—\$34,198,310

Total Funding to Date—\$35,846,310

Current Active Organizations and Contract Numbers

1. Baylor College of Medicine
Houston, Texas —HR-76101
2. Brigham and Women’s Hospital
Boston, Massachusetts —HR-76102
3. University of California, San Diego
La Jolla, California —HR-76103
4. Cedars-Sinai Medical Center
Los Angeles, California —HR-76104
5. Cleveland Clinic Foundation
Cleveland, Ohio —HR-76105
6. Columbia University
New York, New York —HR-76106
7. Duke University Medical Center
Durham, North Carolina —HR-76107
8. University of Maryland
Baltimore, Maryland —HR-76108

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| 9. Mayo Foundation
Rochester, Minnesota | —HR-76109 |
| 10. University of Michigan at Ann Arbor
Ann Arbor, Michigan | —HR-76110 |
| 11. National Jewish Medical and Research Center
Denver, Colorado | —HR-76111 |
| 12. The Ohio State University
Columbus, Ohio | —HR-76112 |
| 13. University of Pennsylvania
Philadelphia, Pennsylvania | —HR-76113 |
| 14. University of Pittsburgh
Pittsburgh, Pennsylvania | —HR-76114 |
| 15. Saint Louis University
St. Louis, Missouri | —HR-76115 |
| 16. Temple University
Philadelphia, Pennsylvania | —HR-76116 |
| 17. University of Washington
Seattle, Washington | —HR-76118 |
| 18. The Johns Hopkins University
Baltimore, Maryland | —HR-76119 |

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 2004—\$5,972,521

Fiscal Years 2001–2003—\$17,209,287

Total Funding to Date—\$23,181,808

Current Active Organizations and Grant Numbers

- | | |
|---|------------|
| 1. University of Nebraska Medical Center
Omaha, Nebraska | —HL-069233 |
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2. Fred Hutchinson Cancer Research Center
Seattle, Washington —HL-069246
3. Dana Farber Cancer Institute
Boston, Massachusetts —HL-069249
4. Children's Mercy Hospital
Kansas City, Missouri —HL-069254
5. University of California, San Diego
La Jolla, California —HL-069273
6. Duke University
Durham, North Carolina —HL-069274
7. City of Hope Medical Center
Duarte, California —HL-069278
8. University of Pennsylvania
Philadelphia, Pennsylvania —HL-069286
9. University of Minnesota, Twin Cities,
Minneapolis, Minnesota —HL-069290
10. Stanford University
Stanford, California —HL-069291
11. Medical College of Wisconsin
Milwaukee, Wisconsin —HL-069294
12. University of Florida
Gainesville, Florida —HL-069301
13. The Johns Hopkins University
Baltimore, Maryland —HL-069310
14. Sloan Kettering Institute for Cancer Research
New York, New York —HL-069315
15. University of Michigan
Ann Arbor, Michigan —HL-069330
16. Case Western Reserve University
Cleveland, Ohio —HL-069348

Cord Blood Stem Cell Transplantation Study (COBLT), Initiated in Fiscal Year 1996

This multicenter study is designed to show whether umbilical cord blood stem cell transplants from unrelated, newborn donors are a safe and efficient alternative to bone marrow transplantation for children and adults with a variety of cancers, blood diseases, and genetic disorders.

Obligations

Funding History:

Fiscal Year 2004—\$707,000

Fiscal Years 1996–2003—\$31,699,365

Total Funding to Date—\$32,406,365

Current Active Organizations and Contract Numbers

1. The EMMES Corporation
Potomac, Maryland —HB-67132
2. Dana Farber Cancer Institute
Boston, Massachusetts —HB-67133
3. Fred Hutchinson Cancer Research Center
Seattle, Washington —HB-67134
4. University of California, Los Angeles
Los Angeles, California —HB-67135
5. Indiana University
Indianapolis, Indiana —HB-67137
6. Duke University Medical Center
Durham, North Carolina —HB-67138
7. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HB-67139
8. Duke University Medical Center
Durham, North Carolina —HB-67141
9. University of California, Los Angeles
Los Angeles, California —HB-67142

Multicenter Study of Hydroxyurea (MSH) in Sickle Cell Anemia Adult Follow-up, Initiated in Fiscal Year 1996

The purpose of this trial is to determine the long-term effects of hydroxyurea. Patients were examined annually to determine their health status, quality of life, incidence of malignancies, and birth defects in their offspring(s). Mortality rates from this cohort were compared to mortality

data from the CSSCD cohort and the normal black population mortality. Results showed that patients who took hydroxyurea over a 9-year period experienced a 40 percent reduction in deaths. Improved survival was related to benefits of drug therapy—an increase in fetal hemoglobin level and reduced episodes of severe pain “crises” and acute chest syndrome.

Obligations

Funding History:

Fiscal Year 2004—\$1,136,093

Fiscal Years 1996–2003—\$3,700,743

Total Funding to Date—\$4,836,836

Current Active Organization and Contract Number

1. Maryland Medical Research Institute
Baltimore, Maryland —HB-67129

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 2004—\$1,963,630

Fiscal Years 2000–2003—\$6,223,568

Total Funding to Date—\$8,187,198

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. The Johns Hopkins University
Baltimore, Maryland —HB-07153

5. Medical University of South Carolina
Charleston, South Carolina —HB-07154

6. St. Jude Children’s Research Hospital
Memphis, Tennessee —HB-07155

7. The Research Foundation of SUNY
New York, New York —HB-07156

8. University of Miami
Miami, Florida —HB-07157
9. University of Mississippi Medical Center
Jackson, Mississippi —HB-07158
10. University of Texas Southwestern Medical Center
Dallas, Texas —HB-07159
11. Clinical Trials and Surveys Corporation
Baltimore, Maryland —HB-07160

T-Cell Depletion in Unrelated Donor Marrow Transplantation, Initiated in Fiscal Year 1994

The purpose of this randomized multicenter clinical trial is to determine whether a reduction in morbidity and mortality from acute and chronic graft-versus-host disease can be achieved without a counterbalancing increase in relapse of leukemia in patients receiving an unrelated donor marrow transplant.

Obligations

Funding History:

Fiscal Year 2004—\$163,598

Fiscal Years 1994–2003—\$11,804,918

Total Funding to Date—\$11,968,516

Current Active Organizations and Contract Numbers

1. The EMMES Corporation
Potomac, Maryland —HB-47094
2. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HB-47095
3. University of Kentucky
Lexington, Kentucky —HB-47097
4. Sloan-Kettering Institute for Cancer Research
New York, New York —HB-47098

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 2004—\$2,374,805

Fiscal Years 2000–2003—\$8,999,883

Total Funding to Date—\$11,374,688

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 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 2004—\$6,092,846

Fiscal Years 2002–2003—\$12,293,630

Total Funding to Date—\$18,386,476

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. The 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
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

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: a randomized controlled clinical trial 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.

Obligations

Funding History:

Fiscal Year 2004—\$57,483,316

Fiscal Years 2000–2003—\$615,132,161 (This figure reflects funding for the clinical trials and observational studies only. From 1992–98, major support was provided through the Office of the Director, NIH. The Community Prevention Study receives funding through an interagency agreement with the CDC: \$4,000,000 in FY 1999 and \$12,000,000 from FY 1996–98.)

Total Funding to Date—\$672,615,477

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. University of Medicine and Dentistry of New Jersey
Newark, New Jersey —WH-32110
11. Emory University
Atlanta, Georgia —WH-32111
12. University of Pittsburgh
Pittsburgh, Pennsylvania —WH-32112

13. University of California, Davis
Davis, California —WH-32113
14. University of Arizona
Tucson, Arizona —WH-32115
15. University of Tennessee
Memphis, Tennessee —WH-32118
16. Memorial Hospital of Rhode Island
Pawtucket, Rhode Island —WH-32119
17. University of California, San Diego,
La Jolla, California —WH-32120
18. State University of New York at Buffalo,
Buffalo, New York —WH-32122
19. American College of Obstetricians and Gynecologists
Washington, DC —WH-34205
20. University of California, Irvine,
Irvine, California —WH-42107
21. The George Washington University,
Washington, DC —WH-42108
22. Stanford University
Stanford, California —WH-42109
23. Baylor College of Medicine,
Houston, Texas —WH-42110
24. University of Texas Health Science Center
San Antonio, Texas —WH-42111
25. The Ohio State University,
Columbus, Ohio —WH-42112
26. University of Nevada School of Medicine
Reno, Nevada —WH-42113
27. Kaiser Foundation Research Institute
Oakland, California —WH-42114
28. State University of New York at Stony Brook
Stony Brook, New York —WH-42115
29. University of Massachusetts Medical School,
Worcester, Massachusetts —WH-42116

30. University of North Carolina at Chapel Hill
Chapel Hill, North Carolina —WH-42117
31. Wayne State University
Detroit, Michigan —WH-42118
32. Albert Einstein College of Medicine,
New York, New York —WH-42119
33. Harbor-UCLA Research and Education Institute
Torrance, California —WH-42120
34. Kaiser Foundation Research Institute
Oakland, California —WH-42121
35. Medical College of Wisconsin,
Milwaukee, Wisconsin —WH-42122
36. Medlantic Research Institute,
Washington, DC —WH-42123
37. Rush-Presbyterian-St. Luke's Medical Center
Chicago, Illinois —WH-42124
38. University of California, Los Angeles School of Medicine,
Los Angeles, California —WH-42125
39. University of Cincinnati Medical Center
Cincinnati, Ohio —WH-42126
40. University of Florida College of Medicine
Gainesville, Florida —WH-42129
41. University of Hawaii at Manoa,
Honolulu, Hawaii —WH-42130
42. University of Miami
Miami, Florida —WH-42131
43. University of Wisconsin
Madison, Wisconsin —WH-42132

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 in order to compare health status between various populations, but also given high priority to programs that focus exclusively on minority health issues.

Since FY 1991, the Institute has had procedures in place to ensure full compliance with the NIH Policy on Inclusion of Women and Minorities as Subjects in Clinical Research. As a result, all NHLBI-supported research that involves human subjects includes minorities, with the exception of a very few projects for which a compelling justification for limited diversity in the study population exists. Thus, all segments of the population, both minority and non-minority, 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 2004 activities addressing this goal include:

- **Minority K–12 Initiative for Teachers and Students (MKITS):** Supports research, development, and evaluation of innovative science training programs to provide minority students in grades K–12 with the exposure, skills, and knowledge that will encourage them to pursue advanced studies in biomedical and behavioral sciences.
- **Historically Black Colleges and Universities (HBCU) Research Scientist Award:** Supports efforts by HBCU to recruit an established research scientist in 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.
- **Summer for Sickle Cell Science Program:** As part of the Comprehensive Sickle Cell Centers program, supports research training and mentoring of individuals from high school to junior investigator level.
- **Student National Medical Association Externship in Sickle Cell Disease:** Supports an 8-week clinical rotation in SCD for third- and fourth-year medical students at an NHLBI-funded medical institution engaged in sickle cell research and patient care.
- **Research Scientist Award for Minority Institutions:** Strengthens the biomedical and behavioral research capabilities and resources of minority institutions by recruiting an established scientist with expertise in areas related to cardiovascular, lung, or blood health and disease; transfusion medicine; or sleep disorders.
- **Cultural Competence and Health Disparity Academic Award:** Enhances the ability of physicians and other health care professionals to reduce disparities—in a culturally sensitive manner—in cardiovascular, lung, and blood diseases, and sleep disorders among various population groups.
- **Partnership Programs To Reduce Cardiovascular Disparities:** Expand the capacity of research institutions to reduce health disparities, encourage more researchers to focus on minority health, and improve minority acceptance and community willingness to participate in research by pairing research-intensive medical centers that have a track record of NIH-supported research and patient care with minority health care serving institutions that lack a strong research program. Research will focus on the complex biological, behavioral, and

societal factors that result in cardiovascular health disparities in their target populations (e.g., African Americans, Hispanics, Native Hawaiians, and Pacific Islanders).

The Office of Minority Health Affairs (OMHA) within the OD 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 OMHA also coordinates activities to foster greater participation of underrepresented minorities in NHLBI research and research training programs. Selected FY 2004 activities include:

- Issuing four minority training and career development RFAs to increase the number of highly trained minority individuals conducting biomedical and behavioral research.
- Participating in HHS-Endorsed Minority Organization Internship Programs by providing positions in NHLBI extramural divisions to students from the National Association for Equal Opportunity in Higher Education, the Hispanic Association of Colleges and Universities, and the Washington Internships for Native Students programs.
- 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 youngsters 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 Tougaloo College Scholars the opportunity to observe biomedical research at the NHLBI during a 3-day tour of the NIH that included learning about the NIH and available research training opportunities.

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 through 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; 50 percent of the 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; 30 percent of the participants are black.
- **CHS** (see Chapter 10): To examine risk factors for CHD and stroke in the elderly; 16 percent of the participants are minorities.

- 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; 62 percent of the participants are minorities.
- 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.
- HEIRS (see Chapter 10): To determine the prevalence of hereditary hemochromatosis; to identify genetic and environmental determinants and potential clinical, personal, and societal impacts of iron overload in an adult population consisting of 28 percent blacks, 13 percent Asians, and 13 percent Hispanics.

Several investigator-initiated epidemiologic studies are examining gene–environment interactions that increase CVD risk factors among various racial groups. Included among them are studies that compare gene–environment interactions in black populations in Africa, the Caribbean, and selected areas of the United States; determine the genes responsible for CVD risk factor response to dietary fat changes in blacks; investigate genes influencing changes in blood pressure in response to high- and low-salt diets in a rural Chinese population; and identify and map specific genes that contribute to CVD risk in Mexican Americans.

A study of the etiology of atherosclerosis focusing on diet and oxidative mechanisms is examining new risk factors that promote or inhibit LDL damage and inflammatory responses in the artery wall. Investigators seek to determine the relationship between longitudinal change in atherosclerosis and dietary antioxidants, antioxidant enzymes, and genetic polymorphisms; 43 percent of the participants are Hispanic.

The NHLBI supports research on the impact of adolescent lifestyle on the development of CVD. One project being conducted in youths, half of whom are black, is assessing the influences of diet and exercise on adiposity and regional fat distribution and the subsequent relationship between the two factors and development of CVD. Another is tracking the development of cardiovascular, behavioral, and physiological risk factors in Hispanic children and adolescents.

An ancillary study to MESA is seeking to determine whether impairment of myocardial perfusion reserve can serve as a marker of CHD. Scientists hypothesize that impaired myocardial perfusion reserve indicates the presence of subclinical coronary atherosclerosis and coronary microvascular disease. Developing a new measure of subclinical disease would enable early interventions and lifestyle modifications to prevent CHD. Fifty percent of the population will be Hispanic. Other ancillary studies to MESA are investigating progression of carotid atherosclerosis, association of risk factors with arteriosclerosis measured in retinal vessels, and the relationship of sex hormones to subclinical CVD and other risk factors in men and women.

Additional epidemiologic studies being supported include (1) a multicenter study to investigate cardiovascular and metabolic responses to endurance training, contribution of genetic factors to the accompanying response of CVD, and type 2 diabetes risk factors in a population that is 46 percent black; (2) a study of Chagas' disease a leading cause of heart disease throughout Latin America—to identify genetic determinants of susceptibility to infection and differential disease pathogenesis in a black population residing in rural Brazil; (3) 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 relationship, patterns of comorbidity, and population attributable risk; and (4) a project to examine the relationship between neighborhood socioeconomic characteristics and the prevalence and progression of subclinical atherosclerosis in an ethnically diverse population consisting of approximately 30 percent blacks, 10 percent Asians, and 20 percent Hispanics.

Treatment and Prevention

Many evidence-based guidelines for treatment of risk factors or disease have been developed, but they often are not adhered to by patients—especially minority populations—or adopted in routine clinical practice. The Institute has initiated the following activities to address this important problem:

- **Trials Assessing Innovative Strategies To Improve Clinical Practice Through Guidelines in Heart, Lung, and Blood Diseases:** To identify obstacles to implementing national evidence-based guidelines and test interventions to promote their use in clinical practice. Several approaches will be tested, including use of decision support tools; interactive seminars; internet learning; a computerized patient activation tool placed in the waiting room of primary care offices; and performance feedback and practice profiling.
- **Overcoming Barriers to Treatment Adherence in Minorities and Persons Living in Poverty:** To overcome barriers to treatment adherence for lifestyle changes and pharmacologic therapy in minorities and persons living in poverty. Studies are testing several approaches, such as telephone-based interventions, nurse case management and counseling, and patient and physician education intervention in clinical and community settings designed to overcome patient, provider, and medical systems barriers that impede treatment adherence. Urban and rural blacks, Hispanics, Asian Americans, and women are the targeted groups.

Education

The NHLBI, through its education programs (see Chapter 2), disseminates health information to physicians, health care professionals, patients, and the public on ways to prevent or treat diseases within the Institute’s mandate. It has developed the following programs to combat cardiovascular health disparities among four major cultural/ethnic groups: blacks, Hispanics, American Indians and Alaska Natives, and Asian Americans and Pacific Islanders. In addition, the NHLBI is exploring opportunities to reach residents of public housing communities nationally with science-based information on lifestyles and behaviors that can prevent, treat, and manage CVD.

- **Cardiovascular Health Outreach and Education in Public Housing Communities:** To empower blacks who reside in Baltimore City public housing developments to take charge of improving their cardiovascular health by adopting a heart healthy lifestyle.
- **Salud para su Corazón:** To disseminate information on CVD prevention, intervention, and treatment and promote heart healthy behaviors in Hispanic communities.
- **NHLBI-Indian Health Service Partnership to Strengthen the Heartbeat of American Indian and Alaska Native (AI/AN) Communities:** To develop and implement effective approaches to improve the cardiovascular health, including implementation of tailored heart health strategies, in three tribal communities and creation of a national cardiovascular health training program, “Honoring the Gift of Heart Health,” with the Indian Health Service.
- **NHLBI Asian American and Pacific Islanders Heart Health Outreach Project:** To develop culturally and linguistically appropriate outreach activities and tools (e.g., CVD risk factor fact sheets) to increase community awareness of heart disease and its associated risk factors

and to promote heart healthy lifestyles among a diverse Asian American and Pacific Islander population.

In addition to the activities mentioned above, the Institute has prepared publications on CVD prevention for minority populations. Examples include:

- Improving Cardiovascular Health in African Americans—Package of Seven Easy-To-Read Booklets
- Heart-Healthy Home Cooking African American Style
- Nine Easy-to-Read Booklets in Spanish and English on Heart Health
- Bringing Heart Health to Latinos: A Guide for Building Community Programs
- Filipinos Aspire for Healthy Hearts Fact Sheets in Tagalog and English
- Vietnamese Aspire for Healthy Hearts Fact Sheets in Vietnamese and English
- Filipinos Take It To Heart: A How-To Guide for Bringing Heart Health to Your Community
- Treat Your Heart to a Healthy Celebration.

The educational materials listed throughout this chapter may be obtained from the NHLBI public Web site or through the NHLBI online catalog.

High Blood Pressure

Etiology and Pathophysiology

High blood pressure is a serious health problem that is especially prevalent and severe among minorities. Institute-initiated studies addressing the etiology and pathophysiology of high blood pressure include:

- Molecular Genetics of Hypertension (see Chapter 9): To determine the etiology and pathogenesis of hypertension and its complications in order to improve diagnosis and treatment of the disease. Many of the subprojects have a high percentage of minority participation; others target blacks or Hispanics exclusively.
- Family Blood Pressure Program (see Chapter 9): To use a network of investigators to identify genes associated with high blood pressure and to examine interactions between genetic and environmental determinants of hypertension in specific minority populations: blacks, Mexican Americans, and Asian Americans.

The Institute supports a number of investigator-initiated projects to examine antecedents of hypertension in children to determine racial differences in blood pressure regulation. One study is determining relationships between cardiovascular reactivity in adolescent normotensive blacks and development of pathobiologic markers of hypertension risk (i.e., increased resting blood pressure, left ventricular mass, and relative wall thickness) later in life. Another is investigating the genetics of cardiovascular reactivity in black youth.

Impaired sodium regulation also appears to be linked to the development of hypertension. Scientists are investigating the effects of stress on salt retention and measuring hormonal variables known to influence sodium regulation in a population of obese and nonobese black youths. They are seeking to determine whether the mechanisms regulating sodium retention differ between the two groups. Another group of scientists is examining the role of sodium and obesity in hypertension development among blacks living in three different environments: Nigeria, Jamaica, and Chicago.

Investigators have observed that blacks have an augmented blood pressure response to salt. A study has been initiated to improve understanding of the genetic basis and phenotypic characterization of salt-sensitive hypertension in blacks.

Researchers also are examining the influence of SES and ethnic discrimination on stress reactivity to determine if it provides a pathophysiologic link to CVD in blacks. One group is studying the combined influence of low SES and ethnicity on development of behavioral risk factors and testing the extent to which they mediate associations between sociodemographic factors, stress, and cardiovascular markers in adolescents. Another group is assessing the relationship between early life exposure to socioeconomic stressors such as adverse socioeconomic conditions, low levels of social integration, and racial discrimination, and development of hypertension in blacks.

Stress may be a major contributor to CVD among American Indians. Investigators are evaluating the long-term effects of posttraumatic stress disorder—a common disorder among reservation-dwelling Indians—on the cardiovascular system and the role of lifestyle, cultural, and biological mediators in the relationship of posttraumatic stress disorders with coronary flow reserve and heart rate variability.

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 impact of selected dietary components (proteins, lipids, carbohydrates, amino acids, calcium, magnesium, sodium, potassium, antioxidants, fiber, and caffeine) on blood pressure.

The NHLBI supports a number of 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 kallikrein-kinin system, and sodium transport.

Treatment and Prevention

Identifying effective treatment strategies for various populations requires large-scale studies with representative populations in sufficient numbers.

- ALLHAT (see Chapter 11): To compare the combined incidence of fatal CHD and nonfatal MI among patients receiving ACE inhibitors, calcium antagonists, or alpha-1 blockers and patients in a control group receiving a diuretic. Also, in a subset of these groups, to determine whether cholesterol-lowering therapy reduces mortality in moderately hypercholesterolemic individuals compared with a control group; 32 percent of the participants are black and 19 percent are Hispanic. Research findings demonstrated that the less expensive traditional diuretics are at least as effective as newer medicines in treating high blood pressure and preventing some forms of heart disease.

Although it is well known that reducing hypertension will reduce CVD rates, the implementation of evidence-based guidelines for hypertension treatment in clinical practice is not very high. To address this issue, the NHLBI initiated a program to improve hypertension control rates in blacks, a group with the highest prevalence and earliest onset of hypertension and disparately high premature cardiovascular mortality and morbidity:

- **Interventions To Improve Hypertension Control Rates in African Americans:** To evaluate the feasibility of clinical interventions directed at the medical care delivery system to increase the proportion of blacks who have their blood pressure controlled to levels specified by the JNC VII guidelines.

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 (see Chapter 2) 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 for health professionals, patients, and the public. Below are some examples:

- *Sí se Puede: Prevenir y Controlar la Presión Arterial Alta con Actividad Física*
- *Plan de Alimentación Saludable Contra la Hipertensión: Prevenir y Controlar la Presión Arterial Alta Siguiendo el Plan de Alimentación Conocida Como DASH*
- *Sí se Puede: Prevenir y Controlar la Presión Arterial Alta. Lo Que Usted Debe Saber Sobre la Prevención y Control de la Presión Arterial Alta*
- *Sí se Puede: Prevenir y Controlar la Presión Arterial Alta. Lo Que los Médicos Deben Saber*
- *Take Steps To Prevent High Blood Pressure in English and Spanish*
- *Cut Down on Salt and Sodium in English and Spanish*
- *Churches as an Avenue to High Blood Pressure Control*
- *Working With Religious Congregations: A Guide for Health Professionals*
- *Protect Your Heart! Prevent High Blood Pressure*
- *Spice up Your Life! Eat Less Salt and Sodium*
- *Keep the Harmony Within You—Check Your Blood Pressure*
- *Keep Your Heart in Check—Know Your Blood Pressure Number in Tagalog and English and in Vietnamese and English.*

NHBPEP Coordinating Committee Activities

The organizations that belong to the NHBPEP coordinating committee have continuing education programs on the prevention and treatment of hypertension that are focused on their minority members. They also support hypertension prevention and awareness in community-based settings such as screening and church activities, community awareness campaigns, and media events.

High Serum Cholesterol

Etiology

The Institute supports a number of investigator-initiated projects 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 between various racial and ethnic groups.

Scientists also are interested in the protective effect of HDL. One study is focusing on isolating and characterizing native HDL species to determine their structure and function. Research findings may lead to new strategies to prevent and treat arteriosclerotic heart disease. Thirty-eight percent of the participants are minorities.

Variation in hepatic lipase activity is associated with differences in plasma concentrations of HDL and LDL synthesis and catabolism. Researchers are investigating whether ethnic differences in hepatic lipase activity are responsible for the well-known differences in plasma HDL concentrations found in blacks and whites. Genetic studies are being conducted on a population that is 39 percent black.

Prevention

The NHLBI is supporting an investigator-initiated study among minority preschool children to track the long-term effectiveness of nutrition interventions on blood cholesterol and diet. Additional potential risk factors, such as increased blood pressure, obesity, and intention to smoke, also will be monitored.

Education

The NCEP (see Chapter 2) has prepared the following publications on blood cholesterol for minority audiences.

- Learn Your Cholesterol Number in Spanish and English
- Protect Your Heart—Lower Your Blood Cholesterol in Spanish and English
- Heart-Healthy Home Cooking African American Style
- Delicious Heart-Healthy Latino Recipes
- Cut Down on Fat—Not on Taste in Spanish and English
- Empower Yourself! Learn Your Cholesterol Number
- Be Heart Smart! Eat Foods Lower in Saturated Fats and Cholesterol
- American Indian and Alaska Native People: Treat Your Heart to a Healthy Celebration
- Serve Up a Healthy Life—Give the Gift of Good Nutrition in Tagalog and English
- Serve Up a Healthy Life With Good Nutrition in Vietnamese and English.

Obesity

Etiology

The latest NHANES data show a continued rise in the proportion of Americans who are overweight; black women are especially at risk. To understand the reasons for the racial disparity among women, the Institute initiated a long-term program, the NHLBI Growth and Health Study (NGHS), to examine the development of obesity and CVD risk factors in a biracial cohort of young girls. The study, which ended in FY 2000, found black girls consumed more calories and a higher percentage of calories from fat and watched more television than white girls. An investigator-initiated study using the NGHS cohort, starting at ages 18 to 19 years, is examining the changes in cardiac output and total peripheral resistance that occur with developing obesity and their influence on ethnic difference in blood pressure regulation. Another project, using data

from the NGHS, is examining CHD risk factors in black and white girls to identify genes involved in black–white differences in lipid metabolism and obesity.

Pregnancy is often associated with excess weight gain and postpartum weight retention that can lead to obesity. Understanding the determinants of pregnancy-associated weight gain and retention is the focus of a project being conducted within a predominantly black and Hispanic population of pregnant adolescents.

Prevention and Treatment

The NHLBI has initiated a program to prevent obesity in high-risk children.

- GEMS (see Chapter 9): To test the effectiveness of weight-control interventions (involving diet, physical activity, and psychosocial and familial influences) administered during the critical transition period from prepuberty to puberty in black girls at high risk for obesity.

The Institute supports a number of investigator-initiated studies on the effectiveness of obesity prevention and control interventions among diverse populations. Black and Hispanic parents and children at Head Start sites are participating in a nutrition education and weight-control program; 70 percent of the participants will be minorities. Another study will test the effectiveness of a family-based intervention to prevent obesity in low-income Latino children.

A school-based study involving predominantly minority children is determining whether reducing the amount of time children spend watching television and videos and playing video games prevents obesity. A project with a subject population consisting of Asians, Hispanics, and whites is testing an integrated school- and community-based intervention involving physical activity and diet to reduce the prevalence of obesity. An ancillary study to an Institute-initiated program to reduce the decline in physical activity in adolescent girls (TAAG) is investigating the influence of community characteristics (e.g., street design, access to public transportation, facilities for physical activity, population mix, and socioeconomic mix of the neighborhood) on physical activity levels and body mass index; approximately 50 percent of the girls are minority.

The Institute is supporting a weight loss maintenance trial to test the effectiveness of two strategies to promote the long-term maintenance of weight loss in adults who recently lost weight; about 40 percent of the population will be black. Another study will evaluate the effectiveness of diets of different macronutrient compositions to promote and sustain weight loss in adults; approximately 25 percent of the population will be black.

Black women are the subjects of a weight management program specifically tailored to their psychosocial, sociocultural, and health perspectives and life circumstances. A study using data from the NHANES III is seeking to determine whether multiple perceptions and behaviors related to weight loss cluster according to sociodemographic characteristics. Research findings may lead to the design of culturally sensitive intervention strategies for minorities. Blacks and Mexican Americans at various SES levels constitute the major portion of the population surveyed.

Education

The NHLBI OEI (see Chapter 2) has prepared health information on losing excess weight for minorities.

- *Watch Your Weight* in English and Spanish

- Embrace Your Health! Lose Weight if You Are Overweight.

Physical Inactivity

The Institute has initiated research on the effectiveness of intervention programs to encourage greater physical activity within selected groups.

- TAAG (see Chapter 11): To test the effectiveness of school–community-linked interventions to reduce the decline in physical activity in adolescent girls, from grades 6 through 8. Of 3,600 girls from 36 schools, approximately 30 percent will be minorities.

The NHLBI supports several investigator-initiated studies on strategies to increase physical activity among minority populations. Included among them are studies to examine the effect of vigorous exercise on reduction of childhood obesity in black girls. Adolescent girls are the focus of a number of projects to determine the optimal amount of exercise required for primary prevention of CHD, provide culturally relevant physical activities, enhance social support for exercise, and test the effects of different amounts and intensities of physical activity on CVD risk factors. Hispanic women and women with low SES and literacy skills are subjects in two intervention projects to encourage sustained increases in physical activity among sedentary and underserved groups. One of the projects also is seeking to determine the degree of generalization of activity from wife to husband and mother to child.

Education

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

- Stay Active and Feel Better in English and Spanish
- Energize Yourself! Stay Physically Active
- American Indian and Alaska Native People: Be Active for Your Heart!
- Be Active for a Healthy Heart 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

The Institute supports a number of investigator-initiated smoking intervention and follow-up cessation maintenance studies that specifically target minorities. Two studies are evaluating the effectiveness of two smoking cessation programs for smokers who seek treatment at the hospital emergency department. One study involves patients who suffer from acute respiratory illness; approximately 35 percent are minorities. The other targets Chinese American patients hospitalized with CVD, pulmonary disease, or diabetes mellitus.

Other projects being supported include a study to assess the extent of smoking onset and cessation in minority youths, identify determinants of smoking onset, and determine predictors of cessation; a study of elderly smokers (40 percent minority) to evaluate the effectiveness of three smoking cessation strategies; and an intervention study tailored to an underserved population at risk for smoking relapse, smoking onset, and smokeless tobacco use.

Education

The Institute has prepared the following publications on smoking cessation for minorities.

- *Kick the Smoking Habit* in English and Spanish
- Refresh Yourself! Stop Smoking
- American Indian and Alaska Native People: Help Your Heart
- *Don't Burn Your Life Away—Be Good to Your Heart* in Tagalog and English and in Vietnamese and English.

Psychosocial Factors

The NHLBI has initiated research on the effect of depression, anxiety, and lack of social support on prognosis after a CHD event.

- ENRICHD (see Chapter 11): To determine the effects of psychosocial interventions on morbidity and mortality in post-MI patients who were depressed and socially isolated and/or who perceived themselves as lacking support from family and friends; 34 percent of the participants were minorities. Despite the treatment group's improvement in psychological and social functioning and quality of life, no difference in heart disease survival or second heart attack rate was demonstrated compared to the control group, who also reported improvement in their psychological well-being.

The Institute supports investigator-initiated research on the role of race and ethnicity, psychosocial and environmental factors, and low SES in the development of CHD. Scientists are investigating the contribution of biobehavioral factors in the etiology, pathogenesis, and course of CHD. Racial differences in stress-induced physiologic responses also are being examined.

Investigators are interested in the effects of race and psychosocial factors, such as hostility, on glucose metabolism. A study was initiated to determine how hostility is differentially related to glucose metabolism in blacks and whites. Research findings may increase understanding of the differences in the etiology of diabetes in the two groups.

Additional areas of focus include the genetic basis of aggression and the relationships between risk-promoting variables (psychosocial stress, smoking, poor diet, physical inactivity); presumed mediating variables (sympathetic nervous system activity and insulin metabolism); and CHD risk factors. Fifty to sixty percent of the participants are black or Hispanic.

Ischemic Heart Disease

The NHLBI supports a major multicenter program involving basic and clinical research on ischemic heart disease in blacks.

- Ischemic Heart Disease in Blacks (see Chapter 9): To elucidate the pathophysiological basis for excess morbidity and mortality from ischemic heart disease in blacks, and subsequently to develop appropriate therapeutic strategies.

Diabetes

Blacks, Hispanics, and American Indians have a high prevalence of diabetes. The NHLBI supports research to elucidate the pathogenic mechanisms involved in the relationship between diabetes and elevated risk for CVD.

Several investigator-initiated studies are examining the genetic relationships between noninsulin-dependent diabetes mellitus (NIDDM) and atherosclerosis. They include a study between two sets of Hispanic families with NIDDM, one with CHD and one without; a study in Mexican Americans to determine common genes linking insulin resistance and coronary artery disease; a project in Japanese American families to characterize the genetic epidemiology of CHD risk factors (high LDL, risk factors that characterize the insulin resistance syndrome and NIDDM, and lipoprotein(a) levels and apo-lipoprotein(a) phenotypes); and a project in blacks and Hispanics to examine genetic determinants of insulin resistance and visceral adiposity as intermediate components in the pathways that lead to type 2 diabetes and atherosclerosis.

In addition, the Institute supports research on the role of hyperglycemia and insulin resistance in the development of vascular disease. A study in American Indians with NIDDM is seeking to elucidate the underlying biological processes and their interaction in the acceleration of atherogenesis. A project in a diverse diabetic patient population of blacks, whites, and Hispanics with and without carotid atherosclerosis is seeking to understand the atherogenicity of hypertriglyceridemia in diabetes by focusing on the size and number of triglyceride-rich lipoproteins.

Hypertension and diabetes are major contributors to CVD and occur disproportionately in blacks. In particular, black women seem to have earlier disease onset and poorer outcomes. Scientists are investigating the link between hypertension and type 2 diabetes and the relative excess of androgen found in black women to determine whether insulin resistance, excess androgen, and endothelial dysfunction contribute to accelerated vascular injury in blacks.

Other investigator-initiated studies on diabetes and CVD risk among minority populations include a survey to compare the prevalence of diabetes and CVD risk factors among native Mexicans and Mexican Americans, and a study among blacks, whites, and Hispanics with existing insulin resistance, including impaired glucose tolerance and NIDDM, to identify dietary factors that may contribute to elevated CVD risk.

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; over one-third of the participants are minorities.
- BARI 2D (see Chapter 9): To evaluate whether urgent revascularization offers an advantage over medical therapy in patients with coronary artery disease and diabetes. In addition, for a given level of glycemic control, to determine whether insulin-providing drugs offer advantages or risks compared to insulin sensitizers (drugs that enhance insulin action); 33 percent of the participants are from minority populations.
- SANDS (see Chapter 9): To compare intensive treatment (pharmacologic agents, such as ACE inhibitors and simvastatin for high blood pressure and LDL cholesterol) to conventional

treatment in 488 American Indians with diabetes, ages 40 or older. The primary outcome measure is change in carotid intimal-medial thickness.

Lung Diseases

The NHLBI supports research on a number of lung diseases, such as asthma, sarcoidosis, and TB, that disproportionately affect minorities. The following section provides examples of research to address health disparities in lung diseases.

Asthma

Etiology and Pathophysiology

Asthma is a chronic lung disease characterized by inflammation of the airways. Various genetic and environmental factors contribute to the severity of symptoms. The Institute has launched a collaborative program to investigate the mechanistic basis for severe asthma and to determine how it differs from mild-to-moderate asthma.

The NHLBI is supporting a number of investigator-initiated projects on the etiology and pathophysiology of asthma. Two studies are using genomic screening to search for the genetic basis of asthma, one in a large sample of Asian siblings who are already known to differ widely in their airway responsiveness (sensitivity to histamine) and lung function and another in a homogeneous Hispanic population in Costa Rica. A third study is identifying genes contributing to asthma severity in blacks, a population disproportionately affected in the United States.

Other projects are focusing on understanding the mechanisms by which environmental factors trigger the onset of asthma. One study is investigating the role of viruses in the exacerbation of asthma; 50 percent of the participants are minorities. Another is examining how pulmonary infection caused by mycoplasma pneumoniae exacerbates asthma and prolongs abnormalities in lung function; 40 percent of the participants are minority. A third study is seeking to understand the role of gene–environment interactions in the development of immune responses in a pediatric population that is genetically predisposed to asthma; 40 percent of the participants are Hispanic.

Occupational- or environmental-induced asthma is a major problem, especially among low-income, urban blacks and Hispanics. The NHLBI is supporting a project to examine work-related asthma in those populations.

Circadian change in airway function is an important aspect of asthma; more than 70 percent of deaths and 80 percent of respiratory arrests occur during sleep. Researchers are investigating the mechanisms that cause the changes in airway function in nocturnal asthma that lead to exacerbation of symptoms; 36 percent of the participants are minority.

Treatment and Control

The Institute has initiated research to identify optimal drug strategies for treatment and management of asthma. Because the disorder disproportionately affects minority children, it is important for them to be well represented in clinical trials.

- ACRN (see Chapter 9): To establish an interactive network of asthma clinical research groups to conduct studies of new therapies for asthma and disseminate findings to the practicing community. Overall, 37 percent of the participants are from minority populations.

- CAMP (see Chapter 11): To determine whether inhaled corticosteroids are safe and effective for long-term treatment of children with mild-to-moderate asthma. The therapy proved more effective than nonsteroidal anti-inflammatory medication and significantly reduced airway hyperresponsiveness. The only side-effect was a transient slowing in growth rate during the first year of treatment; 31 percent of the participants were minorities.
- CARE (see Chapter 11): To establish a network of pediatric clinical care centers to determine optimal treatment and management strategies for children with asthma. The study will attempt to customize therapy based on specific asthma phenotypes and genotypes; 30 percent of the population will be minorities.
- Centers for Reducing Asthma Disparities (see Chapter 9): To establish partnerships between minority-serving institutions and research-intensive institutions to conduct studies on causes of and corrections for disparities in asthma among racial/ethnic and low SES populations. Reciprocal training is encouraged to ensure culturally sensitive projects and enhance research capabilities.

The Institute also is supporting an investigator-initiated study on the effect of steroids on enhanced alpha-adrenergic vascular responsiveness in asthma; 77 percent of the participants are minority.

Translational Activities

Ensuring full use of modern asthma treatment strategies is an important goal of the NHLBI. An investigator-initiated study, conducted in black communities in Baltimore, is examining the effectiveness of two asthma interventions to reduce emergency room visits, improve adherence to medication schedules, and lower asthma morbidity. One strategy provides assistance to families in accessing medical care; the other combines this assistance with a family intervention to encourage consistent use of asthma medication. Another study is determining whether shared decisionmaking between patients and physicians in choosing asthma therapy improves adherence; 82 percent of the participants are minority.

Two studies are evaluating the benefits of administering drug treatment to children at school. One is a Birmingham-based study involving a predominately black population with moderate-to-severe asthma. The other is a New York City-based study that is establishing a collaboration between school nurses and primary care physicians to form a network to prevent asthma attacks. The project is identifying school children with asthma and working with their families and physicians to develop an asthma management plan that includes supervision of drug treatment at school. It refers children who lack continuing care to physicians who follow the NAEPP Guidelines.

In Detroit, investigators are developing and evaluating computer-based instructions and peer counseling for teens with asthma. All of the participants enrolled are black.

In San Diego, scientists are evaluating an intervention project to reduce tobacco-related morbidity among low SES Hispanic children with asthma. By collaborating with Hispanic counselors, researchers have developed a behavioral program that seeks to reduce environmental tobacco smoke (ETS) exposure in children with asthma.

In Ohio, investigators are testing the effects of reducing indoor ETS on asthma symptoms, pulmonary function, airway inflammation, and health services use; 44 percent of the participants are minorities.

Another ETS intervention program is being tested among predominately low SES black and Hispanic children in Los Angeles. Researchers are evaluating the effectiveness of two low-cost interventions (one involving counseling and booster telephone calls and the other involving a video and household reminder kit) to reduce asthma morbidity.

In St. Louis, a randomized controlled trial is being conducted among young black children recruited at the time of an emergency department visit for asthma exacerbation. Investigators are testing the effectiveness of an intervention strategy that includes case management, telephone contacts, and a monetary incentive to increase follow-up visits to primary care providers.

Education

The NAEPP (see Chapter 2) has developed easy-to-read materials on asthma treatment and control directed to audiences with low literacy.

- Facts About Controlling Your Asthma
- El asma: Cómo Controlar Esta Enfermedad.

Chronic Lung Disease in Premature Infants

The NHLBI supports research on prevention of chronic lung disease (bronchopulmonary dysplasia) in preterm infants.

- Inhaled Nitric Oxide (NO) for the Prevention of Chronic Lung Disease (CLD) (see Chapter 9): To determine if low-dose inhaled NO will reduce CLD in premature newborns (gestational age less than 34 weeks and birth weight between 500 and 1,250 grams at birth) with respiratory failure that required mechanical ventilation in the first 48 hours of life; 27 percent of the infants will be from minority populations.
- Inhaled Nitric Oxide in Prevention of Chronic Lung Disease (see Chapter 9): To investigate whether low-dose inhaled NO administered to preterm infants between 500 and 1,250 grams birth weight who continue to require mechanical ventilation at 10 days of age increases survival without CLD at 36 weeks postmenstrual age; 55 percent of the infants will be from minority populations.

Sarcoidosis

Sarcoidosis is an inflammatory disease of unknown etiology that affects the lungs. The Institute has initiated a study to elucidate the mechanism involved in the disease.

Investigator-initiated studies on the causes of sarcoidosis include a study to identify genes linked to sarcoidosis susceptibility in blacks and to determine if hereditary susceptibility predisposes blacks to sarcoidosis, and a project to elucidate the mechanisms involved in the immunologic and inflammatory processes that ultimately lead to end-stage fibrosis in progressive pulmonary sarcoidosis; 50 percent of the participants are black.

Sleep Disorders

The NHLBI supports research on the etiology, pathophysiology, and consequences of sleep-disordered breathing (SDB), a condition characterized by repetitive interruptions in breathing. Sleep apnea, a common disorder that disproportionately affects blacks, is associated with an

increased risk of CVD, and is particularly prevalent in heart failure patients. An Institute-initiated program is assessing the interrelationship between sleep disorders and heart, lung, and blood diseases. Another study will examine the interrelationship between sleep apnea and heart failure and the mechanisms leading to cardiovascular stress when they occur together.

The Institute also supports a wide spectrum of investigator-initiated projects to elucidate cardiovascular and other health consequences of SDB. Ongoing studies in various community settings are assessing the health risks of SDB within specific ethnic populations, including blacks, Hispanics, Asians, and American Indians. A study of sleep in black families will investigate whether sleep problems contribute to diabetes, and the potential relationship to CVD. 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.

Treatment strategies for SDB are another area of interest. A multisite clinical trial was initiated to determine whether continuous positive airway pressure is an effective treatment for excessive daytime sleepiness and cognitive impairment associated with moderate-to-severe SDB; 30 percent of the participants are minority.

Tuberculosis

Beginning in 1993, the NHLBI funded five annual competitions for Tuberculosis Academic Awards (TBAAAs). The goal of the TBAA program was to improve prevention, management, and control of TB by supporting increased opportunities for health care practitioners to learn modern principles and practices. The TBAA program promoted coordinated clinical approaches to the care of patients of various ethnic backgrounds who have TB; raised awareness among health care providers of unique ethnic, cultural, and socioeconomic dimensions of TB; focused educational efforts in areas where TB incidence is persistently high (e.g., immigrant communities, refugee centers, homeless shelters, correctional facilities); promoted development of minority faculty capable of providing appropriate instruction in diagnosis and management of TB; and enhanced TB education programs in minority medical schools and in the communities they serve. The program ended in 2002.

Building on the foundation laid by the TBAA program, the NHLBI funded a contract for a TB Curriculum Coordinating Center to provide access to the best TB educational and training opportunities in the United States. The program is directed at medical schools, nursing schools, and allied health schools—especially those that provide primary care to communities where TB is endemic and the population is at high risk.

In 2001, the Institute initiated a program on Genetic Aspects of Tuberculosis in the Lung. Four of the ten awards were to institutions conducting genetic studies in humans to characterize genes associated with TB susceptibility and host immune responses to infection. A large number of the participants being recruited are from minority populations.

The NHLBI supports a number of investigator-initiated studies focused on understanding the relationship of the immune system to TB. Most of the patients are from minority populations with HIV. One group is seeking to identify the correlates of protective immunity in a Mexican population in order to aid development of anti-TB vaccines. Another group will conduct a Phase I safety trial on a vaccine with a patient population consisting of 85 percent minorities. A third group is examining the role of interferon-gamma in the pathogenesis of TB among Hispanics

with and without HIV. A fourth group is identifying and characterizing host factors that predispose Asians to develop TB. In predominately minority populations in the United States and South Africa, a new study will compare the effectiveness of adding aerosolized interferon-gamma to the usual treatment regimen for advanced TB.

The NHLBI also supports research to improve TB control among minority populations. One project is evaluating educational strategies to improve adherence to medication regimens and regular clinic visits among TB-infected adolescents in California. The program, based in San Diego, is directed at Hispanic adolescents. Another study, located in the Harlem community of New York City, is testing a new strategy to promote adherence to therapy among inner-city TB patients. Both programs are outgrowths of behavioral research programs begun by the Institute in 1995.

Blood Diseases

Sickle Cell Disease

SCD is an inherited blood disorder that produces chronic anemia, end organ damage, and periodic episodes of pain. 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 and uncover better approaches for its diagnosis and treatment and for prevention of complications.

- Comprehensive Sickle Cell Centers Program (see Chapter 9): To provide a multidisciplinary and multilevel research approach to expedite development and application of new knowledge for improved diagnosis and treatment of SCD and prevention of its complications.
- Reference Laboratory to Evaluate Therapies for SCD (see Chapter 9): To use a battery of standardized tests for preclinical evaluation of potential new therapeutic agents for SCD.

Basic Research

SCD is caused by hemoglobin polymerization that causes red blood cells to become hard, sticky, and shaped like sickles or crescents. When sickled cells go through small blood vessels, they tend to get stuck and block the flow of blood. This can cause pain, damage, and low blood count or anemia. Finding improved treatments and ultimately a cure for SCD is a major commitment of the Institute. NHLBI-supported scientists have learned a great deal about sickle cell anemia—what causes it, how it affects the patient, and how to treat some of its complications. They also have begun to have success in developing drugs to prevent the symptoms of sickle cell anemia and procedures that should ultimately provide a cure.

Advances in basic research include unraveling the molecular pathways that lead to sickling, thus allowing investigators to test compounds that might interrupt the sickling process; discovering the beneficial role of fetal hemoglobin in patients with SCD that prevents sickling and confirming the need to find fetal hemoglobin-enhancing drugs; developing the transgenic mouse model for SCD that allows investigators to study the effects of sickle cell anemia in a living organism and evaluate experimental treatments that cannot be done in humans; and curing a sickle mouse model through gene therapy, a significant achievement that brings us close to human gene therapy.

Basic research advances reported in FY 2004 include:

- Developing high-throughput robotic screening methods to identify active compounds for further mechanistic and preclinical evaluation as potential therapeutic agents for sickle cell anemia.
- Identifying nitrite as a major bioavailable pool of NO, a known vasodilator that could increase blood flow to oxygen-deprived tissue. Therapeutic application of nitrite could potentially be used to treat diseases associated with oxygen-starved tissue, such as SCD.
- Establishing the link between a candidate genetic modifier in an endothelial NO synthase gene and acute chest syndrome (ACS) in female patients with SCD. Identifying genetic modifiers of ACS will aid in choosing potential therapeutic targets and enable individualized treatment.
- Developing the first gene therapy cure of a hemoglobinopathy mouse model using purified hematopoietic stem cells.
- Treating transgenic SCD mice with vanillin, a food additive that binds with sickle hemoglobin, prolongs survival under hypoxia, and correlates with a reduced number of sickle red cells. Study results demonstrate the potential of vanillin to be a new and safe antisickling agent for SCD patients.

In 2004, the NHLBI participated in a trans-NIH conference on “New Directions for Sickle Cell Therapy in the Genome Era.” One of the recommendations from the conference was for the Institute to develop a joint initiative with the National Human Genome Research Institute to apply chemical genomics approaches to SCD pathophysiology and therapy.

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.

- Multicenter Study of Hydroxyurea (MSH) Patients’ Follow-up (see Chapter 11): To determine the toxic effects of long-term hydroxyurea use in the patients who participated in the adult hydroxyurea clinical trial that ended successfully in 1995; 100 percent of the participants are black. A significant finding of the study was that patients who took hydroxyurea for 9 years experienced a 40 percent reduction in deaths.
- BABY HUG (see Chapter 11): To assess the effectiveness of hydroxyurea in preventing onset of chronic organ damage in young black children with sickle cell anemia.
- STOP 2 (see Chapter 9): To determine the optimal primary prevention strategy for the transfusion treatment shown to be effective in STOP 1 in a minority pediatric population. The trial is designed to determine how long transfusions are needed for primary stroke prevention.

An article in the July 2004 issue of the journal *Blood* highlighted a stroke prevention outcome from the NHLBI-supported STOP 1 Trial on the efficacy of blood transfusion in primary stroke prevention. The study showed a strong causal relationship between the publication of the STOP 1 Clinical Alert by the NHLBI and a dramatic reduction in the the rate of first-time stroke in California children with SCD.

The NHLBI is supporting several transplant-related clinical studies that are seeking to reach minority populations. To ensure increased awareness and equitable opportunities for participation, the studies support bilingual transplant center personnel and provide public Web

pages, educational materials, and informed consent documents in Spanish, Japanese, Korean, Chinese, and Vietnamese. In addition, focus groups have been held to identify barriers to participation.

- Cord Blood Stem Cell Transplantation Study (COBLT) (see Chapter 11): To establish ethnically diverse cord blood banks and to determine the utility of umbilical cord blood cells as a hematopoietic stem cell source for patients diagnosed with malignant and nonmalignant blood diseases. The COBLT bank contains more than 8,000 cord blood units; approximately 57 percent are from minority donors. Approximately 30 percent of the patients are minority.
- Blood and Marrow Transplant Clinical Research Network (see Chapter 11): In collaboration with the NCI, to promote the efficient comparison of innovative treatments and management strategies for patients undergoing blood or marrow transplantation. It has developed strategies and implemented procedures to enroll patients from minority groups.

Each year in the United States approximately 1,500 children are diagnosed with sickle cell anemia, and 30 to 50 children with thalassemia. A recent retrospective analysis of 44 children who were transplanted with sibling cord blood for SCD or thalassemia showed that matched sibling cord blood transplantation offers the potential for a cure.

- Sibling Donor Cord Blood Banking and Transplantation Study (see Chapter 9): To establish a cord blood bank for collecting sibling donor cord blood in families that currently have a child with sickle cell anemia or thalassemia. Investigators will evaluate the safety and effectiveness of matched sibling cord blood transplantation for treatment of children with SCD or thalassemia. A majority of the participants are black.

Transplants for patients with sickle cell anemia are performed at many centers across the United States, with few performed at a single center. To promote a unified strategy for sharing data, the NHLBI, with support from the National Center for Minority Health and Health Disparities, awarded a grant supplement to the International Bone Marrow Transplant Registry (IBMTR) to collect data on demographics and outcomes of patients with sickle cell anemia who received a blood or marrow transplant. Recognizing that the registry by itself may not be sufficient to instill a sense of collaboration among investigators, the Institute, with support from the NIH Office of Rare Diseases, recently sponsored a meeting to bring together transplant investigators to review data collected by the IBMTR and to develop a systematic plan to sustain an infrastructure for collaboration among U.S. centers treating and transplanting patients with sickle cell anemia.

Although medical progress has increased the lifespan of patients with SCD, translating research advances to clinical practice remains a challenge. Adult patients continue to have difficulty receiving advanced care. To address this need, the NHLBI held a workshop in June 2004 to focus on the major unmet needs faced by adults with SCD and to develop strategies to address them. This fall, the Institute issued an initiative to establish a SCD Network that will develop and evaluate safe and effective therapies to treat and prevent complications of SCD.

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 Mediterranean, African, Southeast Asian, Chinese, and Asiatic Indian origin. In 2000, the Institute initiated a program to establish a network of clinical research centers to evaluate new therapeutic agents. Research efforts include developing oral chelators to remove iron overload caused by repetitive transfusion therapy, testing drugs to enhance fetal hemoglobin production, and examining gene therapy approaches to cure the disease.

- **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.

Investigator-initiated studies include efforts to develop oral chelators to remove the iron overload caused by repetitive transfusion therapy; exploration of hormone therapy for patients surviving into their teens; testing of drugs intended to enhance fetal hemoglobin production (hydroxyurea and butyrate); investigation of gene therapy approaches to cure the disease; prevention of bone diseases; optimum treatment of hepatitis; treatment of heart disease and iron overload; noninvasive ways of measuring iron burden; and efforts to improve the safety of the Nation's blood supply.

Women's Health Initiative

Coronary heart disease, cancer, and osteoporosis are the most common causes of death, disability, and impaired quality of life in postmenopausal women. The WHI (see Chapters 2 and 11) is addressing the benefits and risks of HT, changes in dietary patterns, and calcium/vitamin D supplements in disease prevention. Several of the centers have recruited primarily minority populations: blacks, Hispanics, Asian Americans, Pacific Islanders, and American Indians. The Clinical Trial recruited 12,607 minorities and the Observational Study recruited 15,658. Overall, of the 161,809 postmenopausal women recruited into the WHI, 17 percent were minorities.

13. Research Training and Career Development Programs

NHLBI Research Training and Career Development Obligations: Fiscal Years 1994–2004

Dollars in Millions

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Graduate Training Programs (National Research Service Awards (NRSA))	\$40,022	\$39,968	\$40,237	\$41,984	\$42,014	\$50,335	\$55,215	\$63,368	\$68,135	\$75,526	\$76,627
Research Career Programs	31,398	31,675	33,862	33,912	36,069	47,670	54,184	57,470	63,514	65,817	67,794
Fellowships	7,220	7,103	7,267	6,848	7,560	9,243	8,857	8,926	9,449	8,543	8,543

Note: Numbers of awards and trainees may not agree with other tables due to the method of counting supplements.

NHLBI Full-Time Training Positions: Fiscal Years 1994–2004

Number of Trainees

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Graduate Training Programs (National Research Service Awards (NRSA))	1,469	1,449	1,437	1,365	1,475	1,238	1,603	1,670	1,730	1,784	1,828
Research Career Programs	373	371	397	398	420	422	459	509	543	552	559
Fellowships	242	241	248	230	248	252	238	223	214	185	189

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 2004

	Number of Awards Obligated	Trainees (Full-time Training Positions)	Direct Cost	Indirect Cost	Total Cost	Percent of Total NHLBI Training Program Dollars
Fellowship Programs						
Predocctoral Fellowship Award (F31)	18	18	\$549,661	\$0	\$549,661	0.6%
Individual NRSA (F32)	168	168	8,127,743	0	8,127,743	9.5
Senior Fellowships NRSA (F33)	3	3	144,090	0	144,090	0.2
Subtotal, Fellowships	189	189	8,821,494	0	8,821,494	10.3
Graduate Training Programs						
Institutional NRSA (T32)	218	1,578	65,873,312	5,355,826	71,229,138	83.4
Minority Institutional NRSA (T32)	5	32	665,397	68,683	734,080	0.9
Off-Quarter Professional Student Training NRSA (T34, T35)	18	99	1,819,027	173,609	1,992,636	2.3

	Number of Awards Obligated	Trainees (Full-time Training Positions)	Direct Cost	Indirect Cost	Total Cost	Percent of Total NHLBI Training Program Dollars
Short-Term Training for Minority Students (T35M)	35	119	2,428,792	242,610	2,671,402	3.1
Subtotal, Graduate Training Programs	276	1,828	70,786,528	5,840,728	76,627,256*	89.7
Total, Training Programs	465	2,017	\$79,608,022	\$5,840,728	\$85,448,750	100.0%

* Excludes assessment of \$1,744,000.

History of Training Obligations by Activity: Fiscal Years 1994–2004

Dollars (Thousands)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Fellowship Programs											
Predocctoral Fellowship Award (F31)	199	304	551	388	466	346	\$248	264	478	563	549
Individual NRSA (F32)	6,853	6,651	6,483	6,281	6,969	8,807	8,517	8,515	8,887	7,868	8,128
Senior Fellowships NRSA (F33)	99	99	233	179	125	90	92	147	84	112	144
Intramural NRSA (F35)	69	49									
Subtotal, Fellowships	7,220	7,103	7,267	6,848	7,560	9,243	8,857	8,926	9,449	8,543	8,821
Graduate Training Programs											
Institutional NRSA (T32)	36,534A	36,270CB	36,718C	38,253D	37,904E	45,551F	50,507G	58,516H	62,999I	69,951J	71,229K
Minority Institutional NRSA (T32)	735	982	679	898	706	901	1,167	996	1,092	1,006	734
Off-Quarter Professional Student Training NRSA (T34, T35)	1,132	951	1,001	1,216	1,435	1,384	966	1,974	1,987	1,975	1,993
MARC (T36)	5	5	5	5	5	5	5	5			
Short-Term Training for Minority Students (T35M)	1,616	1,760	1,834	1,612	1,964	2,494	2,570	1,877	2,057	2,594	2,671
Subtotal, Training Grants	40,022	39,968	40,237	41,984	42,014	50,335	55,215	63,368	68,135	75,526	76,627
Total, Training Programs	47,242A	47,071B	47,504C	48,832D	49,574E	59,578F	64,072G	72,294H	77,584I	84,069J	85,448K

A Excludes Assessment of \$864,000.

B Excludes Assessment of \$964,000.

C Excludes Assessment of \$982,000.

D Excludes Assessment of \$1,004,000.

E Excludes Assessment of \$1,032,000.

F Excludes Assessment of \$1,216,000.

G Excludes Assessment of \$1,280,000.

H Excludes Assessment of \$1,424,000.

I Excludes Assessment of \$1,584,000.

J Excludes Assessment of \$1,716,000.

K Excludes Assessment of \$1,744,000.

Full-Time Training Positions by Activity: Fiscal Years 1994–2004

Number of Positions

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Fellowship Programs											
Predocctoral Fellowship Award (F31)	7	13	21	15	19	13	11	12	18	19	18
Individual NRSA (F32)	229	222	220	210	225	237	225	208	194	164	168
Senior Fellowships NRSA (F33)	4	4	7	5	4	2	2	3	2	2	3
Intramural NRSA (F35)	2	2									
Subtotal, Fellowships	242	241	248	230	248	252	238	223	214	185	1,578
Graduate Training Programs											
Institutional NRSA (T32)	1,237	1,201	1,216	1,179	1,423	1,185	1,368	1,425	1,482	1,542	32
Minority Institutional NRSA(T32)	30	47	30	43	52	53	48	43	39	42	99
Off-Quarter Professional Student Training NRSA (T34,T35)	100	76	78	68			51	109	179	93	119
Short-Term Training for Minority Students (T35M)	102	125	113	75			136	93	30	107	119
Subtotal, Training Grants	1,469	1,449	1,437	1,365	1,475	1,238	1,603	1,670	1,730	1,784	1,828
Total, Training Positions	1,711	1,690	1,685	1,595	1,723	1,490	1,841	1,893	1,944	1,969	2,017

NHLBI Research Career Programs: Fiscal Years 1994–2004

Number of Awards

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Mentored Research Scientist Development Award for Minority Faculty (K01)	0	0	0	5	19	30	29	44	54	47	46
Minority Institution Faculty Mentored Research Scientist Development Award (K01)	0	0	0	1	0	0	11	9	2	7	6
Mentored Scientist Development Award in Research Ethics (K01)	0	0	0	0	0	0	0	0	0	2	2
Independent Scientist Award (K02)	0	0	3	8	14	18	27	34	33	32	31
Research Career Development Award (K04)	34	30	25	18	10	6	1	0	0	0	0
Research Career Award (K06)	3	3	3	3	3	2	2	2	2	2	1
Preventive Cardiology Academic Award (K07)	11	7	0	0	0	0	0	0	0	0	0
Preventive Pulmonary Academic Award (K07)	8	4	0	0	0	0	0	0	0	0	0
Transfusion Medicine Academic Award (K07)	9	5	2	0	0	0	0	0	0	0	0
Systemic Pulmonary and Vascular Disease Academic Award (K07)	11	15	11	9	3	3	1	0	0	0	0
Asthma Academic Award (K07)	6	9	9	9	6	3	0	0	0	0	0

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Tuberculosis Academic Award (K07)	12	15	19	23	20	13	9	5			
Sleep Academic Award (K07)			8	12	20	20	20	12	8		
Nutrition Academic Award (K07)					10	10	19	19	19	9	9
Cultural Competence and Health Disparities Academic Award (K07)											8
Clinical Investigator Development Award (K08)	208	222	254	267	278	262	257	241	236	240	229
Physician Scientist Award (K11)	46	22	12								
Minority School Faculty Development Award (K14)	12	11	15	9			4	1			
Research Development Award for Minority Faculty (K14)	13	28	36	34	37	22	7				
Career Enhancement Award for Stem Cell Research (K18)										1	5
NHLBI Career Transition Award (K22)											1
Mentored Patient-Oriented Research Career Development Award (K23)						13	36	58	90	110	122
Midcareer Investigator Award in Patient-Oriented Research (K24)						11	20	27	37	38	32
Mentored Quantitative Research Career Development Award (K25)								2	7	9	12
Clinical Research Curriculum Award (K30)						9	16	55	55	55	55
Total, Research Career Programs	373	371	397	398	420	422	459	509	543	552	559

NHLBI Research Career Program Obligations: Fiscal Years 1994–2004

Dollars (Thousands)

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Mentored Research Scientist Development Award for Minority Faculty (K01)				460	1,723	2,738	3,650	5,556	5,711	6,156	6,150
Minority Institution Faculty Mentored Research Scientist Award (K01)				106	101	905	1,300	1,143	1,703	991	867
Mentored Scientist Development Award in Research Ethics (K01)										255	253
Independent Scientist Award (K02)			207	545	933	1,548	2,350	3,202	3,130	3,099	3,079
Research Career Development Award (K04)	2,224	2,006	1,693	1,226	684	568	69				
Research Career Award (K06)	102	104	105	103	103	70	70	70	69	69	34
Preventive Cardiology Academic Award (K07)	1,397	957									
Preventive Pulmonary Academic Award (K07)	726	309									
Transfusion Medicine Academic Award (K07)	868	485	326								
Systemic Pulmonary and Vascular Diseases Academic Award (K07)	1,863	2,295	1,715	1,415	386	423	113				
Asthma Academic Award (K07)	502	749	740	764	509	248					

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Tuberculosis Academic Award (K07)	906	1,155	1,496	1,831	1,566	1,161	745	396			
Sleep Academic Award (K07)			699	1,027	1,734	1,736	1,760	1,081	722		
Nutrition Academic Award (K07)					1,491	1,480	2,829	2,869	2,906	1,472	1,516
Cultural Competence and Health Disparities Academic Award (K07)											925
Clinical Investigator Development Award (K08)	16,635	18,090	21,093	22,238	23,122	29,741	30,189	29,263	29,295	30,288	29,037
Physician Scientist Award (K11)	3,993	1,903	1,023								
Minority School Faculty Development Award (K14)	893	810	1,158	729	618	445	862	98			
Research Development Award for Minority Faculty (K14)	1,289	2,812	3,607	3,468	3,099	2,093	393				
Career Enhancement Award for Stem Cell Research (K18)										243	980
NHLBI Career Transition Award (K22)											185
Mentored Patient-Oriented Research Career Development Award (K23)						1,687	4,619	7,570	11,909	14,571	16,216
Midcareer Investigator Award in Patient-Oriented Research (K24)						1,054	2,072	2,877	4,058	4,368	3,815
Mentored Quantitative Research Career Development Award (K25)								272	921	1,195	1,622
Clinical Research Curriculum Award (K30)						1,772	3,163	3,073	3,090	3,110	3,115
Total, Research Career Program Obligations	31,398	31,675	33,862	33,912	36,069	47,669	54,184	57,470	63,514	65,817	67,794

NHLBI Minority Biomedical Research Training, Career Development, and Research Supplements Program Obligations: Fiscal Years 1994–2004

Dollars (Thousands)

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
MARC Summer Research Training Program	31	28	32	17		10	4	20	15	4	
Mentored Research Scientist Development Award for Minority Faculty				460	1,723	2,738	3,650	5,556	5,711	6,156	6,150
MARC			5	5	5		5	5			
Minority Biomedical Research Support (MBRS)	2,433	2,313	2,503	2,722	2,978	3,423	3,873	3,165	2,793	3,600	2,806
Minority Institution Faculty Mentored Research Scientist Development Award				106	101	905	1,300	1,143	1,703	991	867
Minority Institution Research Training Program	735	982	679	898	706	901	1,167	996	1,092	1,006	734
Minority Predoctoral Fellowship	199	304	551	388	436	345	248	264	278	308	374
Minority Research Supplements Program	6,754	7,265	6,714	7,070	7,043	7,440	8,304	8,587	9,822	9,323	10,938

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Minority School Faculty Development Award	893	810	1,158	729	618	445	862	98			
Reentry Supplements			140	152	249	106	176	384			
Research Development Award for Minority Faculty	1,289	2,812	3,607	3,468	3,099	2,093	393				
Short-Term Training for Minority Students	1,616	1,760	1,834	1,612	1,964	2,494	2,570	1,876	2,057	2,594	2,671
Total, Minority Programs	13,950	16,274	17,223	17,627	18,922	20,900	22,552	22,095	23,471	23,982	24,540

NHLBI Research Supplements Program by Award Type: Fiscal Years 1994–2004

Number of Awards

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Minority Supplements											
Investigator	46	49	42	38	31	32	33	33	46	47	35
Postdoctoral	31	39	49	47	50	47	42	41	33	38	37
Graduate	55	42	37	36	48	53	47	43	45	57	61
Undergraduate	35	27	12	23	25	17	19	12	17	18	17
High School	15	10	8	9	11	6		3	3	4	3
Post-Master/Post-Baccalaureate									2	8	17
Reentry Supplements			2	2	3	2	1	3			3
Disability Supplements	8	4	3	3	2	1	5	4	5	4	3
Total, Research Supplements Program	190	171	153	158	170	158	147	139	151	176	176

NHLBI Research Supplements Program Obligations by Award Type: Fiscal Years 1994–2004

Dollars (Thousands)

	Fiscal Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Minority Supplements											
Investigator	2,894	3,319	2,552	2,412	2,185	2,331	3,262	3,430	5,046	3,844	4,256
Postdoctoral	1,882	2,153	2,899	3,172	3,032	3,110	3,053	3,086	2,554	2,655	2,713
Graduate	1,585	1,402	1,116	1,181	1,527	1,806	1,791	1,818	1,864	2,181	2,439
Undergraduate	332	351	120	273	246	166	198	235	260	301	282
High School	61	40	27	32	53	27	0	18	33	33	13
Post-Master/Post-Baccalaureate	0	0	0	0	0	0	0	0	65	309	597
Reentry Supplements	0	0	140	152	249	106	176	384	0	0	495
Disability Supplements	357	277	194	165	96	72	282	187	474	360	143
Total, Research Supplements Program	7,111	7,542	7,048	7,387	7,388	7,618	8,762	9,158	10,296	9,683	10,938

14. Geographic Distribution of Awards: Fiscal Year 2004

Geographic Distribution of Awards by State: Fiscal Year 2004

Dollars in Millions

Alabama	99,000,000
Arizona	38,730,225
Arkansas	1,020,037
California	285,897,601
Colorado	51,694,785
Connecticut	36,069,461
Delaware	1,921,414
District of Columbia	19,545,066
Florida	33,542,414
Georgia	47,837,815
Hawaii	2,610,461
Illinois	72,842,276
Indiana	22,121,375
Iowa	33,099,531
Kansas	3,049,838
Kentucky	18,917,737
Louisiana	14,873,642
Maine	10,879,061
Maryland	221,086,278
Massachusetts	280,781,017
Michigan	55,545,022
Minnesota	67,467,481
Mississippi	16,870,663
Missouri	63,060,985
Montana	1,408,736
Nebraska	15,918,230
Nevada	16,000,000
New Hampshire	7,349,404
New Jersey	38,309,394
New Mexico	7,843,374
New York	205,433,311
North Carolina	150,381,669
North Dakota	564,000
Ohio	119,085,471
Oklahoma	10,063,537
Oregon	35,281,360
Pennsylvania	176,418,521
Rhode Island	11,886,773
South Carolina	20,694,788
South Dakota	1,938,387
Tennessee	61,183,346
Texas	121,887,908
Utah	21,028,683
Vermont	15,688,164
Virginia	35,033,394
Washington	122,719,998
West Virginia	2,092,198
Wisconsin	62,793,734

Geographic Distribution of Awards by State or Country: Fiscal Year 2004

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Alabama								
Auburn University at Auburn	5	1,320,112	4	1,271,184	1	48,928	0	0
BioCryst, Ltd.	1	97,990	1	97,990	0	0	0	0
CFD Research Corporation	2	99,951	2	99,951	0	0	0	0
Cooper Green Hospital, Birmingham	1	578,079	1	578,079	0	0	0	0
Gem Pharmaceuticals, Inc.	1	195,590	1	195,590	0	0	0	0
University of Alabama at Birmingham	80	34,621,004	70	29,122,825	6	1,321,708	4	4,176,471
University of South Alabama	14	4,831,735	13	4,710,920	1	120,815	0	0
Total Alabama	104	41,744,461	92	36,076,539	8	1,491,451	4	4,176,471
Arizona								
Arete Associates	1	312,445	1	312,445	0	0	0	0
Arizona State University	5	1,220,493	5	1,220,493	0	0	0	0
Carl T. Hayden VA Medical Center	1	225,000	1	225,000	0	0	0	0
Intrinsic Bioprobes, Inc.	1	591,033	1	591,033	0	0	0	0
Mayo Clinic Scottsdale	3	1,047,000	3	1,047,000	0	0	0	0
St. Joseph's Hospital and Medical Center	1	312,035	1	312,035	0	0	0	0
University of Arizona	34	14,022,219	29	12,493,916	4	808,773	1	719,530
Total Arizona	46	17,730,225	41	16,201,922	4	808,773	1	719,530
Arkansas								
Arkansas Children's Hospital Research Institute	1	155,250	1	155,250	0	0	0	0
University of Arkansas for Medical Sciences, Little Rock	5	864,787	5	864,787	0	0	0	0
Total Arkansas	6	1,020,037	6	1,020,037	0	0	0	0
California								
Advanced Brian Monitoring, Inc.	2	571,719	2	571,719	0	0	0	0
Advanced Cardiovascular Systems, Inc.	1	307,600	1	307,600	0	0	0	0
Alexza Molecular Delivery Corporation	3	546,691	3	546,691	0	0	0	0
Applied Scientific Research	1	100,000	1	100,000	0	0	0	0
Applied Tissue and Materials, Inc.	1	191,313	1	191,313	0	0	0	0
Arginox Pharmaceuticals, Inc.	2	321,141	2	321,141	0	0	0	0
Avrion Molecular, Inc.	1	100,000	1	100,000	0	0	0	0
Biotime, Inc.	1	149,994	1	149,994	0	0	0	0
Blood Systems Research Institute	1	348,827	1	348,827	0	0	0	0
Burnham Institute	8	2,643,928	7	2,595,000	1	48,928	0	0
California Institute of Technology	2	1,123,754	2	1,123,754	0	0	0	0
California State Polytechnic University, Pomona	0	154,141	0	154,141	0	0	0	0
California State University, Long Beach	1	213,750	1	213,750	0	0	0	0
California State University, Northridge	0	117,048	0	117,048	0	0	0	0
Cedars-Sinai Medical Center	10	4,301,012	9	4,257,461	0	0	1	43,551
Cerus Corporation	2	474,303	2	474,303	0	0	0	0
Children's Hospital and Research Center at Oakland	14	9,065,670	12	8,832,320	2	233,350	0	0
Children's Hospital of Los Angeles	18	8,409,825	18	8,409,825	0	0	0	0
Children's Hospital of Orange County	1	26,983	0	0	1	26,983	0	0
Chimeric Technologies, Inc.	1	313,180	1	313,180	0	0	0	0
City of Hope/Beckman Research Institute	3	2,339,335	3	2,339,335	0	0	0	0

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Cyntellect, Inc.	1	211,767	1	211,767	0	0	0	0
Cytograft Tissue Engineering, Inc.	1	427,550	1	427,550	0	0	0	0
Diagnostics for the Real World	2	2,427,656	2	2,427,656	0	0	0	0
Fibrogen, Inc.	1	87,500	1	87,500	0	0	0	0
Functional Insect Genomics Institute	1	228,155	1	228,155	0	0	0	0
Genetronics, Inc.	1	102,865	1	102,865	0	0	0	0
Gen-Probe, Inc.	1	4,300,029	0	0	0	0	1	4,300,029
Good Samaritan Hospital	2	510,930	2	510,930	0	0	0	0
Harbor-UCLA Research and Education Institute	11	4,419,879	9	3,877,132	0	0	2	542,747
House Ear Institute	1	283,500	1	283,500	0	0	0	0
Ibis Therapeutics, Inc.	1	94,040	1	94,040	0	0	0	0
Interhealth Nutraceuticals, Inc.	1	149,800	1	149,800	0	0	0	0
Intuitive Surgical	1	93,345	1	93,345	0	0	0	0
Inverseon, Inc.	2	196,200	2	196,200	0	0	0	0
ISCHEM Corporation	1	374,972	1	374,972	0	0	0	0
J. David Gladstone Institutes	7	2,663,384	6	2,614,456	1	48,928	0	0
Kaiser Foundation Research Institute	8	7,335,577	4	3,984,810	0	0	4	3,350,767
La Jolla Bioengineering Institute	2	568,056	2	568,056	0	0	0	0
La Jolla Institute for Molecular Medicine	3	1,268,800	3	1,268,800	0	0	0	0
LaunchPoint Technologies, LLC	2	574,465	2	574,465	0	0	0	0
Loma Linda University	6	1,558,000	6	1,558,000	0	0	0	0
Los Angeles Orthopaedic Foundation	1	300,000	1	300,000	0	0	0	0
Lpath Therapeutics, Inc.	2	304,154	2	304,154	0	0	0	0
Macropore Biosurgery, Inc.	2	413,467	2	413,467	0	0	0	0
Magnesensors, Inc.	1	169,850	1	169,850	0	0	0	0
Maxwell Sensors, Inc.	1	100,259	1	100,259	0	0	0	0
National Childhood Cancer Foundation	1	966,377	0	0	0	0	1	966,377
Nicopharm Pharmaceutical Solutions, Inc.	1	138,940	1	138,940	0	0	0	0
Northern California Institute for Research and Education	6	5,758,317	6	5,758,317	0	0	0	0
Oma Medical	1	99,502	1	99,502	0	0	0	0
Pacific Tuberculosis/Cancer Research Organization	1	460,525	1	460,525	0	0	0	0
Palo Alto Institute for Research and Education, Inc.	1	223,200	1	223,200	0	0	0	0
Palo Alto Medical Foundation	2	1,210,509	2	1,210,509	0	0	0	0
Polymer Technology Group, Inc.	1	100,000	1	100,000	0	0	0	0
ProteomTech, Inc.	1	100,000	1	100,000	0	0	0	0
Pulmonetic Systems, Inc.	1	485,300	1	485,300	0	0	0	0
Quantum Applied Science and Research	2	199,916	2	199,916	0	0	0	0
Rand Corporation	2	851,560	2	851,560	0	0	0	0
Reva Medical, Inc.	1	150,000	1	150,000	0	0	0	0
Sam Technology, Inc.	1	335,213	1	335,213	0	0	0	0
San Diego State University	11	5,910,418	11	5,910,418	0	0	0	0
Sangamo BioSciences, Inc.	1	104,000	1	104,000	0	0	0	0
Sangart, Inc.	1	133,303	1	133,303	0	0	0	0
Scripps Research Institute	39	20,332,726	34	19,364,326	5	968,400	0	0
Selective Genetics, Inc.	1	1,014,190	1	1,014,190	0	0	0	0

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Shanbrom Technologies, LLC	1	99,750	1	99,750	0	0	0	0
Sidney Kimmel Cancer Center	3	1,359,675	3	1,359,675	0	0	0	0
Sierra Interventions, LLC	1	100,000	1	100,000	0	0	0	0
Sri International	2	862,171	2	862,171	0	0	0	0
Stanford University	73	37,071,900	64	34,908,710	8	1,138,190	1	1,025,000
Twenty First Century Medicine, Inc.	1	590,059	1	590,059	0	0	0	0
University of California, Berkeley	7	1,714,019	6	1,588,237	1	125,782	0	0
University of California, Davis	33	10,334,784	29	9,591,707	2	414,076	2	329,001
University of California, Irvine	18	6,621,230	14	4,572,435	0	0	4	2,048,795
University of California, Lawrence Berkeley National Laboratory	7	5,512,623	6	5,209,424	1	303,199	0	0
University of California, Los Angeles	62	30,478,944	53	27,942,518	6	1,341,223	3	1,195,203
University of California, Merced	1	350,068	1	350,068	0	0	0	0
University of California, Riverside	1	368,452	1	368,452	0	0	0	0
University of California, San Diego	85	43,882,442	69	40,063,059	12	2,444,180	4	1,375,203
University of California, San Francisco	99	38,436,675	87	36,602,112	12	1,834,563	0	0
University of California, Santa Barbara	1	234,707	1	234,707	0	0	0	0
University of Southern California	19	6,840,466	19	6,840,466	0	0	0	0
Veterans Medical Research Foundation, San Diego	3	915,075	3	915,075	0	0	0	0
WebSciences International	1	566,150	1	566,150	0	0	0	0
Total California	629	285,897,600	554	261,793,125	52	8,927,802	23	15,176,673
Colorado								
Children's Hospital (Denver)	1	22,500	1	22,500	0	0	0	0
Colorado State University, Fort Collins	3	738,533	2	695,557	1	42,976	0	0
Denver Health and Hospital Authority	2	1,351,625	2	1,351,625	0	0	0	0
Kestrel Labs, Inc.	1	468,643	1	468,643	0	0	0	0
Keystone Symposia	2	40,000	2	40,000	0	0	0	0
Klein Buendel, Inc.	1	103,446	1	103,446	0	0	0	0
Myogen, Inc.	1	100,000	1	100,000	0	0	0	0
National Jewish Medical and Research Center	36	19,318,359	33	19,137,482	2	103,832	1	77,045
Rocky Mountain Biosystems, Inc.	2	224,833	2	224,833	0	0	0	0
Rose Biomedical Development Corporation	2	528,694	2	528,694	0	0	0	0
University of Colorado at Boulder	13	2,907,331	8	2,395,342	5	511,989	0	0
University of Colorado Health Sciences Center	63	25,613,415	55	22,889,150	5	1,580,241	3	1,144,084
Visible Productions, LLC	1	277,346	1	277,346	0	0	0	0
Total Colorado	128	51,694,785	111	48,234,618	13	2,239,038	4	1,221,129
Connecticut								
CAS Medical Systems, Inc.	1	99,938	1	99,938	0	0	0	0
John B. Pierce Laboratory, Inc.	3	934,395	3	934,395	0	0	0	0
L2 Diagnostics, LLC	1	98,179	1	98,179	0	0	0	0
Physiological Technologies	1	99,510	1	99,510	0	0	0	0
University of Connecticut School of Medicine and Dental Medicine	16	6,973,322	16	6,973,322	0	0	0	0
Wesleyan University	1	284,000	1	284,000	0	0	0	0

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Yale University	66	27,580,117	58	25,875,445	8	1,704,672	0	0
Total Connecticut	89	36,069,461	81	34,364,789	8	1,704,672	0	0
Delaware								0
Compact Membrane Systems, Inc.	2	714,644	2	714,644	0	0	0	0
Sorption Technologies, Inc.	1	99,770	1	99,770	0	0	0	0
University of Delaware	4	1,107,000	4	1,107,000	0	0	0	0
Total Delaware	7	1,921,414	7	1,921,414	0	0	0	0
District of Columbia								
American Institutes for Research	2	2,458,278	0	0	0	0	2	2,458,278
American National Red Cross	1	371,326	1	371,326	0	0	0	0
American Registry of Pathology, Inc.	1	287,463	1	287,463	0	0	0	0
Children's Research Institute	6	2,279,231	5	2,196,854	0	0	1	82,377
George Washington University	11	3,976,976	10	3,551,976	0	0	1	425,000
Georgetown University	17	7,157,225	17	7,157,225	0	0	0	0
Health Media Lab, Inc.	1	486,819	1	486,819	0	0	0	0
Healthmark Associates	1	416,938	1	416,938	0	0	0	0
Howard University	6	2,521,245	3	1,746,927	1	130,838	2	643,480
Medstar Research Institute	1	924,028	0	0	0	0	1	924,028
U.S. Bureau of the Census	1	559,000	0	0	0	0	1	559,000
U.S. Department of Agriculture	1	200,000	1	200,000	0	0	0	0
U.S. Department of Health and Human Services, Office of Human Development Services	6	58,695,062	0	0	0	0	6	58,695,062
U.S. Department of Veterans Affairs Medical Center	1	120,057	0	0	0	0	1	120,057
Total District of Columbia	56	80,453,648	40	16,415,528	1	130,838	15	63,907,282
Florida								
Alpha-1 Foundation	1	20,437	1	20,437	0	0	0	0
Florida Agricultural and Mechanical University	0	338,394	0	338,394	0	0	0	0
Florida Atlantic University	2	526,875	2	526,875	0	0	0	0
Florida Institute of Technology	1	243,250	1	243,250	0	0	0	0
Florida International University	0	258,260	0	258,260	0	0	0	0
Florida State University	3	1,190,668	3	1,190,668	0	0	0	0
H. Lee Moffitt Cancer Center and Research Institute	1	230,673	1	230,673	0	0	0	0
Innovia, LLC	1	413,679	1	413,679	0	0	0	0
Mount Sinai Medical Center, Miami Beach	0	1,000,000	0	1,000,000	0	0	0	0
Nemours Children's Clinic	1	520,186	1	520,186	0	0	0	0
Nova Southeastern University	2	360,554	2	360,554	0	0	0	0
Transgenex Therapeutics	2	267,916	2	267,916	0	0	0	0
University of Central Florida	2	600,319	2	600,319	0	0	0	0
University of Florida	42	14,700,995	38	14,163,151	3	262,844	1	275,000
University of Miami, Coral Gables	4	3,191,450	3	2,874,128	1	317,322	0	0
University of Miami Medical Center	20	6,969,763	17	5,983,612	1	343,605	2	642,546
University of South Florida	6	1,958,995	6	1,958,995	0	0	0	0
Vicor Technologies, Inc.	1	750,000	1	750,000	0	0	0	0
Total Florida	89	33,542,414	81	31,701,097	5	923,771	3	917,546

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Georgia								
American Cardiovascular Research Institute	1	157,242	1	157,242	0	0	0	0
Bresagen, Inc.	0	125,000	0	125,000	0	0	0	0
Centers for Disease Control and Prevention	1	725,000	0	0	0	0	1	725,000
Emory University	63	22,290,867	53	20,463,221	8	926,025	2	901,621
Georgia Institute of Technology	6	2,863,897	5	2,814,969	1	48,928	0	0
Georgia State University	3	720,440	3	720,440	0	0	0	0
Medical College of Georgia	38	15,740,531	35	15,387,036	3	353,495	0	0
Mercer University, Macon	1	168,946	1	168,946	0	0	0	0
Morehouse School of Medicine	12	4,922,368	11	4,719,953	1	202,425	0	0
Transfusion and Transplantation Technology	2	195,741	2	195,741	0	0	0	0
University of Georgia	4	652,783	3	625,800	1	26,983	0	0
Total Georgia	131	48,562,815	114	45,378,348	14	1,557,846	3	1,626,621
Hawaii								
Pacific Health Research Institute	2	1,001,629	2	1,001,629	0	0	0	0
Queen's Medical Center	1	600,000	1	600,000	0	0	0	0
University of Hawaii at Hilo	0	265,082	0	265,082	0	0	0	0
University of Hawaii at Manoa	2	743,750	2	743,750	0	0	0	0
Total Hawaii	5	2,610,461	5	2,610,461	0	0	0	0
Illinois								
AJ Medical Engineering	1	827,746	1	827,746	0	0	0	0
BioTechPlex Corporation	4	1,066,563	4	1,066,563	0	0	0	0
Children's Memorial Hospital, Chicago Chicago	1	98,010	1	98,010	0	0	0	0
Cordynamics, Inc.	1	97,838	1	97,838	0	0	0	0
Evanston Northwestern Healthcare Research Institute	2	522,202	2	522,202	0	0	0	0
Hektoen Institute for Medical Research	1	763,746	1	763,746	0	0	0	0
Howard Brown Health Center	0	96,213	0	96,213	0	0	0	0
Loyola University, Chicago	19	5,970,876	17	5,878,972	2	91,904	0	0
Midwestern University	1	200,496	1	200,496	0	0	0	0
Northwestern University	64	23,604,680	54	19,281,497	7	1,146,140	3	3,177,043
Rosalind Franklin University of Medicine and Science	2	507,000	2	507,000	0	0	0	0
Rush University Medical Center	9	3,908,950	8	3,216,618	0	0	1	692,332
SloWave, Inc.	1	98,322	1	98,322	0	0	0	0
Southern Illinois University, Carbondale	3	830,185	3	830,185	0	0	0	0
Southern Illinois University School of Medicine	1	246,750	1	246,750	0	0	0	0
SSC Small Business Illinois	1	389,341	0	0	0	0	1	389,341
University of Chicago	31	11,893,264	26	10,520,687	4	1,281,769	1	90,808
University of Illinois at Chicago	52	20,361,862	46	19,151,302	6	1,210,560	0	0
University of Illinois, Urbana-Champaign	4	1,358,232	4	1,358,232	0	0	0	0
Total Illinois	198	72,842,276	173	64,762,379	19	3,730,373	6	4,349,524
Indiana								
Clarian Health Partners, Inc.	1	245,753	1	245,753	0	0	0	0
General Biotechnology, LLC	1	498,846	1	498,846	0	0	0	0

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Indiana University–Purdue University at Indianapolis	50	18,854,144	48	18,255,348	2	598,796	0	0
OptoSonics, Inc.	1	111,165	1	111,165	0	0	0	0
University of Notre Dame	3	2,411,467	3	2,411,467	0	0	0	0
Total Indiana	56	22,121,375	54	21,522,579	2	598,796	0	0
Iowa								
Maharishi University of Management	1	496,432	1	496,432	0	0	0	0
University of Iowa	76	32,503,099	70	29,847,209	5	2,255,890	1	400,000
Vida Technologies	1	100,000	1	100,000	0	0	0	0
Total Iowa	78	33,099,531	72	30,443,641	5	2,255,890	1	400,000
Kansas								
Kansas State University	3	463,919	2	436,500	1	27,419	0	0
University of Kansas, Lawrence	2	666,460	2	666,460	0	0	0	0
University of Kansas Medical Center	7	1,738,799	6	1,707,780	1	31,019	0	0
Wichita State University	1	180,660	1	180,660	0	0	0	0
Total Kansas	13	3,049,838	11	2,991,400	2	58,438	0	0
Kentucky								
Regenerex, LLC	1	220,500	1	220,500	0	0	0	0
University of Kentucky	31	8,420,489	29	8,251,912	2	168,577	0	0
University of Louisville	37	10,276,748	32	10,025,813	5	250,935	0	0
Total Kentucky	69	18,917,737	62	18,498,225	7	419,512	0	0
Louisiana								
Louisiana State University Health Sciences Center, New Orleans	11	4,680,056	10	4,404,768	0	0	1	275,288
Louisiana State University Health Sciences Center, Shreveport	1	217,500	1	217,500	0	0	0	0
Louisiana State University Pennington Biomedical Research Center	3	920,820	3	920,820	0	0	0	0
Tulane University of Louisiana	23	8,974,547	20	8,696,648	3	277,899	0	0
Total Louisiana	38	14,792,923	34	14,239,736	3	277,899	1	275,288
Maine								
American Red Cross Blood Services, New England	1	257,915	0	0	0	0	1	257,915
Bowdoin College	1	187,210	1	187,210	0	0	0	0
Jackson Laboratory	11	6,735,091	10	6,729,471	1	5,620	0	0
Maine Medical Center	7	2,388,650	7	2,388,650	0	0	0	0
New England Medical Center Hospitals	1	365,816	0	0	0	0	1	365,816
New England Research Institutes, Inc.	1	837,227	0	0	0	0	1	837,227
University of Maine, Orono	1	472,968	1	472,968	0	0	0	0
Total Maine	23	11,244,877	19	9,778,299	1	5,620	3	1,460,958
Maryland								
Adlyfe, Inc.	1	372,005	1	372,005	0	0	0	0
Biosurface Engineering Technologies	1	99,750	1	99,750	0	0	0	0
Bon Secours Hospital, Baltimore	1	600,000	1	600,000	0	0	0	0
Cellex, Inc.	1	99,670	1	99,670	0	0	0	0
Clearant, Inc.	1	319,487	1	319,487	0	0	0	0
Clinical Trials and Surveys Corporation	2	2,122,831	0	0	0	0	2	2,122,831
EMMES Corporation	2	837,598	0	0	0	0	2	837,598
Engineering and Scientific Research Association	1	100,000	1	100,000	0	0	0	0

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Eva Corporation	1	100,000	1	100,000	0	0	0	0
Federation of American Societies for Experimental Biology	3	56,250	3	56,250	0	0	0	0
Genex Technologies, Inc.	1	100,000	1	100,000	0	0	0	0
Guilford Pharmaceuticals, Inc.	1	95,013	1	95,013	0	0	0	0
Henry M. Jackson Foundation for the Advancement of Military Medicine	6	2,134,708	5	1,846,228	1	288,480	0	0
Individual Monitoring Systems, Inc.	2	664,179	2	664,179	0	0	0	0
Infinite Biomedical Technologies, LLC	2	656,049	2	656,049	0	0	0	0
Institute for Genomic Research	1	1,412,828	1	1,412,828	0	0	0	0
Johns Hopkins University	193	81,489,323	168	75,983,817	18	3,361,400	7	2,144,106
Maryland Medical Research Institute	2	1,547,301	1	411,208	0	0	1	1,136,093
MasiMax Resources, Inc.	1	1,285,064	0	0	0	0	1	1,285,064
MedStar Research Institute	4	3,786,986	4	3,786,986	0	0	0	0
Morgan State University	0	60,151	0	60,151	0	0	0	0
National Cancer Institute	1	1,000,000	0	0	0	0	1	1,000,000
National Center for Complementary and Alternative Medicine	1	200,000	0	0	0	0	1	200,000
National Center for Genome Resources	1	1,032,312	0	0	0	0	1	1,032,312
National Center for Health Statistics	1	245,760	0	0	0	0	1	245,760
National Center for Research Resources	2	618,000	0	0	0	0	2	618,000
National Institute of Child Health and Human Development	3	7,083,373	0	0	0	0	3	7,083,373
National Institute of Diabetes and Digestive and Kidney Diseases	2	5,000,000	0	0	0	0	2	5,000,000
National Institute of Neurological Disorders and Stroke	1	1,307,100	0	0	0	0	1	1,307,100
National Institutes of Health	1	8,661,937	0	0	0	0	1	8,661,937
Northrop Grumman Information Technology Corporation	1	871,786	0	0	0	0	1	871,786
Peace Technology, Inc.	1	73,080	0	0	0	0	1	73,080
Pulmonary Hypertension Association	1	14,546	1	14,546	0	0	0	0
University of Maryland, Baltimore County Campus	1	285,906	1	285,906	0	0	0	0
University of Maryland Baltimore Professional School	53	21,309,643	48	20,402,275	3	756,777	2	150,591
University of Maryland Biotechnology Institute	2	742,500	2	742,500	0	0	0	0
University of Maryland, College Park Campus	2	1,046,932	2	1,046,932	0	0	0	0
U.S. Agricultural Research Center	2	850,000	0	0	0	0	2	850,000
U.S. Small Business Administration	2	143,000	0	0	0	0	2	143,000
U.S. PHS Public Advisory Groups	12	5,111,000	12	5,111,000	0	0	0	0
Warren Grant Magnuson Clinical Center	1	150,000	0	0	0	0	1	150,000
Westat, Inc.	2	4,268,062	1	864,662	0	0	1	3,403,400
Total Maryland	320	157,954,130	262	115,231,442	22	4,406,657	36	38,316,031
Massachusetts								
ABIOMED, Inc.	3	281,280	3	281,280	0	0	0	0
Aeris Therapeutics, Inc.	1	95,000	1	95,000	0	0	0	0
Beth Israel Deaconess Medical Center	58	24,473,598	53	23,128,303	5	1,345,295	0	0
Biomedical Research Models, Inc.	1	223,141	1	223,141	0	0	0	0

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
BioMod Surfaces	1	373,560	1	373,560	0	0	0	0
BioPhysics Assay Laboratory, Inc. (BioPAL)	1	356,143	1	356,143	0	0	0	0
BioSurfaces	1	100,000	1	100,000	0	0	0	0
Boston Biomedical Research Institute	10	4,281,762	10	4,281,762	0	0	0	0
Boston Medical Center	17	8,564,745	17	8,564,745	0	0	0	0
Boston University, Charles River Campus	6	1,546,999	5	1,513,055	1	33,944	0	0
Boston University Medical Campus	62	37,496,187	54	28,791,869	7	2,685,901	1	6,018,417
Brandeis University	1	105,220	1	105,220	0	0	0	0
Brigham and Women's Hospital	130	57,589,925	106	52,763,859	22	3,773,399	2	1,052,667
Candela Laser Corporation	1	79,234	1	79,234	0	0	0	0
Cape Cod Research, Inc.	1	102,450	1	102,450	0	0	0	0
Cardiovascular Engineering, Inc.	1	287,277	1	287,277	0	0	0	0
CBR Institute for Biomedical Research	8	12,359,559	8	12,359,559	0	0	0	0
Children's Hospital Boston	56	23,726,930	50	22,282,153	6	1,444,777	0	0
Covalent Associates, Inc.	1	389,333	1	389,333	0	0	0	0
Dana-Farber Cancer Institute	15	7,326,023	15	7,326,023	0	0	0	0
Gene Regulation Laboratories	1	359,052	1	359,052	0	0	0	0
Giner, Inc.	1	380,178	1	380,178	0	0	0	0
GTC Biotherapeutics, Inc.	1	149,265	1	149,265	0	0	0	0
Gwathmey, Inc.	3	1,676,564	3	1,676,564	0	0	0	0
Harvard Pilgrim Health Care, Inc.	3	1,808,856	3	1,808,856	0	0	0	0
Harvard University	2	815,422	2	815,422	0	0	0	0
Harvard University Medical School	13	4,697,813	8	3,722,753	5	975,060	0	0
Harvard University School of Public Health	24	12,379,025	21	11,817,671	3	561,354	0	0
Hydra Biosciences, Inc.	1	140,000	1	140,000	0	0	0	0
Implant Sciences Corporation	1	94,813	1	94,813	0	0	0	0
Inotek Corporation	3	1,285,122	3	1,285,122	0	0	0	0
IQuum, Inc.	1	154,086	1	154,086	0	0	0	0
IVREA, Inc.	1	130,875	1	130,875	0	0	0	0
Joslin Diabetes Center	2	1,014,170	2	1,014,170	0	0	0	0
Massachusetts Eye and Ear Infirmary	1	125,982	1	125,982	0	0	0	0
Massachusetts General Hospital	72	24,682,699	65	21,330,649	6	1,299,616	1	2,052,434
Massachusetts Institute of Technology	12	7,838,716	11	7,797,648	1	41,068	0	0
Massachusetts Mental Health Institute	1	200,550	1	200,550	0	0	0	0
Molecular Insight Pharmaceuticals, Inc.	2	497,238	2	497,238	0	0	0	0
New England Medical Center Hospitals	33	17,250,109	29	16,686,412	3	518,394	1	45,303
New England Research Institutes, Inc.	5	4,750,098	5	4,750,098	0	0	0	0
Newton Laboratories	1	99,795	1	99,795	0	0	0	0
Northeastern University	2	378,973	2	378,973	0	0	0	0
Pharos, LLC	1	263,056	1	263,056	0	0	0	0
Physical Sciences, Inc.	2	680,330	2	680,330	0	0	0	0
Plethlogic	1	149,126	1	149,126	0	0	0	0
Pyramid Technical Consultants	1	100,000	1	100,000	0	0	0	0
Radiation Monitoring Devices, Inc.	1	375,005	1	375,005	0	0	0	0
Science Research Laboratory, Inc.	1	555,074	1	555,074	0	0	0	0
St. Elizabeth's Medical Center of Boston	5	3,281,642	5	3,281,642	0	0	0	0

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Thermal Technologies, Inc.	1	336,624	1	336,624	0	0	0	0
Tufts University, Boston	13	3,998,062	11	3,710,505	2	287,557	0	0
University of Massachusetts Medical School, Worcester	24	8,880,533	22	8,050,117	1	130,416	1	700,000
Verax Biomedical, Inc.	1	317,094	1	317,094	0	0	0	0
V.I. Technologies, Inc.	2	667,386	2	667,386	0	0	0	0
Whalen Biomedical, Inc.	1	100,525	1	100,525	0	0	0	0
Whitehead Institute for Biomedical Research	1	42,976	0	0	1	42,976	0	0
Total Massachusetts	616	280,415,200	547	257,406,622	63	13,139,757	6	9,868,821
Michigan								
Accumed Systems, Inc.	1	683,709	1	683,709	0	0	0	0
Henry Ford Health System	11	5,348,534	11	5,348,534	0	0	0	0
L-VAD Technology, Inc.	1	668,462	1	668,462	0	0	0	0
MC3, Inc.	5	1,849,500	5	1,849,500	0	0	0	0
Medarray, Inc.	1	428,791	1	428,791	0	0	0	0
Michigan State University	12	3,847,620	11	3,810,420	1	37,200	0	0
Molecular Innovations, Inc.	1	424,685	1	424,685	0	0	0	0
Oakland University	1	71,000	1	71,000	0	0	0	0
University of Michigan at Ann Arbor	101	38,507,085	86	34,768,333	12	2,109,943	3	1,628,809
Wayne State University	14	3,533,760	14	3,533,760	0	0	0	0
Western Michigan University	1	181,875	1	181,875	0	0	0	0
Total Michigan	149	55,545,021	133	51,769,069	13	2,147,143	3	1,628,809
Minnesota								
Advanced Circulatory Systems, Inc.	1	99,947	1	99,947	0	0	0	0
Advanced Medical Electronics Corporation	4	956,148	4	956,148	0	0	0	0
Discovery Genomics, Inc.	1	235,588	1	235,588	0	0	0	0
Korosensor.com, Inc.	1	303,415	1	303,415	0	0	0	0
Mayo Clinic, Rochester	64	22,772,976	55	20,645,275	6	815,593	3	1,312,108
Minneapolis Medical Research Foundation, Inc.	1	6,448,619	0	0	0	0	1	6,448,619
Minnesota State University, Moorhead	1	197,024	1	197,024	0	0	0	0
Minnesota Veterans Research Institute	1	625,310	1	625,310	0	0	0	0
National Marrow Donor Program, Inc.	1	535,351	0	0	0	0	1	535,351
Paradigm Pharmaceuticals, LLC	1	371,950	1	371,950	0	0	0	0
Phygen, Inc.	1	164,984	1	164,984	0	0	0	0
Sunnyside Technologies	1	120,800	1	120,800	0	0	0	0
University of Minnesota, Twin Cities	84	33,939,869	70	26,196,574	7	1,994,712	7	5,748,583
Wilson Wolf Manufacturing Corporation	1	695,500	1	695,500	0	0	0	0
Total Minnesota	163	67,467,481	138	50,612,515	13	2,810,305	12	14,044,661
Mississippi								
Jackson Hinds Comprehensive Health Center	1	196,358	1	196,358	0	0	0	0
Tougaloo College	1	5,000	0	0	0	0	1	5,000
University of Mississippi Medical Center	17	6,669,305	12	6,118,164	4	118,346	1	432,795
Total Mississippi	19	6,870,663	13	6,314,522	4	118,346	2	437,795
Missouri								
A.T. Still University of Health Sciences	1	186,600	1	186,600	0	0	0	0

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Alveoli Medical, LLC	1	100,035	1	100,035	0	0	0	0
APT Therapeutics, Inc.	1	98,750	1	98,750	0	0	0	0
Children's Mercy Hospital, Kansas City	2	562,408	2	562,408	0	0	0	0
Engineering Software Research and Development, Inc	1	251,665	1	251,665	0	0	0	0
St. Louis University	16	4,319,941	15	4,170,061	0	0	1	149,880
University of Missouri, Columbia	18	5,902,600	14	5,634,650	4	267,950	0	0
University of Missouri, Kansas City	1	253,490	1	253,490	0	0	0	0
University of Missouri, St. Louis	1	231,566	1	231,566	0	0	0	0
VitalTech, Inc.	1	96,990	1	96,990	0	0	0	0
Washington University	129	51,056,940	111	47,586,509	17	3,406,730	1	63,701
Total Missouri	172	63,060,985	149	59,172,724	21	3,674,680	2	213,581
Montana								
Resodyn Corporation	1	155,134	1	155,134	0	0	0	0
University of Montana	4	1,253,602	4	1,253,602	0	0	0	0
Total Montana	5	1,408,736	5	1,408,736	0	0	0	0
Nebraska								
Creighton University	3	578,525	2	537,792	1	40,733	0	0
University of Nebraska, Lincoln	1	288,000	1	288,000	0	0	0	0
University of Nebraska Medical Center	8	5,051,705	8	5,051,705	0	0	0	0
Total Nebraska	12	5,918,230	11	5,877,497	1	40,733	0	0
Nevada								
Nevada Cancer Institute	1	358,997	1	358,997	0	0	0	0
Sierra Biomedical Research Corporation	2	753,145	2	753,145	0	0	0	0
University of Nevada at Reno	13	3,914,919	12	3,664,919	0	0	1	250,000
Total Nevada	16	5,027,061	15	4,777,061	0	0	1	250,000
New Hampshire								
Creare, Inc.	2	577,687	2	577,687	0	0	0	0
Dartmouth College	22	6,526,562	21	6,507,209	1	19,353	0	0
University of New Hampshire	1	142,190	1	142,190	0	0	0	0
U.S. Department of Veterans Affairs Medical Center, Albuquerque	1	3,913,076	0	0	0	0	1	3,913,076
Xemed, LLC	1	102,965	1	102,965	0	0	0	0
Total New Hampshire	27	11,262,480	25	7,330,051	1	19,353	1	3,913,076
New Jersey								
Coecare.Com, LLC	2	493,714	2	493,714	0	0	0	0
DVX, LLC	1	688,565	1	688,565	0	0	0	0
Life Recovery Systems, Inc.	1	601,478	1	601,478	0	0	0	0
PharmaSeq, Inc.	1	373,162	1	373,162	0	0	0	0
Princeton University	2	343,191	1	296,771	1	46,420	0	0
Public Health Research Institute	3	1,093,542	3	1,093,542	0	0	0	0
Rutgers, The State University of New Jersey, New Brunswick	3	362,222	2	362,221	1	1	0	0
University of Medicine and Dentistry of New Jersey	18	9,548,284	15	8,964,531	2	0	0	0
University of Medicine and Dentistry of New Jersey, R.W. Johnson Medical School	7	4,081,740	7	4,081,740	0	307,249	1	276,504
Total New Jersey	38	17,585,898	33	16,955,724	4	353,670	1	276,504

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
New Mexico								
Lovelace Biomedical and Environmental Research	5	2,230,842	5	2,230,842	0	0	0	0
Southwest Sciences, Inc.	2	438,946	2	438,946	0	0	0	0
TPL, Inc.	1	304,952	1	304,952	0	0	0	0
University of New Mexico, Albuquerque	11	4,868,634	8	3,781,169	1	80,384	2	1,007,081
Total New Mexico	19	7,843,374	16	6,755,909	1	80,384	2	1,007,081
New York								
Albany Medical College of Union University	7	2,074,387	5	1,454,553	2	619,834	0	0
Angion Biomedica Corporation	1	175,272	1	175,272	0	0	0	0
CardioMag Imaging, Inc.	1	100,000	1	100,000	0	0	0	0
Cell Preservation Services, Inc.	1	474,992	1	474,992	0	0	0	0
City College of New York	3	966,076	3	966,076	0	0	0	0
Columbia University Health Sciences	79	44,431,003	70	36,400,652	6	1,231,103	3	6,799,248
Columbia University, New York Morningside	8	3,261,085	6	2,061,484	0	0	2	1,199,601
Cornell University, Ithaca	9	4,246,828	9	4,246,828	0	0	0	0
CUNY Graduate School and University Center	1	312,500	1	312,500	0	0	0	0
Foster-Miller Technologies, Inc.	5	1,668,861	5	1,668,861	0	0	0	0
Gene Network Sciences, Inc.	1	99,960	1	99,960	0	0	0	0
Graduate College of Union University	0	80,000	0	80,000	0	0	0	0
Hofstra University	1	48,928	0	0	1	48,928		0
Jarvik Research, Inc.	1	1,016,032	0	0	0	0	1	1,016,032
Masonic Medical Research Laboratory, Inc.	3	1,046,480	3	1,046,480	0	0	0	0
Mohawk Innovative Technology, Inc.	1	149,829	1	149,829	0	0	0	0
Montefiore Medical Center, Bronx	1	135,559	1	135,559	0	0	0	0
Mount Sinai School of Medicine	31	19,252,884	28	15,229,236	2	402,131	1	3,621,517
Nanoprobe, Inc.	2	723,301	2	723,301	0	0	0	0
Narrows Institute for Biomedical Research, Inc.	3	615,286	2	558,750	1	56,536	0	0
New York Academy of Medicine	1	478,116	1	478,116	0	0	0	0
New York Blood Center	7	3,185,408	7	3,185,408	0	0	0	0
New York Institute of Technology, Old Westbury	1	307,147	1	307,147	0	0	0	0
New York Medical College	20	9,741,508	20	9,741,508	0	0	0	0
New York University	1	221,250	1	221,250	0	0	0	0
New York University School Of Medicine	25	8,098,475	22	7,693,483	3	404,992	0	0
North Shore–Long Island Jewish Research Institute	5	1,760,028	5	1,760,028	0	0	0	0
Ogilvy Public Relations Worldwide	1	964,493	0	0	0	0	1	964,493
Pharmacon International, Inc.	2	520,741	2	520,741	0	0	0	0
Photon Migration Technologies Corporation	1	140,812	1	140,812	0	0	0	0
Rensselaer Polytechnic Institute	2	509,691	2	509,691	0	0	0	0
Rockefeller University	8	4,225,670	8	4,225,670	0	0	0	0
Roswell Park Cancer Institute Corporation	3	1,065,675	3	1,065,675	0	0	0	0

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Sloan-Kettering Institute for Cancer Research	10	2,542,339	10	2,542,339	0	0	0	0
State University of New York at Albany	1	257,510	1	257,510	0	0	0	0
State University of New York at Buffalo	16	4,945,615	15	4,826,858	1	118,757	0	0
State University of New York at Stony Brook	19	5,248,008	18	4,848,008	0	0	1	400,000
St. John's University	2	901,438	2	901,438	0	0	0	0
St. Luke's-Roosevelt Institute for Health Sciences	7	2,654,619	7	2,654,619	0	0	0	0
SUNY Downstate Medical Center	7	1,787,013	6	1,657,864	0	0	1	129,149
Syracuse University	2	601,500	2	601,500	0	0	0	0
Transonic Systems, Inc.	2	728,403	2	728,403	0	0	0	0
Trudeau Institute, Inc.	4	2,990,754	4	2,990,754	0	0	0	0
University of Rochester	47	17,730,483	42	16,886,224	5	844,259	0	0
Upstate Medical Center	7	3,957,782	7	3,957,782	0	0	0	0
Visiting Nurse Service of New York	1	640,463	1	640,463	0	0	0	0
Weill Medical College of Cornell University	45	27,657,424	42	26,824,337	2	91,195	1	741,892
Winthrop-University Hospital	3	956,956	3	956,956	0	0	0	0
Yeshiva University	32	17,970,301	27	16,998,673	4	550,988	1	420,640
York College	0	297,919	0	297,919	0	0	0	0
Total New York	441	203,966,804	402	184,305,509	27	4,368,723	12	15,292,572
North Carolina								
BioMarck Pharmaceuticals	1	632,540	1	632,540	0	0	0	0
BreathQuant Medical Systems, Inc.	1	584,164	1	584,164	0	0	0	0
Carolinas Medical Center	1	351,789	1	351,789	0	0	0	0
Cognosci, Inc.	1	214,573	1	214,573	0	0	0	0
Constella Group, Inc.	2	1,968,505	0	0	0	0	2	1,968,505
Duke University	121	59,328,343	105	55,162,253	12	1,710,158	4	2,455,932
East Carolina University	2	570,827	2	570,827	0	0	0	0
Ercole Biotech, Inc.	1	270,674	1	270,674	0	0	0	0
MediWave Star Technology, Inc.	2	198,180	2	198,180	0	0	0	0
NDimo, Inc.	1	100,000	1	100,000	0	0	0	0
Nekton Research, LLC	1	98,307	1	98,307	0	0	0	0
North Carolina Central University	2	789,305	2	789,305	0	0	0	0
North Carolina State University at Raleigh	6	1,875,839	5	1,680,014	1	195,825	0	0
Regado Biosciences, Inc.	1	98,568	1	98,568	0	0	0	0
Rho Federal Systems Division, Inc.	1	4,018,206	1	4,018,206	0	0	0	0
Southeast TechInventures	1	175,937	1	175,937	0	0	0	0
University of North Carolina at Chapel Hill	92	36,315,877	81	34,409,637	8	1,609,726	3	296,514
University of North Carolina at Charlotte	1	462,126	1	462,126	0	0	0	0
University of North Carolina at Greensboro	1	193,500	1	193,500	0	0	0	0
U.S. PHS Office of Disease Prevention and Health Promotion	1	2,000,000	0	0	0	0	1	2,000,000
Vortant Technologies, LLC	1	99,776	1	99,776	0	0	0	0
Wake Forest University	7	8,111,343	2	883,141	0	0	5	7,228,202
Wake Forest University Health Sciences	44	33,257,545	38	18,911,350	4	443,558	2	13,902,637

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Williams LifeSkills, Inc.	1	272,355	1	272,355	0	0	0	0
Winston-Salem State University	1	116,885	1	116,885	0	0	0	0
Total North Carolina	294	152,105,164	252	120,294,107	25	3,959,267	17	27,851,790
North Dakota								
North Dakota State University	3	564,000	3	564,000	0	0	0	0
Total North Dakota	3	564,000	3	564,000	0	0	0	0
Ohio								
Athersys, Inc.	1	100,000	1	100,000	0	0	0	0
BIOMEC, Inc.	2	442,148	2	442,148	0	0	0	0
Biomedical Research Associates, Inc.	1	99,419	1	99,419	0	0	0	0
Case Western Reserve University	61	28,332,110	54	21,650,295	6	2,027,662	1	4,654,153
ChantTest, Inc.	1	200,633	1	200,633	0	0	0	0
ChanXpress, Inc.	1	100,000	1	100,000	0	0	0	0
Children's Hospital Medical Center of Cincinnati	48	26,041,345	45	25,706,290	3	335,055	0	0
Children's Research Institute	2	438,915	2	438,915	0	0	0	0
Cleveland Clinic Foundation	6	5,774,397	4	5,541,030	0	0	2	233,367
Cleveland Clinic Lerner College of Medicine of Case Western Reserve University	54	20,676,413	50	19,647,069	3	111,055	1	918,289
Cleveland Medical Devices, Inc.	3	451,007	3	451,007	0	0	0	0
Cleveland State University	1	299,555	1	299,555	0	0	0	0
Curragh Chemistries, Inc.	1	145,600	1	145,600	0	0	0	0
Enable Medical Corporation	1	387,745	1	387,745	0	0	0	0
EnteraTech, Inc.	1	237,155	1	237,155	0	0	0	0
LAM Foundation	1	21,375	1	21,375	0	0	0	0
Medical College of Ohio at Toledo	8	5,459,950	8	5,459,950	0	0	0	0
MetroHealth Medical Center	1	337,500	1	337,500	0	0	0	0
NanoMimetics, Inc.	1	138,071	1	138,071	0	0	0	0
Ohio State University	32	8,891,364	27	8,288,920	3	288,003	2	314,441
Synapse Biomedical, Ltd.	1	99,895	1	99,895	0	0	0	0
University of Cincinnati	47	17,325,907	42	15,774,165	3	733,296	2	818,446
University of Dayton	1	221,340	1	221,340	0	0	0	0
Wright State University	7	2,863,627	6	2,863,626	1	1	0	0
Total Ohio	283	119,085,471	256	108,651,703	19	3,495,072	8	6,938,696
Oklahoma								
Ekips Technologies, Inc.	1	376,928	1	376,928	0	0	0	0
Langston University	1	500,000	1	500,000	0	0	0	0
Oklahoma Medical Research Foundation	6	3,830,971	6	3,830,971	0	0	0	0
Oklahoma State University, Stillwater	2	607,200	2	607,200	0	0	0	0
Selexys Pharmaceuticals Corporation	1	304,843	1	304,843	0	0	0	0
University of Oklahoma Health Sciences Center	11	4,443,595	11	4,443,595	0	0	0	0
Total Oklahoma	22	10,063,537	22	10,063,537	0	0	0	0
Oregon								
Dimera, LLC	2	1,229,136	2	1,229,136	0	0	0	0
Inovise Medical, Inc.	1	325,372	1	325,372	0	0	0	0
Oregon Health and Science University	39	14,352,329	34	13,681,196	5	671,133	0	0
Oregon Research Institute	1	338,478	1	338,478	0	0	0	0
Oregon State University	1	250,250	1	250,250	0	0	0	0

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Portland State University	1	355,000	1	355,000	0	0	0	0
University of Oregon	2	430,795	2	430,795	0	0	0	0
Total Oregon	47	17,281,360	42	16,610,227	5	671,133	0	0
Pennsylvania								
Allegheny-Singer Research Institute	3	717,494	3	717,494	0	0	0	0
APD Life Sciences, Inc.	1	463,708	1	463,708	0	0	0	0
CardiacAssist, Inc.	1	105,074	1	105,074	0	0	0	0
Carnegie Mellon University	3	1,372,762	3	1,372,762	0	0	0	0
CASurgica, Inc.	1	99,412	1	99,412	0	0	0	0
Children's Hospital of Philadelphia	43	25,688,751	40	25,029,812	3	658,939	0	0
Children's Hospital of Pittsburgh	5	1,452,394	4	1,398,042	1	54,352	0	0
Drexel University	5	1,000,547	5	1,000,547	0	0	0	0
Drexel University College of Medicine	4	1,405,943	3	1,322,853	1	83,090	0	0
Ension, Inc.	4	1,366,802	3	739,872	0	0	1	626,930
Fox Chase Cancer Center	2	760,500	2	760,500	0	0	0	0
Guthrie Foundation for Education and Research	1	258,650	1	258,650	0	0	0	0
InSight TeleHealth Systems, LLC	1	400,524	1	400,524	0	0	0	0
Institute for Cancer Research	1	463,213	1	463,213	0	0	0	0
Institute of Hematology and Blood Transfusion	1	195,995	0	0	0	0	1	195,995
Integral Molecular	1	271,137	1	271,137	0	0	0	0
Lankenau Medical Research Center	1	400,000	1	400,000	0	0	0	0
Magee-Women's Health Corporation	2	325,021	1	298,038	1	26,983	0	0
Medical Diagnostic Research Foundation	1	303,364	1	303,364	0	0	0	0
Membrane Assays, Inc.	1	199,320	1	199,320	0	0	0	0
Octagen Corporation	1	100,000	1	100,000	0	0	0	0
Pennsylvania State University, Milton S. Hershey Medical Center	21	9,679,030	19	8,614,383	1	47,296	1	1,017,351
Pennsylvania State University, University Park	3	801,074	3	801,074	0	0	0	0
Philadelphia College of Osteopathic Medicine	1	218,250	1	218,250	0	0	0	0
PinMed, Inc.	1	99,510	1	99,510	0	0	0	0
Temple University	19	7,172,262	16	6,429,539	2	607,425	1	135,298
Thomas Jefferson University	21	6,993,423	20	6,962,410	1	31,013	0	0
University of Pennsylvania	126	58,516,360	109	53,331,219	15	3,644,231	2	1,540,910
University of Pittsburgh at Pittsburgh	105	53,808,229	90	48,479,111	8	1,306,611	7	4,022,507
Vascor, Inc.	1	327,131	1	327,131	0	0	0	0
Villanova University	1	143,077	1	143,077	0	0	0	0
Wistar Institute	4	1,309,564	4	1,309,564	0	0	0	0
Total Pennsylvania	386	176,418,521	340	162,419,590	33	6,459,940	13	7,538,991
Rhode Island								
BCR Diagnostics, Inc.	1	409,347	1	409,347	0	0	0	0
Brown University	10	4,215,512	9	4,157,511	1	58,001	0	0
Gordon Research Conferences	6	90,000	6	90,000	0	0	0	0
Memorial Hospital of Rhode Island	1	531,499	1	531,499	0	0	0	0
Miriam Hospital	12	3,483,153	10	3,399,109	2	84,044	0	0
Pro-Change Behavior Systems, Inc.	1	315,359	1	315,359	0	0	0	0

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
QualityMetric, Inc.	1	99,384	1	99,384	0	0	0	0
Rhode Island Hospital, Providence	6	2,168,454	5	2,125,478	1	42,976	0	0
Roger Williams Hospital	2	574,065	2	574,065	0	0	0	0
Total Rhode Island	40	11,886,773	36	11,701,752	4	185,021	0	0
South Carolina								
Clemson University	2	536,250	2	536,250	0	0	0	0
Medical University of South Carolina	37	14,796,744	33	14,041,997	3	644,178	1	110,569
Organ Recovery Systems, Inc.	2	548,397	2	548,397	0	0	0	0
University of South Carolina at Columbia	12	4,813,397	12	4,813,397	0	0	0	0
Total South Carolina	53	20,694,788	49	19,940,041	3	644,178	1	110,569
South Dakota								
Missouri Breaks Research, Inc.	2	497,512	2	497,512	0	0	0	0
South Dakota Health Research Foundation	2	527,625	2	527,625	0	0	0	0
University of South Dakota	3	913,250	3	913,250	0	0	0	0
Total South Dakota	7	1,938,387	7	1,938,387	0	0	0	0
Tennessee								
Bioinventions, LLC	1	100,000	1	100,000	0	0	0	0
Cumberland Pharmaceuticals, Inc.	1	492,336	1	492,336	0	0	0	0
East Tennessee State University	5	1,155,508	5	1,155,508	0	0	0	0
Meharry Medical College	7	1,461,662	4	1,060,835	3	400,827	0	0
St. Jude Children's Research Hospital	8	7,093,545	6	5,010,443	0	0	2	2,083,102
University of Memphis	3	1,976,094	3	1,976,094	0	0	0	0
University of Tennessee at Knoxville	2	495,950	2	495,950	0	0	0	0
University of Tennessee Health Sciences Center	28	8,677,154	25	7,804,734	2	347,420	1	525,000
Vanderbilt University	73	32,868,385	64	30,123,825	8	2,158,883	1	585,677
Veterans Affairs Medical Center, Memphis	1	2,829,579	0	0	0	0	1	2,829,579
Total Tennessee	129	57,150,213	111	48,219,725	13	2,907,130	5	6,023,358
Texas								
Baylor College of Medicine	92	37,671,776	78	33,183,939	10	2,266,561	4	2,221,276
Baylor Research Institute	1	105,050	1	105,050	0	0	0	0
Cardiovascular Biosciences, Inc.	1	100,000	1	100,000	0	0	0	0
Cooper Institute for Aerobics Research	4	1,879,395	4	1,879,395	0	0	0	0
Indus Instruments	1	100,000	1	100,000	0	0	0	0
Lynntech, Inc.	3	823,182	3	823,182	0	0	0	0
Millar Instruments, Inc.	1	324,397	1	324,397	0	0	0	0
OWLS	1	99,423	1	99,423	0	0	0	0
Prairie View A&M University	0	152,176	0	152,176	0	0	0	0
Rice University	3	777,553	3	777,553	0	0	0	0
Southwest Foundation for Biomedical Research	7	7,816,224	7	7,816,224	0	0	0	0
Texas A&M University Health Science Center	16	4,613,923	15	4,563,375	1	50,548	0	0
Texas A&M University System	3	540,898	3	540,898	0	0	0	0
Texas Engineering Experiment Station	1	639,178	1	639,178	0	0	0	0
Texas Southern University	1	500,000	1	500,000	0	0	0	0

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Texas Technology University Health Sciences Center	3	619,325	3	619,325	0	0	0	0
University of North Texas	1	216,750	1	216,750	0	0	0	0
University of North Texas Health Sciences Center	11	2,968,468	10	2,832,690	1	135,778	0	0
University of Texas at Austin	4	696,186	2	621,750	2	74,436	0	0
University of Texas at Dallas	3	925,003	3	925,003	0	0	0	0
University of Texas at San Antonio	1	328,850	1	328,850	0	0	0	0
University of Texas Health Sciences Center at Houston	34	18,876,547	32	15,476,297	0	0	2	3,400,250
University of Texas Health Sciences Center at San Antonio	22	7,044,007	18	6,171,240	2	320,725	2	552,042
University of Texas Health Sciences Center at Tyler	11	2,757,454	11	2,757,454	0	0	0	0
University of Texas M.D. Anderson Cancer Center	5	1,621,000	5	1,621,000	0	0	0	0
University of Texas Medical Branch Galveston	14	3,622,637	13	3,537,004	1	85,633	0	0
University of Texas–Pan American	0	370,956	0	370,956	0	0	0	0
University of Texas Southwestern Medical Center at Dallas	56	25,550,831	50	24,027,617	5	1,347,270	1	175,944
VidaCare Corporation	1	146,719	1	146,719	0	0	0	0
Total Texas	301	121,887,908	270	111,257,445	22	4,280,951	9	6,349,512
Utah								
Axon Medical, Inc.	1	99,966	1	99,966	0	0	0	0
E.I. Spectra, LLC	1	100,000	1	100,000	0	0	0	0
LDS Hospital	4	2,690,243	2	699,689	0	0	2	1,990,554
Medical Physics, Inc.	1	100,000	1	100,000	0	0	0	0
Thrombodyne, Inc.	1	461,036	1	461,036	0	0	0	0
University of Utah	45	17,577,438	43	17,379,401	2	198,037	0	0
Total Utah	53	21,028,683	49	18,840,092	2	198,037	2	1,990,554
Vermont								
Haematologic Technologies, Inc.	1	99,039	1	99,039	0	0	0	0
Psychological Applications, LLC	1	409,515	1	409,515	0	0	0	0
University of Vermont and State Agricultural College	41	15,179,610	34	13,449,457	5	549,171	2	1,180,982
Total Vermont	43	15,688,164	36	13,958,011	5	549,171	2	1,180,982
Virginia								
Adenosine Therapeutics, LLC	1	624,818	1	624,818	0	0	0	0
American Psychosomatic Society	1	10,000	1	10,000	0	0	0	0
Eastern Virginia Medical School	2	465,605	2	465,605	0	0	0	0
Empirical Technologies Corporation	2	566,780	2	566,780	0	0	0	0
Hampton University	0	98,069	0	98,069	0	0	0	0
Hemodyne, Inc.	1	99,487	1	99,487	0	0	0	0
Hypogen, Inc.	1	153,537	1	153,537	0	0	0	0
NanoSonic, Inc.	1	100,000	1	100,000	0	0	0	0
Personal Improvement Computer Systems	2	747,043	2	747,043	0	0	0	0
Talisman, Ltd.	1	754,040	1	754,040	0	0	0	0
University of Virginia, Charlottesville	61	26,212,857	57	25,261,172	4	951,685	0	0
Virginia Commonwealth University	17	4,952,281	17	4,952,281	0	0	0	0

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Virginia Polytechnic Institute and State University	1	149,206	1	149,206	0	0	0	0
Total Virginia	91	34,933,723	87	33,982,038	4	951,685	0	0
Washington								
Asthma Inc.	1	244,194	1	244,194	0	0	0	0
Barlow Scientific	2	727,103	2	727,103	0	0	0	0
Battelle Pacific Northwest Laboratories	2	2,469,956	2	2,469,956	0	0	0	0
Benaroya Research Institute at Virginia Mason	1	263,250	1	263,250	0	0	0	0
Catch, Inc.	1	338,935	1	338,935	0	0	0	0
Children's Hospital and Medical Center	3	1,839,237	3	1,839,237	0	0	0	0
Ekos Corporation	1	57,514	1	57,514	0	0	0	0
Fred Hutchinson Cancer Research Center	17	38,557,353	15	9,379,311	0	0	2	29,178,042
Group Health Cooperative of Puget Sound	1	782,817	1	782,817	0	0	0	0
Group Health Cooperative of South Central Wisconsin	1	1,252,939	0	0	0	0	1	1,252,939
Institute for Systems Biology	1	121,986	1	121,986	0	0	0	0
Northwest Research Associates, Inc.	2	199,715	2	199,715	0	0	0	0
Pathway Medical Technologies, Inc.	1	479,204	1	479,204	0	0	0	0
Phantoms By Design	2	541,091	2	541,091	0	0	0	0
Puget Sound Blood Center	3	1,013,078	3	1,013,078	0	0	0	0
Seattle Institute for Cardiac Research	1	4,263,755	1	4,263,755	0	0	0	0
Spencer Technologies	1	256,758	1	256,758	0	0	0	0
Therus Corporation	1	412,395	1	412,395	0	0	0	0
University of Washington	121	67,235,169	105	56,073,443	11	3,311,278	5	7,850,448
Washington State University	5	1,663,549	5	1,663,549	0	0	0	0
Total Washington	168	122,719,998	149	81,127,291	11	3,311,278	8	38,281,429
West Virginia								
West Virginia University	8	2,092,198	8	2,092,198	0	0	0	0
Total West Virginia	8	2,092,198	8	2,092,198	0	0	0	0
Wisconsin								
American Society of Gene Therapy	1	10,000	1	10,000	0	0	0	0
Blood Center of Southeastern Wisconsin	10	5,111,134	8	4,686,968	1	187,635	1	236,531
Marquette University	2	436,813	2	436,813	0	0	0	0
Marshfield Clinic	1	3,600,000	0	0	0	0	1	3,600,000
Medical College of Wisconsin	68	30,908,370	61	29,605,608	6	877,762	1	425,000
SpectroCon, LLC	1	343,284	1	343,284	0	0	0	0
University of Wisconsin, Madison	52	22,124,966	46	20,631,378	5	1,368,588	1	125,000
VGSK, LLC	1	125,000	1	125,000	0	0	0	0
WiCell Research Institute	0	134,167	0	134,167	0	0	0	0
Total Wisconsin	136	62,793,734	120	55,973,218	12	2,433,985	4	4,386,531
Puerto Rico								
Ponce School of Medicine	1	123,353	1	123,353	0	0	0	0
Universidad Central del Caribe	0	172,448	0	172,448	0	0	0	0
University of Puerto Rico, Mayaguez	0	158,024	0	158,024	0	0	0	0
University of Puerto Rico, Medical Sciences	1	794,480	1	794,480	0	0	0	0
University of Puerto Rico, Rio Piedras	1	118,406	1	118,406	0	0	0	0
Total Puerto Rico	3	1,366,711	3	1,366,711	0	0	0	0
Total U.S.	5,829	2,611,341,274	5,146	2,244,871,591	472	86,337,318	211	280,132,365

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Argentina								
National University of Cordoba	1	48,928	0	0	1	48,928	0	0
Total Argentina	1	48,928	0	0	1	48,928	0	0
Australia								
ES Cell International Pte Ltd.	0	74,630	0	74,630	0	0	0	0
Howard Florey Institute	1	408,881	1	408,881	0	0	0	0
National Centre/HIV Epidemiology Clinical Research	1	200,000	1	200,000	0	0	0	0
Peter MacCallum Cancer Institute	1	175,000	1	175,000	0	0	0	0
Royal Melbourne Hospital	2	445,000	2	445,000	0	0	0	0
St. Vincent's Hospital, Melbourne	1	216,000	1	216,000	0	0	0	0
University of Melbourne	2	254,000	2	254,000	0	0	0	0
University of Sydney	2	317,600	2	317,600	0	0	0	0
University of Western Australia	1	243,000	1	243,000	0	0	0	0
Victor Chang Cardiac Research Institute	1	83,323	1	83,323	0	0	0	0
Total Australia	12	2,417,434	12	2,417,434	0	0	0	0
Belgium								
Flanders Interuniversity Institute of Biotechnology	1	175,000	1	175,000	0	0	0	0
Free University of Brussels	1	297,000	1	297,000	0	0	0	0
Total Belgium	2	472,000	2	472,000	0	0	0	0
Brazil								
Federal University of Bahia	0	39,000	0	39,000	0	0	0	0
Total Brazil	0	39,000	0	39,000	0	0	0	0
Canada								
Clinical Research Institute of Montreal	1	261,109	1	261,109	0	0	0	0
Hospital for Sick Children, Toronto	4	780,940	3	739,872	1	41,068	0	0
London Health Sciences Center	1	166,613	0	0	0	0	1	166,613
McGill University	1	300,000	1	300,000	0	0	0	0
McMaster University	1	5,169,199	0	0	0	0	1	5,169,199
Ontario Cancer Institute	1	200,000	1	200,000	0	0	0	0
Ottawa Health Research Institute	2	401,602	2	401,602	0	0	0	0
St. Michael's Hospital	1	90,211	1	90,211	0	0	0	0
Sunnybrook and Women's College Health Sciences Center	1	207,578	1	207,578	0	0	0	0
UHN Toronto General Hospital	1	371,418	1	371,418	0	0	0	0
University Health Network	1	200,000	1	200,000	0	0	0	0
University of Alberta	2	240,632	2	240,632	0	0	0	0
University of British Columbia	1	0	0	0	0	0	1	0
University of Calgary	1	283,725	1	283,725	0	0	0	0
University of Montreal	2	299,071	2	299,071	0	0	0	0
University of Toronto	0	80,000	0	80,000	0	0	0	0
Total Canada	21	9,052,098	17	3,675,218	1	41,068	3	5,335,812
China								
Chinese Center, Disease Control and Prevention	0	24,300	0	24,300	0	0	0	0
Total China	0	24,300	0	24,300	0	0	0	0
Finland								
University of Helsinki	1	270,000	1	270,000	0	0	0	0
Total Finland	1	270,000	1	270,000	0	0	0	0
India								
Center for DNA Fingerprinting/Diagnostics	0	39,000	0	39,000	0	0	0	0
Total India	0	39,000	0	39,000	0	0	0	0

Institution	Totals		Grants		Research Training and Career Development		Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Israel								
Technion-Israel Institute of Technology	2	382,408	1	372,000	1	10,408	0	0
Total Israel	2	382,408	1	372,000	1	10,408	0	0
Italy								
University of Parma	1	369,289	1	369,289	0	0	0	0
Total Italy	1	369,289	1	369,289	0	0	0	0
Netherlands								
Erasmus University of Rotterdam	1	216,000	1	216,000	0	0	0	0
State University at Groningen	1	270,000	1	270,000	0	0	0	0
Total Netherlands	2	486,000	2	486,000	0	0	0	0
Nigeria								
University of Ibadan	0	10,000	0	10,000	0	0	0	0
Total Nigeria	0	10,000	0	10,000	0	0	0	0
Republic of Korea								
Mizmedi Hospital	0	50,000	0	50,000	0	0	0	0
Total Republic of Korea	0	50,000	0	50,000	0	0	0	0
Russia								
Central Institute for Tuberculosis	1	150,000	1	150,000	0	0	0	0
Total Russia	1	150,000	1	150,000	0	0	0	0
Sweden								
Karolinska Institute	2	560,856	2	560,856	0	0	0	0
Uppsala University	1	162,000	1	162,000	0	0	0	0
Total Sweden	3	722,856	3	722,856	0	0	0	0
Thailand								
Chiang Mai University	0	16,200	0	16,200	0	0	0	0
Total Thailand	0	16,200	0	16,200	0	0	0	0
United Kingdom								
Royal Free and University College Medical School	1	216,000	1	216,000	0	0	0	0
University of Bristol	1	484,179	1	484,179	0	0	0	0
University of Cambridge	1	298,256	1	298,256	0	0	0	0
University of Edinburgh	1	200,000	1	200,000	0	0	0	0
University of Leicester	1	47,296	0	0	1	47,296	0	0
University of London National Heart and Lung Institute	1	339,351	1	339,351	0	0	0	0
University of London University College, London	1	288,106	1	288,106	0	0	0	0
University of Oxford	1	41,068	0	0	1	41,068	0	0
University of Southampton	1	265,110	1	265,110	0	0	0	0
Total United Kingdom	9	2,179,366	7	2,091,002	2	88,364	0	0
Total Other	55	16,728,879	47	11,204,299	5	188,768	3	5,335,812
Grand Total	5,884	\$2,628,070,153	5,193	\$2,256,075,890	477	\$86,526,086	214	\$285,468,177

Appendixes

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 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.

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.

First Independent Research Support and Transition (FIRST) Award (R29): To provide a sufficient initial period of research support for newly independent biomedical investigators to develop their research capabilities and demonstrate the merit of their research ideas.

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.

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 Research (SCOR) Grants (P50): To support both basic and clinical research related to an Institute-identified theme. The spectrum of SCOR activities comprises multidisciplinary approaches to specific disease entities or biomedical problem areas. The SCOR grants differ from research program projects in that they are in response to an announcement of programmatic needs of the Institute. Centers may be asked to perform additional studies because of urgently needed information or may serve as a regional or national resource for special purpose research.

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.

Minority Institution Faculty Mentored Research Scientist Development Award (K01): To support at minority institutions faculty members who have the interest and potential to conduct state-of-the-art research in the areas of 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 (RCDA) (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 (RCA) (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 includes the Preventive Cardiology Academic Award, the Preventive Pulmonary Academic Award, the Transfusion Medicine Academic Award, and the Systemic Pulmonary and Vascular Diseases Academic Awards, the Asthma Academic Award, the Tuberculosis Academic Award, the Sleep Academic Award, the Nutrition Academic Award, and the Cultural Competence and Health Disparities Academic Award. Currently, only the Sleep Academic Award, the Nutrition Academic Award, and the Cultural Competence and Health Disparities Academic Award programs are being supported.

Clinical Investigator Development Award (CIDA) (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. This award was developed as a means to encourage clinical investigators to engage in research in specific areas designated by the Institute.

Physician Scientist Award (PSA) (K11): To encourage newly trained clinicians to develop independent research skills and experience in one of the fundamental sciences. New grants are no longer awarded.

Minority School Faculty Development Award (K14): To develop faculty investigators at minority schools and to 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 to 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.

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.

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 (MBRS) Grants (S06) (S14): 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.

Biomedical Research Support Grants (S07): To strengthen, balance, and stabilize supported biomedical and behavioral research programs through flexible funds that permit institutions to respond quickly and effectively to emerging needs and opportunities; to enhance creativity and innovation, to support pilot studies, and to improve research resources.

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.

Conference (Cooperative Agreements) (U13): To support international, national, or regional meetings; conferences; and workshops where substantial programmatic involvement is planned to assist the recipient.

Resource-Related Research Projects (U24): To support research projects contributing to improvement of the capability of resources to serve biomedical research.

Historical Black College and University Scientist Award (UH1): To 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)

Predoctoral Individual NRSA (F31): To provide predoctoral individuals with supervised research training in areas related to heart, lung, and blood diseases; blood resources; and sleep disorders leading toward the research degree (e.g., Ph.D.).

Postdoctoral Individual NRSA (F32): To provide postdoctoral research training to individuals to broaden their scientific background and extend their potential for research in areas related to heart, lung, and blood diseases and blood resources.

NRSA for Senior Fellows (F33): To provide experienced scientists with an opportunity to make major changes in the direction of their research careers, to broaden their scientific background, to acquire new research capabilities, to enlarge their command of an allied research field, or to take time from regular professional responsibilities for the purpose of broadening their research capabilities.

Intramural NRSA Individual Postdoctoral Program Appointee (F35): To offer research health scientists, research clinicians, and others the opportunity to receive full-time research training in intramural laboratories of the NHLBI and of other Institutes of the NIH.

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 T35S): 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 Interagency 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
ACE	angiotensin-converting enzyme
ACRN	Asthma Clinical Research Network
ACTION	A CHF Trial Investigating Outcomes of Exercise
AIDS	acquired immunodeficiency syndrome
ALLHAT	Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial
AMI	acute myocardial infarction
APPLES	Apnea Positive Pressure Long-Term Efficacy Study
ARDS	acute respiratory distress syndrome
ARDSNET	Acute Respiratory Distress Syndrome Clinical Network
ARIC	Atherosclerosis Risk in Communities
ATP III	Adult Treatment Panel III
BABY HUG	Pediatric Hydroxyurea Phase III Clinical Trial
BEA	Board of Extramural Advisors
BARI 2D	Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics
CABG	coronary artery bypass graft
CAMP-CS/Phase 2	Childhood Asthma Management Program-Continuation Study/Phase 2
CARDIA	Coronary Artery Risk Development in Young Adults
CARE	Childhood Asthma Research and Education Network
CF	cystic fibrosis
CHD	coronary heart disease
CHF	congestive heart failure
CHS	Cardiovascular Health Study
CIHR	Canadian Institutes of Health Research
COBLT	Cord Blood Stem Cell Transplantation Study
COPD	chronic obstructive pulmonary disease
CORAL	Cardiovascular Outcomes in Renal Atherosclerotic Lesions
CSCC	Comprehensive Sickle Cell Centers
CVD	cardiovascular diseases
DBDR	Division of Blood Diseases and Resources
DECA	Division of Epidemiology and Clinical Applications
DHVD	Division of Heart and Vascular Diseases

DIR	Division of Intramural Research
DLN	Division of Lung Diseases
EDUC	Enhanced Dissemination and Utilization Center
ENRICH	Enhancing Recovery in Coronary Heart Disease
ESCAPE	Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness
FHS-SCAN	Family Heart Study-Subclinical Atherosclerosis Network
FOCUS	Functional Outcomes in Cardiovascular Patients Undergoing Surgical Hip Fracture Repair
FORTE	Feasibility of Retinoid Treatment in Emphysema
FY	fiscal year
GEMS	Girls Health Enrichment Multisite Studies
GOCADAN	Genetics of Coronary Artery Disease in Alaskan Natives
HAT	Home Automatic External Defibrillator Trial
HBCU	historically black colleges and universities
HDL	high-density lipoprotein
HEIRS	Hemochromatosis and Iron Overload Screen Study
HEW	Department of Health, Education, and Welfare (now HHS)
HHS	Health and Human Services (formerly HEW)
HIV	human immunodeficiency virus
ICD	International Classification of Diseases
JHS	Jackson Heart Study
JNC	Joint National Committee on the Detection, Evaluation, and Treatment of High Blood Pressure
LDL	low-density lipoprotein
MARC	Minority Access to Research Careers
MBRS	Minority Biomedical Research Support
MERIT	Method to Extend Research in Time
MESA	Multi-Ethnic Study of Atherosclerosis
MGS	Mammalian Genotyping Service
MI	myocardial infarction
MRI	magnetic resonance imaging
MSH	Multicenter Study of Hydroxyurea
NAEPP	National Asthma Education and Prevention Program
NCEP	National Cholesterol Education Program
NCHS	National Center for Health Statistics
NCI	National Cancer Institute

NCSDR	National Center on Sleep Disorders Research
NETT	National Emphysema Treatment Trial
NHAAP	National Heart Attack Alert Program
NHANES	National Health and Nutrition Examination Survey
NHBPEP	National High Blood Pressure Education Program
NHI	National Heart Institute
NHIS	National Health Interview Survey
NHLBAC	National Heart, Lung, and Blood Advisory Council
NHLBI	National Heart, Lung, and Blood Institute (formerly NHI and NHLI)
NHLI	National Heart and Lung Institute
NIA	National Institute on Aging
NICHD	National Institute of Child Health and Human Development
NIDDK	National Institute of Diabetes and Digestive and Kidney Diseases
NIDDM	noninsulin-dependent diabetes mellitus
NIH	National Institutes of Health
NIMH	National Institute of Mental Health
NLMS	National Longitudinal Mortality Study
NO	nitric oxide
NRSA	National Research Service Award
OAR	Office of AIDS Research
OD	Office of the Director
OEI	Obesity Education Initiative
OMHA	Office of Minority Health
OPEC	Office of Prevention, Education, and Control
OSA	obstructive sleep apnea
PA	Program Announcement
PAD	peripheral artery disease
PAHI	Pan American Hypertension Initiative
PAHO	Pan American Health Organization
PEACE	Prevention of Events With Angiotensin Converting Enzyme Inhibitor Therapy
PEGT	Programs of Excellence in Gene Therapy
PGA	Programs for Genomic Applications
PHS	Public Health Service
POUNDS LOST	Preventing Overweight Using Novel Dietary Strategies
REDS	Retrovirus Epidemiology Donor Study

RFA	Request for Applications
RFP	Request for Proposals
RPG	research project grant
SANDS	Stop Atherosclerosis in Native Diabetics Study
SBIR	Small Business Innovation Research
SCD	sickle cell disease
SCCOR	Specialized Centers of Clinically Oriented Research
SCOR	Specialized Centers of Research
SDB	Sleep Disordered Breathing
SEP	Special Emphasis Panel
SES	socioeconomic status
SIDS	sudden infant death syndrome
SRG	Scientific Research Group
STICH	Surgical Treatment for Ischemic Heart Failure
STOP	Stroke Prevention in Sickle Cell Anemia
STTR	Small Business Technology Transfer
TAAG	Trial of Activity for Adolescent Girls
TB	Tuberculosis
WHI	Women's Health Initiative
WHL	World Health League
WLM	Weight Loss Maintenance
WISE	Women's Ischemia Syndrome Evaluation
WHO	World Health Organization