Fact Book

Fiscal Year

2002

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For Administrative Use

National Institutes

of Health

National Heart, Lung,

and Blood Institute

NATIONAL INSTITUTES OF HEALTH
NATIONAL HEART, LUNG, AND BLOOD INSTITUTE

Contents

Figures

Tables

1. Directory of Personnel
2. Program Overview
3. Important Events
4. Disease Statistics
5. Institute-Initiated Programs Starting in FY 2002
6. Institute Public Advisory Committees
7. Fiscal Year 2002 Budget Overview
8. Long-Term Trends
9. Research Grants
10. Research and Development Contracts
11. Clinical Trials
12. Minority Activities
13. Research Training and Career Development Programs
14. Geographic Distribution of Awards: Fiscal Year 2002

Appendixes

Types of Research Activity

List of Abbreviations and Acronyms

Figures

Chapter 4. Disease Statistics

Deaths by Major Causes, U.S., 2000

Deaths From Cardiovascular, Lung, and Blood Diseases, U.S., 2000

Deaths From Cardiovascular Diseases, U.S., 2000

Deaths From Lung Diseases, U.S., 2000

Deaths From Blood Diseases, U.S., 2000

Deaths From Cardiovascular Diseases, U.S., 1900–2000

Death Rates for Cardiovascular Diseases, U.S., 1900–2000

Ten Leading Causes of Death: Death Rates, U.S., 2000

Ten Leading Causes of Death Among Minority Groups, U.S., 2000

Deaths From Congestive Heart Failure, U.S., 1968–2000

Death Rates for Heart Disease by Gender, Race, and Ethnicity, U.S., 1985–2000

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

Death Rates for Coronary Heart Disease, U.S., 1950–2000

Common Cardiovascular and Lung Diseases With High Percentage Discharged Dead From Hospitals, U.S., 1975, 1985, and 2000

Death Rates for Coronary Heart Disease in Men Ages 35–74 Years, Selected Countries, 1970–2000

Death Rates for Coronary Heart Disease in Women Ages 35–74 Years, Selected Countries, 1970–2000

Change in Death Rates for Selected Causes by Race and Gender, U.S., 1990–2000

Death Rates for Lung Diseases in Infants, U.S., 1980–2000

Ten Leading Causes of Infant Mortality, U.S., 2000

Deaths Under Age 1 Year Due to Cardiovascular and Lung Diseases, U.S., 2000

Death Rates for Chronic Obstructive Pulmonary Disease in Men Ages 35+ Years, Selected Countries, 1980–2000

Death Rates for Chronic Obstructive Pulmonary Disease in Women Ages 35+ Years, Selected Countries, 1980–2000

Death Rates for Chronic Obstructive Pulmonary Disease by Gender, Race, and Ethnicity, U.S., 1985–2000

Physician Office Visits for Sleep Disorders, U.S., 1989–2000

Prevalence of Cardiovascular Diseases in Adults by Age, U.S., 1988–94

Prevalence of Common Cardiovascular and Lung Diseases by Age, U.S., 2000

Prevalence of Cardiovascular Disease Risk Factors in Adults, U.S., 1961–2000

Hypertensive Population Aware, Treated, and Controlled, Age 18+, U.S., 1971–72 to 1999–2000

Adult Population With Hypertension by Age, Gender, and Race, U.S., 1999–2000

Hospitalization Rates for Congestive Heart Failure, Ages 45–64 Years and 65+ Years, U.S., 1971–2000

Prevalence of Asthma by Age, U.S., 1981, 1991, and 2001

Total Economic Costs, U.S., 2003

Economic Costs: Cardiovascular, Lung, and Blood Diseases, U.S., 2003

Chapter 7. Fiscal Year 2002 Budget Overview

NHLBI Total Obligations by Budget Category

NHLBI Extramural Obligations by Program

NHLBI Extramural Obligations by Division

Chapter 8. Long-Term Trends

NHLBI Total Obligations by Budget Category: Fiscal Years 1992–2002
Current Dollars
Constant 1992 Dollars

NHLBI Total Obligations by Budget Mechanism: Fiscal Years 1992–2002

NHLBI Institute-Initiated and Investigator-Initiated Awards: Fiscal Years 1992–2002

NHLBI Grants and Research and Development Contracts as Subsets of Institute-Initiated Awards: Fiscal Years 1992–2002

NHLBI Extramural Research Funding Mechanism: Fiscal Years 1992–2002
Dollars
Percent of Extramural Funds

Chapter 9. Research Grants

NHLBI Total Research Grants by Category

NHLBI Research Project Grant, Research Centers Grant, and Other Research Grant Obligations: Fiscal Years 1992–2002

NHLBI Competing Research Project Grant Applications: Fiscal Years 1992–2002

Total Cost Dollars Reviewed and Awarded

Number Reviewed and Awarded

Percent of Reviewed Applications Funded (Success Rate)

NHLBI Investigator-Initiated and Institute-Initiated Grant Obligations: Fiscal Years 1992–2002

NHLBI Research Project Grants: Average Costs, Fiscal Years 1992–2002

Chapter 10. Research and Development Contracts

NHLBI Research and Development Contract Obligations: Fiscal Years 1992–2002

Chapter 13. Research Training and Career Development Programs

NHLBI Research Training and Career Development Obligations: Fiscal Years 1992–2002

NHLBI Full-Time Training Positions: Fiscal Years 1992–2002

NHLBI Minority Biomedical Research Training, Career Development, and Research Supplements Program Obligations: Fiscal Years 1992–2002

Chapter 14. Geographic Distribution of Awards: Fiscal Year 2002

Geographic Distribution of Awards by State: Fiscal Year 2002

Tables

Chapter 2. Program Overview

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

Chapter 4. Disease Statistics

Deaths From All Causes and Deaths From Cardiovascular, Lung, and Blood Diseases, U.S., 1980 and 2000

Deaths From Specific Cardiovascular, Lung, and Blood Diseases, U.S., 2000

Death Rates for Cardiovascular and Noncardiovascular Diseases, U.S., 1980 and 2000

Deaths Under Age 1 Year Due to Cardiovascular and Lung Diseases, U.S., 2000

Prevalence of Common Cardiovascular, Lung, and Blood Diseases, U.S., 2000

Direct and Indirect Economic Costs of Illness by Major Diagnosis, U.S., 2003

Chapter 7. Fiscal Year 2002 Budget Overview

NHLBI Obligations by Funding Mechanism: Fiscal Year 2002

NHLBI Extramural Obligations by Program: Fiscal Year 2002

NHLBI Heart and Vascular Diseases Program Obligations by Funding Mechanism: Fiscal Year 2002

NHLBI Epidemiology and Clinical Applications Program Obligations by Funding Mechanism: Fiscal Year 2002

NHLBI Lung Diseases Program Obligations by Funding Mechanism: Fiscal Year 2002

NHLBI Blood Diseases and Resources Program Obligations by Funding Mechanism: Fiscal Year 2002

National Center on Sleep Disorders Research Program Obligations by Budget Mechanism: Fiscal Year 2002

Women's Health Initiative Obligations by Funding Mechanism: Fiscal Year 2002

Chapter 8. Long-Term Trends

Budget History of the NHLBI: Fiscal Years 1950–2002

NHLBI Total Obligations by Budget Category: Fiscal Years 1992–2002

Current Dollars
Constant 1992 Dollars

NHLBI Total Obligations by Budget Mechanism: Fiscal Years 1992–2002

NHLBI Employment: Fiscal Years 1992–2002

NHLBI Extramural Programs: Fiscal Years 1992–2002
Dollars
Percent of Total Extramural Budget

NHLBI Extramural Research Funding Mechanism: Fiscal Years 1992–2002
Dollars
Percent of Total Extramural Budget

Chapter 9. Research Grants

NHLBI Research Grants by Funding Mechanism: Fiscal Year 2002

NHLBI Research Project Grant, Research Centers Grant, and Other Research Grant Obligations: Fiscal Years 1992–2002

NHLBI Competing Research Project Grant Applications: Fiscal Years 1992–2002

Total Cost Dollars Reviewed and Awarded

Number Reviewed and Awarded and Percent Funded

NHLBI Investigator-Initiated and Institute-Initiated Grant Obligations: Fiscal Years 1992–2002

NHLBI Research Project Grants: Amount Funded by Type of Award, Fiscal Years 1992–2002

Facility and Administrative (F&A) Costs of NHLBI Research Project Grants: Fiscal Years 1992–2002

NHLBI Research Project Grants: Average Costs, Fiscal Years 1992–2002

NHLBI Cooperative Agreements (U01, U10) Programs

Specialized Centers of Research (P50) Program

Chapter 10. Research and Development Contracts

NHLBI Total Research and Development Contract Obligations: Fiscal Years 1992–2002

Major NHLBI Research and Development Contracts by Program: Fiscal Years 1992–2002

Chapter 11. Clinical Trials

NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 1992–2002

NHLBI Investigator-Initiated Clinical Trials, Fiscal Year 2002: Summary by Program

Institute-Initiated Clinical Trials: Fiscal Years 1992–2002
Contracts
Cooperative Agreements

Institute-Initiated Clinical Trials, Fiscal Year 2002: Summary by Program
Contracts
Cooperative Agreements

Chapter 13. Research Training and Career Development Programs

Training Awards, Full-Time Training Positions, and Obligations by Activity: Fiscal Year 2002

History of Training Obligations by Activity: Fiscal Years 1992–2002

Full-Time Training Positions by Activity: Fiscal Years 1992–2002

NHLBI Research Career Programs: Fiscal Years 1992–2002

NHLBI Research Career Program Obligations: Fiscal Years 1992–2002

NHLBI Minority Biomedical Research Training, Career Development, and Research Supplements Program Obligations: Fiscal Years 1992–2002

NHLBI Research Supplements Program by Award Type: Fiscal Years 1992–2002

NHLBI Research Supplements Program Obligations by Award Type: Fiscal Years 1992–2002

Chapter 14. Geographic Distribution of Awards: Fiscal Year 2002

Geographic Distribution of Awards by State or Country: Fiscal Year 2002

1. Directory of Personnel

Current as of October 15, 2002. For locating personnel not listed, the general information number is 301–496–4000. All listed phone numbers are in area code 301. The Personnel Directory, which is periodically updated throughout the year, is located on the NHLBI Home Page under About NHLBI.

** MSC = Mail Stop Code.
*** Full mailing address formats are located at the end of this chapter.
§ RKL2 = Rockledge II Building.
**** RKL1 = Rockledge I Building.

	Bldg.	Room	Phone	MSC**, ***
Office of the Director				
Director, **Claude Lenfant, M.D.**	31	5A52	496–5166	2486
Deputy Director, **Barbara Alving, M.D.**	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, M.D.**	31	4A35	496–3245	2490
Assistant Director for Ethics and Clinical Research, **Lawrence Friedman, M.D.**	31	5A03	496–9899	2490
Associate Director for Administrative Management, **Donald P. Christoferson**	31	5A48	496–2411	2490
Associate Director for Scientific Program Operation, **Carl A. Roth, Ph.D., LL.M.**	31	5A03	496–6331	2482
Associate Director for Prevention, Education, and Control, **Gregory J. Morosco, Ph.D., M.P.H.**	31	4A10	496–5437	2480
Associate Director for International Programs, **Ruth J. Hegyeli, M.D.**	31	4A27	496–5375	2490
Office of Special Concerns Director, **Mishyelle I. Croom**	31	4A22	496–1763	2490
Office of Minority Health Affairs Director, **Helena Mishoe, Ph.D., M.P.H.**	RKL2§	6216	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, **David L. Whitmer**	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
Human Resources Management Branch Chief, **Barry Rubinstein**	31	5A28	496–6477	2484
Extramural Administrative Management Branch Chief, **Christinia E. Roark**	RKL2	7026	435–6373	7921
Intramural Administrative Management Branch Chief, **Carrol Hanson**	10	7N220	402–1985	1670
National Center on Sleep Disorders Research				
Director, **Carl E. Hunt, M.D.**	RKL2	10038	435–0199	7920
Administrative Officer, **Stacey Long**	RKL2	7026	435–6373	7921
Women's Health Initiative				
Acting Director, **Jacques E. Rossouw, M.D.**	RKL1*, ***	300	402–2900	7966
Administrative Officer, **Rebecca Tener**	31	5A33	496–5931	2490
Office of Prevention, Education, and Control				
Director, **Gregory J. Morosco, Ph.D., M.P.H.**	31	4A10	496–5437	2480

	Bldg.	Room	Phone	MSC**, ***
Program Operations Coordinator, **Nancy J. Poole, M.B.A.**	31	4A10	496–5437	2480
Administrative Officer, **Valery Gheen**	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, Ph.D., M.S.P.H.**	31	4A10	496–0554	2480
NHLBI Nutrition Coordinator, **Darla E. Danford, D.Sc., M.P.H.**	31	4A10	496–0554	2480
National High Blood Pressure Education Program Coordinator, **Edward J. Roccella, Ph.D., M.P.H.**	31	4A10	496–1051	2480
National Cholesterol Education Program Coordinator, **James I. Cleeman, M.D.**	31	4A10	496–1051	2480
National Asthma Education and Prevention Program Coordinator, **Diana Schmidt, M.S.P.H.**	31	4A10	496–1051	2480
National Heart Attack Alert Program Coordinator, **Mary McDonald Hand, M.S.P.H., R.N.**	31	4A10	496–1051	2480
National Obesity Education Initiative Coordinator, **Karen Donato, M.S., R.D.**	31	4A10	496–1051	2480
Office of Science and Technology				
Director, **Carl A. Roth, Ph.D., LL.M.**	31	5A03	496–6331	2482
Deputy Director, **Barbara Liu, S.M.**	31	5A06	496–9899	2482
Administrative Officer, **Rebecca E. Tener**	31	5A33	496–5931	2490
Office of International Programs Director, **Ruth Hegyeli, M.D.**	31	4A29	496–5375	2490
Program Studies and Reports Program Director, **Carl A. Roth, Ph.D., LL.M.**	31	5A03	496–6331	2482
Science and Special Issues Program Director, **Barbara Liu, S.M.**	31	5A06	496–9899	2482
Office of Public Liaison Coordinator, **Sandra Lindsay, M.P.H.**	31	5A07	496–9899	2482
Information Resources and Technology Program Director, **John J. Filigenzi**	RKL2	8093	435–0119	7932
Office of Technology Transfer and Development Director, **Concetta Bartosh, J.D.**	31	1B30	402–5579	2490
Division of Heart and Vascular Diseases				
Director, **Stephen C. Mockrin, Ph.D.**	RKL2	9160	435–0466	7940
Deputy Director, **David M. Robinson, Ph.D.**	RKL2	9158	435–0477	7940
Special Assistant for Clinical Studies, **David J. Gordon, M.D.**	RKL2	9152	435–0466	7940
Research Training and Special Programs, Leader, **Beth Schucker, M.S.**	RKL2	9140	435–0535	7940
Administrative Officer, **Lisa A. Freeny**	RKL2	7026	435–6373	7921
Clinical and Molecular Medicine Program Director, **John Watson, Ph.D.**	RKL2	9166	435–0555	7940
Cardiovascular Medicine Scientific Research Group Leader, **Patrice Desvigne-Nickens, M.D.**	RKL2	9178	435–0515	7940
Bioengineering and Genomic Applications Scientific Research Group Leader, **Susan Old, Ph.D.**	RKL2	9144	435–0513	7940
Heart Research Program				
Director, **John L. Fakunding, Ph.D.**	RKL2	9170	435–0494	7940
Arrhythmias, Ischemia, and Sudden Cardiac Death Scientific Research Group Leader, **Peter M. Spooner, Ph.D.**	RKL2	9192	435–0504	7940
Heart Development, Function, and Failure Scientific Research Group Leader, **Gail D. Pearson, M.D. Sc.D.**	RKL2	9200	435–0510	7940
Vascular Biology Research Program Director, **Sonia Skarlatos, Ph.D.**	RKL2	10198	435–0545	7956

	Bldg.	Room	Phone	MSC**, ***
Atherosclerosis Scientific Research Group Leader, **Momtaz Wassef, Ph.D.**	RKL2	10196	435–0558	7956
Hypertension Scientific Research Group Leader, **Paul A. Velletri, Ph.D.**	RKL2	10202	435–0560	7956
Division of Lung Diseases				
Director, **James P. Kiley, Ph.D.**	RKL2	10122	435–0233	7952
Deputy Director, **Carol E. Vreim, Ph.D.**	RKL2	10120	435–0233	7952
Administrative Officer, **Kathryn Lightbody**	RKL2	7026	435–6373	7921
Airway Biology and Disease Program Director, **Gail G. Weinmann, M.D.**	RKL2	10210	435–0202	7952
Senior Scientific Advisor, **Susan P. Banks-Schlegel, Ph.D.**	RKL2	10220	435–0202	7952
Asthma Scientific Research Group Leader, **Susan P. Banks-Schlegel, Ph.D.**	RKL2	10220	435–0202	7952
Chronic Obstructive Pulmonary Disease/Environment Scientific Research Group Leader, **Thomas Croxton, M.D., Ph.D.**	RKL2	10208	435–0202	7952
Cystic Fibrosis Scientific Research Group Leader, **Susan P. Banks-Schlegel, Ph.D.**	RKL2	10220	435–0202	7952
Sleep and Neurobiology Scientific Research Group Leader, **Michael J. Twery, Ph.D.**	RKL2	10116	435–0202	7952
Training and Special Programs Scientific Research Group Leader, **J. Sri Ram, Ph.D.**	RKL2	10206	435–0202	7952
Lung Biology and Disease Program Director, **Dorothy B. Gail, Ph.D.**	RKL2	10100	435–0222	7952
Senior Scientific Advisor, **Andrea Harabin, Ph.D.**	RKL2	10108	435–0222	7952
Acquired Immunodeficiency Syndrome/Tuberculosis Scientific Research Group Leader, **Hannah H. Peavy, M.D.**	RKL2	10110	435–0222	7952
Acute Lung Injury/Critical Care Scientific Research Group Leader, **Andrea Harabin, Ph.D.**	RKL2	10108	435–0222	7952
Developmental Biology and Pediatrics Scientific Research Group Leader, **Mary Anne Berberich, Ph.D.**	RKL2	10102	435–0222	7952
Immunology/Fibrosis Scientific Research Group Leader, **Herbert Reynolds, M.D.**	RKL2	10112	435–0222	7952
Lung Cell and Vascular Biology Scientific Research Group Acting Leader, **Dorothy B. Gail, Ph.D.**	RKL2	10100	435–0222	7952
Training and Special Programs Scientific Research Group Leader, **Sandra Hatch, M.D.**	RKL2	10104	435–0222	7952
Division of Blood Diseases and Resources				
Director, **Charles Peterson, M.D.**	RKL2	10160	435–0080	7950
Deputy Director, **Liana Harvath, Ph.D.**	RKL2	10170	435–0065	7950
Senior Program Analyst, **Susan Pucie**	RKL2	10166	435–0584	7950
Administrative Officer, **Kathryn Lightbody**	RKL2	7026	435–6373	7921
Blood Resources Program Acting Director, **Liana Harvath, Ph.D.**	RKL2	10170	435–0065	7950
Senior Scientific Advisor, **George J. Nemo, Ph.D.**	RKL2	10142	435–0075	7950
Transfusion Medicine Scientific Research Group Leader, **George J. Nemo, Ph.D.**	RKL2	10142	435–0075	7950
Bone Marrow Transplantation Scientific Research Group Acting Leader, **LeeAnn Jensen, Ph.D.**	RKL2	10140	435–0065	7950
Thrombosis and Hemostasis Scientific Research Group Leader, **Pankaj Ganguly, Ph.D.**	RKL2	10176	435–0070	7950
Training and Special Programs Leader, **Traci Mondoro, Ph.D.**	RKL2	10182	435–0075	7950

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Blood Diseases Program Director, **Charles Peterson, M.D.**	RKL2	10160	435–0050	7950
Sickle Cell Disease Scientific Research Group Leader, **Duane Bonds, M.D.**	RKL2	10148	435–0055	7950
Cellular Hematology Scientific Research Group Leader, **Charles Peterson, M.D.**	RKL2	10160	435–0050	7950
Research Training Leader, **Ellen Werner, Ph.D.**	RKL2	10182	435–0061	7950
Division of Epidemiology and Clinical Applications				
Director, **Peter Savage, M.D.**	RKL2	8100	435–0422	7938
Deputy Director, **(Vacant)**	RKL2	8104	435–0422	7938
Senior Advisor, **Jefferey Cutler, M.D.**	RKL2	8102	435–0433	7938
Administrative Officer, **Charlotte Wiltshire**	RKL2	7026	435–6373	7921
Office of Biostatistics Research Director, **Nancy L. Geller, Ph.D.**	RKL2	8210	435–0434	7938
Clinical Applications and Prevention Program Acting Director, **Denise Simons-Morton, M.D., Ph.D.**	RKL2	8138	435–0377	7936
Prevention Scientific Research Group Acting Leader, **Eva Obarzanek, Ph.D.**	RKL2	8136	435–0377	7936
Clinical Trials Scientific Research Group Leader, **Michael Domanski, M.D.**	RKL2	8146	435–0399	7936
Behavioral Medicine Scientific Research Group Leader, **Peter G. Kaufmann, Ph.D.**	RKL2	8118	435–0404	7936
Epidemiology and Biometry Program Director, **Teri Manolio, M.D., M.H.S.**	RKL2	8160	435–0707	7934
Analytical Resources Scientific Research Group Leader, **Paul D. Sorlie, Ph.D.**	RKL2	8176	435–0707	7934
Genetic Epidemiology Scientific Research Group Leader, **Richard Fabsitz, M.A.**	RKL2	8178	435–0444	7934
Field Studies and Clinical Epidemiology Scientific Research Group Acting Leader, **Catherine Loria, Ph.D.**	RKL2	8150	435–0707	7934
Framingham Epidemiology Research Unit Leader, **Daniel Levy, M.D.**	73 Mt. Wayte Avenue Suite 2 Framingham, MA 01702–5827 508–935–3458			
Jackson Heart Study Leader, **Evelyn Walker, M.D.**	Jackson Medical Mall 350 West Woodrow Wilson Drive Jackson, MS 39213 601–368–4654			
Division of Extramural Affairs				
Director, **Deborah P. Beebe, Ph.D.**	RKL2	7100	435–0260	7922
Deputy Director, **Robert Musson, Ph.D.**	RKL2	7216	435–0266	7924
Committee Management Officer, **Kathryn M. Valeda**	RKL2	7220	435–0255	7922
Administrative Officer, **Veronica M. Wharton**	RKL2	7112	435–6373	7921
Review Branch Chief, **Anne P. Clark, Ph.D.**	RKL2	7214	435–0270	7924
Referral Officer, **(Vacant)**	RKL2	7202	435–0310	7924
Heart/Lung Scientific Review Group Leader, **Robert B. Moore, Ph.D.**	RKL2	7178	435–0725	7924
Vascular/Blood Scientific Review Group Leader, **Jeffrey H. Hurst, Ph.D.**	RKL2	7208	435–0303	7924

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Clinical Studies and Training Scientific Review Group Leader, **Valerie Prenger, Ph.D.**	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	435–0357	7902
Heart, Lung, and Vascular Diseases Contracts Section Acting 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	435–0166	7926
Heart and Vascular Diseases Grants Management Section Chief, **David Reiter**	RKL2	7172	435–0177	7926
Lung Diseases Grants Management Section Chief, **Robert A. Pike**	RKL2	7154	435–0171	7926
Blood Diseases and Resources Grants Management Section Chief, **Robert Vinson, Jr.**	RKL2	7156	435–0170	7926
Epidemiology and Clinical Application Grants Management Section Chief, **Holly Atherton**	RKL2	7152	435–0170	7926
Division of Intramural Research				
Office of the Director				
Clinical Research Program Director, **Elizabeth G. Nabel, M.D.**	10	8C103	496–1518	1754
Clinical Director, **Richard O. Cannon III, M.D.**	10	7B15	496–9985	1650
Laboratory Research Program Director, **Robert S. Balaban, Ph.D.**	10	7N214	496–2116	1061
Intramural Administrative Management Branch Chief, **Carroll Hanson**	10	7N220	402–3646	1670
Clinical Research Program				
Bioinformatics Core Head, **Eric Billings, Ph.D.**	10	4A17	496–6520	1412
Flow Cytometry Core Head, **Philip McCoy, Ph.D.**	10	4A07	451–8824	1412
Office of Clinical Affairs Chief, **Maria Stagnitto, M.S.N., R.N.**	10	8C104	496–2295	1755
Office of Education Chief, **Herbert Geller, Ph.D.**	10	8C213	435–6719	1755
Cardiovascular Branch Chief, **Toren Finkel, M.D., Ph.D.**	10	7B15	496–5817	1650
Clinical Cardiology Section Chief, **Richard O. Cannon III, M.D.**	10	7B15	496–9985	1650
Experimental Atherosclerosis Section Chief, **Howard S. Kruth, M.D.**	10	5N113	496–4826	1422
Molecular Biology Section Chief, **Toren Finkel, M.D., Ph.D.**	10	7B15	402–0983	1650
Vascular Biology Section Chief, **Elizabeth Nabel, M.D.**	10	8C103	496–1518	1754
Hematology Branch Chief, **Neal Young, M.D.**	10	7C103	496–5093	1652
Laboratory of Animal Medicine & Surgery Chief, **Robert Hoyt, D.V.M.**	14E	106B	496–9673	5570
Molecular Disease Branch Chief, **H. Bryan Brewer, M.D.**	10	7N115	496–5095	1666
Molecular Biology Section Chief, **Silvia Santamarina-Fojo, M.D., Ph.D.**	10	7N108	496–6050	1666
Peptide Chemistry Section Chief, **H. Bryan Brewer, M.D.**	10	7N115	496–5095	1666
Pulmonary Critical Care Medicine Branch Chief, **Joel Moss, M.D., Ph.D.**	10	6D03	496–1597	1590
Deputy Chief, **Martha Vaughan, M.D.**	10	5N307	496–4554	1434

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Biochemical Physiology Section Chief, **Vincent Manganiello, M.D., Ph.D.**	10	5N307	496–1770	1434
Clinical Studies Section Chief, **Joel Moss, M.D., Ph.D.**	10	6D03	496–1597	1590
Metabolic Regulation Section Chief, **Martha Vaughan, M.D.**	10	5N307	496–4554	1434
Molecular Mechanisms Section Chief, **Joel Moss, M.D., Ph.D.**	10	6D03	496–1597	1590
Pulmonary and Cardiac Assist Devices Section Chief, **Theodor Kolobow, M.D.**	10	5D07	496–2057	1590
Laboratory Research Program				
Light Microscopy Core Head, **Christian Combs, Ph.D.**	10	5D19	594–6739	1412
Electron Microscopy Core Head, **Zu-Xi Yu, Ph.D.**	10	2N246	402–0908	1518
Pathology Core Head, **Zu-Xi Yu, Ph.D.**	10	2N240	402–0908	1518
Transgenics Core Head, **Chengyu Liu, Ph.D.**	50	3536	435–5034	8018
Laboratory of Biochemical Genetics Chief, **Marshall Nirenberg, Ph.D.**	10	7N315	496–5208	4036
Molecular Biology Section Chief, **Marshall Nirenberg, Ph.D.**	10	7N315	496–5208	4036
Laboratory of Biochemistry Chief, **Boon Chock, Ph.D.**	50	2132	496–4645	8012
Enzymes Section Chief, **Earl R. Stadtman, Ph.D.**	50	2140	496–4645	8012
Intermediary Metabolism and Bioenergetics Section Chief, **Thressa C. Stadtman, Ph.D.**	50	2120	496–4645	8012
Metabolic Regulation Section Chief, **Boon Chock, Ph.D.**	50	2132	496–4645	8012
Protein Chemistry Section Chief, **R. Ann Ginsburg, Ph.D.**	50	2339	496–1278	8012
Protein Function in Disease Section Chief, **Rodney L. Levine, M.D., Ph.D.**	50	2351	496–4645	8012
Laboratory of Biophysical Chemistry Chief, **James A. Ferretti, Ph.D.**	50	3517	496–3341	8013
Chemical Structure Section Chief, **Henry M. Fales, Ph.D.**	50	3406	496–2135	8014
Computational Biophysics Section Chief, **Bernard Brooks, Ph.D.**	50	3069	496–0148	8014
Optical Spectroscopy Section Chief, **Jay R. Knutson, Ph.D.**	10	5D16	496–2557	1412
Structural Biophysics Section Chief, **James A. Ferretti, Ph.D.**	50	3517	496–3341	8013
Laboratory of Cardiac Energetic Chief, **Robert S. Balaban, Ph.D.**	10	B1D416	496–3658	1061
Laboratory of Cell Biology Chief, **Edward D. Korn, Ph.D.**	50	2523	496–1001	8017
Cellular Biochemistry and Ultrastructure Section Chief, **Edward D. Korn, Ph.D.**	50	2517	496–1616	8017
Cellular Physiology Section Chief, **Lois Greene, Ph.D.**	50	2537	496–2846	8017
Molecular Cell Biology Section Chief, **John A. Hammer III, Ph.D.**	50	2306	496–8960	8017
Laboratory of Cell Signaling Chief, **Sue Goo Rhee, Ph.D.**	50	3523	594–7225	8015
Laboratory of Developmental Biology Chief, **Cecilia Lo, Ph.D.**	50	4537	451–8041	8019
Laboratory of Kidney & Electrolyte Metabolism Chief, **Mark A. Knepper, M.D., Ph.D.**	10	6N260	496–3187	1603
Renal Cellular and Molecular Biology Section Chief, **Maurice Burg, M.D.**	10	6N260	496–3187	1603
Renal Mechanisms Section Chief, **Mark A. Knepper, M.D., Ph.D.**	10	6N312	496–3064	1598
Transport Physiology Section Chief, **Kenneth R. Spring, Ph.D.**	10	6N309	496–3236	1598
Laboratory of Molecular Immunology Chief, **Warren Leonard, M.D.**	10	7N252	496–0098	1674
Intracellular Signaling Section Chief, **Michael A. Beaven, Ph.D.**	10	8N114	496–6188	1760
Lymphocyte Activation Section Chief, **Warren Leonard, M.D.**	10	7N252	496–0098	1674
Molecular and Cellular Toxicology Section Chief, **Lance R. Pohl, Ph.D.**	10	8N110	496–4841	1674
Laboratory of Molecular Cardiology Chief, **Robert S. Adelstein, M.D.**	10	8N202	496–1865	1762

	Bldg.	Room	Phone	MSC**, ***
Cellular and Molecular Motility Section Chief, **James R. Sellers, Ph.D.**	10	8N117	496–6887	1760
Molecular Physiology Section Chief, **Neal Epstein, M.D.**	10	8N112	496–2102	1762
Muscle Molecular Biology Section Chief, **Robert S. Adelstein, M.D.**	10	8N202	496–1865	1762

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2. Program Overview

In 1948, the National Heart Institute was established 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, trial, 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 12, 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, program project grants, Small Business Innovation Research grants, Small Business Technology Transfer grants, Specialized Centers of Research (SCORs), comprehensive center grants, contracts, and research training 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 Programs

Heart and Vascular Diseases

Heart Research
Heart Development
Cardiac Function and Heart Failure
Ischemic Heart Disease
Cardiac 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
Genomic and Proteomic Applications
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
Cellular Hematology
Stem Cell Research

Blood Resources
Transfusion Medicine
Bone Marrow Transplantation
Thrombosis and Hemostasis

Epidemiology and Clinical Applications

Clinical Applications and Prevention
Prevention
Clinical Trials
Behavioral Medicine

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
Cardiovascular
Cardiothoracic Surgery
Hematology
Molecular Disease
Pulmonary/Critical Care Medicine
Animal Medicine and Surgery
Biochemical Genetics
Biochemistry
Biophysical Chemistry
Cardiac Energetics
Cell Biology
Cell Signaling
Developmental Biology
Kidney and Electrolyte Metabolism
Lymphocyte Biology
Molecular Immunology

Division of Heart and Vascular Diseases

An estimated 61.8 million people in the United States have CVD, 32 million of whom are less than 65 years of age. Hypertension affects 50 million. Approximately 13 million have coronary heart disease (CHD), 4.9 million have congestive heart failure (CHF), and 4.7 million have cerebrovascular disease. Approximately 8 million with CVD are limited in activity. In 2000, 39 percent of all deaths (946,000) in the United States were attributed to CVD; 53 percent occurred in women. The economic cost of CVD to the Nation in 2003 is projected to be $352 billion, of which $209 billion will be for health-related expenditures and $143 billion will be due to lost productivity.

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 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 consists of three major programs:

- Heart Research Program
- Vascular Biology Research Program

- Clinical and Molecular Medicine Program

and the Research Training and Special Programs group.

The Heart Research Program supports basic and clinical research in cardiac diseases, from embryonic life through adulthood. Areas of interest include:

- Heart development
- Cardiac function and failure
- Ischemic heart disease
- Arrhythmias and sudden cardiac death.

Research on cardiovascular development focuses on normal and abnormal formation of the heart and major blood vessels. It encompasses research on embryonic and fetal cardiovascular development and on the diagnosis and treatment of congenital and acquired pediatric heart disease. The Institute is supporting studies on molecular, cellular, genetic, environmental, and mechanical mechanisms of normal cardiovascular development, as well as congenital cardiovascular malformations. A multicenter clinical research network, the Pediatric Heart Network, has been initiated to study the diagnosis and treatment of congenital and acquired pediatric CVD.

Research studies in cardiac function and failure focus on the fundamental mechanisms associated with the structure, function, mechanics, and bioenergetics of normal and diseased myocardium; the role that contractile and matrix proteins play in the cardiovascular system; and the causes of cardiac hypertrophy and the subsequent transition from hypertrophy to heart failure. Targeted projects encompass 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; studies to identify modifiers of gene defects leading to hypertrophic cardiomyopathy and heart failure; and basic research to improve cardiopulmonary and neurological outcomes following resuscitation from cardiopulmonary arrest.

Scientists engaged in research on ischemic heart disease are investigating the etiology and pathophysiology of the disease and its consequences. Studies include myocardial infarction (MI), angina pectoris, coronary thrombosis, coronary blood flow, and myocardial revascularization and reperfusion. Researchers are seeking ways to improve the diagnosis and treatment of myocardial ischemia. Of particular importance are programs directed at understanding the pathophysiology of ischemic heart disease in blacks.

Projects related to cardiac arrhythmia research are focused on elucidating the mechanisms involved in control of cardiac electrical activity, especially as it relates to sudden cardiac death. Scientists are seeking to understand how cardiac membrane biophysics, membrane structure and organization, ion pumps and channels, and transport and gap junction proteins contribute to electrogenesis. They are also investigating the impact of genetic influences—including mutations underlying arrhythmic diseases—on arrhythmogenesis and sudden cardiac death. Of special importance are studies directed at understanding electrical remodeling and genetic defects in long QT syndrome (arrhythmic disease) and other arrhythmic disorders. Finding pharmacologic agents that are effective in regulating cardiac rhythm and rate is also a major research priority.

The Vascular Biology Research Program supports research in:

- Atherosclerosis
- Hypertension
- Biology and pathophysiology of blood vessels
- Gene therapy for prevention and treatment of vascular diseases.

Research in atherosclerosis encompasses the etiology, pathogenesis, diagnosis, prevention, and treatment of the disorder. Programs include the 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. Targeted areas involve characterization of atherosclerotic plaque prone to rupture, pathogenesis of abdominal aortic aneurysms, the role of homocysteinemia in atherosclerosis, mechanisms of atherosclerosis in various vascular beds, and research on atherosclerotic lesions using human autopsy tissue. Additional studies focus on pathobiological determinants of atherosclerosis, cardiovascular complications of diabetes mellitus, vessel-wall calcification, the role of infectious agents in atherosclerosis, immunobiology of the vessel wall, hormone replacement therapy (HRT) on atherosclerosis, and effect of protease inhibitors on atherosclerosis development in HIV infection. Of special interest is understanding atherosclerosis risk among minorities.

Studies related to hypertension focus on identifying and characterizing genes involved with hypertension; elucidating regulation mechanisms associated with blood pressure control; identifying causative factors of essential hypertension, as well as rare forms of high blood pressure; examining mechanisms by which high blood pressure increases the risk of, or occurs concomitantly with other diseases, such as kidney failure, stroke, diabetes, atherosclerosis, preeclampsia, and left ventricular hypertrophy; and developing preventive strategies, as well as novel interventions for hypertension. Additional areas of interest include understanding the biological underpinnings of salt sensitivity; identifying neurological mechanisms responsible for long-term control of blood pressure and functional neurological changes that result in essential hypertension; and understanding the basis of target-organ damage in hypertension. Of special interest is eliminating health disparities among minorities and between men and women.

Basic and clinical studies on arteriogenesis (formation of new arteries), angiogenesis (formation of new blood vessels), and the biology and pathophysiology of blood vessel structure and function in the cerebral, coronary, and peripheral vascular beds are designed to increase understanding of how oxygen, nutrient, and fluid exchange occurs within vessels; how vascular inflammatory response originates and contributes to CVD; how blood flow within the tissues is autoregulated; how vascular smooth muscle contraction is altered; how new vessels are formed; and how vascular remodeling is orchestrated. Scientists are investigating ways to control the inflammatory response in blood vessels, manipulate mechanisms that regulate blood flow, and stimulate the formation of new blood vessels (especially after an ischemic event in the brain, heart, or a limb).

Gene transfer is being used to deliver growth factors to the myocardium to promote development of new blood vessels. Clinical trials are under way to test the safety and efficacy of this approach in humans. Ultimately, these studies should offer insight into developing new therapeutic agents for ischemic disease.

The Clinical and Molecular Medicine Program (CMMP) supports basic, applied, clinical, and engineering research in:

- Cardiovascular medicine
- Bioengineering
- Genomic applications.

Research in cardiovascular medicine is focused on new strategies to ameliorate disease through improving risk stratification and management and developing novel drugs and therapies. In addition to risk factor reduction, healthy lifestyles and behaviors are emphasized. The preventive and therapeutic potential of nutrition and exercise are currently being evaluated. To date, hormone replacement trials consistently demonstrate lack of benefit with regard to cardiovascular outcomes despite benefits suggested by fundamental and observational data. Devices are used to prevent fatal consequences of ventricular fibrillation in patients at high risk of sudden death, improve ventricular function in heart failure patients with intraventricular conduction delays, and improve survival in selected end-stage heart failure patients who are ineligible for heart transplantation. The development of drug-eluting stents holds promise of significant reduction of restenosis even in patients with a tendency for a hypercellular response to coronary interventions. Current projects encompass developing new strategies for acute and chronic heart disease, cardiomyopathies of different etiologies (i.e., ischemic, valvular, genetic, metabolic, and HIV-related), peripheral vascular disease, aortic aneurysms, and restenosis after percutaneous coronary interventions.

Examples of therapies and approaches include diet, exercise, and pharmacologic management of dyslipidemias, genetic susceptibility and directed treatment, diagnosis and management of arrhythmias, surgical and medical management of heart failure, and novel imaging of atherosclerosis. Studies also seek to understand and reduce disparities associated with minority and women's cardiovascular health.

Bioengineering applies engineering theory to advance knowledge at the genetic, molecular, cellular, tissue, and organ levels and to develop new biologic materials, processes, devices, and systems. Research on the treatment of advanced heart failure is leading to the development of innovative ventricular assist systems and the artificial heart as a bridge to cardiac transplant and myocardial recovery, and eventually, to the artificial heart for permanent circulatory support. A broad program of functional tissue engineering research using biomimetic culture conditions and in vivo approaches has been initiated to address the clinical need for tissue regeneration, repair, and replacement. Additional areas being supported include imaging techniques for CVD diagnosis and treatment in a diverse program of x-ray, magnetic resonance, positron emission, ultrasound, and nuclear medicine research projects, and molecular, cellular, and functional imaging methods. Nanotechnology and nanoscience will bring new opportunities in diagnostics and biosensors, tissue engineering, bioimaging, and drug delivery.

Genomic applications covers the research and development of resources related to genetics, genomics, proteomics, informatics, and gene transfer, as well as their application, for heart, lung, and blood diseases. The NHLBI Mammalian Genotyping Service, the Rat Genome Sequencing Program, the Rat Genome Database, the Programs for Genomic Applications, the NHLBI Microarray Facilities, the NIH BISTIC (Biomedical Information Science and Technology Initiative Consortium) Initiatives, and the NHLBI Proteomics Initiatives are programs supported by the CMMP. Additional areas of focus include gene mapping studies to identify the genetic variation that underlies common CVDs, functional genomics, bioinformatics and biocomputing, and microarray development.

Division of Lung Diseases

Lung diseases are among the leading causes of death and disability in the United States. As an underlying cause, excluding lung cancers, they accounted for 233,000 deaths in 2000 and were a contributing factor to more than 300,000 additional deaths. More than 30 million persons have chronic bronchitis, emphysema, asthma, or other obstructive or interstitial lung diseases. In 2000, pulmonary diseases accounted for 27 percent of all hospitalizations of children younger than 15 years of age in the United States. The projected economic cost to the Nation in 2003 is about $126 billion, of which $70 billion will be for health-related expenditures and $56 billion will be for lost productivity.

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, the fundamental mechanisms associated with specific pulmonary disorders, and the development of new treatment strategies for patients. 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, are also important activities. A variety of funding mechanisms, including research grants, contracts, cooperative agreements, SCORs, career development awards, fellowships, and research training grants are used to support these activities.

The DLD has two major programs:

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

The Airway Biology and Disease Program supports basic and clinical studies related to:

- Asthma
- Cystic fibrosis

- COPD and environmental lung diseases
- Neurobiology and sleep.

Basic research in asthma focuses on elucidating the etiology and pathophysiology of the disease. Studies include investigating cellular and molecular mechanisms associated with the 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; and determining the differences between the pathophysiology of severe asthma and mild-to-moderate asthma.

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. In FY 2002, the Division established cooperative partnerships between minority-serving institutions and research-intensive institutions to examine factors that contribute to health disparities and develop strategies for their elimination. The purpose of the partnership is to conduct collaborative research on asthma disparities and provide reciprocal training experiences to enhance research opportuni-ties and capabilities and enrich the cultural sensitivity at both institutions.

Scientists participating in CF research are investigating the origins and control of infections and inflammatory and immune responses in the lungs of CF patients, examining loss of CF transmembrane conductance regulation on development of CF, determining the modifying effects of other genes on its manifestation, and delineating genetic and metabolic defects underlying pulmonary complications associated with CF. Developing new genetic, pharmacologic, and nonpharmacologic (e.g., gene transfer) treatments is also an area of focus.

Research in COPD, which includes chronic bronchitis and emphysema, is concerned with understanding the underlying causes of the disorder and improving disease treatment and management. Investigators are 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; seeking to identify and characterize 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.

Scientists in sleep research are seeking to understand the neurobiology of breathing control during sleep and sleep apnea, examining the health consequences of sleep-disordered breathing, and developing treatments for sleep apnea.

The Lung Biology and Disease Program supports basic and clinical research in:

- Lung cell and vascular biology
- Developmental biology and pediatric lung disease
- Critical care and acute lung injury
- AIDS and TB
- Immunology and fibrosis.

The molecular and cellular biology of alveolar epithelial and endothelial cells and the lung surfactant system are important areas of interest for scientists in lung cell and vascular biology research. In the vascular biology program, researchers are examining regulation of the pulmonary vasculature, including cell growth and signaling, and the cellular and molecular mechanisms of primary pulmonary hypertension. They are also seeking to identify genes related to lung function and develop new methods to deliver drugs via lung epithelial cells.

Developmental biology and pediatric lung disease research focuses on normal lung development and factors that contribute to abnormal lung development. Scientists are studying the effects of prenatal and postnatal infections and reactive inflammation on lung development in infancy and early childhood, especially vulnerable stages of lung maturation, to gain information on lung development and long-term lung function. Investigators are also seeking to identify genes and molecules that regulate formation of lung alveoli in order to design new treatments for lung diseases. The creation of a molecular profile of bronchopulmonary dysplasia will advance understanding of the condition and lead to effective clinical intervention. Clinical trials are evaluating the safety and efficacy of nitric oxide in preventing and treating chronic lung disease in newborn infants.

The program supports multidisciplinary approaches to improving our understanding of the etiology and pathophysiology of acute lung injury and the molecular and cellular pathogenesis of acute respiratory distress syndrome (ARDS). In addition, it maintains an ARDS network to evaluate the efficacy of different therapeutic strategies, such as pulmonary artery catheterization versus central venous catheterization, fluid management, and anti-inflammatory agents, including corticosteroids, in patients with the disorder and those at risk.

AIDS researchers are seeking to develop animal models of HIV-related lung disease that will enable them to study the basic pathogenetic mechanisms involved in lung disorders, with the ultimate goal of providing information that will lead to new treatment strategies. Pneumocystic pneumonia, lymphoid interstitial lung diseases, and TB are among the prominent complications found in HIV patients. Human studies include multiple racial groups in the United States and abroad.

The interstitial diseases program includes basic research on genetic factors that influence sarcoidosis in blacks and genes that increase susceptibility to pulmonary fibrosis. Clinical research focuses on lymphangioleiomyomatosis, cyclophosphamide in the treatment for pulmonary fibrosis in scleroderma patients, and causes of noninfectious pneumonia associated with bone marrow transplantation.

Division of Blood Diseases and Resources

Blood diseases, including both acute and chronic disorders, resulted in 263,000 deaths in 2000; 254,000 of them were due to thrombotic disorders, and 9,000 were due to diseases of the red blood cells and bleeding disorders. In 2003, thrombotic disorders and other blood diseases will cost an estimated $93 billion, of which $57 billion will be for health expenditures and $36 billion for lost productivity.

The DBDR has a dual role within the Institute. It develops, administers, and coordinates programs both to reduce the morbidity and mortality caused by blood diseases and to lead to their primary prevention. Diseases addressed include sickle cell anemia, hemophilia, Cooley's anemia (also known as thalassemia), and disorders of hemostasis and thrombosis. The Division is also responsible for ensuring the adequacy and safety of the Nation's blood supply. A full range of activities, including studies of the transmission of disease through transfusion, development of methods to inactivate viruses in donated blood, improvement of blood donor screening procedures, research to reduce human error in transfusion medicine, and studies of emerging diseases that may be transmitted by blood transfusion are used to achieve this goal. Demonstration and education projects are supported to ensure that the research knowledge acquired is translated and disseminated to physicians, health care professionals, patients, and the public. The Division uses a variety of funding mechanisms, including research grants, contracts, cooperative agreements, centers, career development awards, fellowships, and research training grants to support its mission.

The Division consists of two programs:

- Blood Diseases Program
- Blood Resources Program.

The Blood Diseases Program focuses its research and training on such areas in hematology and hematologic diseases as:

- Thalassemia
- Sickle cell disease
- Cellular hematology
- Stem cells.

Research in thalassemia and SCD 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, gene therapy, and stem cell transplantation. Animal models are another area of interest. Recently, scientists have successfully corrected SCD in mice using gene therapy. Clinical studies in SCD are examining the natural history of the disorder, stroke prevention, and 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.

A thalassemia clinical network has been established to evaluate new treatment strategies and ensure that research findings on optimal management of the disease are rapidly disseminated to practitioners and health care professionals.

Research in cellular hematology is focused on reducing morbidity and mortality caused by disorders of the hematopoietic system, as well as preventing their occurrence. Areas of interest include red blood cell membrane and enzyme systems, hematopoiesis and stem cell biology, and Cooley's anemia and other hemoglobin variants.

The goal of stem cell research is to develop an effective treatment involving gene therapy to cure SCD. Scientists are focusing on new, less toxic conditioning regimens and other factors that could have a positive impact on engraftment.

The Blood Resources Program plans and directs research and training in:

- Thrombosis and hemostasis
- Bone marrow transplantation
- Transfusion medicine.

Research in thrombosis and hemostasis is directed toward understanding the pathogenesis of both arterial and venous thrombosis. Scientists are seeking to gain knowledge that will lead to improved diagnosis, prevention, and treatment of thrombosis in MI and stroke. One of the goals is to find additional platelet inhibitors, anticoagulants, and fibrinolytic agents that will improve specificity and reduce side effects when used in treatment.

Finding an effective treatment for hemophilia is another major priority. Researchers are using different approaches to study gene therapy for the disorder. Three Phase I clinical trials to test the safety of these procedures are under way. Bleeding disorders related to defects in coagulation proteins or abnormal platelet function, such as the immune thrombocytopenias, are also being investigated.

Bone marrow transplantation research focuses on basic and clinical studies in allogeneic blood and marrow transplantation, including graft versus host disease (GVHD), use of unrelated donors, tolerance induction, and clinical trials using cord blood and T-cell depleted grafts. Major concerns involve overcoming human leukocyte antigen (HLA) matching barriers so that more patients will have access to potential donors, and modifying toxic pretransplant regimens that are used to eradicate a patient's blood cell system and enhance engraftment. Additional areas of interest include graft engineering; ex vivo expansion of stem and progenitor cells for clinical use; and diagnosis, prevention, and treatment of major complications from transplantation.

Research in transfusion medicine includes studies of transmission of disease through transfusion, development of methods to inactivate viruses in donated blood, improvement of blood donor screening procedures, and studies of emerging diseases that may be transmitted by blood transfusions. Scientists are involved in basic and clinical investigations related to transfusion immunobiology, focusing on GVHD, graft versus leukemia effect, and dendritic cell therapies.

Division of Epidemiology and Clinical Applications

The DECA plans, directs, and evaluates research on the causes, prevention, diagnosis, and treatment of cardiovascular, lung, and blood diseases, as well as on the need for technological development in the acquisition and application of research findings in these areas. It supports epidemiologic studies, clinical trials, demonstration and education research, disease prevention and health promotion research, and basic and applied research in behavioral medicine. A variety of funding mechanisms is used, including research grants, contracts, cooperative agreements, career development awards, fellowships, and research training grants.

The Division has two major programs:

- Clinical Applications and Prevention Program
- Epidemiology and Biometry Program

and the Office of Biostatistics Research.

The Clinical Applications and Prevention Program is divided into three major areas:

- Prevention
- Clinical trials
- Behavioral medicine.

Research in the prevention of cardiovascular, lung, and blood diseases encompasses clinical trials, community intervention studies, prevention trials, nutrition studies, health education research, and behavioral medicine studies. The program supports a number of multicenter prevention and education trials to test the efficacy and effectiveness of, and demonstrate the capability of, prevention strategies designed to reduce cardiovascular risk factors. Major studies include determining the effectiveness of school- and home-based interventions to reduce development of CVD risk factors in children, especially those from minority populations; examining the effects of dietary patterns, sodium intake, and other lifestyle factors on blood pressure; and comparing the efficacy of various treatments to prevent major cardiovascular events in adults with diabetes. Studies on increasing the implementation of interventions known to be effective are of particular interest.

Clinical trials are used to evaluate the effectiveness of various medical procedures and therapeutic agents in patients with coronary heart disease, hypertension, and heart failure. Examples include assessing the long-term safety and efficacy of an angiotensin-converting enzyme (ACE) inhibitor to prevent major CVD events in patients with documented normal ventricular function, testing the ability of selected antihypertensive and lipid-lowering drugs to prevent heart attacks among individuals at high risk for hypertension and CHD, and comparing the use of an implantable cardiac defibrillator to conventional pharmacologic therapy to improve survival among heart failure patients.

Research in behavioral medicine focuses on biopsychological and sociocultural factors involved in heart, lung, and blood diseases. Areas of interest include central nervous system regulation of the cardiovascular system; identification of psychosocial factors (social support, depression, and hostility) affecting disease etiology, treatment, and rehabilitation; and effects of psychosocial and behavioral interventions on risk factors (smoking, adverse diet, physical inactivity), disease outcomes, and quality of life. Study participants are from all levels of health and from all ages and racial groups.

The Epidemiology and Biometry Program supports and conducts research using:

- Field studies and clinical epidemiology
- Genetic epidemiology
- Analytical resources.

Investigators are conducting long-term epidemiological studies of heart and vascular, lung, and blood diseases in defined populations in the United States and other countries. These studies focus on the development and progression of CVD risk factors in children and young adults, the development and progression of atherosclerosis measured noninvasively or at autopsy in middle-aged or older adults, and the development and progression of overt cardiovascular and pulmonary disease in older adults. Areas of emphasis include genetic and environmental influences on CVD and its risk factors; trends in incidence, prevalence, and mortality from CVD, stroke, peripheral vascular disease, CHF, and cardiomyopathy; and relationships between insulin, insulin resistance, and overt diabetes and CVD and its risk factors. Another area of interest is the incidence of and mortality from cardiovascular, lung, and blood diseases. Research strategies apply family, longitudinal, demographic, and vital statistics to study their natural history, etiology, and epidemiology.

Genetic epidemiology has become an increasingly important component of the DECA Research Program. Several long-term studies of twins, multiple generations, Native Americans, and blacks focus on related individuals to estimate heritability and identify genes that contribute to the development of CVD risk factors and CVD. Other long-term studies are storing DNA and testing candidate genes from unrelated individuals. In addition to examining associations between CHD risk factors and development of atherosclerosis, heart failure, cardiomyopathy, and stroke in adults and the elderly, investigators will seek to identify and characterize genes related to CHD and atherosclerosis and to determine how they interact with environmental factors in the development of disease. Additional studies are underway to identify genetic factors influencing coronary and aortic calcification and individual variability in the inflammatory response and to investigate gene-environment interaction, collaborative approaches to linkage analysis, and population screening for genetic diseases.

The program also focuses on understanding the relationships between insulin, insulin resistance, overt diabetes, and CVD and its risk factors. Scientists are attempting to find and characterize genes linked to risk factors that are associated with the insulin resistance syndrome and diabetes. Research strategies include family and longitudinal studies in racially diverse populations.

The Office of Biostatistics Research is responsible for providing statistical expertise to the Institute on planning, designing, implementing, and analyzing NHLBI-sponsored studies. When called upon, it develops new statistical solutions to problems for which techniques are not yet available. Designing efficient trials and monitoring data collection are important functions of the office. Research includes new methods for permitting extension or early suspension of ongoing randomized clinical trials, methods for analyzing complex survival data, trials with multiple endpoints, and trials involving multiple treatments.

National Center on Sleep Disorders Research

An estimated 70 million people in the United States suffer from sleep problems, and nearly 60 percent of them have a chronic disorder. About 30 million U.S. adults have frequent or chronic insomnia, approximately 12 million have sleep apnea, and an estimated 250,000 have narcolepsy. Additionally, approximately 100,000 accidents and 1,500 traffic fatalities a year are sleep-related. More than 50 percent of Americans over age 65 have sleep difficulties. As the over-65 population grows, sleep problems will affect an even greater proportion of the U.S. population. Each year, sleep disorders, sleep deprivation, and excessive daytime sleepiness add $16 billion to the national health care bill.

The NCSDR plans, directs, and supports a program of basic, clinical, and applied research, health education, research training, and prevention-related 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 among them and encourages their cooperation to plan and implement relevant interdisciplinary programs.

In 2002, an NCSDR-appointed task force revised the first National Sleep Disorders Research Plan, which was released in 1996. The Trans-NIH Sleep Research Coordinating Committee and the Sleep Disorders Research Advisory Board shared responsibility for approval of the final revised plan and also provided assistance. The updated plan summarizes the extensive progress in the field since that time, outlines the major gaps in knowledge, and concludes with a list of new research priorities.

The neurobiology of sleep and sleep apnea and the cardiovascular effects of sleep-related breathing disorders continue to be major areas of emphasis for the NCSDR. In FY 2002, new programs were initiated on sleep disorders in children and on the interrelationship of sleep to heart, lung, and blood diseases in children and adults. Workshops focusing on sleep, fatigue, and medical training; the role of sleep in memory; and cardiovascular and sleep-related consequences of temporomandibular disorders were held to identify gaps in knowledge and to prioritize opportunities for new research.

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 NIH Director's Sleep Disorders Research Plan. Among them is the Sleep Academic Award Program, 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. In collaboration with the American Academy for Sleep Medicine, the Sleep Academic Award Program developed a Web page that includes more than 50 curricular 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 sleep problems and sleep disorder education for physicians and the general public. A video program, "Sleep Apnea: Is Your Patient at Risk," was recently 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 major priority. Educational activities for 2002 include developing a curriculum on the biology of sleep for high school science teachers, revamping the Garfield Star Sleep Campaign Web site, and convening a working group to address sleepiness in adolescents and young adults (ages 13 to 22).

Women's Health Initiative

The WHI, 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 include more than 161,000 women ages 50 to 79; approximately 18 percent are minorities. Specifically, the clinical trial, consisting of approximately 68,000 women to be followed for an average of 9 years, has three parts: HRT, diet modification, and calcium and vitamin D supplements. The HRT portion of the trial is investigating the risks and benefits of combined estrogen and progestin on CHD, breast cancer, and osteoporosis risk in women with a uterus; women who have had a hysterectomy before joining the WHI hormone program are given estrogen alone. The dietary

modification portion is examining the ability of a diet low in fat but high in fruits, vegetables, and grains to prevent breast and colorectal cancers and heart disease and the calcium, and vitamin D supplements portion is seeking to determine the ability of the two nutrients to 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 9 years. The study is looking for predictors and biological markers—including genetic markers—for disease.

A key component of the observation study is the introduction of new forms of HRT, in particular those that are from natural sources and those that are designer estrogens. Investigators will compare the data from the clinical trial 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, and Pacific Islanders, and American Indians.

The community prevention study component is focusing on community-based strategies to enhance adoption of healthful behaviors, especially among women of different races, ethnic groups, and socioeconomic strata. Its goal is to develop carefully evaluated model programs that can be implemented in a wide range of communities throughout the United States. Areas of emphasis include reduction of CVD among black women; peer support among black women; environmental factors and physical activity in women; osteoporosis prevention, education, and outreach; diabetic care in minority women; methods to enhance physical activity in women; and women's attitudes regarding surgical menopause and HRT.

On July 9, 2002, the NHLBI announced an early end to the WHI's 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, stroke, and blood clots in study participants on the combined therapy compared to women taking placebo pills. They also found decreases in hip fractures and colon cancer in the treatment group compared to the control group. Although the actual increased risk of breast cancer or CVD for women on long-term estrogen plus progestin was very 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.

A separate study of estrogen alone among women who have had a hysterectomy is continuing, so the balance of risks and benefits for that treatment strategy is still unknown. Currently, the Data and Safety Monitoring Board has determined that the number of cases of invasive breast cancer has not exceeded the statistical boundary established to ensure participant safety.

Division of Intramural Research

The DIR conducts clinical research on normal and pathophysiological functioning of the heart, lung, blood, and vascular systems, and basic research on normal and abnormal cellular behavior at the molecular level. In FY 2001, the clinical and laboratory research programs were modified to consolidate some of the research effort. In the Clinical Research Program, the Cardiology and Vascular Biology Laboratories were combined to form the Cardiovascular Branch. In the Laboratory Research Program, the Laboratory of Developmental Biology was created, and the Laboratory of Molecular Biology was abolished.

Research foci of the 16 laboratories and branches and the core facilities range from structural organic chemistry to cardiology. Major areas of interest include mechanisms of gene regulation, 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.

The DIR is located on the 300-acre NIH campus in Bethesda. It has a staff of 723, including approximately 359 doctoral-level scientists, 65 of whom are in tenured or tenure-track positions. Approximately 150 guest workers contribute importantly to the research. This combined staff occupies a total space of about 115,000 square feet and has the use of 53 beds in the NIH Clinical Center.

Office of Prevention, Education, and Control

The 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. To accomplish its mission, OPEC established health education programs and initiatives that address high blood pressure, high blood cholesterol, asthma, early warning signs of heart attack, obesity, and sleep disorders. The programs use two strategies: one focuses on individuals at high risk; the other focuses on the general public. The four largest programs have coordinating committees consisting of national medical, public health, and voluntary organizations and of other Federal agencies. These committees help to plan, implement, and evaluate program efforts in professional, patient, and public education.

The National High Blood Pressure Education Program (NHBPEP) was initiated in 1972 to reduce death and disability related to high blood pressure through professional, patient, and public education programs. It is a cooperative effort among the NHLBI, professional and voluntary health agencies, and State health departments that has served as a model for national health education programs and continues to be adopted by other national and international groups. Special attention is directed to reducing health disparities among hypertensives.

Since the program's inception, the number of people with hypertension aware of their condition has increased fourfold, and four times as many are treating and controlling their disease. Data from the National Health and Nutrition Examination Surveys (NHANES) indicate that over the past four decades, mean systolic blood pressure has declined by 10 mmHg and age-adjusted mortality rates from heart disease and stroke have fallen by 50 percent and 60 percent, respectively.

The program continues its mission of translating research results to improve medical care outcomes and the public's health. It is committed to raising public awareness of the importance of adopting a heart-healthy lifestyle. Research has identified steps that individuals can take to control their blood pressure and to lower their risk of heart disease. For example, certain dietary habits can decrease blood pressure and can prevent it from rising. The DASH diet—rich in fruits and vegetables, low in saturated and total fat and cholesterol, and containing low-fat dairy products—has been shown to be beneficial for individuals who have high blood pressure and for those who wish to prevent high blood pressure. Combined with a reduced salt intake, the diet can further lower blood pressure.

In 2002, community and professional activities focused on updating the Primary Prevention Report, encouraging communities to hold local events to mark May as National High Blood Pressure Education Month, and redesigning and expanding "Your Guide to Lowering High Blood Pressure" Web page. The NHLBI initiated the development of a major repositioning strategy, which will include new partners, to

enhance its position as the U.S. leader in high blood pressure prevention and control, raise the importance of high blood pressure on the national public agenda, and reach individual audiences by designing activities directed specifically to them. In addition, along with the SPRY (Setting Priorities for Retirement Years) Foundation, it launched a 2-year pilot project to raise awareness about high and high normal blood pressure; risk factors and treatment; and prevention strategies among multigenerations, from school-age children (ages 11 to 13) to older adults (ages 55 and over). The project involves various intervention components: a school-delivered curriculum module for middle school aged students with outreach to parents and grandparents, a senior center-delivered curriculum module for older adults, intergenerational workshops, and a training program for teachers and senior center personnel involved in implementing the program and community outreach.

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. From 1983 to 1995, the percentage of the public who had their cholesterol checked rose from 35 percent to 75 percent, showing that 70 million to 80 million more Americans were aware of their cholesterol levels in 1995 than in 1983. Moreover, in 1995 physicians reported initiating diet and drug treatment at much lower cholesterol levels than in 1983. Major elements of the NCEP guidelines for detection and treatment have become established practice.

NHANES III (1988–1994) data demonstrate that the NCEP's dual strategy—one emphasizing the need for detection and treatment for individuals whose high blood cholesterol places them at increased risk for CHD and the other encouraging heart-healthy eating patterns to lower average cholesterol levels for the general public— has had a substantial effect on measured blood cholesterol levels of U.S. adults. Since 1978, the intake of saturated fat, total fat, and cholesterol among the general public decreased significantly, resulting in an impressive decline in average blood cholesterol levels. The prevalence of high blood cholesterol in the U.S. population has also fallen significantly. Cholesterol levels in adolescents likewise have declined.

In 2002, the NCEP focused its attention on disseminating the new "Adult Treatment Panel III (ATP III) Guidelines" on managing high cholesterol in adults. It developed a Web-based kit of materials derived from the Guidelines to support cholesterol education for Cholesterol Month 2002 and throughout the year. An ATP III Opinion Leader Dissemination kit was distributed to influential members of the medical community to encourage them to use the Guidelines and communicate their importance to professional colleagues. The NCEP is producing a new patient booklet on therapeutic lifestyle changes based on the ATP III recommendations. Additional activities include developing an action plan for reducing lifetime risk for CHD and convening an international conference on scientific issues that should be addressed in developing cardiovascular guidelines. The NHLBI, the American College of Cardiology, and the American Heart Association issued a clinical advisory on the use and safety of statins—specifically focusing on myopathy—in response to concerns that arose after cerivastatin was voluntarily withdrawn from the market by its manufacturer. The advisory provides reassurance that the benefits of statins far outweigh the risks if patients are properly selected and attention is paid to possible side effects.

The National Asthma Education and Prevention Program (NAEPP) was initiated in March 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. Special attention is directed to minority populations who are at increased risk.

The dissemination and implementation of national guidelines on the diagnosis and management of asthma are major priorities. In 2002, based on a review of the evidence report on asthma management, a panel of experts updated selected topics of the 1997 Guidelines. The final document, Expert Panel Report: Guidelines for the Diagnosis and Management of Asthma—Updates on Selected Topics 2002, and a Quick Reference summary can be found on the NHLBI Web site. The NAEPP is currently evaluating its partnerships with a local asthma coalition program—a grassroots program established especially in underserved, high-risk communities throughout the country—to gain information that will contribute to the development of innovative approaches to asthma management.

In 2002, the Federal Liaison Group on Asthma (FLGA), of which the NAEPP is a member, developed a briefing paper to explain the changes in the method for estimating asthma that caused confusion among the public and policymakers about asthma prevalence trends. The NAEPP participated in the preparation of three documents: the revised Managing Asthma: A Guide for Schools; Making a Difference in the Management of Asthma: A Guide for Respiratory Therapists; and Key Clinical Activities for Quality Asthma Care.

The National Heart Attack Alert Program (NHAAP) was initiated in June 1991 to reduce morbidity and mortality from MI, including out-of-hospital cardiac arrest, through education of health professionals (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 acute coronary syndromes such as unstable angina. Since its inception, the program has taught health care providers in emergency departments and emergency medical services systems about the importance of reducing the interval between a heart attack and treatment. Available treatments, if administered soon after heart attack symptoms start, can save lives and minimize heart muscle damage in heart attack survivors.

In 2001, the NHAAP, in partnership with the American Heart Association, the American Red Cross, and the National Council on Aging, launched a major campaign to urge physicians and health care providers to educate their patients about heart attack risk, warning signs, and steps to survival. As part of the campaign to increase awareness of the need to act fast when someone may be having a heart attack, the NHLBI established its "Act in Time to Heart Attack Signs" Web page with educational materials for health professionals, patients, and the public.

The Obesity Education Initiative (OEI) began 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.

In FY 2002, 50 at-risk communities belonging to the NHLBI Hearts N' Parks project, made a 3-year commitment to create model community-based programs to increase the number of children, adults, and seniors practicing heart-healthy behaviors. Its goal is to reduce obesity, improve nutritional status, and increase physical activity. The American Dietetic Association, in partnership with the project, is providing nutrition consultation. A Hearts 'N Parks Web page has been established with information on the program. The NHLBI was a partner on a Memorandum of Understanding between the Department of Health and Human Services (DHHS) and the National Recreation and Parks Association to address the leading health indicators of Healthy People 2010 (HP) related to physical inactivity and obesity and overweight. Other signers included the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), the Centers for Disease Control and Prevention (CDC), the DHHS office of Disease Prevention and Health Promotion, and the President's Council on Physical Fitness and Sports.

The NHLBI also served on the Steering Committee for the Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity. The Call to Action, released in 2002, states that overweight and obesity are among the most pressing health challenges facing our Nation today and may soon cause as much preventable death and disease as cigarette smoking.

The NHLBI Women's Heart Health Education Initiative was launched in 2001 in response to the Women's Health Research and Prevention Amendments, Public Law 105-304, which requires the Institute Director "to expand, intensify, and coordinate research and related activities, including information and educational programs with respect to heart attack, stroke, and other cardiovascular diseases in women." The Institute held a strategy development workshop, "Women's Heart Health: Developing a National Health Education Action Plan," to plan an agenda for the new health education effort. As a result of the recommendations of the workshop, the Institute awarded a 3-year contract for planning and implementing a comprehensive public awareness and professional education program on women's heart health. In 2002, the Heart Truth—a campaign directed toward women 40 to 60 years of age and health professionals—was launched to increase awareness about heart disease, improve detection and treatment of risk factors by health

professionals, and motivate national and community organizations to become involved in heart-health education. Special attention is given to minority women who are at increased risk for developing CVD.

As a key part of its response to the HP 2010 Objectives for the Nation, the NHLBI initiated a new funding mechanism 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 increase quality and years of health in underserved populations. In 2001, the Institute awarded EDUCs to high-risk health service areas in Arkansas, North Carolina, Texas, Virginia, and West Virginia to conduct educational projects targeting populations at greatest risk for heart disease and stroke. Multiple strategies to prevent and control CVD risk factors and to promote heart-healthy behavior have been designed specifically for different age groups, ranging from childhood to adulthood. Six additional EDUCs were awarded to areas in Maryland, Ohio (two), Colorado, Nebraska, and North Carolina in 2002.

The NHLBI Ad Hoc Committee on Minority Populations was established in 1975 to facilitate communication between minority communities and the NHBPEP. Its role has since expanded as the Institute developed new education and prevention programs. The committee includes health professionals from diverse cultural backgrounds with broad-based expertise in a variety of areas. Representing blacks, Hispanics, American Indians, Alaska Natives, Asian Americans, and Pacific Islanders, the committee provides important input on the Institute's minority initiatives.

A major goal of the Institute is to eliminate health disparities and to increase the quality and years of healthy life of all Americans. Through partnerships with groups that have special ties and access to targeted populations, the NHLBI is extending its outreach and educational activities to underserved communities. The Institute is collaborating with the Baltimore City Cardiovascular Health Partnership on a project that has a two-pronged strategy consisting of a population-wide public education campaign and a targeted subgroup outreach and education approach to build and reinforce positive cardiovascular health lifestyle skills and behaviors. The targeted population consists of blacks who reside in Baltimore City public housing developments.

The Institute's Salud para su Corazón (Health for Your Heart) Initiative, a community-based heart-health program for Latinos, is expanding across the United States. Trained local lay health workers (promotores), applying 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-health behaviors. In 2002, the NHLBI and the Health Resources and Services Administration signed an interagency agreement to expand the program to communities along the Texas-Mexico border and along the southern border areas of California and New Mexico.

The NHLBI-Indian Health Service Partnership to Strengthen the Heartbeat of American Indian and Alaskan Native Communities is a collaborative effort to educate three tribal communities—the Ponca Tribe of Oklahoma, the Bristol Bay Area in Western Alaska, and the Laguna Pueblo in New Mexico—about cardiovascular health and how to reduce their risk for CVD. In 2002, tribal heart-heath teams received training on cardiovascular health, including physical activity, obesity, smoking prevention, nutrition, high blood cholesterol, and high blood pressure, as well as on theories of team building, evaluation, and community interaction and intervention. Since then, they have initiated community outreach educational activities on cardiovascular health and disease. In addition, they have developed connections with local organization to aid them with their mission.

Asian Americans and Pacific Islanders are a diverse and heterogeneous group with varying levels of CVD risk factors, acculturation, and socioeconomic status (SES) and with different cultures, languages, immigration history, and community norms related to health and well-being. In 2002, the NHLBI, along with the Asian and Pacific Islander American Health Forum, conducted health assessments among Americans of Philippine, Vietnamese, and Cambodian heritage to obtain information on their knowledge of and attitudes toward CVD and its risk factors, disease prevention, and health behavior. The assessments will guide the Institute in its development of culturally and language-appropriate materials and activities for these groups.

International Activities

In addition to having national programs, the Institute is also 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 is contributing to and benefits from the rapidly developing global knowledge base in medicine, science, and technology related to its mission. 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 to international research fellows from approximately 35 countries in its laboratories.

Australia, China, Germany, 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, working with international organizations, contributes to worldwide health plans in areas within its mandated mission. The Director and the NHLBI staff serve as consultants to and partners with the Pan American Health Organization (PAHO), the Global Initiative on Asthma, the Global Initiative on Obstructive Lung Disease, and the World Health Organization (WHO). In 2000, the NHLBI Director began a 5-year term as president of the World Health League (WHL).

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 WHL. The initiative seeks to reduce morbidity and mortality from CVD by controlling hypertension, a major risk factor for the disease, in an estimated 40 million people who already have the condition and by preventing it in millions more at risk because of their unhealthy lifestyles. Significant reductions in the sequelae of heart attacks, stroke, heart failure, and premature deaths are expected to result from the PAHI.

In 2002, the NHLBI, in collaboration with the Giovanni Lorenzini Medical Science Foundation, the NIH Office of Research on Women's Health, and the NIH, published the International Position Paper on Women's Health and Menopause: A Comprehensive Approach. Information in the report is based on an extensive international review and evaluation of scientific evidence for current clinical practice as presented in the published literature. The document covers women's health and disease, specifically, menopause and aging, CVD, cancer, osteoporosis, Alzheimer's disease, and the role of hormone replacement therapy.

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 National Heart Institute (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 cardiovascular diseases (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 Lyndon B. 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 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 HDFP, "which stands alone among clinical studies in its profound potential benefit to millions of people."

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

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

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

July 6, 1982. Dr. Claude Lenfant is appointed Director of the NHLBI. He succeeds Dr. Robert I. 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 (SEP) 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 sickle cell disease.

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 for Health, Health and Human Services (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 intra-mural 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, National Cancer Institute, 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 sickle cell disease. 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 21, 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. 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 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 high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, and cigarette smoking affect the progression of atherosclerosis equally in women and men, regardless of race.

February 24, 1997. The National Asthma Education and Prevention Program 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 National High Blood Pressure Education Program 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 bio-behavioral 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 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.

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 DHHS Office of Disease Prevention and Health Promotion, the Office of the Surgeon General, the Centers for Disease Control and Prevention, 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 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 a wearable 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 DHHS Office of Disease Prevention and Health Promotion, the Centers for Disease Control and Prevention, the American Heart Association, the Centers for Medicare and 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*.

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.

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 2000, cardiovascular, lung, and blood diseases accounted for 1,175,000 deaths and 49 percent of all deaths in the United States. The projected economic cost in 2003 for these diseases is expected to be $489 billion, 23 percent of the total economic costs of illness, injuries, and death. Of all diseases, heart disease is the leading cause of death, cerebrovascular disease is third (behind cancer), and COPD (including asthma) ranks fourth. Cardiovascular and lung diseases account for three of the four leading causes of death and four of the six leading causes of infant death. Hypertension, heart disease, asthma, and chronic bronchitis are especially prevalent and account for substantial morbidity in Americans. 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 30 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 2000, CVD caused 946,000 deaths—39 percent of all deaths.
- Heart disease is the leading cause of death; the main form, CHD, caused 515,000 deaths in 2000.
- The annual number of deaths from CVD increased substantially between 1900 and 1970. This trend ended even though the population continues to increase and age.
- Total CVD mortality from all ages combined, measured by the crude death rate, changed from an increasing to a decreasing trend with a peak in 1968. By 1995, the rate achieved was similar to the rate in 1936.
- Cerebrovascular disease, the third leading cause of death, accounted for 168,000 deaths in 2000.
- 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 steep decline in age-adjusted death rate for CVD means a substantial reduction in annual risk of death for an individual of any age. The smaller reduction in crude death rate reflects the impact of an aging population that is growing over time, so that the overall national mortality burden of CVD remains at a high level compared with other causes of death.
- The rapid increase in deaths due to CHF between 1968 and 2000 is a major exception to the mortality decline in CVD.
- Between 1985 and 2000, death rates for heart disease and stroke declined for men and women in all racial/ethnic groups.
- Because of the rapid decline in mortality from CHD since the peak in 1968, there were 814,000 fewer deaths from CHD in 2000 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 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 1990 and 2000, the percent decline in death rates for CHD was greatest among white males and least among black females.
- In 2000, an estimated 61.8 million persons in the United States had some form of CVD; 50 million had hypertension, and almost 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.
- A 1988–94 national survey showed that many more people with hypertension (systolic BP > 160 mmHg or diastolic BP > 95 mmHg or on antihypertensive medication) were aware of their condition and had it treated and controlled compared with individuals with hypertenson in previous years.
- A 1999–2000 national survey showed only 31 percent of hypertensive patients (systolic BP > 140 mmHg or diastolic BP > 90 mmHg or on antihypertensive medication) had their condition under control.
- Hospitalization rates for CHF increased between 1971 and 2000.
- The estimate of economic cost of CVD is expected to be $352 billion in 2003:
  - $209 billion in direct health expenditures
  - $32 billion in indirect cost of morbidity
  - $110 billion in indirect cost of mortality.

Lung Diseases

- Lung diseases, excluding lung cancer, caused an estimated 233,000 deaths in 2000.
- COPD caused 117,000 deaths in 2000 and is the fourth leading cause of death.
- Between 1990 and 2000, death rates for COPD increased substantially in women and decreased slightly in men; mortality for asthma increased in black women but decreased in white women and in men.
- Between 1980 and 2000, infant death rates for various lung diseases declined markedly.
- Of the six leading causes of infant mortality, four are lung diseases or have a lung disease component. Between 1990 and 2000, changes in mortality for the causes were:
  - Congenital anomalies (-21 percent)
  - Disorders of short gestation (+1 percent)
  - Sudden infant death syndrome (SIDS) (-54 percent)
  - Respiratory distress syndrome (RDS) (-65 percent).
- Lung diseases accounted for 22 percent of all deaths under 1 year of age in 2000.
- The COPD death rate for women in the United States is increasing significantly compared with the rates in several other countries.
- Between 1985 and 2000, death rates for COPD increased for women in all racial/ethnic groups. Among men, they increased in blacks and American Indians, but declined in whites and Hispanics.
- 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 710,000 in 1989 to 4,690,000 in 2000.
- Asthma is a common chronic condition, particularly in children.
- The economic cost of lung diseases is expected to be $126 billion in 2003—$70 billion in direct health expenditures and $56 billion in indirect cost of morbidity and mortality.

Blood Diseases

- An estimated 263,000 deaths, 11 percent of all deaths, were attributed to blood diseases in 2000. These include the following:
  - 254,000 due to blood-clotting disorders
  - 9,000 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 2003, blood-clotting disorders are expected to cost the nation's economy $83 billion, and other blood diseases will cost $11 billion.
- The mean age at death for persons with sickle cell anemia increased from about 28 years in 1979 to 36.9 years in 2000 (not shown).
- Each year, an estimated 14 million units of blood are collected from 8 million donors and transfused to about 4.5 million patients (not shown).

Deaths From All Causes and Deaths From Cardiovascular, Lung, and Blood Diseases, U.S., 1980 and 2000

	1980		2000	
Cause of Death	Number of Deaths	Percent of Total	Number of Deaths	Percent of Total
All Causes	1,990,000	100	2,403,000	100
All Cardiovascular, Lung, and Blood Diseases	1,146,000	58	1,175,000	49
Cardiovascular Diseases	1,000,000	50	946,000	39
Blood	344,000*	16	263,000**	11
Lung	150,000***	8	233,000***	10
All Other Causes	844,000	42	1,228,000	51

* Includes 328,000 CVD deaths involving blood clotting.

** Includes 254,000 CVD deaths involving blood-clotting disease.

*** Includes 11,000 CVD deaths due to pulmonary heart disease in 1980 and 13,000 in 2000.

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

Deaths by Major Causes, U.S., 1999

Major Causes	Percent
Other	51.1%
CVD	39.4%
Lung*	9.1%
Blood**	0.4%

Total Cardiovascular, Lung, and Blood Diseases 48.9%

* Excludes deaths from pulmonary heart disease.

** Excludes deaths from blood-clotting disorders and pulmonary embolism (10.8%).

Deaths From Cardiovascular, Lung, and Blood Diseases, U.S., 2000

	Percent
CVD*	80.5%
Lung	18.7%
Blood	0.8%

* CVD involving blood clotting (21.6%).

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

Deaths From Specific Cardiovascular, Lung, and Blood Diseases, U.S., 2000

Deaths in Thousands

Cause of Death	Cardiovascular	Lung	Blood
Acute Myocardial Infarction	193		131*
Other Coronary Heart Disease	322		
Cerebrovascular Diseases (Stroke)	168		110*
Other Atherosclerosis	40		4*
Pulmonary Embolism	8	8*	9*
Other Cardiovascular Diseases	215	5*	
Bleeding and Red Blood Cell Diseases			9
Chronic Obstructive Pulmonary Disease		117	
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		5	
Total	**946**	**233**	**263**

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

Note: Total, excluding overlap, is 1,175,000.

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

Deaths From Cardiovascular Diseases, U.S., 2000

Other CHD	34.0%
Other CVD*	22.7%
AMI	20.4%
Stroke	17.8%
Other Atherosclerosis	4.2%
Pulmonary Embolism	0.8%

Atherosclerosis-Related Disease 76.4%

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

Deaths From Lung Diseases, U.S., 2000

Airway Diseases	52.4%
Pneumonia	27.9%
Interstitial/Other	12.0%
Pulmonary Circulation	5.6%
Neonatal	2.1%

Deaths From Blood Diseases, U.S., 2000

Disease	Percent
AMI	49.8%
Stroke	41.8%
Pulmonary Embolism	3.4%
Bleeding and Red Cell Diseases	3.4%
Other Atherosclerosis	1.5%

Blood-Clotting Disorders 96.6%
Note: Numbers may not add to total due to rounding.
Source: Estimated by the NHLBI from Vital Statistics of the United States, NCHS.

Deaths From Cardiovascular Diseases, U.S., 1900–2000

Deaths in Thousands

Year	Total CVD	Heart Diseases	CHD	Stroke
1900	52.766	27.427		21.353
1905	62.597	35.252		23.062
1910	136.357	75.429		45.461
1915	179.775	101.429		58.46
1920	243.18	137.374		80.019
1925	307.94	188.554		91.29
1930	384.765	251.153		104.345
1935	450.277	312.333		109.058
1940	538.47	385.191		119.753
1945	591.833	424.329		129.144
1950	745.074	537.629	396.055	156.751
1955	815.532	585.751	464.517	174.142
1960	923.635	661.712	546.366	193.588
1965	990.192	712.087	608.508	201.057
1970	1024.501	735.542	666.665	207.166
1975	988.073	716.215	642.719	194.038
1980	993.348	761.085	635.677	170.225
1985	982.739	771.169	608.372	153.05
1990	920.245	720.058	558.291	144.088
1995	948.419	726.974	552.464	159.791
2000	941.526	710.76	515.204	167.661

Source: Vital Statistics of the United States, NCHS.

Death Rates* for Cardiovascular Diseases, U.S., 1900–2000

Rate per 100,000 Population

Year	CVD	Heart Diseases	CHD	Stroke
1900	264.3	137.4		106.9
1905	293.3	161.9		105.9
1910	287.2	158.9		95.8
1915	290.5	163.9		94.5
1920	282.5	159.6		93.0
1925	301.8	184.8		89.5
1930	327.8	214.2		89.0
1935	353.4	245.4		85.7
1940	406.6	292.5		90.9
1945	443.8	320.3		97.5
1950	494.4	356.8	262.8	104.0
1955	496.3	356.5	282.7	106.0
1960	515.1	369.0	304.7	108.0
1965	511.7	367.4	314.0	103.9
1970	504.2	362.0	328.1	101.9
1975	458.6	332.4	298.3	92.1
1980	438.5	336.0	280.5	75.1
1985	411.6	323.0	255.6	64.3
1990	370.0	289.5	224.3	57.9
1995	354.4	271.6	210.2	59.7
2000	342.0	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., 2000

Cause of Death	Rate per 100,000 Population	Years of potential life lost in millions***
1 = Heart*	258.2	3.3
2 = Cancer	200.9	4.4
3 = Cerebrovascular	60.9	0.6
4 = COPD**	44.3	0.5
5 = Accidents	35.6	2.7
6 = Diabetes	25.2	0.5
7 = Influenza and Pneumonia	23.7	0.2
8 = Alzheimer's Disease	18.0	<0.1
9 = Nephritis	13.5	0.2
10 = Septicemia	11.3	0.2

Ten Leading Causes of Death Among Minority Groups, U.S., 2000

Black		**Asian***	
Pneumonia	2.1	Perinatal	1.1
Nephritis	2.4	Nephritis	1.5
COPD	2.7	Suicide	1.8
HIV Infection	2.7	Diabetes	3.2
Homicide	2.8	Pneumonia	3.2
Diabetes	4.2	COPD	3.2
Accidents	4.3	Accidents	4.8
Stroke	6.7	Stroke	9.4
Cancer	21.7	Cancer	26.1
Heart	27.1	Heart	26.4
Hispanic		**American Indian****	
Perinatal	2.0	Nephritis	1.9
Pneumonia	2.4	Pneumonia	2.5
COPD	2.5	Suicide	2.6
Homicide	2.7	COPD	3.8
Cirrhosis	3.0	Cirrhosis	4.7
Diabetes	5.0	Stroke	5.0
Stroke	5.8	Diabetes	5.4
Accidents	8.2	Accidents	11.9
Cancer	19.7	Cancer	16.8
Heart	24.1	Heart	21.3

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

** Includes deaths among Aleuts and Eskimos.

Source: Vital Statistics of the United States, NCHS.

Death Rates* for Cardiovascular and Noncardiovascular Diseases, U.S., 1980 and 2000

Cause of Death	Rate*		Rate Change	Percent Change
	1980	2000**		
All Causes	1,039	872	-167	-16
Cardiovascular Diseases	544	341	-203	-37
Coronary Heart Disease	345	187	-158	-46
Stroke	96	57	-39	-41
Other	103	97	-6	-6
Noncardiovascular Diseases	495	531	36	7

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

** Data for 2000 are preliminary or estimated by the NHLBI.

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

Source: Vital Statistics of the United States, NCHS.

Deaths From Congestive Heart Failure, U.S., 1968–2000

Deaths in 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

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., 1985–2000

Rate per 100,000 Population

Male

Year	Black	White**	American Indian	Hispanic	Asian
1985	538.1	477.7	283.1	302.8	257.5
1986	526.9	465.5	277.9	295.4	252.9
1987	516.0	453.6	272.8	288.1	248.4
1988	505.3	442.0	267.8	281.0	243.9
1989	494.8	430.7	262.9	274.1	239.5
1990	484.6	419.7	258.0	267.4	235.3
1991	474.5	408.9	253.3	260.8	231.0
1992	464.7	398.5	248.6	254.4	226.9
1993	455.1	388.3	244.1	248.2	222.8
1994	445.7	378.4	239.6	242.1	218.8
1995	436.4	368.7	235.2	236.1	214.9
1996	427.4	359.2	230.9	230.3	211.1
1997	418.5	350.1	226.6	224.7	207.3
1998	409.9	341.1	222.5	219.2	203.6
1999	401.4	332.4	218.4	213.8	199.9
2000	393.1	323.9	214.4	208.5	196.3

Female

Year	Black	White**	American Indian	Hispanic	Asian
1985	354.9	283.3	167.7	197.1	157.4
1986	349.9	278.0	165.3	192.8	154.7
1987	344.9	272.8	162.9	188.6	152.1
1988	340.0	267.7	160.6	184.5	149.5
1989	335.2	262.8	158.3	180.4	146.9
1990	330.4	257.8	156.0	176.5	144.4
1991	325.7	253.0	153.8	172.6	141.9
1992	321.1	248.3	151.6	168.9	139.5
1993	316.5	243.7	149.4	165.2	137.1
1994	312.0	239.1	147.3	161.6	134.8
1995	307.6	234.7	145.2	158.0	132.5
1996	303.2	230.3	143.1	154.6	130.2
1997	298.9	226.0	141.1	151.2	128.0
1998	294.6	221.8	139.1	147.9	125.8
1999	290.4	217.6	137.1	144.6	123.7
2000	286.3	213.6	135.2	141.5	121.6

* 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

Rate per 100,000 Population

Male

Year	Black	White**	American Indian	Hispanic	Asian
1985	114.3	74.7	48.8	55.8	66.4
1986	111.9	73.3	48.0	54.7	65.8
1987	109.5	72.0	47.2	53.6	65.2
1988	107.3	70.7	46.4	52.6	64.5
1989	105.0	69.4	45.6	51.5	63.9
1990	102.8	68.2	44.8	50.5	63.4
1991	100.6	66.9	44.1	49.4	62.8
1992	98.5	65.7	43.3	48.5	62.2
1993	96.5	64.5	42.6	47.5	61.6
1994	94.4	63.4	41.9	46.5	61.0
1995	92.5	62.2	41.2	45.6	60.5
1996	90.5	61.1	40.5	44.7	59.9
1997	88.6	60.0	39.8	43.8	59.3
1998	86.8	58.9	39.1	42.9	58.8
1999	84.9	57.8	38.5	42.0	58.3
2000	83.2	56.8	37.8	41.2	57.7

Female

Year	Black	White**	American Indian	Hispanic	Asian
1985	96.7	68.3	43.5	48.4	57.1
1986	94.9	67.3	43.1	47.4	56.3
1987	93.1	66.4	42.7	46.3	55.6
1988	91.3	65.5	42.3	45.3	54.8
1989	89.6	64.6	41.9	44.2	54.1
1990	87.9	63.7	41.5	43.2	53.4
1991	86.2	62.9	41.1	42.3	52.7
1992	84.6	62.0	40.7	41.3	52.0
1993	83.0	61.1	40.4	40.4	51.4
1994	81.4	60.3	40.0	39.5	50.7
1995	79.9	59.5	39.6	38.6	50.0
1996	78.3	58.7	39.2	37.7	49.4
1997	76.9	57.9	38.9	36.9	48.7
1998	75.4	57.1	38.5	36.1	48.1
1999	74.0	56.3	38.1	35.2	47.5
2000	72.6	55.5	37.8	34.4	46.8

* 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., 1950–2000

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

Year	Actual	Expected	Peak
1950	439.5		
1951	433.6		
1952	431.2		
1953	439.5		
1954	426.0		
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		482.6
1969	469.8	469.8	482.6
1970	448.0	479.0	482.6
1971	448.5	481.4	482.6
1972	445.5	483.8	482.6
1973	437.0	486.2	482.6
1974	414.6	488.6	482.6
1975	388.1	491.1	482.6
1976	382.2	493.5	482.6
1977	368.5	496.0	482.6
1978	362.0	498.5	482.6
1979	339.1	501.0	482.6
1980	345.2	503.5	482.6
1981	329.5	506.0	482.6
1982	320.4	508.5	482.6
1983	316.1	511.0	482.6
1984	304.1	513.6	482.6
1985	296.2	516.2	482.6
1986	283.4	518.7	482.6
1987	273.9	521.3	482.6
1988	268.5	524.0	482.6
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	226.1	539.9	482.6
1995	221.9	542.6	482.6
1996	214.0	545.3	482.6
1997	205.6	548.0	482.6
1998	197.9	550.7	482.6
1999	195.7	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 2000

Percent Discharged Dead

Disease	1975	1985	2000
Cardiac Dysrhythmia	7.9	2.1	
Pneumonia	6.4	7.6	4.9
Congestive Heart Failure	8.1	4.1	
Stroke	16.4	8.7	6.4
AMI	19.3	15.5	9.9

Source: National Hospital Discharge Survey, NCHS.

Death Rates for Coronary Heart Disease in Men Ages 35–74 Years, Selected Countries, 1970–2000

Rate 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	74.0
1979	638.5	477.5	473.2	522.6	255.6	149.6	71.7
1980	616.1	449.1	465.0	508.8	277.2	148.3	74.5
1981	602.8	442.6	448.0	491.9	261.9	145.0	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	65.0
1984	561.5	380.3	401.1	477.3	283.6	143.0	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	310.0	118.5	52.2
1989	471.0	304.6	322.7	394.4	324.0	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	407.0	242.6	290.3	353.1	326.0	100.5	44.7
1993	377.3	230.3	286.9	346.3	304.2	98.7	44.5
1994	346.4	217.0	276.7	315.1	280.6	94.4	48.7
1995	339.7	202.4	269.0	304.5	273.1	92.0	48.7
1996	319.9	195.5	259.1	288.1	266.7	90.7	57.7
1997	292.3	183.2	247.8	267.0	274.8	86.6	56.8
1998	287.5	171.5	236.4	257.5	282.9	85.3	56.0
1999	276.4	160.9	229.9	241.0	291.0		56.7
2000			217.6				

* 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, 1970–2000

Rate per 100,000 Population

Year	Finland	Australia	USA	England	Poland	France	Japan
1970	193.0	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	193.0	235.2	241.0	175.1	58.6	52.1	41.3
1973	187.9	225.9	231.8	175.8	62.0	50.1	43.0
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	51.0	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	177.0	185.6	185.0	173.4	75.6	43.8	33.5
1979	176.0	169.6	170.8	170.6	71.9	41.7	31.8
1980	161.3	159.6	172.9	165.8	73.9	41.0	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	42.0	29.3
1983	154.6	149.6	159.8	164.6	70.2	40.2	28.6
1984	155.0	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	83.0	37.7	23.2
1987	153.0	126.2	137.8	154.8	87.6	34.0	21.4
1988	140.8	118.1	133.2	148.0	83.3	30.4	21.2
1989	129.8	113.4	126.2	143.0	89.5	28.2	19.5
1990	125.6	105.6	122.0	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	125.0	89.0	24.6	16.7
1994	98.4	78.9	110.1	114.4	83.0	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	74.0	65.8	100.2	96.0	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		18.9
2000			89.7				

* 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., 1990–2000

Percent

	COPD	Asthma	CHD	Stroke
White Men	-1.8%	-29%	-28.1%	-16.7%
Black Men	-5.5%	-15.1%	-23.4%	-21.2%
White Women	42.5%	-13%	-24.2%	-10.4%
Black Women	46.1%	13.3%	-15.3%	-13.7%

* Age-adjusted.

Source: Vital Statistics of the United States, NCHS.

Death Rates for Lung Diseases in Infants, U.S., 1980–2000

Rate 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	28.0
1981	119.0	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	103.0	53.1	13.6	14.1
1995	37.3	87.1	47.6	12.2	12.6
1996	34.9	74.2	46.8	11.0	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	51.0	43.2	10.9	8.4

Source: Vital Statistics of the United States, NCHS.

Ten Leading Causes of Infant Mortality, U.S., 2000

Cause of Mortality	Deaths Under Age 1 per 100,000 Live Births	Percent Change
CONGENITAL ANOMALIES*	141.5	-21**
DISORDERS RELATING TO SHORT GESTATION	108.3	+1
SUDDEN INFANT DEATH SYNDROME	62.6	-15
Newborns affected by maternal complications of pregnancy	34.6	-65
Newborns affected by complications of placenta, cord, and membrane	26.2	+7
RESPIRATORY DISTRESS SYNDROME	24.6	-65
Accidents and adverse effects	21.7	-5
Bacterial sepsis of newborn	18.9	NA
Diseases of circulatory system	16.3	-7
Intrauterine hypoxia	15.5	-41

* In 2000, congenital CVD and congenital anomalies of the respiratory system represented 44 percent of all infant deaths due to congenital anomalies.

** Between 1990 and 2000, congenital CVD declined 39 percent; congenital anomalies of the respiratory system declined 39 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., 2000

Cause of Death	Deaths Under Age 1
All Causes	28,035
Cardiovascular Diseases	2,505
Congenital Anomalies	1,842*
Other	663*
Lung Diseases	6,066
Sudden Infant Death Syndrome	2,523*
Respiratory Distress Syndrome	933*
Pneumonia	280
Bronchopulmonary Dysplasia (BPD)	261
Atelectasis of Newborn	496
Congenital Anomalies	647*
Other Lung Diseases	926
Other Diseases	19,464

* NHLBI programs address these diseases.

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

Source: Vital Statistics of the United States, NCHS.

By Percent

Other Diseases	69.4%
SIDS	9.0%
Congenital Anomalies of the CV System	6.6%
Atelectasis and Other Lung Diseases	5.1%
RDS	3.3%
Other CVD	2.4%
Congenital Anomalies of the Respiratory System	2.3%
Pneumonia	1.0%
BPD	0.9%

Death Rates for Chronic Obstructive Pulmonary Disease in Men Ages 35+ Years, Selected Countries, 1980–2000

Rate 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	144.0	129.5	128.8		88.3		61.3	42.1
1985	155.6	139.0	139.9		91.7		65.0	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	133.0	125.5	100.7		91.0	74.1	54.9	39.2
1989	137.1	136.0	100.3		86.6	73.8	56.6	36.6
1990	122.9	110.8	93.8	96.2	89.3	69.4	56.1	37.5
1991	124.4	105.3	90.0	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	90.0	88.7	57.2	56.1	36.0
1995	110.0	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		36.5
1997	99.2	83.7	68.4	76.8	86.6	67.8		35.6
1998		79.2	69.0	71.4	86.0	72.2		33.5
1999		76.3	69.5	69.6	92.5	65.3		35.2
2000					87.0			

* 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, 1980–2000

Rate 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	37.0	26.7		29.4		18.4	17.0
1983	40.7	37.7	30.7		33.2		19.9	17.7
1984	43.1	37.5	32.7		35.0		20.1	16.4
1985	50.5	44.6	34.2		38.4		22.1	16.6
1986	48.1	38.9	30.0		39.6		23.3	15.6
1987	45.0	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	48.0	42.6	22.3	27.2	46.1	11.0	22.2	13.9
1991	50.4	41.5	22.0	28.3	48.7	12.9	21.9	13.5
1992	51.4	48.9	18.5	27.0	49.0	14.9	23.1	13.1
1993	52.6	44.4	19.3	29.7	54.3	14.8	25.8	13.2
1994	48.0	47.7	16.7	29.0	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		12.7
1997	52.3	42.7	17.1	26.4	57.4	16.3		12.1
1998		41.6	17.9	26.6	58.8	17.8		11.3
1999		39.7	18.7	26.4	64.2	16.7		11.4
2000					64.5			

* 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., 1985–2000

Rate per 100,000 Population

Male

Year	Black	White**	American Indian	Hispanic	Asian
1985	44.4	58.2	29.3	28.4	28.3
1986	44.5	58.1	29.7	28.2	28.3
1987	44.6	58.0	30.1	28.0	28.3
1988	44.7	57.9	30.5	27.8	28.3
1989	44.9	57.8	31.0	27.6	28.3
1990	45.0	57.7	31.4	27.5	28.3
1991	45.1	57.6	31.8	27.3	28.3
1992	45.3	57.5	32.2	27.1	28.3
1993	45.4	57.4	32.7	26.9	28.3
1994	45.5	57.3	33.1	26.8	28.3
1995	45.7	57.2	33.6	26.6	28.3
1996	45.8	57.1	34.1	26.4	28.3
1997	45.9	57.0	34.5	26.3	28.3
1998	46.1	56.9	35.0	26.1	28.3
1999	46.2	56.8	35.5	25.9	28.3
2000	46.4	56.7	36.0	25.7	28.3

Female

Year	Black	White**	American Indian	Hispanic	Asian
1985	13.7	23.9	11.6	12.3	11.1
1986	14.3	24.7	12.2	12.5	11.2
1987	14.8	25.6	12.9	12.7	11.2
1988	15.3	26.6	13.7	12.8	11.3
1989	15.9	27.5	14.4	13.0	11.3
1990	16.5	28.5	15.3	13.2	11.4
1991	17.1	29.5	16.1	13.3	11.4
1992	17.7	30.6	17.1	13.5	11.4
1993	18.4	31.7	18.0	13.7	11.5
1994	19.1	32.8	19.0	13.9	11.5
1995	19.8	34.0	20.1	14.1	11.6
1996	20.5	35.2	21.3	14.2	11.6
1997	21.3	36.5	22.5	14.4	11.6
1998	22.0	37.8	23.8	14.6	11.7
1999	22.9	39.2	25.1	14.8	11.7
2000	23.7	40.6	26.5	15.0	11.8

* 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., 1989–2000

Source: National Ambulatory Medical Care Survey, NCHS.

Physician Office Visits for Sleep Disorders, U.S., 1989–2000

Year	Visits in Millions
1989	0.710228
1990	1.046927
1991	1.331879
1992	1.418702
1993	1.234703
1994	1.587218
1995	2.386158
1996	2.752231
1997	3.244039
1998	3.974866
1999	3.378591
2000	4.689916

Source: National Ambulatory Medical Care Survey, NCHS.

Prevalence of Common Cardiovascular, Lung, and Blood Diseases, U.S., 2000

Disease	Number
Total Cardiovascular Diseases	61,800,000
Hypertension*	50,000,000
Coronary Heart Disease	12,900,000
Congestive Heart Failure	4,900,000
Stroke	4,700,000
Congenital Heart Disease	1,000,000
Asthma**	20,300,000
COPD**	12,100,000
Chronic Bronchitis only (age 25+)**	9,200,000
Emphysema only (age 25+)**	2,000,000
Chronic Bronchitis and Emphysema (age 25+)**	900,000
Anemias (all forms)***	3,500,000

* Systolic blood pressure 140 mmHg or greater and/or diastolic 90 or greater or on antihypertensive medication.

** For 2001.

*** For 1996.

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), 1988–94, and National Health Interview Survey (NHIS), 2000 and 2001.

Prevalence of Cardiovascular Diseases* in Adults by Age, U.S., 1988–94

Age	Percent
18–19	4.2
20–29	6.8
30–39	11.9
40–49	23
50–59	42.8
60–69	58.6
70–79	73.9
80+	77.6

* Hypertension, coronary heart disease, cerebrovascular disease, congestive heart failure, rheumatic heart disease, or congenital cardiovascular disease.

Hypertension = 140/90+ mmHg or on antihypertensive medication.

Source: NHANES, 1988–94.

Prevalence of Common Cardiovascular and Lung Diseases by Age, U.S., 2000

Age	Percent
Less than 18 Years	
Asthma*	8.7
18-44 Years	
Anemias	2.0
Coronary Heart Disease	2.5
Chronic Bronchitis*	4.6
Asthma*	7.2
Hypertension	9.0
45-64 Years	
Emphysema*	1.2
Stroke	2.2
Congestive Heart Failure	2.8
Chronic Bronchitis*	6.0
Asthma*	6.7
Coronary Heart Disease	7.9
Hypertension	33.0
65+ Years	
Anemias	2.0
Emphysema*	3.6
Chronic Bronchitis*	5.3
Asthma*	6.0
Congestive Heart Failure	8.1
Stroke	8.5
Coronary Heart Disease	15.5
Hypertension	75.0

* For 2001.

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

Source: NHIS and NHANES, NCHS.

Prevalence of Cardiovascular Disease Risk Factors in Adults, U.S., 1961–2000

Percent of Population

Year	Hypertension	Smoking	High Cholesterol	Overweight
1960				
1961	38.1		33.6	44.8
1962				
1963				
1964				
1965		41.9		
1966				
1967				
1968				
1969				
1970				
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

* Age-adjusted.

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

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

Hypertensive Population Aware, Treated, and Controlled, Age 18+, U.S., 1971–72 to 1999–2000

Percent of Hypertensive Population

SBP 160+ or DBP 95+ or on medication				
	1971–72	**1974–75**	**1976–80**	**1988–94**
Aware	51%	64%	73%	88%
Treated	36%	34%	46%	79%
Controlled	16%	20%	34%	65%

SBP 140+ or DBP 90+ or on medication				
	1976–80	**1988–91**	**1991–94**	**1999–2000**
Aware	51%	73%	68%	69.04%
Treated	31%	55%	53%	58.43%
Controlled	10%	29%	27%	31.1%

* Systolic blood pressure 160+ mmHg or diastolic blood pressure 95+ mmHg or on antihypertensive medication.

**** Systolic blood pressure 140+ mmHg or diastolic blood pressure 90+ mmHg or on antihypertensive medication.

Source: NHANES, NCHS.

Adult Population With Hypertension* by Age, Gender, and Race, U.S., 1999–2000

Percent of Population

Age	Mexican-American Men	Black Men	White Men	Mexican-American Women	Black Women	White Women
18–39	8.47%	13.48%	9.81%	2.49%	7.18%	4.21%
40–59	29.79%	40.44%	28.56%	28.5%	51.77%	25.61%
60+	59.68%	75.38%	58.15%	67.15%	82.61%	70.1%

* Systolic blood pressure 140+ mmHg or 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., 1971–2000

Rates per 100,000 Population

Year	Ages 45–64 Years	Ages 65+ Years
1971	9.5	60.1
1972	11.3	73.3
1973	12.0	78.2
1974	12.8	82.7
1975	13.2	88.4
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	26.0	182.0
1991	27.0	193.6
1992	31.5	206.4
1993	34.1	207.7
1994	29.8	210.0
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

Source: National Hospital Discharge Survey, NCHS.

Prevalence of Asthma by Age, U.S., 1981, 1991, and 2001

Percent

	1981*	1991*	2001**
<18	3.8%	6.2%	8.7%
18–44	2.9%	4.3%	7.2%
45–64	3.4%	4.1%	6.7%
65+	2.9%	3.7%	6.0%

* Positive response to question: During the past 12 months, did anyone in your family have asthma?

** Positive responses to questions: Has a doctor or other health professional ever told you that you had asthma? Do you still have it?

Note: NCHS changed interview questions, so estimates for 2001 are not comparable with earlier estimates.

Source: NHIS, NCHS.

Direct and Indirect Economic Costs of Illness by Major Diagnosis, U.S., 2003

	Dollars in Billions				Percent Distribution			
		Indirect Costs				Indirect Costs		
	Direct Costs*	Morbidity**	Mortality***	Total	Direct Costs	Morbidity	Mortality	Total
Cardiovascular Disease	209.3	32.4	110.1	351.8	14.7	17.0	21.3	16.5
(including Blood Clotting)§	(49.3)	(7.1)	(26.1)	(82.5)	(3.5)	(3.7)	(5.0)	(3.9)
Lung Diseases****	70.2	25.0	31.0	126.2	4.9	13.1	6.0	5.9
Blood Diseases	7.4	0.7	2.8	10.9	0.5	0.4	0.5	0.5
Subtotal	286.9	58.1	143.9	488.9	20.1	30.5	27.8	22.9
Diseases of the Digestive System	146.3	9.8	23.0	179.1	10.3	5.1	4.4	8.4
Neoplasms	64.2	16.3	109.0	189.5	4.5	8.5	21.1	8.9
Mental Disorders	114.8	25.1	7.9	147.8	8.0	13.2	1.5	6.9
Diseases of the Nervous System	117.7	7.4	11.1	136.2	8.2	3.9	2.1	6.4
Diseases of the Musculoskeletal System	81.7	19.5	2.6	103.8	5.7	10.2	0.5	4.9
Diseases of the Genitourinary System	60.4	5.0	5.4	70.8	4.2	2.6	1.0	3.3
Endocrine, Nutritional, and Metabolic Diseases	56.9	6.3	16.9	80.1	4.0	3.3	3.3	3.8
Infectious and Parasitic Diseases	29.1	11.6	27.6	68.3	2.0	6.1	5.3	3.2
Diseases of the Skin	32.1	1.6	0.5	34.2	2.2	0.8	0.1	1.6
Other Respiratory Diseases	40.0	7.7	2.8	50.5	2.8	4.0	0.5	2.4
Other and Unallocated to Diseases	394.9	22.3	165.9	583.1	27.7	11.7	32.1	27.3
Total	**$1,425**	**$190.8**	**$516.6**	**$2,132.4**	**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 2003 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 2003 total by type of direct cost.

** Morbidity costs were estimated for 2003 by multiplying NCHS estimates for 1980 by a 4.8 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 2003 by first multiplying the number of deaths in 1999 in each age- and sex-specific group by the 1999 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 1999–2003 inflation factor (1.26) 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., 2003

	Percent
Other	77.1%
Cardiovascular	16.5%
Lung	5.9%
Blood	0.5%

Economic Costs: Cardiovascular, Lung, and Blood Diseases, U.S., 2003

	Percent
Direct	58.7%
Mortality	29.4%
Morbidity	11.9%

5. Institute-Initiated Programs Starting in FY 2002

More than two-thirds of the research supported by the NHLBI is initiated by individual investigators; the remainder is initiated by the Institute. This chapter describes the rationale for Institute-initiated programs and the objectives of the Institute-initiated programs that began in FY 2002.

It is incumbent upon the Institute to respond appropriately to evolving national needs, congressional mandates, and advances in scientific knowledge. Each NHLBI initiative represents the outcome of numerous and extensive discussions and thorough reviews by representatives of the scientific community, by Institute advisory committees or special emphasis panels, and by the National Heart, Lung, and Blood Advisory Council (NHLBAC). The advisory committees special emphasis panels, 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 have 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 compete with other investigator-initiated applications for funding.

RFA, RFP, and PA concepts prepared by the Institute are presented to the NHLBAC for review, comments, and concurrence. Initiatives that receive the concurrence of the NHBLAC are considered further by the NHLBI Director in the context of the Institute's budget, program priorities, review workloads, and the proposed mechanism. 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 in FY 2002 are presented below according to NHLBI scientific program. Also described are trans-NIH initiatives that included NHLBI participation.

Heart and Vascular Diseases Program

Initiative Being Renewed

Specialized Centers of Research (SCORs) in Molecular Medicine and Atherosclerosis

The purpose of this renewal is to continue support for a network of collaborative multiproject SCORs that are seeking to elucidate the pathobiology of atherosclerotic lesions in the arterial wall. Researchers are investigating mechanisms associated with lesion susceptibility and initiation; lesion progression, complication, and regression; and interactions of vessel walls with systemic factors promoting athero-genesis.

New Initiative

Role of Infectious Agents in Vascular Diseases

The purpose of this RFA is to investigate the cellular and molecular mechanisms by which bacterial and viral infectious agents contribute to vascular disorders, such as atherogenesis, coronary events, and restenosis. The ultimate goal is to develop antiviral and antibacterial interventions, including vaccines that target these molecular mechanisms.

Lung Diseases Program

Initiative Being Renewed

Specialized Centers of Research (SCORs) in Cellular and Molecular Mechanisms of Asthma, Pathobiology of Lung Development

The purpose of these programs is to promote multi-disciplinary basic and clinical research in cellular and molecular mechanisms associated with asthma, fibrosis and chronic interstitial lung disease, and diseases in newborns related to abnormal lung development and premature birth. Results from these SCOR grants are expected to have an impact on prevention, diagnosis, and treatment of these disorders.

New Initiatives

Centers for Reducing Asthma Disparities

The objective of this RFA is to promote partnerships between minority-serving institutions and research intensive institutions to conduct collaborative research on factors that contribute to health disparities experienced by minority and economically disadvantaged populations in relation to asthma prevalence, morbidity, and mortality. Factors implicated as causes for the disparities include genetic variations, differences in lifestyle, SES, cultural-related health practices, and access to care.

Mathematical Models of Cytokine/Chemokine Networks in HIV-Associated Lung Disease

The purpose of this RFA is to stimulate research in the use of computational biological methods to create mathematical models of cytokine/chemokine networks in order to understand the role of such networks in mediating HIV type 1-associated inflammatory reactions and infections in the lung.

Novel Biomarkers of Chronic Obstructive Pulmonary Disease (COPD)

The purpose of this RFA is to identify and characterize novel biomarkers of COPD presence, severity, and exacerbation. New molecular, chemical, and radiographic measures may provide information about individual patients and about the disease process that is not available from existing methods.

Blood Diseases and Resources Program

Initiatives Being Renewed

Comprehensive Sickle Cell Centers

The purpose of this renewal is to provide continued funding for the comprehensive sickle cell centers. The centers serve to bridge the gap between research and service by providing support for basic and clinical research, clinical trials, training for young investigators, and patient service activities that are focused on implementing the best current models of treatment for SCD.

Multicenter Study of Hydroxyurea (MSH) in Sickle Cell Anemia Adult Follow-up

The purpose of this RFP is to extend the Multicenter Study of Hydroxyurea in Sickle Cell Disease follow-up to 10 years. Researchers are investigating the efficacy and toxic effects of long-term hydroxyurea therapy.

New Initiatives

Transfusion Medicine/Hemostasis Clinical Research Network

The purpose of this RFA is to establish a clinical research network for evaluating new and existing blood products and cytokines in the treatment of hematologic disorders. Management strategies for individuals with hemostatic disorders also will be assessed.

Trans-NHLBI

Initiatives Being Renewed

Mentored Minority Faculty Development Award

The purpose of this renewal is to provide training to underrepresented minority faculty members that will prepare them for careers as independent investigators in research related to heart, lung, or blood diseases or sleep disorders.

Minority Institution Research Scientist Development Award

The objective of this renewal is to enhance the research skills of faculty members at minority institutions in heart, lung, and blood diseases and sleep disorders. Applicants will establish a mentoring relationship with an accomplished investigator at a nearby institution. The ultimate goals are to enhance the minority institutions' science infrastructure and to provide research opportunities for underrepresented minorities at the applicant institutions.

Minority Institutional Research Training Program

The objective of this renewal is to provide support to minority schools for research training in heart, lung, and blood diseases and sleep disorders. Qualified graduate and health professional students and individuals in postdoctoral training selected for the program will establish a mentoring relationship with an accomplished investigator at a nearby institution. Important program goals are to enhance the minority institutions' science infrastructure and to provide research opportunities for underrepresented minorities.

Short-Term Training for Minority Students

The purpose of this renewal is to encourage institutions to provide opportunities for underrepresented minority undergraduate and graduate students to become exposed to biomedical or behavioral research in areas relevant to heart, lung, and blood diseases and sleep disorders through a short-term, full-time research experience of 2 to 3 consecutive months.

New Initiatives

Innovative Concepts and Approaches to Developing Functional Tissues and Organs for Heart, Vascular, Lung, and Blood Applications

The objective of this RFA is to stimulate research in tissue engineering as a biological substitute for implantation, or tissue regeneration and remodeling in vivo to replace, repair, maintain, or enhance heart, vascular, lung, or blood functions. The RFA encourages the formation of multidisciplinary teams of chemists, physicists, materials scientists, biologists, and physicians.

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

The purpose of this RFA is to identify genes that modify the impact of environmental exposures on heart, lung, blood, and sleep disorders by quantifying the interaction between genetic variants and specific environmental changes. The ultimate goal is to identify subgroups of individuals based on genotype who are most likely to benefit from targeted environmental changes designed to reduce the development or progression of these diseases.

NHLBI Innovative Research Grant Program

The objective of this RFA is to explore new approaches to heart, lung, and blood diseases and sleep disorders through analysis of existing data or use of existing biological specimens. Scientists will seek to

provide preliminary results that demonstrate the feasibility of novel approaches for exploring and testing new hypotheses.

NHLBI Shared Microarray Facilities

The purpose of this RFA is to establish or expand shared DNA microarray facilities with the equipment and expertise in the relevant disciplines (molecular biology, robotics, bioinformatics, genomics, statistics) needed to facilitate the application of DNA microarray technology to research in heart, lung, and blood diseases and sleep disorders. The shared microarray facilities will provide microarray services; relevant education, skills development, and assistance in microarray technology and its application; and analytical tools and guidance in the interpretation of gene expression profiling results to NHLBI-supported researchers.

Resuscitation: SBIR/STTR Technologies for Monitoring and Performing

The objective of this PA is to stimulate multidisciplinary research in the development of new approaches and technologies for monitoring and resuscitating individuals who experience out-of-hospital cardiopulmonary and traumatic arrest. The goal of the program is to improve survival following severe reduction of oxygen and carbon dioxide transport due to circulatory failure.

Trials Assessing Innovative Strategies to Improve Clinical Practice Through Guidelines in Heart, Lung, and Blood Diseases

The objective of this RFA is to evaluate clinical intervention strategies to improve implementation of national, evidence-based clinical practice guidelines for the treatment of heart, lung, and blood diseases. The interventions should involve strategies that address multiple barriers to guideline implementation or factors enhancing guideline adherence.

TRANS-NIH

New Initiatives

Basic Research to Improve Cardiopulmonary and Neurological Outcomes Following Resuscitation From Cardiopulmonary Arrest

The purpose of this RFA is to study the effects of ischemia and subsequent blood flow restoration on cardiovascular and neurological functions. The ultimate goal is to develop effective new therapeutic strategies to restore heart function and preserve neurologic function after cardiopulmonary arrest.

Environmental Approaches to the Prevention of Obesity

The purpose of this RFA is to study primary and secondary prevention approaches targeting environmental factors that contribute to excessive weight gain in children, adolescents, and adults. Collaboration with organizations/institutions, such as schools, worksites, community groups, supermarkets, restaurants, religious organizations, and recreation facilities, is recommended so that newly developed approaches that prove to be successful can be translated into larger scale interventions.

Heritable Disorders of Connective Tissue

The objective of this RFA is to investigate heritable disorders of connective tissue caused by abnormalities in molecules involved in biosynthesis, processing, and degradation of structural macromolecules, as well as abnormalities in regulatory and signaling molecules that reside within the extracellular matrix. The ultimate goal is to develop new therapeutic strategies for diseases that involve alterations of the integrity of connective tissue compartments within the wall of the blood vessel and subsequent formation of aneurysms in the aorta and smaller arteries.

Highly Active Anti-Retroviral Therapy (HAART) Cardiovascular Toxicities

The objective of this RFA is to elucidate the mechanisms by which use of HAART for HIV disease contributes to development of CVD. Results will lead to improved strategies for prevention and treatment.

Interrelationship Between Sleep and Diseases of the Heart, Lung, and Blood

The goal of this RFA is to identify measurable characteristics of sleep and the interrelationship of sleep with heart, lung, and blood diseases in order to facilitate epidemiological and clinical studies, provide improved diagnostic tools, and stimulate development of innovative therapies.

Placebo Effects in Clinical Practice

The objective of this RFA is to study the effects placebos have on clinical practice. Emphasis will be placed on factors necessary to elicit a placebo effect in clinical practice so that benefits of the therapeutic intervention can be enhanced to improve health and promote wellness.

Placebo Effects: Elucidation of Underlying Mechanisms

The purpose of this RFA is to delineate, through cross-cutting multidisciplinary, integrative research, the underlying mechanisms by which a placebo leads to its ultimate physiological and psychological effects.

Sleep and Sleep Disorders in Children

The purpose of this RFA is to advance understanding of fundamental biological mechanisms through which sleep deprivation and sleep disorders affect the cardio-pulmonary, hematological, immunological, mental, and behavioral health of children. Specific objectives are to advance understanding of age-specific and individual requirements for sleep in children, define pathophysiological mechanisms underlying emergence and progression of childhood sleep disorders, and identify genetic factors and phenotypic variations in sleep characteristics that determine childhood patterns of sleep and circadian rhythmicity.

Treatment of HAART-Associated Metabolic Changes in Patients With HIV Infection

The purpose of this RFA is to develop and evaluate strategies for treating metabolic complications associated with HAART in patients with HIV infection. Complications include dyslipidemia, insulin resistance, and lipodystrophy (abnormal distribution of body fat) which, in turn, are major risk factors for development of diabetes and CVD.

6. Institute Public Advisory Committees

National Heart, Lung, and Blood Advisory Council

Structure

Chair: Claude Lenfant, M.D., Director, NHLBI

Executive Secretary: Deborah P. Beebe, Ph.D., 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 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 2002. The current roster, containing full addresses for the NHLBAC and Committees, can be obtained from the NHLBI's home page on the Internet at http://www.nhlbi.nih.gov/nhlbi/meetings/index.htm.)

Claude Lenfant, M.D.
Chair
National Heart, Lung, and Blood Institute

Rina Alcalay, Ph.D. (2003)
University of California, Davis

Melissa A. Austin, M.D. (2004)
University of Washington

Carolyne Sue Byrnes (2004)
LAM Foundation

Allen W. Cowley, Jr., Ph.D. (2002)
Medical College of Wisconsin

Paul L. Douglass, M.D., F.A.C.C. (2002)
Metropolitan Atlanta Cardiology Consultants, P.C.

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

Mary F. Lipscomb, M.D. (2003)
University of New Mexico School of Medicine

Robert J. Mason, M.D. (2005)
University of Colorado

Alan Meisel, J.D. (2003)
University of Pittsburgh School of Law

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

Ananda S. Prasad, M.D., Ph.D (2004)
Wayne State University

Amelie G. Ramirez, Dr.P.H. (2002)
Baylor College of Medicine

Robert D. Rosenberg, M.D., Ph.D. (2002)
Massachusetts Institute of Technology

Roger G. Spragg, M.D. (2002)
University of California, San Diego

George Thomas, M.D. (2005)
Bradenton Cardiology Center

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

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

Roberta G. Williams, M.D. (2003)
Children's Hospital of Los Angeles

Ex Officio Members

Arn H. Eliasson, M.D.
Walter Reed Army Medical Center

Pamela Steele, M.D.
Department of Veterans Affairs Central Office

Tommy G. Thompson
Department of Health and Human Services

Elias A. Zerhouni, M.D.
National Institutes of Health

Program Advisory and Review Committees

Sickle Cell Disease Advisory Committee

Chair: Peter Lane, M.D., University of Colorado Health Sciences Center

Executive Secretary: Charles M. Peterson, M.D., Director, Blood Diseases Program, DBDR, NHLBI, National Institutes of Health, Bethesda, MD 20892; 301-435-0050

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 2002)

Gilda A. Barabino, Ph.D. (2004)
Northeastern University

Oswaldo Castro, M.D. (2004)
Howard University

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

Herbert J. Meiselman, Sc.D. (2003)
University of Southern California

Marie J. Stuart, M.D. (2003)
Thomas Jefferson University

Joseph Telfair, Dr.P.H. (2004)
University of Alabama at Birmingham

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

Theodore Wun, M.D. (2006)
University of California, Davis Cancer Center

Ex Officio Members

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

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

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

Robert L. Sheffler, M.D.
Brooke Army Medical Center

Elias A. Zerhouni, M.D.
National Institutes of Health

Sleep Disorders Research Advisory Board

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

Executive Secretary: Carl E. Hunt, M.D., Director, National Center on Sleep Disorders Research, NHLBI, National Institutes of Health, Bethesda, Maryland 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 on 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 2002)

Gene D. Block, Ph.D. (2004)
University of Virginia

Sarah J. Caddick, Ph.D. (2004)
Steven and Michele Kirsch Foundation

Mary A. Carskadon, Ph.D. (2003)
Brown University School of Medicine

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

Sandra B. McGinnis (2003)
Patient Advocate—Sleep

Rafael Pelayo, M.D. (2006)
Stanford University

Susan Redline, M.D. (2006)
Case Western Reserve University

Clifford B. Saper, M.D., Ph.D. (2005)
Harvard Medical School

Michael J. Sateia, M.D. (2006)
Dartmouth Medical School

Dara D. Spearman (2003)
University of Michigan

Phillip L. Williams (2004)
Bethlehem Steel

Ex Officio Members

Colonel Gregory Belenky, M.D.
Walter Reed Army Institute of Research

Robert W. Greene, M.D., Ph.D.
Veterans Affairs Medical Center, Brockton

Israel Lederhendler, Ph.D.
NIMH, National Institutes of Health

Claude Lenfant, M.D.
NHLBI, National Institutes of Health

Andrew Monjan, Ph.D., M.P.H.
NIA, National Institutes of Health

Paul Nichols, Ph.D.
NINDS, National Institutes of Health

Eve E. Slater, M.D.
Department of Health and Human Services

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

Elias A. Zerhouni, M.D.
National Institutes of Health

Clinical Trials Review Committee

Chair: Carl J. Pepine, M.D., University of Florida College of Medicine

Scientific Review Administrator: Valerie L. Prenger, Ph.D., Health Science Administrator, Division of Extramural Affairs, NHLBI, National Institutes of Health, Bethesda, Maryland 20892; 301-435-0287

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

Membership (current as of October 2002)

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

Vernon M. Chinchilli, Ph.D. (2003)
Pennsylvania State College of Medicine

James E. Fish, M.D. (2005)
Thomas Jefferson Medical College

John M. Fontaine, M.D. (2005)
Hahnemann University

Judith S. Hochman, M.D. (2006)
Columbia University

James D. Hosking, Ph.D. (2003)
University of North Carolina

Kenneth V. Leeper, M.D. (2004)
Emory University School of Medicine

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

Cynthia S. Rand, Ph.D. (2003)
The Johns Hopkins University

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

Linda G. Snetselaar, Ph.D. (2004)
University of Iowa

Charles M. Stein, Ph.D. (2004)
Vanderbilt University Medical Center

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

Carla Yunis, M.D. (2004)
3M Pharmaceuticals

Heart, Lung, and Blood Program Project Review Committee

Chair: Gary K. Owens, Ph.D., University of Virginia School of Medicine

Scientific Review Administrator: Jeffery H. Hurst, Ph.D., Health Scientist Administrator, Division of Extramural Affairs, NHLBI, National Institutes of Health, Bethesda, Maryland 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 2002)

Roberto Bolli, M.D. (2004)
University of Louisville School of Medicine

Martha K. Cathcart, Ph.D. (2004)
Cleveland Clinic Foundation

Debra I. Diz, Ph.D. (2003)
Wake Forest University School of Medicine

Jeffrey J. Fredberg, Ph.D. (2006)
Harvard University

Joe G. Garcia, M.D. (2005)
The Johns Hopkins University

Katherine A. High, M.D. (2005)
University of Pennsylvania

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

Alan H. Kadish, M.D. (2004)
Northwestern University Medical School

K. J. Koa, M.D., Ph.D. (2005)
University of Florida

Aldons J. Lusis, Ph.D. (2003)
University of California, Los Angeles

Brooke T. Mossman, Ph.D. (2006)
University of Vermont

Nancy J. Rusch, Ph.D. (2004)
Medical College of Wisconsin

Roy L. Silverstein, M.D. (2006)
Cornell University

Julian Solway, M.D. (2006)
University of Chicago

Kurt R. Stenmark, M.D. (2005)
University of Colorado Health Sciences Center

Michiko Watanabe, Ph.D. (2006)
Case Western Reserve University

Gilbert C. White II, M.D. (2003)
University of North Carolina

National Heart, Lung, and Blood Institute Special Emphasis Panel

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

Board of Scientific Counselors

Chair: Joseph Loscalzo, M.D., Ph.D., Boston University School of Medicine

Executive Secretary: Elizabeth Nabel, M.D., Director, Clinical Research Program, NHLBI, National Institutes of Health, Bethesda, MD 20892; 301-496-1518

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 2002)

Ivor J. Benjamin, M.D. (2007)
University of Texas Southwestern Medical Center

Nancy Berliner, M.D. (2007)
Yale University

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

Pamela B. Davis, M.D. (2006)
Case Western Reserve University

Kevin J. Foskett, Ph.D. (2005)
University of Pennsylvania

Carole R. Mendelson, Ph.D. (2004)
University of Texas Southwestern Medical Center

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

7. Fiscal Year 2002 Budget Overview

Obligations by Funding Mechanism: Fiscal Year 2002

Funding Mechanism	Obligated Dollars* in Thousands	Percent of Total NHLBI Budget
Research Project Grants	$1,779,573	69.2%
Centers of Research	108,416	4.2
Sickle Cell Centers	17,208	0.7
Centers for AIDS Research	*2,538*	*0.1*
Other Research Grants	98,459	3.8
Research Careers Programs§	*63,511*	*2.5*
Training Programs	79,170	3.1
Research and Development Contracts	258,300	10.1
Intramural Laboratory and Clinical Research	146,736	5.7
Research Management and Support****	79,394	3.1
Research Facilities Construction Grants		
Total Obligations	$2,569,794	100%

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

** Includes $60,841 for Small Business Innovation Research (SBIR) Grants.

*** Includes P50, P20, and P30.

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

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

NHLBI Total Obligations by Budget Category

Disease	Percent
Heart and Vascular Diseases*	52.7%
Sleep Disorders Research	1.7%
Research Management Support	3.1%
Lung Diseases	19.1%
Blood Diseases and Resources	15.4%
Intramural Laboratory and Clinical Research	5.7%
Women's Health Initiative	2.3%

* Includes Heart and Vascular Diseases and Epidemiology and Clinical Applications.

NHLBI Extramural Obligations by Program

Disease	Percent
Heart and Vascular Diseases*	57.8%
Sleep Disorders Research	1.9%
Lung Diseases	20.9%
Blood Diseases and Resources	16.9%
Women's Health Initiative	2.5%

* Includes Heart and Vascular Diseases and Epidemiology and Clinical Applications.

NHLBI Extramural Obligations by Division

Disease	Percent
Lung Diseases	20.9%
Sleep Disorders Research	1.9%
Women's Health Initiative	2.5%
Heart and Vascular Diseases	47.9%
Epidemiology and Clinical Applications	9.8%
Blood Diseases and Resources	16.9%

* Includes Heart and Vascular Diseases and Epidemiology and Clinical Applications.

For detailed data on FY 2002:

- 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 2002

Program	Obligated Dollars in Thousands	Percent of NHLBI Extramural Budget
Heart and Vascular Diseases*	$1,353,587	57.8%
Lung Diseases	490,457	20.9%
Blood Diseases and Resources	395,957	16.9%
Sleep Disorders Research	44,653	1.9%
Women's Health Initiative	59,010	2.5%
Total, Extramural Obligations	$2,343,664	100%

* Includes Heart and Vascular Diseases and Epidemiology and Clinical Applications.

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

NHLBI Heart and Vascular Diseases Program*Obligations by Funding Mechanism: Fiscal Year 2002

Funding Mechanism	Obligated Dollars in Thousands	Percent of Program Budget
Research Project Grants	$897,338	79.9%
Centers of Research	45,384	4.0%
Other Research Grants	34,853	3.1%
Research Career Programs	*21,778*	*1.9%*
Training Programs	40,729	3.6%
Research and Development Contracts	104,762	9.3%
Total, Heart and Vascular Diseases	$1,123,066	100%

* Includes Heart and Vascular Diseases only.

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

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

NHLBI Epidemiology and Clinical Applications Program Obligations by Funding Mechanism: Fiscal Year 2002

Funding Mechanism	Obligated Dollars in Thousands	Percent of Program Budget
Research Project Grants	$164,449	71.3%
Centers of Research		
Other Research Grants	10,951	4.8%
*Research Career Programs**	*9,177*	*4.%0*
Training Programs	4,648	2.0%
Research and Development Contracts	50,473	21.9%
Total, Epidemiology and Clinical Applications	$230,521	100%

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

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

NHLBI Lung Diseases Program Obligations by Funding Mechanism: Fiscal Year 2002

Funding Mechanism	Obligated Dollars in Thousands	Percent of Program Budget
Research Project Grants	$375,138	76.5%
Centers of Research	42,597	8.7
Other Research Grants	36,601	7.5
*Research Career Programs**	*20,415*	*4.2*
Training Programs	19,247	3.9
Research and Development Contracts	16,874	3.4
Total, Lung Diseases	$490,457	100%

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

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

NHLBI Blood Diseases and Resources Program Obligations by Funding Mechanism: Fiscal Year 2002

Funding Mechanism	Obligated Dollars in Thousands	Percent of Program Budget
Research Project Grants	$306,139	77.3%
Centers of Research	15,494	3.9
Sickle Cell Centers	17,208	4.3
Centers for AIDS Research	2,538	0.6
Other Research Grants	13,998	3.5
Research Career Programs*	*10,101*	*2.6*
Training Programs	13,502	3.4
Research and Development Contracts	27,078	6.8
Total, Blood Diseases and Resources Program	$395,957	100%

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

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

National Center on Sleep Disorders Research Program Obligations by Budget Mechanism: Fiscal Year 2002

Funding Mechanism	Obligated Dollars in Thousands	Percent of Program Budget
Research Project Grants	$36,509	81.8%
Centers of Research	4,941	11.1
Other Research Grants	2,056	4.6
*Research Career Programs**	*2,042*	*4.6*
Training Programs	1,043	2.3
Research and Development Contracts	104	0.2
Total, Sleep Disorders Research	$44,653	100%

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

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

Women's Health Initiative Obligations by Funding Mechanism: Fiscal Year 2002

Funding Mechanism	Obligated Dollars in Thousands	Percent of Program Budget
Research Project Grants	$	%
Centers of Research		
Other Research Grants		
*Research Career Programs**		
Training Programs		
Research and Development Contracts	59,010	100
Total, Women's Health Initiative	$59,010	100%

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

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

8. Long-Term Trends

Budget History of the NHLBI: Fiscal Years 1950–2002

	Dollars in 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
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

	Dollars in Thousands					
Fiscal Year	Budget Estimate to Congress	House Allowance	Senate Allowance	Appropriation	Obligations	Cumulative Fiscal Year Obligations
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	1,793,697H	1,788,008	25,568,035
2000	1,759,806	1,937,404	2,001,185	2,040,291I	2,027,286	27,595,321
2001	2,069,582	2,328,102	2,328,102	2,299,866J	2,298,035	29,893,356
2002	2,567,429	2,547,675	2,618,966	2,576,125K	2,569,794	32,463,150

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 $321,000 Director Transfer; $2,856,000 Secretary Transfer; and $1,600,000 Director Rescission.

G Includes $5,161,000 Bioterrorism reduction.

H Excludes $3,840,000 Director Transfer; $571,000 Secretary Transfer; and $1,188,000 Director Rescission.

I Excludes $1,701,000 Director Transfer; $424,000 Secretary Transfer; and $10,867,000 Rescission.

J Excludes $479,000 transfer to the Office of Human Research Protection; $436,000 Secretary Transfer; and $875,000 Rescission.

K Excludes $395,000 Government-wide Rescission; $2,135,000 Labor/HHS/Education Rescission; $928,000 from HHS to OMB Rescission; and $2,782,000 Secretary 1 percent transfer.

NHLBI Total Obligations by Budget Category: Fiscal Years 1992–2002

Current Dollars

Year	Total	Heart	Lung	Blood	Sleep Disorders Research	Women's Health Initiative	Intramural Research	Research Management and Support (RMS)
1992	1,190.1	619.5	203.4	211.9			97.1	58.2
1993	1,214.7	632.0	221.6	203.5			98.2	59.4
1994	1,277.9	651.7	238.7	227.4			101.7	58.4
1995	1,314.9	668.9	243.0	244.6			98.9	59.5
1996	1,352.0	693.0	262.0	224.0	16.0		102.0	55.0
1997	1,432.0	738.0	273.0	243.0	19.0		104.0	55.0
1998	1,526.3	795.6	281.7	257.5	22.3		111.6	57.6
1999	1,788.0	898.0	346.2	266.1	31.2	63.1	119.5	63.9
2000	2,027.3	1058.0	380.4	305.9	35.1	57.7	122.3	67.9
2001	2,297.4	1186.0	444.0	364.0	37.0	59.2	133.7	73.5
2002	2,569.8	1353.0	491.0	396.0	44.7	59.0	146.7	79.4

NHLBI Total Obligations by Budget Category: Fiscal Years 1992–2002

Constant 1992 Dollars

Year	Total	Heart	Lung	Blood	Sleep Disorders Research	Women's Health Initiative	Intramural Research	Research Management and Support (RMS)
1992	1,190.1	619.5	203.4	211.9			97.1	58.2
1993	1,174.6	611.1	214.3	196.8			95.0	57.4
1994	1,189.7	606.7	222.2	211.7			94.7	54.4
1995	1,183.4	602.0	218.7	220.1			89.0	53.6
1996	1,185.7	607.8	229.8	196.4	14.0		89.5	48.2
1997	1,222.9	630.3	233.1	207.5	16.2		88.8	47.0
1998	1,260.7	657.2	232.7	212.7	18.4		92.2	47.6
1999	1,423.2	714.8	275.6	211.8	24.8	50.2	95.1	50.9
2000	1,546.8	807.3	290.2	233.4	26.8	44.0	93.3	51.8
2001	1,681.7	868.2	325.0	266.4	27.1	43.3	97.9	53.8
2002	1,809.1	952.5	345.7	278.8	31.5	41.5	103.3	55.9

NHLBI Total Obligations by Budget Category: Fiscal Years 1992–2002

	Current Dollars (Millions)										
	Fiscal Year										
Budget Category	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Extramural Research											
Heart	$619.5	$632.0	$651.7	$668.9	$692.8	$737.9	$795.6	$898.0	$1,058.0	$1,186.6	$1,353.4
Lung	203.4	221.6	238.7	243.0	261.9	273.4	281.7	346.2	380.4	444.0	490.5
Blood	211.9	203.5	227.4	244.6	224.3	242.7	257.5	266.1	305.9	364.0	396.0
Sleep Disorders Research					15.9	18.7	22.3	31.2	35.1	37.0	44.7
Women's Health Initiative								63.1	57.7	59.2	59.0
Intramural Research	97.1	98.2	101.7	98.9	101.8	104.4	111.6	119.5	122.3	133.7	146.7
Research Management and Support (RMS)	58.2	59.4	58.4	59.5	54.8	54.6	57.6	63.9	67.9	73.5	79.4
Total	$1,190.1	$1,214.7	$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

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

NHLBI Total Obligations by Budget Category: Fiscal Years 1992–2002

	Constant 1992 Dollars in Millions										
	Fiscal Year										
Budget Category	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999***	**2000**	**2001**	**2002**
Extramural Research											
Heart	$619.5	$611.1	$606.7	$602.0	$607.8	$630.3	$657.2	$714.8	$807.3	$868.2	$952.9
Lung	203.4	214.3	222.2	218.7	229.8	233.1	232.7	275.6	290.2	325.0	345.3
Blood	211.9	196.8	211.7	220.1	196.4	207.5	212.7	211.8	233.4	266.4	278.8
Sleep Disorders Research					14.0	16.2	18.4	24.8	26.8	27.1	31.5
Women's Health Initiative								50.2	44.0	43.3	41.5
Intramural Research	97.1	95.0	94.7	89.0	89.5	88.8	92.2	95.1	93.3	97.9	103.3
Research Management and Support (RMS)	58.2	57.4	54.4	53.6	48.2	47.0	47.6	50.9	51.8	53.8	55.9
Total	**$1,190.1**	**$1,174.6**	**$1,189.7**	**$1,183.4**	**$1,185.7**	**$1,222.9**	**$1,260.8**	**$1,423.2**	**$1,546.8**	**$1,681.7**	**$1,809.2**

* 2.8% Inflation Factor used to calculate FY 1999.

This table is based on the Biomedical Research & Development Price Index (January 2002).

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

NHLBI Total Obligations by Budget Mechanism: Fiscal Years 1992–2002

	Current Dollars (Millions)										
	Fiscal Year										
Funding Mechanism	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Research Grants*	$880.4	$895.3	$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
Research and Development (R&D) Contracts	107.7	117.5	118.3	125.9	120.9	121.9	116.7	197.2	201.3	220.1	258.3
Training Programs	46.7	44.3	48.3	48.0	48.5	49.8	50.6	60.8	65.4	73.7	79.2
Intramural Research and Research Management and Support (RMS)**	155.3	157.6	160.1	158.4	156.6	159.1	169.2	183.4	190.1	207.3	226.1
Total	**$1,190.1**	**$1,214.7**	**$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**

* Includes Research Career Programs.

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

NHLBI Employment: Fiscal Years 1992–2002

	Fiscal Year										
Staff	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
FTEs*	931	911	854	822	834	829	840	847	865	868	880

* Full-time equivalents.

NHLBI Institute-Initiated and Investigator-Initiated Awards: Fiscal Years 1992–2002

Percent of Extramural Funds

Year	Investigator-Initiated Grants*	Institute-Initiated Awards (Grants and R&D Contracts)
1992	66.1	29.4
1993	65.5	30.3
1994	64.9	30.8
1995	64.9	31.0
1996	71.7	28.0
1997	67.9	28.2
1998	71.2	25.0
1999	66.7	29.5
2000	67.5	28.8
2001	69.2	27.3
2002	70.0	30.0

* Includes Research Career Programs.

NHLBI Grants and Research and Development Contracts as Subsets of Institute-Initiated Awards: Fiscal Years 1992–2002

Percent of Extramural Funds

Year	Institute-Initiated Awards (Grants and R&D Contracts)	Grants	R&D Contracts
1992	29.4	19.0	10.4
1993	30.3	19.2	11.1
1994	30.8	20.2	10.6
1995	31.0	20.1	10.9
1996	28.3	18.4	9.9
1997	28.2	18.6	9.6
1998	25.0	16.4	8.5
1999	29.5	17.2	12.3
2000	28.8	17.9	11.0
2001	27.3	16.8	10.5
2002	30.0	18.6	11.4

NHLBI Extramural Programs: Fiscal Years 1992–2002

	Dollars (Millions)										
	Fiscal Year										
Funding Mechanism	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Investigator-Initiated Awards											
Investigator-Initiated Grants*	$654.8	$663.2	$669.7	$725.0	$815.5	$835.3	$930.5	$1,023.6	$1,188.6	$1,388.8	$1,521.4
Research Career Programs	23.0	23.1	25.1	25.7	28.9	28.9	36.1	46.3	53.0	57.5	63.5
Subtotal, Investigator-Initiated Awards	677.8	686.3	694.8	750.7	844.4	864.2	966.6	1,069.9	1,241.6	1,446.3	1,584.9
Institute-Initiated Awards											
Institute-Initiated Grants (RFA)	202.6	209.0	226.4	231.9	216.8	236.8	223.2	276.7	328.9	350.7	421.3
*Centers***	*96.5*	*96.6*	*101.5*	*107.0*	*87.5*	*87.7*	*114.4*	*119.9*	*123.8*	*127.2*	*128.2*
R&D Contracts (RFP)	107.7	117.5	118.3	125.9	116.7	121.9	116.7	197.2	201.3	220.1	258.3
Subtotal, Institute-Initiated Awards	310.3	326.5	344.7	357.8	333.5	358.7	339.9	473.9	530.2	570.8	679.6
Training											
Individual Awards	6.3	6.2	7.2	7.1	7.3	6.8	7.6	9.2	8.9	8.9	9.5
Institutional Awards	39.9	37.2	40.0	40.0	40.2	42.0	42.0	50.3	55.2	63.4	69.7
Subtotal, Training***	46.7	44.3	48.2	48.0	48.5	49.8	50.6	60.8	65.4	73.7	79.2
Total, Extramural	**$1,034.8**	**$1,057.1**	**$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**

* Includes all R18s.

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

*** Numbers do not add to subtotal because line-items exclude NIH assessments.

NHLBI Extramural Programs: Fiscal Years 1992–2002

	Percent of Total Extramural Budget										
	Fiscal Year										
Funding Mechanism	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Investigator-Initiated Awards											
Investigator-Initiated Grants*	63.3%	62.7%	61.6%	62.7%	66.5%	65.6%	68.6%	63.8%	64.7%	66.4%	64.9%
Research Career Programs (K04, K06)	2.2	2.2	2.3	2.2	2.4	2.3	2.7	2.9	2.9	2.8	2.7
Subtotal, Investigator-Initiated Awards	65.5	64.9	63.9	64.9	68.9	67.9	71.2	66.7	67.6	69.2	67.6
Institute-Initiated Awards											
Institute-Initiated Grants (RFA)	19.6	19.8	20.8	20.1	17.7	18.6	16.4	17.2	17.9	16.8	18.0
*Centers***	*9.3*	*9.1*	*9.3*	*9.3*	*7.1*	*6.9*	*8.4*	*7.5*	*6.7*	*6.1*	*5.5*
R&D Contracts (RFP)	10.4	11.1	10.9	10.9	9.5	9.6	8.6	12.3	11.0	10.5	11.0
Subtotal, Institute-Initiated Awards	30.0	30.9	31.7	30.9	27.2	28.2	25.0	29.5	28.9	27.3	29.0
Training											
Individual Awards	0.6	0.6	0.7	0.6	0.6	0.5	0.6	0.6	0.5	0.4	0.4
Institutional Awards	3.9	3.5	3.7	3.5	3.3	3.3	3.1	3.1	3.0	3.0	3.0
Subtotal, Training***	4.5	4.2	4.4	4.2	4.0	3.9	3.7	3.8	3.6	3.5	3.4
Total, Extramural	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

* Includes all R18s.

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

*** Numbers do not add to subtotal because line-items exclude NIH assessments.

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

NHLBI Extramural Research Funding Mechanism: Fiscal Years 1992–2002

	Dollars in Millions										
	Fiscal Year										
Funding Mechanism	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Research Grants*	$783.9	$798.7	$849.7	$875.7	$918.7	$992.3	$1,075.4	$1,226.7	$1,446.7	$1,669.8	$1,878.0
Centers	96.5	96.6	101.5	107.0	106.7	108.7	114.4	119.9	123.8	127.2	128.2
R&D Contracts	107.7	117.5	118.3	125.9	120.9	121.9	116.7	197.2	201.3	220.1	258.3
Research Training	46.7	44.3	48.2	48.0	48.5	49.8	50.6	60.8	65.4	73.7	79.2
Total, Extramural	**$1,034.8**	**$1,057.1**	**$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**

* Includes Research Career Programs; does not include Centers.

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

NHLBI Extramural Research Funding Mechanism: Fiscal Years 1992–2002

	Percent of Total Extramural Budget										
	Fiscal Year										
Funding Mechanism	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Research Grants*	75.8%	75.6%	76.0%	75.7%	76.9%	78.0%	79.2%	76.4%	78.7%	79.9%	80.1%
Centers	9.3	9.1	9.1	9.3	8.9	8.5	8.4	7.5	6.7	6.1	5.5
R&D Contracts	10.4	11.1	10.6	10.9	10.1	9.6	8.6	12.3	11.0	10.5	11.0
Research Training	4.5	4.2	4.3	4.2	4.1	3.9	3.7	3.8	3.6	3.5	3.4
Total, Extramural	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

* Includes Research Career Programs; does not include Centers.

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

9. Research Grants

NHLBI Research Grants by Funding Mechanism: Fiscal Year 2002

	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)	3,462	$1,165,689	58.10%
Small Research Grants (R03)	12	857	0.04
Program Project Grants (P01)	180	308,622	15.38
Cooperative Agreements (U01)	243	194,313	9.69
Area Grants (R15)	13	1,781	0.09
Explorative Developmental Grant (R21)	50	10,841	0.54
Transition Award (R29)	23	2,555	0.13
Method to Extend Research in Time (R37)	88	32,641	1.63
Exploratory/Developmental Grants Phase II (R33)	4	1,433	0.07
Subtotal, Research Project Grants (Excluding Small Business RPGs)	**4,075**	**1,718,732**	**85.67**
Small Business Research Project Grants			
Small Business Technology Transfer (STTR Phase I) (R41)	8	1,306	0.07
Small Business Technology Transfer (STTR Phase II) (R42)	7	2,199	0.11
Small Business Innovation Research (SBIR Phase I) (R43)	81	10,229	0.51
Small Business Innovation Research (SBIR Phase II) (R44)	105	47,107	2.35
Subtotal, Small Business Research Project Grants	**201**	**60,841**	**3.03**
Subtotal, Research Project Grants	**4,276**	**1,779,573**	**88.70**
Research Center Grants			
Exploratory Grants (P20)	2	1,513	0.08
Centers for AIDS Research (P30)	—	2,538	0.13
Animal Model and Animal and Biological Material Resource Grants (P40)	—	125	0.01
Specialized Centers of Research (SCOR) (P50)	64	106,777	5.32
Sickle Cell Centers (P60)	10	17,208	0.86
Subtotal, Research Center Grants	**76**	**128,161**	**6.39**
Research Career Programs			
Mentored Research Development Award for Minority Faculty (K01)	54	5,711	0.28
Minority Institution Faculty Mentored Research Scientist Award (K01)	2	1,703	0.08
Independent Scientist Award (K02)	33	3,130	0.16
Research Career Award (K06)	2	69	0.00
Nutrition Academic Award (K07)	19	2,906	0.14
Sleep Academic Award (K07)	8	722	0.04
Clinical Investigator Scientist Award (K08)	236	29,295	1.46
Mentored Patient-Oriented Research Career Development Award (K23)	90	11,909	0.59
Midcareer Investigator Award in Patient-Oriented Research (K24)	37	4,058	0.20

	Number of Grants	Total Cost (Dollars in Thousands)	Percent of Total NHLBI Research Grant Dollars
Mentored Quantitative Research Career Development Award (K25)	7	921	0.05
Clinical Research Curriculum Award (K30)	55	3,090	0.15
Subtotal, Research Career Programs	**543**	**63,514**	**3.17**
Other Research Grants			
Cooperative Clinical Research (U10, R10)	26	14,048	0.70
Minority Biomedical Research Support (S06, S14, R25)	—	3,480	0.17
Biomedical Research Support (S07)	—	3,452	0.17
Other (R09, R13, R18, R24, R25, T15, U09, U24, UH1)	48	13,966	0.70
Subtotal, Other Research Grants	**74**	**34,946**	**1.74**
Total, NHLBI Research Grants	**4,969**	**$2,006,194**	**100%**

NHLBI Total Research Grants by Category

Percent

Research Project Grants	88.7%
Research Centers Grants	6.4%
Research Career Programs	3.2%
Other Research Grants	1.7%

NHLBI Research Project Grant,* Research Centers Grant, and Other Research Grant Obligations: Fiscal Years 1992–2002

Dollars in Thousands

	Research Project Grants*	Research Centers Grants	Other Research Grants**	Total
1991	$688,330	$92,174	$44,387	$824,891
1992	$736,232	$96,510	$47,656	$880,398
1993	$752,978	$96,628	$45,654	$895,260
1994	$797,092	$101,535	$52,576	$951,203
1995	$819,674	$106,980	$55,974	$982,628
1996	$862,027***	$106,688	$56,692	$163,380
1997	$935,322	$108,665	$56,993	$1,100,980
1998	$1,009,152	$114,397	$66,234	$1,189,783
1999	$1,142,473	$119,889	$84,219	$1,346,581
2000	$1,356,034	$123,803	$90,666	$1,570,503
2001	$1,580,751	$127,232	$88,958	$1,796,941
2002	$1,779,573	$128,161	$98,460	$2,006,194

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

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

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

NHLBI Competing Research Project Grant Applications*: Fiscal Years 1992–2002
Total Cost Dollars Reviewed and Awarded

	Dollars in Millions										
	Fiscal Year										
	1992	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Applications Reviewed	$658.4	$724.3	$715.0	$710.3	$699.2	$802.1	$687.1	$867.1	$809.8	$851.7	$1,221.7
Awarded	181.3	158.0	180.4	207.5	182.1	240.1	252.4	330.4	418.4	424.3	437.4

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

NHLBI Competing Research Project Grant Applications*: Fiscal Years 1992–2002
Number Reviewed and Awarded and Percent Funded

	Fiscal Year										
	1992	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Applications Reviewed	2,580	3,072	2,801	2,744	2,605	2,771	2,657	2,704	2,893	2,895	3,064
RPGs Awarded	759	673	655	740	652	821	837	959	1,003	1,033	1,018
Success Rate (percent)	29.4%	21.9%	23.4%	27.0%	25.0%	29.6%	31.5%	35.5%	34.7%	35.7%	33.2%

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

Percent of Reviewed Applications Funded (Success Rate)

Year	Awarded
1992	29.4%
1993	21.9%
1994	23.4%
1995	27.0%
1996	25.0%
1997	29.6%
1998	31.5%
1999	35.5%
2000	34.7%
2001	35.7%
2002	33.2%

NHLBI Investigator-Initiated and Institute-Initiated Grant Obligations: Fiscal Years 1992–2002

	Dollars in Millions										
	Fiscal Year										
	1992	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Investigator-Initiated*	$683.9	$692.8	$724.8	$750.7	$804.1	$867.9	$966.6	$1,069.9	$1,241.6	$1,446.2	$1,584.9
Institute-Initiated**	196.5	202.5	226.4	231.9	216.8	233	223.2	276.7	328.9	350.7	421.3
Total	**$880.4**	**$895.3**	**$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**

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

** Includes Centers Grants and Cooperative Agreement RFAs.

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

NHLBI Research Project Grants*: Amount Funded by Type of Award, Fiscal Years 1992–2002

	Dollars (Millions)										
	Fiscal Year										
	1992	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Competing											
New Competing	$88.5	$89.9	$99.7	$111.1	$90.5	$135.8	$147.5	$202.0	$266.4	$280.0	$291.2
Renewal Competing	101.2	79.1	79.6	94.5	90.4	104	103.9	127.2	152.0	143.9	143.9
Competing Supplements	0.5	0.6	1.1	1.9	1.2	0.3	1.0	1.2	0.9	0.4	2.3
Subtotal, Competing	190.2	169.6	180.4	207.5	182.1	240.1	252.4	330.4	419.3	424.3	437.4
Noncompeting											
Subtotal, Noncompeting	546.0	583.4	599.9	588.4	649.9	662.4	721.3	770.6	889.3	1,101.5	1,281.3
Total, Competing and Noncompeting	**$736.2**	**$753.0**	**$780.3**	**$795.9**	**$832.0**	**$902.5**	**$973.7**	**$1,101.0**	**$1,308.6**	**$1,525.8**	**$1,718.7**

* Includes R01, U01, P01, R29, and R37; R03 beginning in 1994; R55 beginning in 1995; 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 1992–2002

	Dollars in Thousands			
Fiscal Year	**Direct Cost**	**F&A Cost****	**Total Cost**	**F&A Cost as a Percent of Direct Cost**
1992	$503,076	$233,156	$736,232	46.3%
1993	516,022	236,956	752,978	45.9%
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%
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%

* Previously called Indirect Cost.

** Includes R01, U01, P01, R29, and R37; R03 beginning in 1994; R55 beginning in 1995; 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 1992–2002

	Dollars in Thousands										
	Fiscal Year										
	1992	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Noncompeting	$261.7	$281.0	$294.8	$312.8	$317.5	$323.0	$322.6	$323.4	$346.6	$390.7	$418.8
Competing	251.4	252.0	275.5	280.4	279.3	292.5	301.6	344.5	418.0	410.8	409.1
Total	**$259.0**	**$273.9**	**$290.1**	**$303.7**	**$308.3**	**$314.2**	**$316.9**	**$329.4**	**$366.6**	**$396.1**	**$416.2**

* Includes R01, U01, P01, R29, R37, R43, and R44; R03 and R41 beginning in 1994; R55 beginning in 1995, 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 2002	Total FY 2002 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
A CHF Trial Investigating Outcomes of Exercise (ACTION)	$0	$7,489,394	$7,489,394
Azithromycin and Coronary Events Study (ACES)	6,412,683	1,254,228	7,666,911
Bypass Angioplasty Revascularization Investigation (BARI) Data Coordinating Center	50,906,906	1,455,489	52,362,395
Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics (BARI 2D)	10,457,477	8,642,339	19,099,816
Center for Fetal Monkey Gene Transfer for Heart, Lung, and Blood Diseases	529,898	705,445	1,235,343
Ecologically Guided Bioprospecting in Panama	150,000	50,000	200,000
Family Blood Pressure Program	57,418,654	10,082,786	67,501,440
Genetics of Coronary and Aortic Calcification (GENCAC)	3,283,532	3,408,710	6,692,242
Genetics of Coronary Artery Disease in Alaskan Natives (GOCADAN)	3,417,148	2,138,227	5,555,375
Girls Health Enrichment Multisite Studies (GEMS)	7,523,751	2,713,306	10,237,057
Hematocrit Strategy in Infant Heart Surgery	1,030,268	595,956	1,626,224
Home Automatic External Defibrillator Trial (HAT)		3,566,730	3,566,730
Interaction of Genes and Environment in Shaping Risk Factors for Heart, Lung, Blood, and Sleep Disorders		10,727,651	10,727,651
Multidisciplinary Study of Right Ventricular Dysplasia	1,703,278	1,642,067	3,345,345
Mutations in Developmental Pathways by N-Ethyl-N-Nitrosourea (ENU) Mutagenesis	400,000	200,000	600,000
Occluded Artery Trial (OAT)	12,574,250	1,724,200	14,298,450
Pediatric Cardiovascular Clinical Research Network	3,447,570	4,822,007	8,269,577
Pharmacogenetics Research Network	8,235,472	8,444,897	16,680,369
PREMIER: Lifestyle Interventions for Blood Pressure Control	12,179,443	1,505,073	13,684,516
Programs of Excellence in Gene Therapy	23,398,893	13,698,117	37,097,010
Programs of Genomic Applications (PGAs) for Heart, Lung, and Blood Diseases	73,676,170	36,690,489	110,366,659
Stop Atherosclerosis in Native Diabetics Study (SANDS)		2,409,835	2,409,835
Strong Heart Study	33,066,388	5,788,919	38,855,307
Sudden Cardiac Death in Heart Failure Trial (SCD-HeFT)	8,443,157	1,412,018	9,855,175
Surgical Treatment for Ischemic Heart Failure (STICH)		5,709,397	5,709,397
Trial of Activity for Adolescent Girls (TAAG)	10,105,269	5,919,453	16,024,722
Women's Ischemia Syndrome Evaluation (WISE)	1,502,322	1,506,497	3,008,819

	Total Obligations Prior to FY 2002	Total FY 2002 Obligations	Total Obligations to Date
Subtotal, Heart and Vascular Diseases	329,862,529	144,303,230	474,165,759
Lung Diseases			
Asthma Clinical Research Network (ACRN)	40,562,000	5,862,537	46,424,537
Centers for Reducing Asthma Disparities	—	5,933,220	5,933,220
Childhood Asthma Research and Education (CARE) Network	14,491,554	6,004,651	20,496,205
Collaborative Program in Bronchopulmonary Dysplasia	12,411,885	3,811,393	16,223,278
Collaborative Studies on the Genetics of Asthma (CSGA)	32,846,231	27,349	32,873,580
Inhaled Nitric Oxide for the Prevention of Chronic Lung Disease	3,762,198	1,764,494	5,526,692
Inhaled Nitric Oxide in Prevention of Chronic Lung Disease	3,289,375	1,839,151	5,128,526
Linkage Study in Familial Pulmonary Fibrosis	1,340,699	706,592	2,047,291
Lung Health Study—Long-Term Follow-up	7,271,408	926,580	8,197,988
Pharmacogenetics of Asthma Treatment	5,333,868	2,673,360	8,007,228
Prospective Investigation of Pulmonary Embolism Diagnosis-II (PIOPED II)	5,856,834	3,171,660	9,028,494
Sarcoidosis Genetic Linkage Consortium	5,493,680	1,600,982	7,094,662
Scleroderma Lung Study	4,301,152	1,501,330	5,802,482
Subtotal, Lung Diseases	136,960,884	35,823,299	172,784,183
Blood Diseases and Resources			
Blood and Marrow Transplant Clinical Research Network	5,360,364	5,899,050	11,259,414
Induction of Stable Chimerism for Sickle Cell Anemia	489,103	525,048	1,014,151
Reference Laboratory to Evaluate Therapies for Sickle Cell Disease	433,180	494,568	927,748
Sibling Donor Cord Blood Banking and Transplantation	1,221,933	1,223,754	2,445,687
Stroke Prevention in Sickle Cell Anemia (STOP II)	7,658,580	3,168,445	10,827,025
Thalassemia (Cooley's Anemia) Clinical Research Network	4,410,593	2,269,299	6,679,892
Transfusion Medicine/Hemostasis Clinical Research Network		6,052,717	6,052,717
Subtotal, Blood Diseases and Resources	19,573,753	19,632,881	39,206,634
National Center for Sleep Disorders Research			
Apnea Positive Pressure Long-Term Efficacy Study (APPLES)		3,223,476	3,223,476
Determinants of Compensatory Sleep Phenotype in Mice	510,579	277,531	788,110
Sleep Heart Health Study	11,289,289	3,015,542	14,304,831
Subtotal, National Center for Sleep Disorders Research	11,799,868	6,516,549	18,316,417
Total, NHLBI Cooperative Agreements	**$498,197,034**	**$206,275,959**	**$704,472,993**

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 CHF. Patients receiving the exercise regimen also will receive standard care and will be compared with patients receiving standard care alone. The secondary objective is to determine the incidence and significance of exercise-related complications, the effect of training on exercise tolerance and quality of life, and the cost-effectiveness of training.

Obligations

Funding History:
Fiscal Year 2002—$7,489,394
Total Funding to Date—$7,489,394

Current Active Organizations and Grant Numbers

1. Duke University
   Durham, North Carolina —HL-63747
2. Case Western Reserve University
   Henry Ford Health System
   Detroit, Michigan —HL-64250
3. Oregon Health & Science University
   Portland, Oregon —HL-64257
4. Washington University
   St. Louis, Missouri —HL-64264
5. University of Colorado
   Health Sciences Center
   Denver, Colorado —HL-64265
6. Duke University
   Durham, North Carolina —HL-66461
7. Emory University
   Atlanta, Georgia —HL-66482
8. Wake Forest University
   Winston-Salem, North Carolina —HL-66491
9. Ohio State University
   Columbus, Ohio —HL-66494
10. University of Alabama at Birmingham
    Birmingham, Alabama —HL-66497
11. Case Western Reserve University
    Cleveland, Ohio —HL-66501
12. Boston Medical Center
    Boston, Massachusetts —HL-68973
13. University of California, Los Angeles
    Los Angeles, California —HL-68990

Azithromycin and Coronary Events Study (ACES), Initiated in Fiscal Year 1998

The purpose of this study is to determine whether treatment with the antibiotic, azithromycin, for 1 year will reduce the rate of nonfatal MI and CHD deaths over 3 ½ years in patients with documented coronary artery disease and serologic evidence of past infection with Chlamydia pneumoniae.

Obligations

Funding History:
Fiscal Year 2002—$1,254,228
Fiscal Years 1998–2001—$6,412,683
Total Funding to Date—$7,666,911

Current Active Organization and Grant Number

1. University of Washington
   Seattle, Washington —HL-58706

Bypass Angioplasty Revascularization Investigation (BARI) Data Coordinating Center, Initiated in Fiscal Year 1987

See Chapter 11. Clinical Trials.

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 2002—$8,642,339
Fiscal Years 2000–2001—$10,457,477
Total Funding to Date—$19,099,816

Current Active Organizations and Grant Numbers

1. University of Pittsburgh
   Pittsburgh, Pennsylvania —HL-61744
2. St. Louis University
   St. Louis, Missouri —HL-61746
3. Stanford University
   Stanford, California —HL-61748
4. University of Vermont
   Burlington, Vermont —HL-63804

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 2002—$705,445
Fiscal Year 2001—$529,898
Total Funding to Date—$1,235,343

Current Active Organization and Grant Number

1. University of California, Davis
   Davis, California —HL-69748

Ecologically Guided Bioprospecting in Panama, Initiated in Fiscal Year 1999

The objective of this study is to promote conservation and sustainable bioprospecting in Panama via ecological research and to discover new products for medicine and agriculture.

Obligations

Funding History:
Fiscal Year 2002—$50,000
Fiscal Years 1999–2001—$150,000
Total Funding to Date—$200,000

Current Active Organization and Grant Number

1. Smithsonian Institution
   Washington, DC —TW-01021

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 2002—$10,082,786
Fiscal Years 1995–2001—$57,418,654
Total Funding to Date—$67,501,440

Current Active Organizations and Grant Numbers

1. University of Michigan at Ann Arbor
   Ann Arbor, Michigan —HL-54457
2. University of Mississippi Medical Center
   Jackson, Mississippi —HL-54463
3. Mayo Foundation
   Rochester, Minnesota —HL-54464
4. The Johns Hopkins University
   Baltimore, Maryland —HL-54466
5. University of Utah
   Salt Lake City, Utah —HL-54471
6. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HL-54472

7. Washington University
   St. Louis, Missouri —HL-54473
8. University of Texas Health Science Center
   Houston, Texas —HL-54481
9. Loyola University Medical Center
   Maywood, Illinois —HL-54485
10. University of Alabama at Birmingham
    Birmingham, Alabama —HL-54495
11. University of Minnesota, Twin Cities
    Minneapolis, Minnesota —HL-54496
12. Boston University
    Boston, Massachusetts —HL-54497
13. Staub Pacific Health Foundation
    Health Research Institute
    Honolulu, Hawaii —HL-54498
14. University of Texas Health Science Center
    Houston, Texas —HL-54504
15. Medical College of Wisconsin
    Milwaukee, Wisconsin —HL-54508
16. University of North Carolina
    Chapel Hill, North Carolina —HL-54509
17. University of Michigan at Ann Arbor
    Ann Arbor, Michigan —HL-54512
18. University of Pittsburgh
    Pittsburgh, Pennsylvania —HL-54526
19. Stanford University
    Stanford, California —HL-54527
20. University of California, San Diego
    San Diego, California —HL-64777

Genetics of Coronary and Aortic Calcification (GENCAC), 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 (275 sibships).

Obligations

Funding History:
Fiscal Year 2002—$3,408,710
Fiscal Year 2001—$3,283,532
Total Funding to Date—$6,692,242

Current Active Organizations and Grant Numbers

1. University of North Carolina
   Chapel Hill, North Carolina —HL-67893
2. University of Utah
   Salt Lake City, Utah —HL-67894

3. Wake Forest University
   Winston Salem, North Carolina —HL-67895
4. Boston University
   Boston, Massachusetts —HL-67896
5. Wake Forest University
   Winston Salem, North Carolina —HL-67897
6. University of Alabama
   Birmingham, Alabama —HL-67898
7. Washington University
   St. Louis, Missouri —HL-67899
8. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HL-67900
9. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HL-67901
10. University of Texas Health Science Center
    Houston, Texas —HL-67902

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 (1,200 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 2002—$2,138,227
Fiscal Years 2000–2001—$3,417,148
Total Funding to Date—$5,555,375

Current Active Organization and Grant Number

1. MedStar Research Institute
   Washington, DC —HL-64244

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

See Chapter 11. Clinical Trials.

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

The purpose of this study is to determine which hematocrit level—30 versus 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 2002—$595,956
Fiscal Years 2000–2001—$1,030,268
Total Funding to Date—$1,626,224

Current Active Organization and Grant Number

1. Children's Hospital, Boston
   Boston, Massachusetts —HL-63411

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 spouses or other family members in 7,000 survivors of an anterior wall MI. The primary end-point is total mortality.

Obligations

Funding History:
Fiscal Year 2002—$3,566,730
Total Funding to Date—$3,566,730

Current Active Organization and Grant Number

1. Seattle Institute for Cardiac Research
   Seattle, Washington —HL-67972

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 who 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 2002—$10,727,651
Total Funding to Date—$10,727,651

Current Active Organizations and Grant Numbers

1. Tulane University
   New Orleans, Louisiana —HL-72507
2. LSU Pennington Biomedical Research Center
   Baton Rouge, Louisiana —HL-72510
3. University of Maryland
   Baltimore Professional School
   Baltimore, Maryland —HL-72525
4. The Johns Hopkins University
   Baltimore, Maryland —HL-72518
5. University of Minnesota
   Minneapolis, Minnesota —HL-72524

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 2002—$1,642,067
Fiscal Year 2001—$1,703,278
Total Funding to Date—$3,345,345

Current Active Organizations and Grant Numbers

1. University of Arizona
   Tucson, Arizona —HL-65594
2. Baylor College of Medicine
   Houston, Texas —HL-65652
3. University of Rochester
   Rochester, New York —HL-65961

Mutations in Developmental Pathways by N-Ethyl-N-Nitrosourea (ENU) Mutagenesis, Initiated in Fiscal Year 2000

The purpose of this project is to establish a mouse mutagenesis center to isolate ENU-induced mutations that disrupt developmental pathways. Investigators will screen and characterize lethal mutants that disrupt cardiac and central nervous system/axial development.

Obligations

Funding History:
Fiscal Year 2002—$200,000
Fiscal Years 2000–2001—$400,000
Total Funding to Date—$600,000

Current Active Organization and Grant Number

1. Baylor College of Medicine
   Houston, Texas —HD-39372

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

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

Obligations

Funding History:
Fiscal Year 2002—$1,724,200
Fiscal Years 1999–2001—$12,574,250
Total Funding to Date—$14,298,450

Current Active Organizations and Grant Numbers

1. Duke University
   Durham, North Carolina —HL-62257
2. St. Luke's-Roosevelt Institute for Health Science
   New York, New York —HL-62509
3. Maryland Medical Research Institute
   Baltimore, Maryland —HL-62511

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 2002—$8,444,897
Fiscal Year 2001—$8,235,472
Total Funding to Date—$16,680,369

Current Active Organizations and Grant Numbers

1. University of California
   Lawrence Berkeley Laboratory
   Berkeley, California —HL-69757
2. University of California, San Diego
   San Diego, California —HL-69758

PREMIER: Lifestyle Interventions for Blood Pressure Control, Initiated in Fiscal Year 1998

The objective of this study is to evaluate two multicomponent lifestyle interventions to control blood pressure in a patient population consisting of a high percentage of blacks. Participants with either Stage 1 hypertension or high normal blood pressure are assigned to usual care, a comprehensive intervention (reduced salt intake, increased physical activity, moderation of alcohol intake, and weight loss), or the comprehensive intervention plus the "DASH" diet (enhanced fruit and vegetable intake, enhanced use of low-fat dairy products, and reductions in saturated fats, total fats, and cholesterol).

Obligations

Funding History:
Fiscal Year 2002—$1,505,073
Fiscal Years 1998–2001—$12,179,443
Total Funding to Date—$13,684,516

Current Active Organizations and Grant Numbers

1. Duke University
   Durham, North Carolina —HL-60570
2. LSU Pennington Biomedical Research Center
   Baton Rouge, Louisiana —HL-60571
3. Kaiser Foundation Research Institute
   Oakland, California —HL-60573
4. The Johns Hopkins University
   Baltimore, Maryland —HL-60574
5. Kaiser Foundation Hospitals
   Oakland, California —HL-62828

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 2002—$13,698,117
Fiscal Years 2000–2001—$23,398,893
Total Funding to Date—$37,097,010

Current Active Organizations and Grant Numbers

1. University of Washington
   Seattle, Washington —HL-66947
2. Stanford University
   Stanford, California —HL-66948
3. University of Pittsburgh
   Pittsburgh, Pennsylvania —HL-66949
4. Weill Medical College of Cornell University
   New York, New York —HL-66952
5. Weill Medical College of Cornell University
   New York, New York —HL-67738

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 will identify the 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 2002—$36,690,489
Fiscal Years 2000–2001—$73,676,170
Total Funding to Date—$110,366,659

Current Active Organizations and Grant Numbers

1. Medical College of Wisconsin
   Milwaukee, Wisconsin —HL-66579
2. Institute for Genomic Research
   Rockville, Maryland —HL-66580
3. Harvard University School of Medicine
   Boston, Massachusetts —HL-66582
4. The Johns Hopkins University
   Baltimore, Maryland —HL-66583
5. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-66588

6. University of California, Berkeley
   Berkeley, California —HL-66590
7. University of California, San Francisco
   San Francisco, California —HL-66600
8. Duke University
   Durham, North Carolina —HL-66604
9. Jackson Laboratory
   Bar Harbor, Maine —HL-66611
10. The George Washington University
    Washington, DC —HL-66613
11. Children's Research Institute
    Washington, DC —HL-66614
12. The Johns Hopkins University
    Baltimore, Maryland —HL-66615
13. Boston University
    Boston, Massachusetts —HL-66617
14. The Johns Hopkins University
    Baltimore, Maryland —HL-66618
15. Institute for Genomic Research
    Rockville, Maryland —HL-66619
16. Jackson Laboratory
    Bar Harbor, Maine —HL-66620
17. J. David Gladstone Institutes
    San Francisco, California —HL-66621
18. The Johns Hopkins University
    Baltimore, Maryland —HL-66623
19. Fred Hutchinson Cancer Research Center
    Seattle, Washington —HL-66642
20. Massachusetts General Hospital
    Boston, Massachusetts —HL-66678
21. University of California
    Lawrence Berkeley Laboratory
    Berkeley, California —HL-66681
22. University of Washington
    Seattle, Washington —HL-66682
23. University of California
    Lawrence Berkeley Laboratory
    Berkeley, California —HL-66691
24. University of California
    Lawrence Berkeley Laboratory
    Berkeley, California —HL-66713
25. University of California
    Lawrence Berkeley Laboratory
    Berkeley, California —HL-66727

26. University of California
Lawrence Berkeley Laboratory
Berkeley, California —HL-66728

27. University of California
Lawrence Berkeley Laboratory
Berkeley, California —HL-66729

28. Stanford University
Stanford, California —HL-66735

29. Brigham and Women's Hospital
Boston, Massachusetts —HL-66795

30. Brigham and Women's Hospital
Boston, Massachusetts —HL-66796

31. University of Arizona
Tucson, Arizona —HL-66800

32. University of Arizona
Tucson, Arizona —HL-66801

33. University of Arizona
Tucson, Arizona —HL-66803

34. Brigham and Women's Hospital
Boston, Massachusetts —HL-66804

35. Brigham and Women's Hospital
Boston, Massachusetts —HL-66805

36. University of Arizona
Tucson, Arizona —HL-66806

37. University of Texas
Southwestern Medical Center
Dallas, Texas —HL-66880

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

The purpose of this study is to compare a treatment of aggressively lowering LDL cholesterol (goal less than or equal to 75 mg/dL) and blood pressure (goal less than or equal to 115/75 mmHg) to usual standard care in a population of diabetic American Indians with CVD, but who have relatively low levels of LDL cholesterol and blood pressure.

Obligations

Funding History:
Fiscal Year 2002—$2,409,835
Total Funding to Date—$2,409,835

Current Active Organization and Grant Number

1. MedStar Research Institute
Washington, DC —HL-67031

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 2002—$5,788,919
Fiscal Years 1988–2001—$33,066,388
Total Funding to Date—$38,855,307

Current Active Organizations and Grant Numbers

1. MedStar Research Institute
   Washington, DC —HL-41642
2. Missouri Breaks Research, Inc.
   Timberlake, South Dakota —HL-41652
3. University of Oklahoma
   Health Sciences Center
   Oklahoma City, Oklahoma —HL-41654
4. Southwest Foundation for
   Biomedical Research
   San Antonio, Texas —HL-65520
5. Weill Medical College of Cornell University
   New York, New York —HL-65521

Sudden Cardiac Death in Heart Failure Trial (SCD-HeFT), Initiated in Fiscal Year 1997

The purpose of this study is to determine whether survival among heart failure patients is improved by the treatment with amiodarone or implantation of a cardioverter defibrillator compared to conventional therapy.

Obligations

Funding History:
Fiscal Year 2002—$1,412,018
Fiscal Years 1997–2001—$8,443,157
Total Funding to Date—$9,855,175

Current Active Organizations and Grant Numbers

1. Duke University
   Durham, North Carolina —HL-55297
2. Duke University
   Durham, North Carolina —HL-55496
3. University of Washington
   Seattle, Washington —HL-55766

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

The objectives of this multicenter, international, randomized trial are twofold: (1) to determine whether coronary artery bypass grafting (CABG) plus intensive medical therapy compared to medical therapy alone improves long-term survival in patients with heart failure and left ventricular (LV) dysfunction who have coronary artery disease amenable to surgical revascularization; and (2) to determine whether CABG plus surgical ventricular restoration to a more normal LV size compared to CABG alone improves survival free of subsequent hospitalization in patients with anterior LV dysfunction.

Obligations

Funding History:
Fiscal Year 2002—$5,709,397
Total Funding to Date—$5,709,397

Current Active Organizations and Grant Numbers

1. Jefferson Medical College
   Philadelphia, Pennsylvania —HL-69009
2. Mayo Clinic
   Rochester, Minnesota —HL-69010
3. Duke University
   Durham, North Carolina —HL-69011
4. Northwestern University
   Chicago, Illinois —HL-69012
5. Duke University
   Durham, North Carolina —HL-69013
6. Duke University
   Durham, North Carolina —HL-69015
7. University of Southern California
   Los Angeles, California —HL-72683

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

See Chapter 11. Clinical Trials.

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 to maintain a WISE database and infrastructure to facilitate further investigations into the mechanisms underlying ischemic syndromes in women.

Obligations

Funding History:
Fiscal Year 2002—$1,506,497
Fiscal Year 2001—$1,502,322
Total Funding to Date—$3,008,819

Current Active Organizations and Grant Numbers

1. University of Pittsburgh
   Pittsburgh, Pennsylvania —HL-64829
2. University of Pittsburgh
   Pittsburgh, Pennsylvania —HL-64914
3. University of Florida
   Gainesville, Florida —HL-64924

Lung Diseases

Asthma Clinical Research Network (ACRN), Initiated in Fiscal Year 1993

The objective of this study is to establish a network of interactive asthma clinical research groups to rapidly assess novel treatment methods and to ensure that findings on optimal management of asthmatic patients are rapidly disseminated to practitioners and health care professionals. The minority patient population will be approximately 33 percent for each protocol.

Obligations

Funding History:
Fiscal Year 2002—$5,862,537
Fiscal Years 1993–2001—$40,562,000
Total Funding to Date—$46,424,537

Current Active Organizations and Grant Numbers

1. Jefferson Medical College
   Philadelphia, Pennsylvania —HL-51810
2. University of California, San Francisco
   San Francisco, California —HL-51823
3. Brigham and Women's Hospital
   Boston, Massachusetts —HL-51831
4. National Jewish Center for Immunology and Respiratory Medicine
   Denver, Colorado —HL-51834
5. University of Wisconsin
   Madison, Wisconsin —HL-51843
6. Pennsylvania State University
   Hershey, Pennsylvania —HL-51845
7. Columbia University
   New York, New York —HL-56443

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 2002—$5,933,220
Total Funding to Date—$5,933,220

Current Active Organizations and Grant Numbers

1. Meharry Medical College
   Nashville, Tennessee —HL-72431

2. Howard University
   Washington, DC —HL-72433
3. Rhode Island Hospital
   Providence, Rhode Island —HL-72438
4. The Johns Hopkins University
   Baltimore, Maryland —HL-72455
5. Vanderbilt University
   Nashville, Tennessee —HL-72471
6. Northwestern University
   Chicago, Illinois —HL-72478
7. Brigham and Women's Hospital
   Boston, Massachusetts —HL-72494
8. Center for Community Health Education, Research, and Service
   Boston, Massachusetts —HL-72495
9. Hektoen Institute for Medical Research
   Chicago, Illinois —HL-72496
10. University of Puerto Rico Medical Sciences
    San Juan, Puerto Rico —HL-72519

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 2002—$3,811,393
Fiscal Years 1999–2001—$12,411,885
Total Funding to Date—$16,223,278

Current Active Organizations and Grant Numbers

1. Southwest Foundation for Biomedical Research
   San Antonio, Texas —HL-52636
2. Brigham and Women's Hospital
   Boston, Massachusetts —HL-52638
3. University of Texas, Southwestern Medical Center
   Dallas, Texas —HL-52647
4. University of California, San Francisco
   San Francisco, California —HL-56061
5. National Jewish Medical and Research Center
   Denver, Colorado —HL-56263

6. Barnes Jewish Hospital
   St. Louis, Missouri —HL-63387
7. National Jewish Medical and Research Center
   Denver, Colorado —HL-63397
8. University of Texas
   Southwestern Medical Center
   Dallas, Texas —HL-63399
9. University of Rochester
   Rochester, New York —HL-63400

Collaborative Studies on the Genetics of Asthma (CSGA), Initiated in Fiscal Year 1992

The CSGA is a study to identify genes associated with asthma and to elucidate their functional role in development of the disease. The initial genome screen has been completed on 237 sibling pairs from three racial/ethnic groups (blacks, whites, and Hispanics).

Obligations

Funding History:
Fiscal Year 2002—$27,349
Fiscal Years 1992–2001—$32,846,231
Total Funding to Date—$32,873,580

Current Active Organizations and Grant Numbers

1. University of Chicago
   Chicago, Illinois —HL-49596
2. Wake Forest University
   Winston-Salem, North Carolina —HL-49602
3. University of Minnesota
   Minneapolis, Minnesota —HL-49609
4. The Johns Hopkins University
   Baltimore, Maryland —HL-49612
5. Wake Forest University
   Winston-Salem, North Carolina —HL-58977

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 1250 grams) with respiratory failure requiring mechanical ventilation, will prevent development of chronic lung disease.

Obligations

Funding History:
Fiscal Year 2002—$1,764,494
Fiscal Years 2000–2001—$3,762,198
Total Funding to Date—$5,526,692

Current Active Organization and Grant Number

1. The Children's Hospital University of Colorado
   Denver, Colorado —HL-64857

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 1250 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 2002—$1,839,151
Fiscal Years 2000–2001—$3,289,375
Total Funding to Date—$5,128,526

Current Active Organization and Grant Number

1. Children's Hospital of Philadelphia
   Philadelphia, Pennsylvania —HL-62514

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 2002—$706,592
Fiscal Years 2000–2001—$1,340,699
Total Funding to Date—$2,047,291

Current Active Organization and Grant Number

1. Duke University
   Durham, North Carolina —HL-67467

Lung Health Study—Long-Term Follow-up, Initiated in Fiscal Year 1998

The purpose of this study is to perform a long-term follow-up to former Lung Health Study participants to assess the incidence of morbidity and mortality from respiratory diseases, CVD, and other causes.

Obligations

Funding History:
Fiscal Year 2002—$926,580
Fiscal Years 1998–2001—$7,271,408
Total Funding to Date—$8,197,988

Current Active Organizations and Grant Numbers

1. The Johns Hopkins University
   Baltimore, Maryland —HL-59274
2. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HL-59275
3. University of Pittsburgh
   Pittsburgh, Pennsylvania —HL-59276
4. Case Western Reserve University
   Cleveland, Ohio —HL-59277

5. University of Utah
   Salt Lake City, Utah —HL-59290
6. University of Alabama at Birmingham
   Birmingham, Alabama —HL-59291
7. University of Manitoba
   Winnipeg, Canada —HL-59292
8. University of California
   Los Angeles, California —HL-59293
9. Mayo Foundation
   Rochester, Minnesota —HL-59294
10. Oregon Health Sciences University
    Portland, Oregon —HL-59320
11. Case Western Reserve University
    Detroit, Michigan —HL-59739

Pharmacogenetics of Asthma Treatment, Initiated in Fiscal Year 2000

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

Obligations

Funding History:
Fiscal Year 2002—$2,673,360
Fiscal Years 2000–2001—$5,333,868
Total Funding to Date—$8,007,228

Current Active Organization and Grant Number

1. Brigham and Women's Hospital
   Boston, Massachusetts —HL-65899

Prospective Investigation of Pulmonary Embolism Diagnosis-II (PIOPED II), Initiated in Fiscal Year 2000

The purpose of this multicenter collaborative study is to determine the sensitivity, specificity, and positive and negative predictive values of spiral computed tomography for diagnosis of acute pulmonary embolism; 30 percent of the patients are expected to be from minority populations.

Obligations

Funding History:
Fiscal Year 2002—$3,171,660
Fiscal Years 2000–2001—$5,856,834
Total Funding to Date—$9,028,494

Current Active Organizations and Grant Numbers

1. Emory University
   Atlanta, Georgia —HL-63899
2. University of Michigan at Ann Arbor
   Ann Arbor, Michigan —HL-63928
3. Washington University
   St. Louis, Missouri —HL-63931

4. Duke University
   Durham, North Carolina —HL-63932
5. University of Calgary
   Calgary, Alberta —HL-63940
6. Henry Ford Health Sciences Center
   Detroit, Michigan —HL-63941
7. The George Washington University
   Washington, DC —HL-63942
8. Weill Medical College of Cornell University
   New York, New York —HL-63981
9. Massachusetts General Hospital
   Boston, Massachusetts —HL-63982
10. St. Joseph Mercy-Oakland
    Pontiac, Michigan —HL-67453

Sarcoidosis Genetic Linkage Consortium, Initiated in Fiscal Year 1999

The purpose of this multicenter study is to identify sarcoidosis susceptibility genes and determine how these genes and environmental risk factors interact to cause sarcoidosis.

Obligations

Funding History:
Fiscal Year 2002—$1,600,982
Fiscal Years 1999–2001—$5,493,680
Total Funding to Date—$7,094,662

Current Active Organization and Grant Number

1. Case Western Reserve University,
   Henry Ford Health Sciences Center
   Detroit, Michigan —HL-60263

Scleroderma Lung Study, Initiated in Fiscal Year 1999

To evaluate the efficacy and safety of cyclophosphamide versus placebo for the prevention and progression of symptomatic pulmonary disease in patients with systemic sclerosis.

Obligations

Funding History:
Fiscal Year 2002—$1,501,330
Fiscal Years 1999–2001—$4,301,152
Total Funding to Date—$5,802,482

Current Active Organizations and Grant Numbers

1. University of Medicine
   and Dentistry of New Jersey
   Piscataway, New Jersey —HL-60550
2. University of California, Los Angeles
   Los Angeles, California —HL-60587
3. The Johns Hopkins University
   Baltimore, Maryland —HL-60597

4. University of California, Los Angeles
   Los Angeles, California —HL-60606
5. Boston University
   Boston, Massachusetts —HL-60682
6. University of Alabama at Birmingham
   Birmingham, Alabama —HL-60748
7. Medical University of South Carolina
   Charleston, South Carolina —HL-60750
8. Georgetown University
   Washington, DC —HL-60794
9. University of Texas
   Houston, Texas —HL-60839
10. University of Illinois
    Chicago, Illinois —HL-60895

Blood Diseases and Resources

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

See Chapter 11. Clinical Trials.

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 2002—$525,048
Fiscal Year 2001—$489,103
Total Funding to Date—$1,014,151

Current Active Organization and Grant Number

1. Children's Hospital Oakland
   Oakland, California —HL-68091

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 2002—$494,568
Fiscal Year 2001*—$433,180
Total Funding to Date—$927,748

Current Active Organization and Grant Number

1. Children's Hospital of Philadelphia
   Philadelphia, Pennsylvania —HL-58930

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 2002—$1,223,754
Fiscal Year 2001—$1,221,933
Total Funding to Date—$2,445,687

Current Active Organization and Grant Number

1. Children's Hospital Oakland
   Oakland, California —HL-61877

Stroke Prevention in Sickle Cell Anemia (STOP II), 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 2002—$3,168,445
Fiscal Years 2000–2001—$7,658,580
Total Funding to Date—$10,827,025

Current Active Organizations and Grant Numbers

1. New England Research Institutes, Inc.
   Watertown, Massachusetts —HL-52016
2. Medical College of Georgia
   Augusta, Georgia —HL-52193

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 2002—$3,223,476
Total Funding to Date—$3,223,476

Current Active Organization and Grant Number

1. Stanford University
   Stanford, California —HL-68060

Determinants of Compensatory Sleep Phenotype in Mice, Initiated in Fiscal Year 2000

The goal of this study is to increase understanding of dopaminergic stimulant interactions with sleep homeostasis, compensatory sleep response mechanisms, and genetic determinants of phenotypic variation in sleep homeostasis.

Obligations

Funding History:
Fiscal Year 2002—$277,531
Fiscal Years 2000–2001—$510,579
Total Funding to Date—$788,110

Current Active Organization and Grant Number

1. Stanford University
   Stanford, California —HL-64243

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 2002—$3,015,542
Fiscal Years 1999–2001—$11,289,289
Total Funding to Date—$14,304,831

Current Active Organizations and Grant Numbers

1. University of California, Davis
   Davis, California —HL-53916
2. New York University Medical Center
   New York, New York —HL-53931
3. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HL-53934
4. The Johns Hopkins University
   Baltimore, Maryland —HL-53937
5. University of Arizona
   Tucson, Arizona —HL-53938
6. Boston University
   Boston, Massachusetts —HL-53941
7. Missouri Breaks Research, Inc.
   Timberlake, South Dakota —HL63429
8. Case Western Reserve University
   Cleveland, Ohio —HL63463
9. The Johns Hopkins University
   Baltimore, Maryland —HL64360

NHLBI Research Centers (P50, P60, P30) Programs

Specialized Centers of Research (P50) Program

Specialized Centers of Research (SCOR) were instituted to advance basic knowledge and to generate the most effective techniques and methods of clinical management and prevention in the areas of arteriosclerosis, hypertension, pulmonary diseases, and thrombosis. Currently, the SCOR Program focuses on 16 active areas of heart, blood vessel, lung, blood, and sleep research.

	Obligations in Dollars in Thousands			
Area of Concentration	**Period of Operation**	**Prior to FY 2002**	**FY 2002**	**Total to Date**
Heart and Vascular Diseases Program				
Gene Transfer Principles for Heart, Lung, and Blood Diseases	1997–	$26,428	$879	$27,307
Ischemic Heart Disease in Blacks	1995–	18,288	3,028	21,316
Ischemic Heart Disease, Sudden Cardiac Death, Heart Failure	1995–	98,277	15,492	113,769
Molecular Genetics of Hypertension	1996–	53,836	9,139	62,975
Molecular Medicine and Atherosclerosis	1997–	35,586	7,986	43,572
Pediatric Cardiovascular Diseases	1993–	36,894	7,221	44,115
Subtotal, Heart and Vascular Diseases Program		269,309	43,745	313,054
Lung Diseases Program				
Acute Lung Injury	1994–	65,354	9,932	75,286
Airway Biology and Pathogenesis of Cystic Fibrosis	1988–	46,262	5,559	51,821
Cellular and Molecular Mechanisms of Asthma	1996–	56,958	15,043	72,001
Pathobiology of Fibrotic Lung Disease	1997–	23,564	4,997	28,561
Pathobiology of Lung Development	1996–	40,978	7,067	48,045
Subtotal, Lung Diseases Program		233,116	42,598	275,714
Blood Diseases and Resources Program				
Hematopoietic Stem Cell Biology	1995–	28,981	5,452	34,433
Hemostatic and Thrombotic Disorders	1971–	148,191	7,030	155,221
Transfusion Biology and Medicine	1985–	52,464	3,011	55,475
Subtotal, Blood Diseases and Resources Program		229,636	15,493	245,129
National Center for Sleep Disorders Research				
Neurobiology of Sleep and Sleep Apnea	1998–	17,879	4,941	22,820
Subtotal, National Center for Sleep Disorders Research		17,879	4,941	22,820
Total, Specialized Centers of Research (P50)		**$749,940**	**$106,777**	**$856,717**

Heart and Vascular Diseases Program

Gene Transfer Principles for Heart, Lung, and Blood Diseases

The purpose of this SCOR is to provide the basic science foundation necessary for gene transfer technology and its application to somatic gene transfer.

Obligations

Fiscal Year 2002—$879,414

Current Active Organization and Grant Number

1. Baylor College of Medicine
   Houston, Texas —HL-59314

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 a combination of approaches, including molecular, cellular, and genetic studies; animal experiments; and human studies to advance knowledge in this area.

Obligations

Fiscal Year 2002—$3,027,522

Current Active Organizations and Grant Numbers

1. Boston University
   Boston, Massachusetts —HL-55993
2. Medical College of Wisconsin
   Milwaukee, Wisconsin —HL-65203

Ischemic Heart Disease, Sudden Cardiac Death, Heart Failure

The purpose of this SCOR is to encourage creative, interdisciplinary approaches to elucidation of the etiology and pathophysiology of these diseases at the molecular, cellular, and tissue levels and the translation of research findings into improved diagnosis, treatment, and prevention.

Obligations

Fiscal Year 2002—$15,491,649

Current Active Organizations and Grant Numbers

1. The Johns Hopkins University
   Baltimore, Maryland —HL-52307
2. University of Cincinnati
   Cincinnati, Ohio —HL-52318
3. University of California
   Los Angeles, California —HL-52319
4. Brigham and Women's Hospital
   Boston, Massachusetts —HL-52320
5. University of Utah
   Salt Lake City, Utah —HL-52338
6. University of California
   San Diego, California —HL-53773

7. Baylor College of Medicine
   Houston, Texas —HL-54313
8. New England Medical Center
   Boston, Massachusetts —HL-63494
9. Harvard University
   Boston, Massachusetts —HL-63609

Molecular Genetics of Hypertension

The goals of five SCOR projects are to study the molecular genetics of hypertension, to provide understanding of the etiology and pathogenesis of hypertension, and to apply new knowledge for the improved diagnosis and management of the disease.

Obligations

Fiscal Year 2002—$9,139,696

Current Active Organizations and Grant Numbers

1. Medical College of Wisconsin
   Milwaukee, Wisconsin —HL-54998
2. Brigham and Women's Hospital
   Boston, Massachusetts —HL-55000
3. Boston University Medical Center
   Boston, Massachusetts —HL-55001
4. University of Iowa Hospitals
   Iowa City, Iowa —HL-55006
5. Yale University School of Medicine
   New Haven, Connecticut —HL-55007

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 2002—$7,985,891

Current Active Organizations and Grant Numbers

1. Columbia University
   New York, New York —HL-56984
2. Brigham and Women's Hospital
   Boston, Massachusetts —HL-56985
3. University of California
   San Diego, California —HL-56989
4. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-70128

Pediatric Cardiovascular Diseases

The purpose of this SCOR is to apply innovative approaches to elucidate the etiology and pathophysiology of pediatric CVD. Research findings will be translated into improved diagnosis, treatment, and prevention of CVD in children.

Obligations

Fiscal Year 2002—$7,220,750

Current Active Organizations and Grant Numbers

1. Washington University
   St. Louis, Missouri —HL-61006
2. University of Texas,
   Southwestern Medical Center
   Dallas, Texas —HL-61033
3. Harvard University
   Boston, Massachusetts —HL-61036
4. Children's Hospital of Philadelphia
   Philadelphia, Pennsylvania —HL-62177
5. University of Iowa
   Iowa City, Iowa —HL-62178

Lung Diseases Program

Acute Lung Injury

The objective of this SCOR is to examine biochemical, immunological, and physiological mechanisms associated with acute lung injury and repair to improve the diagnosis, management, and prevention of ARDS.

Obligations

Fiscal Year 2002—$9,932,056

Current Active Organizations and Grant Numbers

1. University of California, San Diego
   La Jolla, California —HL-23584
2. University of Washington
   Seattle, Washington —HL-30542
3. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HL-50152
4. University of Utah
   Salt Lake City, Utah —HL-50153
5. University of Michigan
   Ann Arbor, Michigan —HL-60289
6. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-60290
7. University of Iowa
   Iowa City, Iowa —HL-60316

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 2002—$5,559,099

Current Active Organizations and Grant Numbers

1. University of North Carolina
   Chapel Hill, North Carolina —HL-60280
2. University of California
   San Francisco, California —HL-60288
3. Case Western Reserve University
   Cleveland, Ohio —HL-60293
4. University of Iowa
   Iowa City, Iowa —HL-61234

Cellular and Molecular Mechanisms of Asthma

The objective of this SCOR program 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 2002—$15,042,935

Current Active Organizations and Grant Numbers

1. University of New Mexico
   Albuquerque, New Mexico —HL-56384
2. University of California
   San Francisco, California —HL-56385
3. University of Wisconsin
   Madison, Wisconsin —HL-56396
4. University of Chicago
   Chicago, Illinois —HL-56399
5. Washington University
   St. Louis, Missouri —HL-56419
6. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-67663
7. Beth Israel Deaconess Medical Center
   Boston, Massachusetts —HL-67664
8. University of Arizona
   Tucson, Arizona —HL-67672
9. Stanford University
   Stanford, California —HL-67674

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 2002—$4,996,473

Current Active Organizations and Grant Numbers

1. University of Michigan
   Ann Arbor, Michigan —HL-56402
2. National Jewish Medical & Research Center
   for Immunology and Respiratory Diseases
   Denver, Colorado —HL-56556
3. University of California, Los Angeles
   Los Angeles, California —HL-67665

Pathobiology of Lung Development

The objective of this program is to foster multidisciplinary research enabling basic science findings to be more 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 2002—$7,066,813

Current Active Organizations and Grant Numbers

1. Children's Hospital Medical Center
   Cincinnati, Ohio —HL-56387
2. Children's Hospital of Philadelphia
   Philadelphia, Pennsylvania —HL-56401
3. University of Colorado Health Science Center
   Denver, Colorado —HL-57144
4. Children's Hospital of Boston
   Boston, Massachusetts —HL-67669

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 2002—$5,452,150

Current Active Organizations and Grant Numbers

1. Dana Farber Cancer Institute
   Boston, Massachusetts —HL-54785
2. Children's Hospital
   Los Angeles, California —HL-54850
3. Fred Hutchinson Cancer
   Research Center
   Seattle, Washington —HL-54881

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 2002—$7,030,437

Current Active Organizations and Grant Numbers

1. Mt. Sinai School of Medicine
   New York, New York —HL-54469
2. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-54500
3. University of Oklahoma
   Oklahoma City, Oklahoma —HL-54502
4. Baylor College of Medicine
   Houston, Texas —HL-65967

Transfusion Biology and Medicine

This SCOR has been established 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 2002—$3,011,348

Current Active Organizations and Grant Numbers

1. New York Blood Center
   New York, New York —HL-54459
2. University of California, San Francisco
   San Francisco, California —HL-54476

National Center for 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 2002—$4,940,951

Current Active Organizations and Grant Numbers

1. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-60287
2. Brigham and Women's Hospital
   Boston, Massachusetts —HL-60292
3. University of California
   Los Angeles, California —HL-60296

Comprehensive Sickle Cell Centers (P60) 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 2002—$17,207,672

Current Active Organizations and Grant Numbers

1. Boston Medical Center
   Boston, Massachusetts —HL-15157
2. University of California, San Francisco
   San Francisco, California —HL-20985
3. College of Physicians and Surgeons of Columbia University
   New York, New York —HL-28381
4. Children's Hospital of Philadelphia
   Philadelphia, Pennsylvania —HL-38632
5. University of South Alabama
   Mobile, Alabama —HL-38639
6. Montefiore Medical Center
   New York, New York —HL-38655
7. University of Southern California
   Los Angeles, California —HL-48484
8. University of Alabama at Birmingham
   Birmingham, Alabama —HL-58418
9. Children's Hospital Medical Center
   Cincinnati, Ohio —HL-58421
10. Thomas Jefferson University
    Philadelphia, Pennsylvania —HL-62148

Centers for AIDS Research (P30) Program

The NHLBI, along with five other NIH Institutes, contributes to the support of six Centers for AIDS Research (CFAR) 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 2002—$2,538,133

Current Active Organizations and Grant Numbers

1. University of Washington
   Seattle, Washington —AI-27757
2. University of Alabama at Birmingham
   Birmingham, Alabama —AI-27767
3. University of California, Los Angeles
   Los Angeles, California —AI-28697

4. University of California, San Diego
   San Diego, California —AI-36214

5. Case Western Reserve University
   Cleveland, Ohio —AI-36219

6. Miriam Hospital
   Providence, Rhode Island —AI-42853

7. Northwestern University
   Chicago, Illinois —CA-79458

8. New York University School of Medicine
   New York, New York —AI-27742

9. Massachusetts General Hospital
   Boston, Massachusetts —AI-42851

10. The Johns Hopkins University
    Baltimore, Maryland —AI-42855

11. University of California, Davis
    Davis, California —AI-49366

12. University of North Carolina
    Chapel Hill, North Carolina —AI-50410

13. University of California, San Francisco
    Givi Center for AIDS Research
    San Francisco, California —AI-27763

14. University of Massachusetts Medical School
    Worcester, Massachusetts —AI-42845

15. Emory University
    Atlanta, Georgia —AI-50409

10. Research and Development Contracts

NHLBI Research and Development Contract Obligations*: Fiscal Years 1992–2002

Dollars in Millions

Year	Major Contract-Supported Clinical Trials*	Other R&D Contracts
1992	32.2	75.5
1993	28	89.5
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	109.45	87.8
2000	115.39	85.9
2001	87.402	132.654
2002	91.774	166.526

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

NHLBI Total Research and Development Contract Obligations: Fiscal Years 1992–2002

	Dollars in Thousands										
	Fiscal Year										
	1992	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Heart	$57,714	$66,717	$67,173	$70,178	$80,373	$84,820	$77,886	$93,270	$98,715	$125,291	$155,234
Lung	16,977	18,552	21,957	15,414	21,032	18,183	13,123	25,432	23,341	10,993	16,874
Blood	32,980	32,280	29,122	40,324	19,522	18,934	25,695	15,436	21,538	24,572	27,078
Sleep											104
Women's Health Initiative								63,100	57,700	59,200	59,010
Total	**$107,671**	**$117,549**	**$118,252**	**$125,916**	**$120,927A**	**$121,937B**	**$116,704C**	**$197,238D**	**$201,294E**	**$220,056F**	**$258,300G**

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.

Major NHLBI Research and Development Contracts by Program*: Fiscal Years 1992–2002

	Total Obligations Prior to FY 2002	Total FY 2002 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
Atherosclerosis Risk in Communities (ARIC)	$110,975,635	$2,080,000	$113,055,635
Cardiovascular Health Study (CHS)	69,224,419	2,272,000	71,496,419
Coronary Artery Risk Development in Young Adults (CARDIA)	56,037,130	2,811,816	58,848,946
Framingham Study	37,365,516	6,198,599	43,564,115
Jackson Heart Study (JHS)	9,516,000	2,802,000	12,318,000
Mammalian Genotyping Service (MGS)	16,269,750	5,250,000	21,519,750
Multi-Ethnic Study of Atherosclerosis (MESA)	29,703,000	10,939,999	40,642,999
Proteomics Initiative		29,477,000	29,477,000
Translational Behavioral Science Research Consortium		4,185,421	4,185,421
Lung Diseases			
A Case-Controlled Etiologic Study of Sarcoidosis (ACCESS)	11,372,464	158,683	11,531,147
Blood Diseases and Resources			
Hemochromatosis and Iron Overload Screening Study (HEIRS)	11,477,577	9,471,775	20,949,352
Maintenance of NHLBI Biological Specimen Repository	3,690,565	932,000	4,622,565
Retrovirus Epidemiology Donor Study (REDS)	62,229,074	5,567,078	67,796,152

* Excludes clinical trials included in Chapter 11.

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 2002—$2,080,000
Fiscal Years 1985–2001—$110,975,635
Total Funding to Date—$113,055,635

Current Active Organizations and Contract Numbers

1. University of North Carolina
   Chapel Hill, North Carolina —HC-55015
2. Baylor College of Medicine
   Houston, Texas —HC-55016

3. University of North Carolina
   Chapel Hill, North Carolina —HC-55018
4. University of Minnesota
   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 2002—$2,272,000
Fiscal Years 1988–2001—$69,224,419
Total Funding to Date—$71,496,419

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. Bowman Gray School of Medicine
   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 identify CVD risk factors that contribute to the development of early atherosclerosis in a cohort of black and white young adults with a range of attained education, aged 18 to 30 at baseline. The study examines the interrelationships of risk factors and lifestyles during the transition from adolescence to middle age. It also compares the evolution of risk factors between men and women, blacks and whites, and groups of differing SES.

Obligations

Funding History:
Fiscal Year 2002—$2,811,816
Fiscal Years 1984–2001—$56,037,130
Total Funding to Date—$58,848,946

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. University of Alabama at Birmingham
   Birmingham, Alabama —HC-48047
4. University of Minnesota
   Minneapolis, Minnesota —HC-48048
5. Northwestern University
   Chicago, Illinois —HC-48049
6. Kaiser Permanente Division of Research
   Oakland, California —HC-48050
7. University of Alabama at Birmingham
   Birmingham, Alabama —HC-95095

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, 700 members still remain. In 1971, the Framingham Offspring Study was initiated to assess familial and genetic factors associated with CHD. More than 5,000 offsprings (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 2002—$6,198,599
Fiscal Years 1983–2001—$37,365,516
Total Funding to Date—$43,564,115

Current Active Organization and Contract Number

1. 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.

Obligations

Funding History:
Fiscal Year 2002—$2,802,000*
Fiscal Years 1998–2001—$9,516,000
Total Funding to Date—$12,318,000

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 2002—$5,250,000
Fiscal Years 1994–2001—$16,269,750
Total Funding to Date—$21,519,750

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 consisting of 40 percent whites, 30 percent blacks, 20 percent Hispanics, and 10 percent Asians, predominantly of Chinese descent.

Obligations

Funding History:
Fiscal Year 2002—$10,939,999
Fiscal Years 1999–2001—$29,703,000
Total Funding to Date—$40,642,999

Current Active Organizations and Contract Numbers

1. University of Washington
   Seattle, Washington —HC-95159
2. University of California
   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
   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

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 towards 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 2002—$29,477,000
Total Funding to Date—$29,477,000

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 Medical Branch
   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 2002—$4,185,421
Total Funding to Date—$4,185,421

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

A Case-Controlled Etiologic Study of Sarcoidosis (ACCESS), Initiated in Fiscal Year 1995

The purpose of this program is to support a multicenter case-control study, in a predominately black population, of potential etiologic factors for sarcoidosis, a systemic granulomatous disease that usually produces disease in the lung. The study is assessing the role of infection, as well as environmental and familial factors in the etiology of the disease. The protocol includes comprehensive clinical characterization and examination of markers of immune responsiveness, as well as banking of blood components for further studies.

Obligations

Funding History:
Fiscal Year 2002—$158,683
Fiscal Years 1995–2001—$11,372,464
Total Funding to Date—$11,531,147

Current Active Organizations and Contract Numbers

1. The Johns Hopkins University
   Baltimore, Maryland —HR-56065
2. National Jewish Center for Immunology and Respiratory Medicine
   Denver, Colorado —HR-56066
3. Case Western Reserve University
   Henry Ford Hospital
   Detroit, Michigan —HR-56067
4. Medical University of South Carolina
   Charleston, South Carolina —HR-56068
5. University of Cincinnati Medical Center
   Cincinnati, Ohio —HR-56069
6. University of Iowa
   Iowa City, Iowa —HR-56070
7. Mt. Sinai School of Medicine
   New York, New York —HR-56071
8. University of Pennsylvania
   Philadelphia, Pennsylvania —HR-56072
9. Georgetown University
   Washington, DC —HR-56073
10. Beth Israel Hospital
    Boston, Massachusetts —HR-56074
11. Clinical Trials and Surveys Corporation
    Baltimore, Maryland —HR-56075

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 2002—$9,471,775
Fiscal Years 2000–2001—$11,477,577
Total Funding to Date—$20,949,352

Current Active Organizations and Contract Numbers

1. University of Minnesota
   Minneapolis, Minnesota —HC-05185
2. Howard University
   Washington, DC —HC-05186
3. University of Alabama
   Birmingham, Alabama —HC-05188

4. Kaiser Foundation Research Institute
   Oakland, California —HC-05189
5. University of California
   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 2002—$932,000
Fiscal Years 1998–2001—$3,690,565
Total Funding to Date—$4,622,565

Current Active Organization and Contract Number

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

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 is also 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 2002—$5,567,078
Fiscal Years 1989–2001—$62,229,074
Total Funding to Date—$67,796,152

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. American Red Cross, Greater
   Chesapeake and Potomac Region
   Baltimore, Maryland —HB-97079
4. American Red Cross
   Southern California
   Los Angeles, California —HB-97080

5. American Red Cross
   Southeastern Michigan Region
   Detroit, Michigan —HB-97081

6. Westat, Inc.
   Rockville, Maryland —HB-97082

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 1992–2002

	Research Grants and Cooperative Agreements in Dollars in Thousands										
	Fiscal Year										
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Heart and Vascular Diseases											
Program on Surgical Control of Hyperlipidemias (POSCH)	$	$485	$500	$538	$566	$294	$	$	$	$	$
Stanford Coronary Risk Intervention Program (SCRIP)	382										
Electrophysiologic Study vs. Electrocardiographic Monitoring (ESVEM)	740										
Coronary Artery Surgery Study Follow-up	670										
Emory Angioplasty Versus Surgery Trial (EAST)	—	277	288	296	296						
Asymptomatic Carotid Artery Plaque Study (ACAPS)	1,255	—	—	66	70						
Infant Heart Surgery: Central Nervous System Sequelae of Circulatory Arrest	770	756	516	598	699	685	582	584	392	75	
Lifestyle Heart Trial	524										
Thrombolysis in Myocardial Ischemia (T3)	636										
Do Fish Oils Prevent Restenosis Post-Coronary Angioplasty?*	750										
Prevention of Early Readmission in Elderly Congestive Heart Failure Patients	108	112	77								
MRFIT Follow-up and Analysis	387	402	418								
Multicenter Unsustained Tachycardia Trial*	2,072	2,092	2,095	1,958	504						
Trial of Aspirin and Vitamin E in Nurses	1,170	1,393	1,488	1,426	1,434	1,473	1,536	1,530	1,594		
Diet and Exercise for Elevated Risk (DEER)	775	805	703								
Cardiovascular Risk Factors and the Menopause	539	610	601	451	478	494	528	186			
Sodium Sensitivity in African Americans	686	492	97	249							

	Research Grants and Cooperative Agreements in Dollars in Thousands										
	Fiscal Year										
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Montreal Heart Attack Readjustment Trial (M-HART)	271	298	340								
Stress Reduction in Elderly Blacks With Hypertension	296	321	338	321							
Trial of Nonpharmacologic Intervention in the Elderly (TONE)	749	1,038	796	729							
CABG Patch Trial*		3,362	3,117	1,344	988	1,171					
Women's Antioxidant and Cardiovascular Study (WACS)		586	612	620	643	501	525	540	556	572	598
Oral Calcium in Pregnant Women With Hypertension		280	290	306	320	332					
Stress Reduction and Atherosclerotic CVD in Blacks			219	330	403	407	40	326	339	360	376
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	1668	1,017			
Shock Trial: Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock?			1,070	1,022	1,008	826	874		440	362	298
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	

	Research Grants and Cooperative Agreements in Dollars in Thousands										
	Fiscal Year										
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Dietary Patterns, Sodium Intake, and Blood Pressure (DASH Sodium)***						2,233	3,693	3,646	1,247	151	387
Sudden Cardiac Death in Heart Failure Trial (SCD-HeFT)*						1,571	1,667	1,709	1,698	1,798	1,412
CVD Risk and Health in Post-Menopausal Phytoestrogen Users						631	662	574	244		304
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
Azithromycin and Coronary Events Study (ACES)*							847	2,663	2,182	720	1,254
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
Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics (BARI 2D)*									3,942	6,515	9,342
Hematocrit Strategy in Infant Heart Surgery*									473	557	596
Angiotensin-II Blockade in Mitral Regurgitation										553	610
Heart Failure Adherence and Retention Trial (HART)										795	1,617
Reduction of Triglycerides in Women on HRT										708	746
Women's Ischemia Syndrome Evaluation (WISE)**										1,502	1,506
ACE Inhibition and Novel Cardiovascular Risk Factors											694
A CHF Trial Investigating Outcomes of Exercise (ACTION)*											7,133
Clinical Trial of Dietary Protein on Blood Pressure											655
Home Automatic External Defibrillator Trial (HAT)*											3,567

	Research Grants and Cooperative Agreements in Dollars in Thousands										
	Fiscal Year										
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Perioperative Interventional Neuroprotection Trial (POINT)											553
Stop Atherosclerosis in Native Diabetics Study (SANDS)*											2,410
Surgical Treatment for Ischemic Heart Failure (STICH)*											5,709
Subtotal, Heart and Vascular Diseases	12,780	13,309	16,098	15,987	13,673	19,483	23,265	29,111	26,578	22,996	44,915
Lung Diseases											
Emphysema: Physiologic Effects of Nutritional Support	230	246	155								
Cardiopulmonary Effects of Ibuprofen in Human Sepsis*	792	886	683								
Inhaled Beclomethasone to Prevent Chronic Lung Disease*		583	690	738	551	436					
Lung Health Study II***		594	3,307	4,434	3,183	3,508	980				
Lung Health Study—Long-Term Follow-up***							1,997	1,986	1,616	1,672	927
Asthma Clinical Research Network (ACRN)***							4,934	5,399	5,686	5,705	5,863
Fetal Tracheal Occlusion for Severe Diaphragmatic Hernia*								419	429	181	
Scleroderma Lung Study*								1,040	1,501	1,761	1,501
Inhaled Nitric Oxide for the Prevention of Chronic Lung Disease*									1,959	1,803	1,764
Inhaled Nitric Oxide in Prevention of Chronic Lung Disease*									1,548	1,742	1,839
Prospective Investigation of Pulmonary Embolism Diagnosis-II (PIOPED II)*									2,190	3,667	3,388
Randomized Trial to Reduce ETS in Children With Asthma									555	545	468
Apnea Positive Pressure Long-Term Efficacy Study (APPLES)*											3,224
Subtotal, Lung Diseases	1,022	2,309	4,835	5,172	3,734	3,944	7,911	8,844	15,484	17,076	18,974
Blood Diseases and Resources											
Multicenter Study of Hydroxyurea in Patients With Sickle Cell Anemia—Phase II*	3,139	3,221	3,271	1,238							

	Research Grants and Cooperative Agreements in Dollars in Thousands										
	Fiscal Year										
	1992	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Chelation Therapy of Iron Overload With Pyridoxal Isonicotinoyl Hydrazone (PIH)	220	218									
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 II)*									4,493	3,166	3,168
Induction of Stable Chimerism for Sickle Cell Anemia										489	525
Sibling Donor Cord Blood Banking and Transplantation										1,222	1,224
Subtotal, Blood Diseases and Resources	3,359	3,439	8,678	5,991	2,958	2,854	2,036		4,786	4,877	4,917
Total, NHLBI	**$17,161**	**$19,057**	**$29,611**	**$27,150**	**$20,365**	**$26,281**	**$33,212**	**$37,955**	**$46,848**	**$44,949**	**$68,806**

* Paid by U01/U10.

** Previously an Institute-Initiated Clinical Trial.

NHLBI Investigator-Initiated Clinical Trials, Fiscal Year 2002: Summary by Program

	Total Obligations Prior to FY 2002	FY 2002 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
ACE Inhibition and Novel Cardiovascular Risk Factors	$	$693,661	$693,661
A CHF Trial Investigating Outcomes of Exercise (ACTION)*		7,132,993	7,132,993
Angiotensin-II Blockade in Mitral Regurgitation	553,312	610,368	1,163,680
Antiarrhythmic Effects of N-3 Fatty Acids	1,584,363	646,961	2,231,324
Azithromycin and Coronary Events Study (ACES)*	6,412,683	1,254,228	7,666,911
Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics (BARI 2D)*	10,457,477	9,342,339	19,799,816
Clinical Trial of Dietary Protein on Blood Pressure		655,198	655,198
CVD Risk and Health in Postmenopausal Phytoestrogen Users	2,110,940	304,000	2,414,940
Dietary Patterns, Sodium Intake, and Blood Pressure (DASH Sodium)*	10,969,396	386,993	11,356,389
Heart Failure Adherence and Retention Trial (HART)	794,551	1,616,901	2,411,452
Hematocrit Strategy in Infant Heart Surgery*	1,030,268	595,956	1,626,224
Home Automatic External Defibrillator Trial (HAT)*		3,566,730	3,566,730
Infant Heart Surgery: Central Nervous System Sequelae of Circulatory Arrest	7,587,435		7,587,435

	Total Obligations Prior to FY 2002	FY 2002 Obligations	Total Obligations to Date
Occluded Artery Trial (OAT)*	12,574,250	1,724,200	14,298,450
Perioperative Interventional Neuroprotection Trial (POINT)		552,597	552,597
PREMIER: Lifestyle Interventions for Blood Pressure Control*	12,179,443	1,505,073	13,684,516
Prevention of Recurrent Venous Thromboembolism (PREVENT)	3,200,043	1,272,135	4,472,178
Reduction of Triglycerides in Women on HRT	708,215	746,384	1,454,599
Shock Trial: Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock?	5,600,795	297,352	5,898,147
Stress Reduction and Atherosclerotic CVD in Blacks	2,424,327	375,707	2,800,034
Stop Atherosclerosis in Native Diabetics Study (SANDS)*		2,409,835	2,409,835
Sudden Cardiac Death in Heart Failure Trial (SCD-HeFT)*	8,443,157	1,412,018	9,855,175
Surgical Treatment for Ischemic Heart Failure (STICH)*		5,709,397	5,709,397
Treatment of Hypertension With Two Exercise Intensities	2,206,498		2,206,498
Women's Antioxidant and Cardiovascular Study (WACS)	5,154,013	598,353	5,752,366
Women's Ischemia Syndrome Evaluation (WISE)***	1,502,322	1,506,497	3,008,819
Subtotal, Heart and Vascular Diseases	95,493,488	44,915,876	140,409,364
Lung Diseases			
Apnea Positive Pressure Long-Term Efficacy Study (APPLES)*		3,223,476	3,223,476
Asthma Clinical Research Network (ACRN)***	21,722,002	5,862,537	27,584,539
Inhaled Nitric Oxide for the Prevention of Chronic Lung Disease*	3,762,198	1,764,494	5,526,692
Inhaled Nitric Oxide in Prevention of Chronic Lung Disease*	3,289,375	1,839,151	5,128,526
Lung Health Study—Long-Term Follow-up***	7,271,408	926,580	8,197,988
Prospective Investigation of Pulmonary Embolism Diagnosis-II (PIOPED II)*	5,856,834	3,388,501	9,245,335
Randomized Trial to Reduce ETS in Children With Asthma	1,099,649	467,698	1,567,347
Scleroderma Lung Study*	4,301,152	1,501,330	5,802,482
Subtotal, Lung Diseases	47,302,618	18,973,767	66,276,385
Blood Diseases and Resources			
Induction of Stable Chimerism for Sickle Cell Anemia	489,103	525,048	1,014,151
Sibling Donor Cord Blood Banking and Transplantation	1,221,933	1,223,754	2,445,687
Stroke Prevention in Sickle Cell Anemia (STOP II)*	7,658,580	3,168,445	10,827,025
Subtotal, Blood Diseases and Resources	9,369,616	4,917,247	14,286,863
Total, NHLBI	**$152,165,722**	**$68,806,890**	**$220,972,612**

* Indicates paid by U01/U10.

** Previously an Institute-Initiated Clinical Trial.

Institute-Initiated Clinical Trials: Fiscal Years 1992–2002

Contracts

	Dollars in Thousands										
	Fiscal Year										
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Heart and Vascular Diseases											
Lipid Research Clinics	$574	$11	$622	$583	$660	$650	$685	$	$	$	$
Systolic Hypertension in the Elderly Program (SHEP)	404	369									
Studies of Left Ventricular Dysfunction (SOLVD)	902										
Cardiac Arrythmia Suppression Trial (CAST)	2,193		29								
Postcoronary Artery Bypass Graft (CABG) Study*	5,195	213									
Prevention and Treatment of Hypertension Study (PATHS)	564	585									
Effects of Digitalis on Survival in Patients With Congestive Heart Failure	3,272	3,464	270	2,235							
Asymptomatic Cardiac Ischemia Pilot Study (ACIP)	2,720	630	210	7							
Psychophysiological Investigations of Myocardial Ischemia (PIMI)	1,400	1,400	433	165							
Arterial Disease Multifactorial Intervention Trial (ADMIT)	663	2,062	2,341	395							
Raynaud's Treatment Study	339	1,131	2,532	1,664	221	19					
Antiarrhythmic vs. Implantable Defibrillator (AVID)	250	1,203	1,068	5,348	2,475		871	548			
Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT)		2,760	10,914	3,412	9,676	15,943	17,119		6,259	7,000	3,980
Activity Counseling Trial (ACT)			1,260	5,000		2,167	2,439				
Postmenopausal Estrogen/Progestin Interventions (PEPI)			600	1,305		3	170				

	Dollars in Thousands										
	Fiscal Year										
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Enhancing Recovery in Coronary Heart Disease Patients (ENRICHD)				1,871	6,993	6,837	5,904	3,303	3,487	596	425
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	
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
Magnesium in Coronaries (MAGIC)							1,169	2,009	1,243		238
Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness (ESCAPE)								1,750	1,820		1,129
Action to Control Cardiovascular Risk in Diabetes (ACCORD)								4,130	6,590		1,750
Public Access Defibrillation (PAD) Community Trial								2,923	2,414	3,058	1,101
Subtotal, Heart and Vascular Diseases	18,476	13,828	20,279	25,368	29,910	40,111	38,490	26,032	31,350	13,821	12,324
Lung Diseases											
Lung Health Study I	10,496		3,398	650	350						
Pediatric Pulmonary and Cardiac Complications of HIV Infection (P2C2)	6,995	7,814	10,550	2,627	4,033	668	1,979		315		113
Childhood Asthma Management Program (CAMP)		11,361	9,745	5,096	7,977	5,695		6,551	729	1,330	2,786
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

	Dollars in Thousands										
	Fiscal Year										
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
National Emphysema Treatment Trial (NETT)						2,710	3,367	7,545	4,047	6,989	7,910
Feasibility of Retinoid Treatment in Emphysema (FORTE)								884	7,711		2,429
Subtotal, Lung Diseases	17,491	19,175	25,493	12,543	16,697	13,583	10,226	21,817	18,389	10,986	14,740
Blood Diseases and Resources											
Clinical Course of Sickle Cell Disease	2,161	1,756	2,390	4,375	376	205	2,144	350	106		
Penicillin Prophylaxis in Sickle Cell Disease (PROPS II)	1,058	1,095	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
Viral Activation Transfusion Study (VATS)				5,000	5,647	2,353	1,668		339		
Cord Blood Stem Cell Transplantation Study					1,419	6,573	12,530	1,456	5,122	1,846	2,166
Multicenter Study of Hydroxyurea (MSH) in Sickle Cell Anemia Adult Follow-up					703	472	475	469			588
Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG)									1,606	405	3,100
Subtotal, Blood Diseases and Resources	3,219	2,851	6,942	13,111	10,312	10,242	19,045	2,965	8,258	3,395	6,411
Women's Health Initiative											
Subtotal, Women's Health Initiative								59,100	57,700	59,200	59,010
Total, NHLBI Clinical Trials Contracts	$39,186	$35,854	$52,714	$51,022	$56,919	$63,936	$67,761	$109,914	$115,697	$87,402	$92,485

***** Gift Fund (unappropriated) used$4,662,000–FY 94; $1,320,000–FY 95; and $917,720–FY 96.

Institute-Initiated Clinical Trials: Fiscal Years 1992–2002 (continued)

Cooperative Agreements

	Dollars in Thousands										
	Fiscal Year										
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Heart and Vascular Diseases											
Trials of Hypertension Prevention (TOHP)	$5,435	$5,111	$4,385	$1,240	$649	$	$	$	$	$	$
Dietary Intervention Study in Children (DISC)	2,018	1,686	1,615	1,625	1,625	746					
Bypass Angioplasty Revascularization Investigation (BARI)	3,952	3,978	3,965	3,882	2,757	2,894	1,360	1,609	1,634	1,549	1,456
Postmenopausal Estrogen/Progestin Interventions (PEPI)	2,554	1,516	1,109	584	331						
Child and Adolescent Trial for Cardiovascular Health (CATCH)	5,501	6,077	2,586	2,342	2,682	3,956	572	210			
Cholesterol Reduction in Seniors Program (CRISP)	850										
Dietary Effects on Lipoproteins and Thrombogenic Activity (DELTA)	1,950	3,213	3,121	2,485	132	290					
Obesity Prevention in American Indians (PATHWAYS)		1,689	1,814	2,150	3,432	4,119	3,945	4,196	2,459		
Dietary Approaches to Stop Hypertension (DASH)		1,650	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
Trial of Activity for Adolescent Girls (TAAG)									5,274	4,831	5,919
Pediatric Cardiovascular Clinical Research Network										3,447	4,822
Subtotal, Heart and Vascular Diseases	22,260	24,920	23,554	21,912	17,499	14,871	6,373	8,297	11,732	12,704	14,910
Lung Diseases											
Asthma Clinical Research Network		2,500	3,694	3,640	4,526	4,479					
Asthma and Pregnancy Studies			1,000	991	1,000	913					

	Dollars in Thousands										
	Fiscal Year										
	1992	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Childhood Asthma Research and Education (CARE) Network								4,175	5,002	5,314	6,005
Subtotal, Lung Diseases		2,500	4,694	4,631	5,526	5,392		4,175	5,002	5,314	6,005
Blood Diseases and Resources											
Trial to Reduce Alloimmun-ization to Platelets (TRAP)	3,483	1,422									
Thalassemia (Cooley's Anemia) Clinical Research Network									2,192	2,219	2,269
Blood and Marrow Transplant Clinical Research Network										5,360	5,899
Transfusion Medicine/Hemostasis Clinical Research Network											6,053
Subtotal, Blood Diseases and Resources	3,483	1,422							2,192	7,579	14,221
Total, NHLBI-Initiated Clinical Trials, Cooperative Agreements	$25,743	$28,842	$28,248	$26,543	$23,025	$20,263	$6,373	$12,472	$18,926	$25,597	$35,136
Total, NHLBI-Initiated Clinical Trials	**$64,929**	**$64,696**	**$80,962**	**$77,565**	**$79,944**	**$84,199**	**$74,134**	**$122,386**	**$134,623**	**$112,999**	**$127,621**

Institute-Initiated Clinical Trials, Fiscal Year 2002: Summary by Program Contracts

	Total Obligations Prior to FY 2002	Total FY 2002 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
Action to Control Cardiovascular Risk in Diabetes (ACCORD)	$10,720,324	1,749,246	$12,469,570
Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT)	73,083,355	3,980,000	$77,063,355
Atrial Fibrillation Follow-up: Investigation in Rhythm Management (AFFIRM)	17,148,473	801,527	$17,950,000
Enhancing Recovery in Coronary Heart Disease Patients (ENRICHD)	28,991,922	425,378	$29,417,300
Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness (ESCAPE)	3,570,120	1,129,417	$4,699,537
Magnesium in Coronaries (MAGIC)	4,420,650	238,292	$4,658,942
Prevention of Events With Angiotensin Converting Enzyme Inhibitor Therapy (PEACE)	18,143,176	2,849,261	$20,992,437
Public Access Defibrillation (PAD) Community Trial	8,396,224	1,101,479	$9,497,703
Women's Angiographic Vitamin and Estrogen Trial (WAVE)	11,058,620		11,058,620
Women's Ischemia Syndrome Evaluation (WISE)	6,931,798	50,000	$6,981,798
Subtotal, Heart and Vascular Diseases	182,464,662	12,324,600	$194,789,262
Lung Diseases			
Acute Respiratory Distress Syndrome Clinical Network (ARDSNET)	34,788,000	1,502,000	36,290,000
Childhood Asthma Management Program (CAMP)	49,772,800	2,786,000	52,558,800
Feasibility of Retinoid Treatment in Emphysema (FORTE)	8,595,001	2,429,000	11,024,001
National Emphysema Treatment Trial (NETT)	24,658,000	7,910,000	32,568,000
Pediatric Pulmonary and Cardiac Complications of HIV Infection (P2C2)	47,315,456	113,101	47,428,557
Subtotal, Lung Diseases	165,129,257	14,740,101	179,869,358
Blood Diseases and Resources			
Cord Blood Stem Cell Transplantation Study	28,945,311	2,165,861	31,111,172
Multicenter Study of Hydroxyurea (MSH) in Sickle Cell Anemia Adult Follow-up	2,118,820	588,000	2,706,820
Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG)	2,011,192	3,100,000	5,111,192
T-Cell Depletion in Unrelated Donor Marrow Transplantation	10,474,328	556,895	11,031,223
Subtotal, Blood Diseases and Resources	43,549,651	6,410,756	49,960,407
Women's Health Initiative			
Subtotal, Women's Health Initiative	492,900,000	59,010,108	551,910,108
Total, NHLBI-Initiated Clinical Trials, Contracts	**$884,043,570**	**$92,485,565**	**$976,529,135**

Institute-Initiated Clinical Trials, Fiscal Year 2002: Summary by Program Cooperative Agreements

	Total Obligations Prior to FY 2002	Total FY 2002 Obligations	Total Obligations to Date
Heart and Vascular Diseases			
Bypass Angioplasty Revascularization Investigation (BARI)	$50,906,906	$1,455,489	$52,362,395
Girls Health Enrichment Multisite Studies (GEMS)	7,523,751	2,713,306	10,237,057
Obesity Prevention in American Indians (PATHWAYS)	23,804,542		23,804,542
Pediatric Cardiovascular Clinical Research Network	3,447,570	4,822,007	8,269,577
Trial of Activity for Adolescent Girls (TAAG)	10,105,269	5,919,453	16,024,722
Subtotal, Heart and Vascular Diseases	95,788,038	14,910,255	110,698,293
Lung Diseases			
Childhood Asthma Research and Education (CARE) Network	14,491,554	6,004,651	20,496,205
Subtotal, Lung Diseases	14,491,554	6,004,651	20,496,205
Blood Diseases and Resources			
Blood and Marrow Transplant Clinical Research Network	5,360,364	5,899,050	11,259,414
Thalassemia (Cooley's Anemia) Clinical Research Network	4,410,593	2,269,299	6,679,892
Transfusion Medicine/Hemostasis Clinical Research Network		6,052,717	6,052,717
Subtotal, Blood Diseases and Resources	9,770,957	14,221,066	23,992,023
Total, NHLBI-Initiated Clinical Trials, Cooperative Agreements	$120,050,549	$35,135,972	$155,186,521
Total, NHLBI-Initiated Clinical Trials	**$1,004,094,119**	**$127,621,537**	**$1,131,715,656**

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 will proceed in FY 2003.

Obligations

Funding History:
Fiscal Year 2002$1,749,246
Fiscal Years 1999–2001$10,720,324
Total Funding to Date$12,469,570

Current Active Organizations and Contract Numbers

1. Wake Forest University
   Winston-Salem, North Carolina HC-95178

2. McMaster University
   Hamilton, Ontario HC-95179
3. University of Washington
   Seattle, Washington HC-95180
4. Case Western Reserve University
   Cleveland, Ohio HC-95181
5. Wake Forest University
   Winston-Salem, North Carolina HC-95182
6. Minneapolis Medical Research Foundation
   Minneapolis, Minnesota HC-95183
7. Trustees of Columbia University of New York
   New York, New York HC-95184

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

The 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 independant expert review committee because the CVD event rate was significantly greater among those patients compared to the control group.

Obligations

Funding History:
Fiscal Year 2002$3,980,000
Fiscal Years 1993–2001$73,083,355
Total Funding to Date$77,063,355

Current Active Organization and Contract Number

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

Atrial Fibrillation Follow-up: Investigation in Rhythm Management (AFFIRM), Initiated in Fiscal Year 1995

This clinical trial compared the impact on total mortality of antiarrhythmic drugs to maintain controlled heart rate and sinus rhythm to a strategy of merely controlling the heart rate. Important secondary end points included quality of life and cost of therapies.

Results of the trial demonstrated that the heart rhythm strategy prevented no more deaths than the alternate strategy of merely controlling the heart rate and, in fact, may contribute to more hospitalizations and adverse drug effects.

Obligations

Funding History:
Fiscal Year 2002$801,527
Fiscal Years 1995–2001$17,148,473
Total Funding to Date$17,950,000

Current Active Organization and Contract Number

1. Statistics and Epidemiology
   Research Corporation
   Seattle, Washington HC-55139

Bypass Angioplasty Revascularization Investigation (BARI), Initiated in Fiscal Year 1987

The BARI assesses the long-term safety and efficacy of percutaneous transluminal coronary angioplasty (PTCA) and coronary artery bypass graft surgery (CABG) in patients who require revascularization and have coronary anatomy suitable for either procedure. The trial has been extended through November 2002 to complete the minimum 10-year follow-up on all patients and to determine the relative efficacy of PTCA versus CABG in subgroups of women, blacks, diabetics, and the elderly.

Obligations

Funding History:
Fiscal Year 2002$1,455,489
Fiscal Years 1987–2001$50,906,906
Total Funding to Date$52,362,395

Current Active Organization and Grant Number

1. University of Pittsburgh
   Pittsburgh, Pennsylvania HL-38610

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 re-uptake 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 33 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 2002$425,378
Fiscal Years 1995–2001$28,991,922
Total Funding to Date$29,417,300

Current Active Organizations and Contract Numbers

1. University of North Carolina
   Chapel Hill, North Carolina HC-55140
2. University of Alabama at Birmingham
   Birmingham, Alabama HC-55141
3. Duke University
   Durham, North Carolina HC-55142
4. University of Miami
   Coral Gables, Florida HC-55143
5. Rush-Presbyterian-St. Luke's Medical Center
   Chicago, Illinois HC-55144
6. Stanford University
   Palo Alto, California HC-55145

7. Washington University
   St. Louis, Missouri HC-55146
8. University of Washington
   Seattle, Washington HC-55147
9. Yale University
   New Haven, Connecticut HC-55148

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

The purpose of this study is to compare the efficacy of pulmonary artery catheterization-directed treatment strategy to a noninvasive treatment strategy on morbidity and mortality in patients with severe CHF.

Obligations

Funding History:
Fiscal Year 2002$1,129,417
Fiscal Years 1999–2001$3,570,120
Total Funding to Date$4,699,537

Current Active Organization and Contract Number

1. Duke University
   Durham, North Carolina HV-98177

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 pre-puberty to puberty in African American girls who are at high risk for developing obesity. Phase 1 (developmental and pilot studies) was completed in FY 2002. Two sites will begin Phase 2 studies in FY 2003.

Obligations

Funding History:
Fiscal Year 2002$2,713,306
Fiscal Years 1999–2001$7,523,751
Total Funding to Date$10,237,057

Current Active Organizations and Grant Numbers

1. University of Memphis
   Memphis, Tennessee HL-62662
2. Stanford University
   Stanford, California HL-62663
3. University of Minnesota, Twin Cities
   Minneapolis, Minnesota HL-62668
4. The George Washington University
   Washington, DC HL-62732
5. Baylor College of Medicine
   Houston, Texas HL-65160

Magnesium in Coronaries (MAGIC), Initiated in Fiscal Year 1998

The purpose of this multicenter trial is to determine whether intravenous magnesium reduces the short-term mortality of high-risk patients with suspected acute MI when it is administered sufficiently early to reduce reperfusion injury.

Obligations

Funding History:
Fiscal Year 2002$238,292
Fiscal Years 1998–2001$4,420,650
Total Funding to Date$4,658,942

Current Active Organization and Contract Number

1. New England Research Institutes, Inc.
   Watertown, Massachusetts HC-85155

Obesity Prevention in Young American Indians (PATHWAYS), Initiated in Fiscal Year 1993

This trial assesses the effectiveness of a school-based intervention in primary prevention of obesity among American Indian elementary school children.

Obligations

Funding History:
Fiscal Year 2002$0
Fiscal Years 1993–2001$23,804,542
Total Funding to Date$23,804,542

Current Active Organizations and Grant Numbers

1. University of New Mexico
   Albuquerque, New Mexico HL-50867
2. The Johns Hopkins University
   Baltimore, Maryland HL-50869
3. University of Minnesota
   Minneapolis, Minnesota HL-50885
4. Gila River Indian Community
   Sacaton, Arizona HL-50905
5. Coordinating Center:
   University of North Carolina
   Chapel Hill, North Carolina HL-50907

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, and arrhythmias.

Obligations

Funding History:
Fiscal Year 2002$4,822,007
Fiscal Year 2001$3,447,570
Total Funding to Date$8,269,577

Current Active Organizations and Grant Numbers

1. Duke University
   Durham, North Carolina HL-68269
2. New England Research Institute, Inc.
   Watertown, Massachusetts HL-68270

3. Children's Hospital of Philadelphia
   Philadelphia, Pennsylvania HL-68279
4. Medical University of South Carolina
   Charleston, South Carolina HL-68281
5. Children's Hospital
   Boston, Massachusetts HL-68285
6. Hospital for Sick Children
   Toronto, Ontario HL-68288
7. Columbia University Health Sciences
   New York, New York HL-68290
8. University of Utah
   Salt Lake City, Utah HL-68292

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

The multicenter, randomized trial is determining whether addition of an ACE inhibitor to standard ther-apy in patients with known coronary artery disease and preserved left ventricular function will prevent CVD mortality and reduce risk of MI and the need for revascularization.

Obligations

Funding History:
Fiscal Year 2002$2,849,261
Fiscal Years 1996–2001$18,143,176
Total Funding to Date$20,992,437

Current Active Organization and Contract Number

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

Public Access Defibrillation (PAD) Community Trial, Initiated in Fiscal Year 1999

The objective of this trial is to determine whether lay volunteers trained in the use of automatic external defibrillators for out-of-hospital cardiac arrest victims will significantly increase survival to hospital discharged compared with community volunteers trained in standard life-saving techniques. One thousand community sites are participating in the study.

Obligations

Funding History:
Fiscal Year 2002$1,101,479
Fiscal Years 1999–2001$8,396,224
Total Funding to Date$9,497,703

Current Active Organization and Contract Number

1. University of Washington
   Seattle, Washington HC-95177

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 will be conducted in 36 schools; 37 percent of the population will be minorities.

Obligations

Funding History:
Fiscal Year 2002$5,919,453
Fiscal Years 2000–2001$10,105,269
Total Funding to Date$16,024,722

Current Active Organizations and Grant Numbers

1. University of Minnesota
   Minneapolis, Minnesota HL-66845
2. University of South Carolina
   Columbia, South Carolina HL-66852
3. University of North Carolina at Chapel Hill
   Chapel Hill, North Carolina HL-66853
4. Tulane University
   New Orleans, Louisiana HL-66855
5. San Diego State University
   San Diego, California HL-66856
6. The Johns Hopkins University
   Baltimore, Maryland HL-66857
7. University of Arizona
   Tucson, Arizona HL-66858

Women's Angiographic Vitamin and Estrogen Trial (WAVE), Initiated in Fiscal Year 1996

The multicenter, randomized trial is assessing whether or not HRT and/or antioxidant treatment stabilize or inhibit progression and induce regression of coronary plaques in women. The trial is also examining the mechanisms by which these treatments modify atherosclerosis. The primary end points are angiographic changes.

Obligations

Funding History:
Fiscal Year 2002$0
Fiscal Years 1996–2001$11,058,620
Total Funding to Date$11,058,620

Current Active Organizations and Grant Numbers

1. The George Washington University
   Washington, DC HV-68165
2. University of Alabama at Birmingham
   Birmingham, Alabama HV-68166
3. Duke University
   Durham, North Carolina HV-68167
4. Medlantic Research Institute
   Washington, DC HV-68168
5. Hartford Hospital
   Hartford, Connecticut HV-68169
6. The Johns Hopkins University
   Baltimore, Maryland HV-68170

Women's Ischemia Syndrome Evaluation (WISE), Initiated in Fiscal Year 1996

The multicenter trial seeks to improve diagnostic reliability of cardiovascular testing in the evaluation of ischemic heart disease in women. Secondary objectives are to develop safe, efficient, and cost-effective diagnostic approaches for evaluating women with suspected ischemic heart disease; determine the frequency of myocardial ischemia in the absence of significant epicardial coronary stenosis; and ascertain the frequency of non-ischemic or noncardiac chest pain.

Obligations

Funding History:
Fiscal Year 2002$50,000
Fiscal Years 1996–2001$6,931,798
Total Funding to Date$6,981,798

Current Active Organizations and Contract Numbers

1. University of Alabama at Birmingham
   Birmingham, Alabama — HV-68161
2. University of Pittsburgh
   Pittsburgh, Pennsylvania — HV-68162
3. University of Florida
   Gainesville, Florida — HV-68163
4. Allegheny Singer Research Institute
   Pittsburgh, Pennsylvania — HV-68164

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 2002$1,502,000
Fiscal Years 1994–2001$34,788,000
Total Funding to Date$36,290,000

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
   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
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

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 anti-inflammatory 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 2002$2,786,000
Fiscal Years 1991–2001$49,772,800
Total Funding to Date$52,558,800

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 Center for Immunology and Respiratory Medicine
   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 study 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 2002$6,004,651
Fiscal Years 1999–2001$14,491,554
Total Funding to Date$20,496,205

Current Active Organizations and Grant Numbers

1. Washington University
   St. Louis, Missouri — HL-64287
2. National Jewish Medical and Research Center
   Denver, Colorado — HL-64288
3. University of California, San Diego
   San Diego, California — HL-64295
4. University of Wisconsin
   Madison, Wisconsin — HL-64305
5. University of Arizona
   Tucson, Arizona — HL-64307
6. Pennsylvania State University
   Hershey, Pennsylvania — HL-6431

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 2002$2,429,000
Fiscal Years 1999–2001$8,595,001
Total Funding to Date11,024,001

Current Active Organizations and Contract Numbers

1.	University of Minnesota 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, California	HR-96143
5.	University of California San Diego, 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 2002$7,910,000
Fiscal Years 1997–2001$24,658,000
Total Funding to Date$32,568,000

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 San Diego, 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
9. Mayo Foundation
   Rochester, Minnesota HR-76109
10. University of Michigan
    Ann Arbor, Michigan HR-76110
11. National Jewish Center for Immunology and Respiratory Medicine
    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

Pediatric Pulmonary and Cardiac Complications of HIV Infection (P2C2), Initiated in Fiscal Year 1989

This multicenter natural history study, in a primarily minority population, is designed to identify and follow the course of lung and cardiovascular diseases that occur in pediatric patients with all stages of vertically transmitted HIV infection.

Obligations

Funding History:
Fiscal Year 2002$113,101
Fiscal Years 1989–2001$47,315,456
Total Funding to Date$47,428,557

Current Active Organization and Contract Number

1. Cleveland Clinic Foundation
   Cleveland, Ohio HR-96037

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 2002$5,899,050
Fiscal Year 2001$5,360,364
Total Funding to Date$11,259,414

Current Active Organizations and Grant Numbers

1.	University of Nebraska Medical Center Omaha, Nebraska	HL-69233
2.	Dana Farber Cancer Institute Boston, Massachusetts	HL-69249
3.	Children's Mercy Hospital Kansas City, Missouri	HL-69254
4.	University of California San Diego La Jolla, California	HL-69273
5.	Duke University Durham, North Carolina	HL-69274
6.	City of Hope Medical Center Duarte, California	HL-69278
7.	University of Pennsylvania Philadelphia, Pennsylvania	HL-69286
8.	University of Minnesota Twin Cities Minneapolis, Minnesota	HL-69290
9.	Stanford University Stanford, California	HL-69291
10.	Medical College of Wisconsin Milwaukee, Wisconsin	HL-69294
11.	University of Florida Gainesville, Florida	HL-69301
12.	The Johns Hopkins University Baltimore, Maryland	HL-69310
13.	Sloan Kettering Institute for Cancer Research New York, New York	HL-69315
14.	University of Michigan Ann Arbor, Michigan	HL-69330
15.	Case Western Reserve University Cleveland, Ohio	HL-69348

Cord Blood Stem Cell Transplantation Study, Initiated in Fiscal Year 1996

The 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 2002$2,165,861
Fiscal Years 1996–2001$28,945,311
Total Funding to Date$31,111,172

Current Active Organizations and Contract Numbers

1. The EMMES Corporation
   Potomac, Maryland HB-67132
2. Dana-Farber Cancer Center
   Boston, Massachusetts HB-67133
3. Fred Hutchinson Cancer Research Center
   Seattle, Washington HB-67134
4. University of California at 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
   Minneapolis, Minnesota HB-67139
8. Duke University Medical Center
   Durham, North Carolina HB-67141
9. University of California at 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 hydroxurea. Patients will be 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 will be compared to mortality data from the CSSCD cohort and the normal black population mortality.

Obligations

Funding History:
Fiscal Year 2002$588,000
Fiscal Year 1996–2001$2,118,820
Total Funding to Date$2,706,820

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 2002$3,100,000
Fiscal Years 2000–2001$2,011,192
Total Funding to Date$5,111,192

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 2002$556,895
Fiscal Years 1994–2001$10,474,328
Total Funding to Date$11,031,223

Current Active Organizations and Contract Numbers

1.	The EMMES Corporation Potomac, Maryland	HB-47094
2.	University of Minnesota 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 2002$2,269,299
Fiscal Years 2000–2001$4,410,593
Total Funding to Date$6,679,892

Current Active Organizations and Grant Numbers

1. Children's Hospital of Philadelphia
   Philadelphia, Pennsylvania HL-65232

2. Hospital for Sick Children
   Toronto, Ontario HL-65233

3. New England Research Institute, Inc.
   Watertown, Massachusetts HL-65238

4. Children's Hospital Oakland
   Oakland, California HL-65239

5. Weill Medical College of Cornell University
   New York, New York HL-65244

6. Children's Hospital
   Boston, Massachusetts HL-65260

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 throm-bocytopenia and thrombotic thrombocytopenic purpura, and to evaluate new and existing blood products and cytokines for treatment of hematologic disorders.

Obligations

Funding History:
Fiscal Year 2002$6,052,717
Total Funding to Date$6,052,717

Current Active Organizations and Grant Numbers

1. University of Iowa
   Iowa City, Iowa HL-72028

2. Case Western Reserve University
   Cleveland, Ohio HL-72033

3. University of Minnesota Twin Cities
   Minneapolis, Minnesota HL-72072

4. The Johns Hopkins University
   Baltimore, Maryland HL-72191

5. Weill Medical College of Cornell University
   New York, New York — HL-72196
6. Emory University
   Atlanta, Georgia — HL-72248
7. New England Research Institutes, Inc.
   Watertown, Massachusetts — HL-72268
8. Tulane Universiity of Louisiana
   New Orleans, Louisiana — HL-72274
9. University of Oklahoma
   Health Sciences Center
   Oklahoma City, Oklahoma — HL-72283
10. Duke University
    Durham, North Carolina — HL-72289
11. Blood Center of Southeastern Wisconsin
    Milwaukee, Wisconsin — HL-72290
12. Children's Hospital Boston
    Boston, Massachusetts — HL-72291
13. Massachusetts General Hospital
    Boston, Massachusetts — HL-72299
14. Puget Sound Blood Center
    Seattle, Washington — HL-72305
15. University of Pittsburgh at Pittsburgh
    Pittsburgh, Pennsylvania — HL-72331
16. University of Pennsylvania
    Philadelphia, Pennsylvania — HL-72346
17. University of North Carolina Chapel Hill
    Chapel Hill, North Carolina — HL-72355
18. University of Maryland
    Baltimore Professional School
    Baltimore, Maryland — HL-72359

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 2002$59,010,108
Fiscal Years 1992–2001*$492,900,000
Total Funding to Date$551,910,108

Current Active Organizations and Contract Numbers

1. Fred Hutchinson Cancer
   Research Center
   Seattle, Washington — WH-22110

2. Fred Hutchinson Cancer Research Center
   Seattle, Washington — WH-32100
3. University of Minnesota, Twin Cities
   Minneapolis, Minnesota — WH-32101
4. University of Iowa College of Medicine
   Iowa City, Iowa — WH-32102
5. University of Alabama at Birmingham
   Birmingham, Alabama — WH-32105
6. Wake Forest University
   Winston-Salem, North Carolina — WH-32106
7. Northwestern University
   Chicago, Illinois — WH-32108
8. Brigham and Women's Hospital
   Boston, Massachusetts — WH-32109
9. University of Medicine
   and Dentistry of New Jersey
   Newark, New Jersey — WH-32110
10. Emory University
    Atlanta, Georgia — WH-32111
11. University of Pittsburgh
    Pittsburgh, Pennsylvania — WH-32112
12. University of California, Davis
    Davis, California — WH-32113
13. University of Arizona
    Tucson, Arizona — WH-32115
14. University of Tennessee
    Memphis, Tennessee — WH-32118
15. Memorial Hospital of Rhode Island
    Pawtucket, Rhode Island — WH-32119
16. University of California, San Diego
    San Diego, California — WH-32120
17. State University of New York at Buffalo
    Buffalo, New York — WH-32122
18. University of California, Irvine
    Irvine, California — WH-42107
19. The George Washington University
    Washington, DC — WH-42108
20. Stanford University
    Palo Alto, California — WH-42109
21. Baylor College of Medicine
    Houston, Texas — WH-42110
22. University of Texas Health Science Center
    at San Antonio
    San Antonio, Texas — WH-42111

23. The Ohio State University
Columbus, Ohio WH-42112

24. University of Nevada School of Medicine
Reno, Nevada WH-42113

25. Kaiser Foundation Research Institute
Oakland, California WH-42114

26. State University of New York at Stony Brook
Stony Brook, New York WH-42115

27. University of Massachusetts
Medical School
Worcester, Massachusetts WH-42116

28. University of North Carolina at Chapel Hill
Chapel Hill, North Carolina WH-42117

29. Wayne State University
Detroit, Michigan WH-42118

30. Albert Einstein College of Medicine
New York, New York WH-42119

31. Harbor-UCLA
Research and Education Institute
Torrance, California WH-42120

32. Kaiser Foundation Research Institute
Oakland, California WH-42121

33. Medical College of Wisconsin
Milwaukee, Wisconsin WH-42122

34. Medlantic Research Institute
Washington, DC WH-42123

35. Rush-Presbyterian-St. Luke's Medical Center
Chicago, Illinois WH-42124

36. UCLA School of Medicine
Los Angeles, California WH-42125

37. University of Cincinnati Medical Center
Cincinnati, Ohio WH-42126

38. University of Florida College of Medicine
Gainesville, Florida WH-42129

39. University of Hawaii at Manoa
Honolulu, Hawaii WH-42130

40. University of Miami
Miami, Florida WH-42131

41. University of Wisconsin, Madison
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 has 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 nonminority, stand to benefit from the Institute's research programs.

The NHLBI supports activities that foster increased participation by minorities in biomedical and behavioral research through outreach to high schools, colleges, and universities, especially minority-serving institutions. It also actively recruits minorities into its training and career development programs (see Chapter 13).

In FY 2001, the Institute sponsored a workshop to develop recommendations for improving recruitment and retention of minorities into research. The workshop recommended:

- Establishing a minority coordinator and a support infrastructure with the responsibility and authority to develop, coordinate, and administer training and career development programs for underrepresented minorities.
- Exposing young children to science and providing them with experiences, skills, and knowledge to pursue science education in college and beyond.
- Improving the research capabilities and resources of minority institutions.

The Institute responded by:

- Establishing the Office of Minority Health Affairs with the mission of improving the health of minority populations by fostering racial and ethnic representation in research and research training programs concerned with diseases of the heart, lung, and blood and sleep disorders.
- Issuing an initiative entitled, Minority K-12 Initiative for Teachers and Students, to encourage NHLBI-funded investigators to collaborate with local school districts, K-12 students and their families, and minority-serving colleges and universities on the development and evaluation of programs to improve the quality of science education in schools that serve underrepresented minority students.
- Establishing a Research Scientist Award for Minority Institutions program to support established scientists with expertise in heart, lung, or blood health and disease, transfusion medicine, or sleep disorders who are interested in developing research programs at minority institutions.

The overall aim of these efforts is to ensure that highly qualified investigators from various racial and ethnic populations are available to conduct future research in heart, lung, and blood diseases and sleep disorders.

The NHLBI has contributed to an NIH-wide effort to formulate a comprehensive plan to address health disparities. This plan, which identified ongoing Institute activities and described goals and objectives for the future, serves as a guide for many NHLBI programs targeted to minority communities.

Listed below are 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 pivotal in 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): Determines 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): Investigates the association of CHD risk factors with development of atherosclerosis and CVD in an adult population; 38 percent of the participants are black.
- CHS (see Chapter 10): Examines risk factors for CHD and stroke in the elderly; 20 percent of the participants are minorities.
- Strong Heart Study (see Chapter 9): Compares risk factor levels and morbidity and mortality from CVD among American Indians from three different geographic locations.
- JHS (see Chapter 10): Identifies environmental and genetic factors influencing the evolution and progression of CVD in blacks.
- MESA (see Chapter 10): Examines the character-istics 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): Documents CVD risk factors and measures of subclinical disease in approximately 40 extended Alaska Native families. Identifies and characterizes genes that contribute to CVD.

Several investigator-initiated epidemiological studies are examining gene-environment interactions that increase CVD risk factors among various racial groups. Included among them are one comparing gene-environment interactions in black populations in Africa, the Caribbean, and selected areas of the United States; one examining links between DNA sequence variations in specific genes associated with key physiological functions involved in CVD development and CVD risk factors among Japanese and Pacific Islanders; and one seeking to 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 examines new risk factors that promote or inhibit LDL damage and inflammatory responses in the artery wall. Researchers are seeking 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 examining the influences of diet and exercise on adiposity and regional fat distribution and the subsequent relationship between these two factors and the development of CVD. Another is tracking the development of cardiovascular, behavioral, and physiological risk factors in Hispanic children and adolescents.

An ancillary study to the 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; 50 percent of the population will be Hispanic.

Treatment and Prevention

Many evidence-based guidelines have been developed for the treatment of cardiovascular, lung, and blood diseases, but they are often not adopted in routine clinical practice. In addition, recent studies have shown

substantial differences in physician decision-making for cardiac diagnostic and therapeutic interventions after controlling or adjusting for SES and reimbursement system. Differences based on race and sex have been demonstrated, but the reasons behind them and possible avenues for modifying them have not been articulated. In 2002, the Institute launched a program to identify obstacles to the implementation of national evidence-based guidelines and to develop effective interventions to stimulate their use.

Because CVD evolves over decades, early intervention programs to reduce multiple risk factors can aid in preventing CVD in later years. To this end, the Institute supports several investigator-initiated intervention studies among diverse populations. Included is a project to compare the effectiveness of a community-based intervention using neighborhood health care workers to a program that provides assistance through referral to primary care resources. Individuals are encouraged to lower their blood pressure, LDL-cholesterol level, and dietary fat intake; increase their physical activity; and stop smoking. High-risk siblings of blacks with premature coronary disease are targeted. Another project is using churches to promote adoption of a healthy lifestyle among blacks. Scientists are evaluating the effectiveness of two nutrition and exercise interventions conducted at several black churches in Atlanta. A third project is seeking to determine how demographic and cultural factors contribute to diet and sedentary practices that lead to CVD among Hispanic women in order to develop a cardiovascular intervention program tailored to this population.

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 groupsblacks, Asians, Hispanics, and American Indians.

- National Physicians' Network: Provides continuing education opportunities and treatment information to clinicians and other health professionals who provide health care to blacks. A Web-based interactive self-study education program for doctors and nurses has been developed and is being tested.
- National Asian American and Pacific Islanders Heart Health Outreach Project: Develops culturally and linguistically appropriate activities to increase community awareness of heart disease and its associated risk factors and promotes the adoption of heart-healthy lifestyles among a diverse Asian population.
- Salud para su Corazón: Disseminates information on CVD prevention, intervention, and treatment and promotes heart-healthy behaviors in Hispanic communities.
- Strengthening the Heartbeat of American Indian/ Alaska Native Communities: Develops culturally appropriate informational material to encourage heart-healthy behavior in three tribal communities.

In addition to the activities mentioned above, the Institute prepares publications on CVD prevention for minority populations. Included are:

- *Improving Cardiovascular Health in African AmericansPackage of Seven Easy-To-Read Booklets*
- *Package of Eight Easy-To-Read Booklets in Spanish and English on Preventing Heart Disease*
- *From Heart to Heart: A Bilingual Group Discussion Guide (includes videotape*) in English and Spanish
- *Bringing Heart Health to Latinos: A Guide for Building Community Programs*
- *Photonovella and CVD Prevention Workbook*.

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 in the etiology and pathophysiology of high blood pressure include:

- Molecular Genetics of Hypertension (see Chapter 9): Determines 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): Uses a collaborative network of investigators to identify genes associated with high blood pressure and to research the interactions between genetic and environmental determinants of hypertension in specific minority populations.

The Institute supports a number of investigator-initiated projects to examine antecedents of hypertension in children to determine racial differences in blood pressure regulation. Researchers are investigating 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.

Nitric oxide (NO) is associated with blood pressure regulation and may influence the development of hypertension. A new study assesses the importance of vascular NO production in the regulation of cardiovascular responses to stress and racial and gender differences in this process.

Impaired sodium regulation also appears to be linked to the development of hypertension. Scientists are investigating various kidney proteins that regulate sodium reabsorption and have found associations of some genetic variants of these proteins with hypertensive blacks. Another group of scientists is 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. A third group 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 elucidate the genetic basis and phenotypic characterization of salt-sensitive hypertension in blacks.

Scientists are also examining the influence of SES 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 the 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.

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 dietary components (i.e., 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.

Asians living in rural China are the focus of a project to identify genes associated with hypertension. By selecting an isolated population, researchers expect that the genetic factors contributing to the disorder will be less heterogeneous and thus more readily detected.

Hypertension associated end-stage renal disease is more prevalent among blacks than whites. Researchers are seeking to identify genes linked to this disorder among blacks. Once the genes are identified, they will

serve as a genetic basis for detecting high risk individuals and developing prevention interventions and treatment strategies.

Treatment and Prevention

Identifying effective treatment strategies for various populations requires large-scale studies with representative populations in sufficient numbers.

- ALLHAT (see Chapter 11): Compares 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, using a subset of these groups, determines 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.
- PREMIER (see Chapter 9): Compares the effectiveness of two multicomponent lifestyle interventions on blood pressure control. Interven-tions include reduced salt intake, increased physical activity, moderation of alcohol intake, and weight loss. In addition, one of the two interventions includes the DASH diet; 40 percent of the participants are black.

Understanding racial differences in blood pressure control is an area of major interest for the Institute. Scientists are examining whether variation in genes of the renin-angiotensin-aldosterone system predicts differences in blood pressure response to diuretic therapy among hypertensive blacks and whites. Another group is focusing on variations in the ACE gene between blacks and whites to explain racial differences in the antihypertensive responsiveness to ACE inhibitors.

Because stress may be a major contributor to CVD among blacks, interventions to reduce stress, such as Transcendental Meditation and aerobic activities, are being tested in this population to evaluate their effectiveness in reducing blood pressure levels. Another intervention being evaluated involves the ability of emotional disclosure writing to lower blood pressure; 71 percent of the participants are minorities.

The NHLBI is concerned about the lack of treatment adherence in minorities and individuals living in poverty. To address this issue, it has initiated a program to evaluate innovative yet practical methods to overcome patient, provider, and medical systems barriers that obstruct treatment adherence among racial and ethnic minorities and persons living in poverty in the United States. One project is determining whether an electronic home monitor that can transmit vital signs from a patient's home to a physician's office can improve hypertension care among a black patient population. Another project is testing the effectiveness of a multicomponent adherence promotion intervention among low-income blacks. It incorporates individual assessment and tailored feedback to help patients develop behavior management skills that enhance consistent medication use.

Education

The NHBPEP (see Chapter 2) has developed a number of outreach programs to inform minority populations of the importance of blood pressure control. Included among them are a public information center accessible by a toll-free number that provides material 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. They include:

- *Control de la Presión Arterial Alta: Guía Para La Mujer de Edad Mayor*
- *Controlling High Blood Pressure: A Guide for Older Women* in English and Spanish
- *Take StepsPrevent 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*
- *Spice Up Your Life! Eat Less Salt and Sodium*
- *Protect Your Heart! Prevent High Blood Pressure.*

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 among these populations.

Scientists are also interested in the protective effect of high density lipoproteins (HDL). One study is focusing on isolating and characterizing native HDL species in order to determine their structure and function. Research findings could 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, will also be monitored.

Education

The NCEP (see Chapter 2) has prepared a number of publications for minority audiences. Two booklets, in Spanish and English, explain what Hispanic families can do to reduce their risk of heart attack or stroke. Cookbooks designed for minority audiences are also available; they contain recipes that are low in both fats, especially saturated fat, and cholesterol:

- *Learn Your Cholesterol Number* in Spanish and English
- *Protect Your HeartLower Your Blood Cholesterol* in Spanish and English
- *Heart-Healthy Home Cooking African American Style*
- *Delicious Heart-Healthy Latino Recipes*
- *Cut Down on FatNot on Taste* in Spanish and English
- *Be Heart Smart! Eat Foods Lower in Saturated Fat and Cholesterol*
- *Empower Yourself! Learn Your Cholesterol Number*.

Obesity

Etiology

The latest NHANES data show a continued rise in the proportion of Americans who are overweight and 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 the influence of these changes on ethnic difference in blood pressure regulation. Another project, using data from the NHGS, 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 this weight gain and retention is the focus of a project being conducted within a predominantly black and Hispanic population of pregnant adolescents.

Prevention

The NHLBI has initiated programs to prevent obesity in high-risk children.

- GEMS (see Chapter 11): Tests 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.
- PATHWAYS (see Chapter 11): Tests school-based interventions to prevent obesity in American Indian elementary school children.

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.

A school-based study involving predominately minority children is determining whether reduced use of television, videotapes, and video games prevents obesity. Another 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.

Black women are the subjects of a weight management program specifically tailored to their psychosocial, sociocultural, and health perspectives and life circumstances. A study is using data from the NHANES III to determine whether multiple perceptions and behaviors related to weight loss cluster according to sociodemographic characteristics. Its results should provide information that will contribute to the design of culturally sensitive intervention strategies for minorities. Blacks and Mexican-Americans at various SES levels constituted the major portion of the population surveyed.

Education

The NHLBI OEI (see Chapter 2) has prepared two booklets on losing excess weight targeted to 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): Evaluates school-community linked interventions to prevent the decline in physical activity in adolescent girls; approximately 37 percent of participants 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 that seek 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 is also seeking to determine the degree of generalization of activity from mother to husband and children.

Education

The Institute has prepared two booklets for minorities on why physical activity is important and ways to become more physically active:

- *Stay Active and Feel Better* in English and Spanish
- *Energize Yourself! Stay Physically Active*.

Smoking

The Institute supports a number of investigator-initiated smoking intervention and follow-up cessation maintenance studies that specifically target minorities. Two studies are directed toward minority pregnant women. One of them will evaluate the effectiveness of a smoking cessation program for pregnant smokers delivered as part of routine care by nurses. The other will bring together prenatal care providers with researchers to assess the effectiveness of three programs to reduce smoking among pregnant women; blacks and Hispanics will make up a significant portion of the participants.

Investigators 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 tracking study of minority youths to assess the extent of smoking onset and cessation, identify determinants of smoking onset, and determine predictors of cessation; a study of elderly smokers40 percent minorityto 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 written two booklets on smoking cessation for minorities:

- *Kick the Smoking Habit* in English and Spanish
- *Refresh Yourself! Stop Smoking*.

Psychosocial Factors

The NHLBI has initiated research on the impact of depression, anxiety, and lack of social support on prognosis after a CHD event.

- ENRICHD (see Chapter 11): Determines the effects of psychosocial interventions on morbidity and mortality in post-MI patients who are depressed and socially isolated and/or who perceive themselves as lacking support from family and friends; 35 percent of the participants are minorities.

The Institute also supports investigator-initiated research on the role of race and ethnicity, psychosocial and environmental factors, and low SES in the development of CHD. Investigators are targeting their efforts on the role of biobehavioral factors in the etiology, pathogenesis, and course of CHD.

Additional areas of interest include the genetic basis of aggression and the relationships between behavioral risk-promoting variables (psychosocial stress, smoking, poor diet, physical inactivity); presumed mediating variables (sympathetic nervous system activity and insulin metabolism); and CHD risk factors; 50 to 65 percent of the population within these projects 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): Elucidates the pathophysiological basis for excess morbidity and mortality from ischemic heart disease in blacks, and subsequently develops therapeutic strategies to address these problems.

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 mellitus 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 among 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 these 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 will determine if the relative excess of androgen found in black women contributes to an accelerated disease pathway. Specifically, they are seeking 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 an epidemiologic 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 define dietary factors that may contribute to elevated risk for CVD.

Treatment

The NHLBI supports clinical trials to determine the benefits of various strategies to reduce CVD among diabetics or treat patients with coronary artery disease and diabetes.

- ACCORD (see Chapter 11): Evaluates the benefits of different therapies to reduce CVD in adult-onset diabetes; 33 percent of the participants are minorities.
- BARI 2D (see Chapter 11): Evaluates 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, determines if insulin-providing drugs offer advantages or risks compared to insulin-sensitizers (drugs that enhance insulin action); 33 percent of the participants will be from minority populations.

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 illustrates 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. 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 such a population.

Circadian change in airway function is an important aspect of asthma, as more than 70 percent of deaths and 80 percent of respiratory arrests occur during sleep. Focusing on nocturnal asthma, researchers are investigating the mechanisms that cause the changes in airway function 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): Establishes 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): Determined that 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): Establishes 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): Establishes partnerships between minority-serving institutions and research-intensive institutions to conduct studies on the causes of and corrections for disparities in asthma among racial/ethnic, low SES, and other groups. Reciprocal training is encouraged to ensure culturally sensitive projects.

The Institute is also 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. The Institute supports a number of investigator-initiated projects to evaluate the effectiveness of various strategies to control asthma. One study, conducted in black communities in Baltimore, is examining the effectiveness of two asthma interventions in reducing emergency room visits, improving adherence to medication schedules, and altering 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 examines whether shared decision-making between patient and physician in choosing asthma therapy improves adherence; 82 percent of the participants are minority.

A New York City-based study is establishing a collaboration between school nurses and primary care physicians to form a network of care focused on prevention of asthma attacks. The project seeks to identify school children with asthma and work with their families and physicians to develop an asthma management plan that includes supervision of drug treatment at school. The project is referring children who lack continuing care to physicians who follow the NAEPP Guidelines.

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 material on asthma treatment and control directed to audiences with low literacy:

- Facts About Controlling Your Asthma
- El asthma: cómo controlar esta enfermedad.

Chronic Lung Disease

The NHLBI supports research on prevention of chronic lung disease (CLD) in preterm infants.

- Inhaled Nitric Oxide for the Prevention of Chronic Lung Disease (see Chapter 9): Determines if low-dose inhaled NO will reduce CLD in premature newborns (gestational age less than 34 weeks and birth weight between 500 and 1250 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): Investigates whether low-dose inhaled NO administered to preterm infants between 500 and 1250 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. Institute-initiated research directed towards understanding the disproportionate prevalence of sarcoidosis among blacks and women include:

- ACCESS (see Chapter 10): Assesses the role of environmental and familial factors in the etiology of sarcoidosis; 43.5 percent of the study participants are minorities.
- Sarcoidosis Genetic Linkage Consortium (see Chapter 9): Identifies genes linked to sarcoidosis susceptibility and determines how they interact with environmental risk factors to cause sarcoidosis; 100 percent of the participants are black.

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. In 2002, the Institute initiated a program to develop new approaches to measure the interrelationship between sleep disorders and heart, lung, and blood diseases. One study will examine the interrelationship between sleep apnea and heart failure and the mechanisms leading to cardiovascular stress when the two occur together.

The Institute also supports a wide spectrum of investigator-initiated projects to elucidate cardiovascular and other health consequences of SDB. Ongoing studies of SDB in various community settings are assessing its health risks within specific ethnic populations, including African-Americans, Hispanics, Asians, and American Indians. 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 initiated in 2002 will 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

Since 1993, the NHLBI has funded five annual competitions for Tuberculosis Academic Awards (TBAAs). The broad goal of the TBAA program is to improve prevention, management, and control of TB by supporting increased opportunities for health-care practitioners to learn modern principles and practices. The objectives are to promote coordinated clinical approaches to the care of patients of various ethnic backgrounds who have TB; raise awareness among health care providers of unique ethnic cultural, and socioeconomic dimensions of TB; focus educational efforts in areas where TB incidence is persistently high (e.g., immigrant communities, refugee centers, homeless shelters, correctional facilities); promote development of minority faculty capable of providing appropriate instruction in diagnosis and management of TB; and enhance TB education programs in minority medical schools and in the communities they serve. A total of 27 awards have been made since inception; the final cycle of the award ended in June 2002.

In 2001, the Institute initiated a program on Genetic Aspects of Tuberculosis in the Lung. Four of the 10 awards were given to institutions conducting genetic studies in humans to characterize genes associated with TB susceptibility and host immune responses to infection. Major minority participation is expected.

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.

The NHLBI also supports investigator-initiated research to improve TB control among minority populations. Two projects are evaluating educational strategies to improve adherence to medication regimes and regular clinic visits among TB-infected adolescents from minority communities in California. The program, based in San Diego, is specifically directed towards Hispanic adolescents; the Los Angeles program encompasses Hispanic and Asian-American communities. A third project has been effective in administering TB prophylaxis to a mostly homeless population in San Francisco. In Chicago, investigators are testing a TB community-outreach intervention that is modeled after a program previously developed for AIDS prevention among injection-drug users. Another study, located in the Harlem community of New York City, is comparing several methods of ensuring completion of treatment among inner-city TB patients. An extension of this research has been funded to test a new strategy to promote adherence to therapy.

Blood Diseases

Sickle Cell Disease

SCD affects approximately 72,000 people in the United States, most of whom trace their ancestry to Africa. The disease occurs in about 1 in every 500 blacks born in the United States.

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. Recently, the Institute launched a program to identify and characterize modifier genes responsible for variations in clinical progression and outcome of SCD.

- Comprehensive Sickle Cell Centers Program (see Chapter 9): Provides a multidisciplinary research approach to expedite development and application of new knowledge for improved diagnosis and treatment of SCD and prevention of its complications.

The Institute also supports a large portfolio of investigator-initiated basic and clinical research in SCD.

Basic Research

The NHLBI sponsors research into gene therapy as a possible approach to finding a cure for all SCD patients. This technically difficult work is being pursued actively by researchers around the country.

Animal models of SCD are being developed and used to evaluate new drugs and to study gene regulation, gene therapy, blood flow, and pathogenic mechanisms. In 2001 scientists corrected SCD in mice using gene therapy.

The NHLBI Reference Laboratory to Evaluate Therapies for SCD is using a battery of standardized tests for preclinical evaluation of potential new therapeutic agents for SCD.

Over the past few years, support has increased for the idea that SCD should be viewed as a disease of the blood vessels as well as a disease of abnormal hemoglobin. Researchers are investigating the effects of blood cells on the endothelium (the lining of blood vessels) in SCD patients, with the expectation that the findings may ultimately point the way to new therapies.

Clinical Research

Since 1991, the Multicenter Transplantation Study has been evaluating the use of bone marrow transplantation for children with SCD who have HLA-matched sibling donors. Researchers are currently exploring a mixed-chimerism protocol for children that would allow a less-toxic regimen than the one currently used before a transplant. The Sibling Donor Cord Blood Banking and Transplantation study is collecting sibling-donor cord blood in families that currently have a child with sickle cell anemia. The cord blood will be transplanted into affected children. The Induction of Stable Chimerism for Sickle Cell Anemia study is investigating, in a minority population, a transplant procedure that significantly reduces the toxicity of hematopoietic cell transplantation, yet retains its therapeutic benefit. The novel approach relies upon the ability of the host to accept and maintain the cells from the donor under conditions achieved by combining less toxic, nonmyeloablative, pretransplant therapy with modulated postgrafting immunosuppression to control host-versus-graft and graft-versus-host reactions.

An infrastructure for collaboration among U.S. centers treating, transplanting, and collecting data on sickle cell anemic patients has been established.

The Cord Blood Transplantation Study has collected umbilical cord blood from a diverse population for transplantation; approximately 15 percent have come from blacks, 8 percent from Asian/Pacific Islanders, 14 percent from Hispanics, and 5 percent from mixed/other ethnicity. Minorities needing cord blood for transplantation should find a match more easily from this diverse pool.

The Multicenter Study of Hydroxyurea (MSH) in Sickle Cell Anemia Adult Follow-up is continuing to observe the patient cohort that participated in the adult hydroxyurea clinical trial that ended successfully in 1995. In addition to addressing issues of long-term safety, the researchers are also looking a the long-term efficacy of hydroxyurea in maintaining elevated fetal hemoglobin levels.

The Pediatric Hydroxyurea Study Group was established in 1994 to test the safety and efficacy of hydroxyurea use in children and infants with SCD. It showed that children respond to the medication in a manner similar to adults; fetal hemoglobin levels and total hemoglobin increased while complications associated with sickle cell anemia decreased. In addition, the study demonstrated that the drug does not adversely affect growth and development between ages 5 and 15 years. To study the effectiveness of hydroxyurea in preventing onset of chronic organ damage in young children with end-stage sickle cell anemia, the NHLBI began the Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG) in September 2000. The trial will recruit 200 children between the ages of 6 months and 2 years with the disorder.

Several investigators are examining the unusual features of basal nutrient metabolism and resting energy expenditure that have been found in children and adults with SCD. The studies may improve understanding of impaired growth seen in children with SCD and suggest changes in nutritional intake that may be required by both children and adults with SCD.

The STOP II trial was initiated in 2000 to take advantage of the findings from the original STOP trial, which showed that periodic blood transfusions can reduce the incidence of stroke in high-risk patients identified with transcranial Doppler ultrasound. Investigators are seeking to optimize the treatment in a minority pediatric population.

The role of daily stress, mood, and coping processes related to SCD pain is being studied to determine whether stress and negative mood are associated with more frequent and severe pain. If a causal link is established, researchers will seek to develop an effective pain management intervention that can improve the quality of life for SCD patients.

Education

The NHLBI has developed a number of publications on SCD that target minorities:

- *Datos Sobre La Anemia Falciforme* (Facts About Sickle Cell Anemia)
- *Facts About Sickle Cell Anemia*
- *Management and Therapy of Sickle Cell Disease*.

Cooley's Anemia

Cooley's anemia is an inherited disorder of the red blood cell that affects primarily people of Mediterranean, African, Southeast Asian, Chinese, and Asiatic Indian origin.

NHLBI research in Cooley's anemia includes 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 to enhance fetal hemoglobin production (hydroxyurea and butyrate), investigation of gene therapy approaches to cure the disease, prevention of bone disease, optimum treatment of hepatitis, treatment of heart disease and iron overload, noninvasive ways of measuring iron burden, development of in utero therapies to treat or cure affected fetuses, and studies to improve the safety of the Nation's blood supply.

In FY 2000, the Institute initiated a program to establish a network of clinical research centers capable of performing clinical trials of promising new therapeutic agents.

Thalassemia (Cooley's Anemia) Clinical Research Network (see Chapter 11): Establishes a network of clinical centers to study the effectiveness of specific interventions to reduce morbidity and mortality from the disorder.

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) seeks to answer questions on benefits and risks of HRT, 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.

13. Research Training and Career Development Programs

NHLBI Research Training and Career Development Obligations: Fiscal Years 1992–2002

	Dollars in Millions		
Year	Graduate Training Programs (NRSA)*	Research Career Programs	Fellowship Programs (NRSA)*
1992	39.8	29.1	6.4
1993	37.2	29.6	6.2
1994	40.0	31.4	7.3
1995	39.9	31.7	7.1
1996	40.2	33.9	7.3
1997	41.9	33.9	6.8
1998	42.0	36.0	7.5
1999	50.3	47.8	9.2
2000	55.216	54.184	8.856
2001	63.369	57.47	8.926
2002	68.1	63.5	9.45

* National Research Service Awards (NRSA).

Note: Numbers of awards may not agree with other tables due to the method of counting supplements.

NHLBI Full-Time Training Positions: Fiscal Years 1992–2002

	Number of Trainees		
Year	Graduate Training Programs (NRSA)*	Research Career Programs	Fellowship Programs (NRSA)*
1992	1,419	358	221
1993	1,346	358	211
1994	1,469	373	242
1995	1,449	371	241
1996	1,437	397	248
1997	1,365	398	230
1998	1,475	420	248
1999	1,238	422	252
2000	1,603	459	238
2001	1,670	509	223
2002	1,730	543	214

* National Research Service Awards (NRSA).

Note: Numbers of 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 2002

	Number of Awards Obligated	Trainees (Full-time Training Positions)	Direct Cost	Indirect Cost	Total Cost	Percent of Total NHLBI Training Program Dollars
Fellowship Programs						
Predoctoral Fellowship Award (F31)	18	18	$478,255	$	$478,255	0.6%
Individual NRSA (F32)	194	194	$8,887,002	$	$8,887,002	11.5%
Senior Fellowships NRSA (F33)	2	2	$84,278	$	$84,278	0.1%
Subtotal, Fellowships	214	214	$9,449,535		$9,449,535	12.2%
Graduate Training Programs						
Institutional NRSA (T32)	207	1,482	$58,217,132	$4,783,012	$62,998,662	81.2%
Minority Institutional NRSA (T32)	5	39	$1,037,480	$54,714	$1,092,194	1.4%
Off-Quarter Professional Student Training NRSA (T34, T35)	22	179	$1,827,315	$159,792	$1,987,107	2.6%
Short-Term Training for Minority Students (T35M)	30	30	$1,866,916	$190,420	$2,057,336	2.6%
Subtotal, Training Grants	264	1,730	$62,945,988	$5,174,101	$68,135,299*	87.8%
Total, Training Programs	**470**	**1,944**	**$72,758,615**	**$5,174,101**	**$77,584,834***	**100%**

* Excludes assessment of $1,584,000.

History of Training Obligations by Activity: Fiscal Years 1992–2002

	Dollars in Thousands										
	1992	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Fellowship Programs											
Predoctoral Fellowship Award (F31)	$55	$97	$199	$304	$551	$388	$466	$346	$248	$264	$478
Individual NRSA (F32)	6,041	5,867	6,853	6,651	6,483	6,281	6,969	8,807	8,517	8,515	8,887
Senior Fellowships NRSA (F33)	141	141	99	99							
Intramural NRSA (F35)	146	70	69	49							
Subtotal, Fellowships	6,383	6,175	7,220	7,103	7,267	6,848	7,560	9,243	8,857	8,926	9,449
Graduate Training Programs											
Institutional NRSA (T32)	37,355[A]	34,846B	36,534C	36,270[D]	36,718E	38,253F	37,904[G]	45,551[H]	50,507I	58,516J	62,999[K]
Minority Institutional NRSA (T32)	684	35	735	982	679	898	706	901	1,167	996	1,092
Off-Quarter Professional Student Training NRSA (T34, T35)	1,106	1,744	1,132	951	1,001	1,216	1,435	1,384	966	1,974	1,987
MARC (T36)	22	15	5	5	5	5	5	5	5	5	
Short-Term Training for Minority Students (T35M)	717	573	1,616	1,760	1,834	1,612	1,964	2,494	2,570	1,877	2,057
Subtotal, Training Grants	39,884	37,213	40,022	39,968	40,237	41,984	42,014	50,335	55,215	63,368	68,135
Total, Training Programs	**$46,267[A]**	**$43,388[B]**	**$47,242[C]**	**$47,071[D]**	**$47,504[E]**	**$48,832[F]**	**$49,574[G]**	**$59,578[H]**	**$64,072[I]**	**$72,294[J]**	**$77,585[K]**

A Excludes Assessment of $466,000.
B Excludes Assessment of $888,000.
C Excludes Assessment of $864,000.
D Excludes Assessment of $964,000.
E Excludes Assessment of $982,000.
F Excludes Assessment of $1,004,000.
G Excludes Assessment of $1,032,000.
H Excludes Assessment of $1,216,000.
I Excludes Assessment of $1,280,000.
J Excludes Assessment of $1,424,000.
K Excludes Assessment of $1,584,000.

Full-Time Training Positions by Activity: Fiscal Years 1992–2002

	Number of Positions										
	Fiscal Year										
	1992	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Fellowship Programs											
Predoctoral Fellowship Award (F31)	3	4	7	13	21	15	19	13	11	12	18
Individual NRSA (F32)	209	200	229	222	220	210	225	237	225	208	194
Senior Fellowships NRSA (F33)	4	4	4	4	7	5	4	2	2	3	2
Intramural NRSA (F35)	5	3	2	2							
Subtotal, Fellowships	221	211	242	241	248	230	248	252	238	223	214
Graduate Training Programs											
Institutional NRSA (T32)	1,240	1,124	1,237	1,201	1,216	1,179	1,423	1,185	1368	1,425	1,482
Minority Institutional NRSA (T32)	24	1	30	47	30	43	52	53	48	43	39
Off-Quarter Professional Student Training NRSA (T34, T35)	102	181	100	76	78	68			51	109	179
Short-Term Training for Minority Students (T35M)	53	40	102	125	113	75			136	93	30
Subtotal, Training Grants	1,419	1,346	1,469	1,449	1,437	1,365	1,475	1,238	1,603	1,670	1,730
Total, Training Positions	**1,640**	**1,557**	**1,711**	**1,690**	**1,685**	**1,595**	**1,723**	**1,490**	**1,841**	**1,893**	**1,944**

NHLBI Research Career Programs: Fiscal Years 1992–2002

	Number of Awards										
	Fiscal Year										
	1992	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Mentored Research Scientist Development Award for Minority Faculty (K01)						5	19	30	29	44	54
Minority Institution Faculty Mentored Research Scientist Development Award (K01)						1			11	9	2
Independent Scientist Award (K02)					3	8	14	18	27	34	33
Research Career Development Award (K04)	50	40	34	30	25	18	10	6	1		
Research Career Award (K06)	7	6	3	3	3	3	3	2	2	2	2
Preventive Cardiology Academic Award (K07)	18	14	11	7							
Preventive Pulmonary Academic Award (K07)	14	11	8	4							
Transfusion Medicine Academic Award (K07)	14	12	9	5	2						
Systemic Pulmonary and Vascular Disease Academic Award (K07)	6	11	11	15	11	9	3	3	1		
Asthma Academic Award (K07)		3	6	9	9	9	6	3			
Tuberculosis Academic Award (K07)		6	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
Clinical Investigator Development Award (K08)	152	180	208	222	254	267	278	262	257	241	236
Physician Scientist Award (K11)	79	60	46	22	12						
Minority School Faculty Development Award (K14)	18	15	12	11	15	9			4	1	
Research Development Award for Minority Faculty (K14)			13	28	36	34	37	22	7		
Mentored Patient-Oriented Research Career Development Award (K23)								13	36	58	90
Midcareer Investigator Award in Patient-Oriented Research (K24)								11	20	27	37
Mentored Quantitative Research Career Development Award (K25)										2	7
Clinical Research Curriculum Award (K30)								9	16	55	55
Total, Research Career Programs	**358**	**358**	**373**	**371**	**397**	**398**	**420**	**422**	**459**	**509**	**543**

NHLBI Research Career Program Obligations: Fiscal Years 1992–2002

	Dollars in Thousands										
	Fiscal Year										
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Mentored Research Scientist Development Award for Minority Faculty (K01)	$	$	$	$	$	$460	$1,723	$2,738	$3,650	$5,556	$5,711
Minority Institution Faculty Mentored Research Scientist Award (K01)						106	101	905	1,300	1,143	1,703
Independent Scientist Award (K02)					207	545	933	1,548	2,350	3,202	3,130
Research Career Development Award (K04)	3,221	2,595	2,224	2,006	1,693	1,226	684	568	69		
Research Career Award (K06)	239	194	102	104	105	103	103	70	70	70	69
Preventive Cardiology Academic Award (K07)	2,376	1,801	1,397	957							
Preventive Pulmonary Academic Award (K07)	1,332	1,040	726	309							
Transfusion Medicine Academic Award (K07)	1,452	1,155	868	485	326						
Systemic Pulmonary and Vascular Diseases Academic Award (K07)	894	1,820	1,863	2,295	1,715	1,415	386	423	113		
Asthma Academic Award (K07)		233	502	749	740	764	509	248			
Tuberculosis Academic Award (K07)		454	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
Clinical Investigator Development Award (K08)	11,733	14,125	16,635	18,090	21,093	22,238	23,122	29,741	30,189	29,263	29,295
Physician Scientist Award (K11)	6,598	5,110	3,993	1,903	1,023						
Minority School Faculty Development Award (K14)	1,265	1,081	893	810	1,158	729	618	445	862	98	

	Dollars in Thousands										
	Fiscal Year										
	1992	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Research Development Award for Minority Faculty (K14)			1,289	2,812	3,607	3,468	3,099	2,093	393		
Mentored Patient-Oriented Research Career Development Award (K23)								1,687	4,619	7,570	11,909
Midcareer Investigator Award in Patient-Oriented Research (K24)								1,054	2,072	2,877	4,058
Mentored Quantitative Research Career Development Award (K25)										272	921
Clinical Research Curriculum Award (K30)								1,772	3,163	3,073	3,090
Total, Research Career Program Obligations	**$29,110**	**$29,608**	**$31,398**	**$31,675**	**$33,862**	**$33,912**	**$36,069**	**$47,670**	**$54,184**	**$57,470**	**$63,514**

NHLBI Minority Biomedical Research Training, Career Development, and Research Supplements Program Obligations: Fiscal Years 1992–2002

	Dollars in Thousands										
	Fiscal Year										
	1992	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
MARC Summer Research Training Program	$20	$48	$31	$28	$32	$17	$	$10	$3,873	$20	$15
Mentored Research Scientist Development Award for Minority Faculty						460	1,723	2,738	3,650	5,556	5,711
MARC					5	5	5		5	5	
Minority Biomedical Research Support (MBRS)	2,672	2,540	2,433	2,313	2,503	2,722	2,978	3,423	3,873	3,165	2,793
Minority Institution Faculty Mentored Research Scientist Development Award						106	101	905	1,300	1,143	1,703
Minority Institution Research Training Program	684	608	735	982	679	898	706	901	1,167	996	1,092
Minority Predoctoral Fellowship	55	114	199	304	551	388	436	345	248	264	278
Minority Research Supplements Program	5,368	6,273	6,754	7,264	6,714	7,070	7,043	7,440	8,304	8,587	9,822
Minority School Faculty Development Award	1,265	1,081	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	717	573	1,616	1,760	1,834	1,612	1,964	2,494	2,570	1,876	2,057
Total, Minority Programs	**$10,781**	**$11,237**	**$13,950**	**$16,273**	**$17,223**	**$17,627**	**$18,922**	**$20,900**	**$22,548**	**$22,094**	**$23,471**

NHLBI Research Supplements Program by Award Type: Fiscal Years 1992–2002

	Number of Awards										
	Fiscal Year										
	1992	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Minority Supplements											
Investigator	45	51	46	49	42	38	31	32	33	33	46
Postdoctoral	25	29	31	39	49	47	50	47	42	41	33
Graduate	37	45	55	42	37	36	48	53	47	43	45
Undergraduate	22	20	35	27	12	23	25	17	19	12	17
High School	1	5	15	10	8	9	11	6		3	3
Post-Master/Post-Baccalaureate											2
Reentry Supplements					2	2	3	2	1	3	
Disability Supplements			8	4	3	3	2	1	5	4	5
Total, Research Supplements Program	**130**	**150**	**182**	**167**	**150**	**155**	**168**	**157**	**142**	**135**	**151**

NHLBI Research Supplements Program Obligations by Award Type: Fiscal Years 1992–2002

	Dollars in Thousands										
	Fiscal Year										
	1992	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Minority Supplements											
Investigator	$2,959	$3,270	$2,894	$3,319	$2,552	$2,412	$2,185	$2,331	$3,262	$3,430	$5,046
Postdoctoral	1,392	1,574	1,882	2,153	2,899	3,172	3,032	3,110	3,053	3,086	2,554
Graduate	843	1,263	1,585	1,402	1,116	1,181	1,527	1,806	1,791	1,818	1,864
Undergraduate	171	150	332	351	120	273	246	166	198	235	260
High School	3	16	61	40	27	32	53	27		18	33
Post-Master/ Post-Baccalaureate											65
Reentry Supplements					140	152	249	106	176	384	
Disability Supplements			357	277	194	165	96	72	282	187	474
Total, Research Supplements Program	**$5,368**	**$6,273**	**$7,111**	**$7,542**	**$7,048**	**$7,387**	**$7,388**	**$7,618**	**$8,762**	**$9,158**	**$10,926**

14. Geographic Distribution of Awards: Fiscal Year 2002

Geographic Distribution of Awards by State: Fiscal Year 2002
Dollars in Millions

Alabama	38.28
Alaska	0.10
Arizona	18.82
Arkansas	1.41
California	264.12
Colorado	43.21
Connecticut	38.52
Delaware	0.92
District of Columbia	35.36
Florida	28.17
Georgia	40.69
Hawaii	3.09
Idaho	0.13
Illinois	65.58
Indiana	21.02
Iowa	35.44
Kansas	3.41
Kentucky	17.02
Louisiana	12.18
Maine	9.65
Maryland	190.73
Massachusetts	259.41
Michigan	49.11
Minnesota	59.70
Mississippi	9.06
Missouri	57.61
Montana	0.63
Nebraska	5.50
Nevada	4.41
New Hampshire	4.15
New Jersey	14.95
New Mexico	7.54
New York	179.89
North Carolina	124.48
North Dakota	0.14
Ohio	97.80
Oklahoma	10.09
Oregon	16.45
Pennsylvania	151.06
Rhode Island	9.93
South Carolina	19.19
South Dakota	1.87
Tennessee	47.36
Texas	114.34
Utah	21.55
Vermont	17.63
Virginia	30.26
Washington	81.26
West Virginia	1.70
Wisconsin	65.59
Wyoming	0.17

Geographic Distribution of Awards by State or Country: Fiscal Year 2002

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Alabama								
Auburn University at Auburn	5	$1,423,328	5	$1,423,328		$		$
CFD Research Corporation	1	413,475	1	413,475				
Diversified Scientific, Inc.	1	329,611	1	329,611				
Gem Pharmaceuticals, Inc.	1	278,764	1	278,764				
Researchsouth, Inc.	1	98,322	1	98,322				
Tuskegee University	1	24,000	1	24,000				
University of Alabama at Birmingham	81	30,335,337	71	25,142,989	6	801,862	4	4,390,486
University of South Alabama	11	5,373,341	11	5,373,341				
Total Alabama	**102**	**38,276,178**	**92**	**33,083,830**	**6**	**801,862**	**4**	**4,390,486**
Arizona								
Arete Associates		13,025		13,025				
Arizona State University	4	1,096,629	4	1,096,629				
AzERx, LLC	1	95,000	1	95,000				
ImaRx Therapeutics, Inc.	1	100,000	1	100,000				
Niadyne, Inc.	1	99,997	1	99,997				
University of Arizona	42	17,412,718	36	14,914,777	5	743,140	1	1,754,801
Total Arizona	**49**	**18,817,369**	**43**	**16,319,428**	**5**	**743,140**	**1**	**1,754,801**
Arkansas								
Arkansas Children's Hospital Research Institute	2	415,114	2	415,114				
University of Arkansas at Pine Bluff	1	79,713	1	79,713				
University of Arkansas for Medical Sciences, Little Rock	4	918,714	4	918,714				
Total Arkansas	**7**	**1,413,541**	**7**	**1,413,541**				
California								
Advanced Brain Monitoring, Inc.	2	978,318	2	978,318				
American National Red Cross, Los Angeles	1	375,992					1	375,992
AntiCancer Inc.	1	451,736	1	451,736				
Applied Gene Technologies, Inc.	1	154,252	1	154,252				
Beckman Research Institute	1	350,000	1	350,000				
Blaufuss Multimedia	1	372,611	1	372,611				
Burnham Institute	4	1,585,085	4	1,549,500		35,585		
California Institute of Technology	3	518,638	2	468,522	1	50,116		
California State University, Northridge		130,212		130,212				
Cedars-Sinai Medical Center	9	2,962,682	8	2,769,585			1	193,097
Children's Hospital Los Angeles	9	5,468,040	9	5,468,040				
Children's Hospital Oakland	13	7,184,368	11	6,904,738	2	279,630		
Children's Hospital of Orange County	1	261,584	1	261,584				
Chronomed, Inc.	1	99,864	1	99,864				
City of Hope National Medical Center	2	1,976,139	2	1,976,139				
COR Therapeutics, Inc.	2	523,600	2	523,600				
Diagnostics for the Real World	3	381,465	3	381,465				
Fallbrook Engineering, Inc.	1	621,835	1	621,835				
Gen-Probe, Inc.	1	1,000,000					1	1,000,000

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
GenStar Therapeutics	2	475,000	2	475,000				
Good Samaritan Hospital	3	487,988	3	487,988				
Harbor-UCLA Research and Education Institute	9	3,567,970	6	1,970,970			3	1,597,000
Ichor Medical Systems	2	621,391	2	621,391				
Imetrx, Inc.	1	120,000	1	120,000				
Institute of Critical Care Medicine	1	180,093	1	180,093				
InterMune Pharmaceuticals, Inc.	1	208,842	1	208,842				
J. David Gladstone Institutes	14	7,410,189	13	7,360,073	1	50,116		
Jaycor	1	310,751	1	310,751				
KAIROS Scientific Inc.	1	148,431	1	148,431				
Kaiser Foundation Hospitals	1	302,549	1	302,549				
Kaiser Foundation Research Institute	8	5,807,317	4	1,838,648			4	3,968,669
La Jolla Bioengineering Institute		576,226		576,226				
La Jolla Institute for Molecular Medicine	3	1,026,264	3	1,026,264				
Loma Linda University	7	1,808,816	7	1,808,816				
Magnesensors, Inc.	1	458,099	1	458,099				
Mallard Medical, Inc.	1	250,170	1	250,170				
MedicalWorks Inc.	1	497,617	1	497,617				
MicroIslet Inc.	1	103,320	1	103,320				
Northern California Institute for Research and Education	6	2,750,918	6	2,750,918				
Oncosis, Inc.		1,000,000		1,000,000				
OPTIME Therapeutics Inc.	1	104,325	1	104,325				
Palo Alto Institute for Research and Education	1	223,200	1	223,200				
Palo Alto Medical Foundation Research Institute	2	1,260,227	2	1,260,227				
PharmaSonics, Inc.	2	570,500	2	570,500				
Philogenesis, Inc.	1	163,350	1	163,350				
Photon Imaging, Inc.	1	101,361	1	101,361				
PhytaGenics, Inc.	1	73,771	1	73,771				
Polymer Technology Group Inc.	1	333,790	1	333,790				
Rand Corporation	1	665,975	1	665,975				
Salk Institute for Biological Studies	2	948,409	2	948,409				
San Diego State University	6	3,235,702	6	3,235,702				
Sangart, Inc.	1	354,234	1	354,234				
Scripps Research Institute	45	22,961,679	40	21,973,027	5	988,652		
Sidney Kimmel Cancer Center	2	878,175	2	878,175				
SRI International	1	361,344	1	361,344				
Stanford University	67	30,473,010	53	24,711,267	12	1,404,981	2	4,356,762
Torrey Pines Institute/Molecular Studies	1	288,134	1	288,134				
Twenty First Century Medicine, Inc.	1	164,852	1	164,852				
University of California, Berkeley	9	2,841,340	7	2,626,203	2	215,137		
University of California, Davis	26	9,079,778	23	7,238,012	1	151,733	2	1,690,033
University of California, Irvine	16	5,339,585	12	2,866,650	2	72,177	2	2,400,758
University of California, Lawrence Berkeley National Laboratory	15	6,253,010	14	6,253,009	1	1		
University of California, Los Angeles	65	30,598,800	55	25,753,154	6	602,317	4	4,243,329

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
University of California, Riverside	4	1,129,958	4	1,129,958				
University of California, San Diego	88	44,241,798	76	39,091,115	9	2,462,249	3	2,688,434
University of California, San Francisco	90	38,499,392	83	35,593,839	6	1,721,024	1	1,184,529
University of California, Santa Barbara	2	451,385	2	451,385				
University of Southern California	23	8,542,356	23	8,542,356				
Veterans Medical Research Foundation, San Diego		99,999		99,999				
WebSciences International	1	370,125	1	370,125				
Total California	**596**	**264,117,936**	**524**	**232,385,615**	**48**	**8,033,718**	**24**	**23,698,603**
Colorado								
Aerophase, Inc.	1	382,500	1	382,500				
Colorado State University	3	834,000	2	795,698	1	38,302		
Keystone Symposia	2	40,000	2	40,000				
Myogen, Inc.	1	576,544	1	576,544				
National Jewish Medical and Research Center	46	17,854,660	39	17,486,760	5	225,600	2	142,300
Rose Biomedical Development Corporation	1	99,495	1	99,495				
University of Colorado at Boulder	10	1,864,007	5	1,513,436	5	350,571		
University of Colorado Health Sciences Center	62	21,557,832	55	19,765,291	7	1,792,541		
Total Colorado	**126**	**43,209,038**	**106**	**40,659,724**	**18**	**2,407,014**	**2**	**142,300**
Connecticut								
John B. Pierce Laboratory, Inc.	5	1,269,090	4	1,230,770	1	38,320		
MGS Research Inc.	1	704,862	1	704,862				
Standing Stone, Inc.	1	88,043	1	88,043				
University of Connecticut School of Medicine and Dentistry	15	6,035,292	15	6,035,292				
University of Connecticut, Storrs	2	232,516	1	178,750	1	53,766		
US Nanocorp, Inc.	1	320,041	1	320,041				
Wesleyan University	1	284,000	1	284,000				
Yale University	65	29,585,793	55	22,574,835	9	1,943,109	1	5,067,849
Total Connecticut	**91**	**38,519,637**	**79**	**31,416,593**	**11**	**2,035,195**	**1**	**5,067,849**
Delaware								
Alfred I. duPont Hospital for Children	1	121,689	1	121,689				
Compact Membrane Systems, Inc.	2	200,000	2	200,000				
University of Delaware	2	602,250	2	602,250				
Total Delaware	**5**	**923,939**	**5**	**923,939**				
District of Columbia								
American Institutes for Research	1	808,873					1	808,873
American National Red Cross	17	6,036,972	16	5,739,301			1	297,671
American Registry of Pathology, Inc.	1	273,836	1	273,836				
Catholic University of America	1	153,100	1	153,100				
Children's National Medical Center	1	427,271	1	427,271				
Children's Research Institute	5	2,011,385	3	1,686,960	1	44,212	1	280,213
George Washington University	11	7,008,011	9	2,885,736			2	4,122,275
Georgetown University	16	6,133,999	15	6,085,851	1	48,148		

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Health Media Lab, Inc.	1	100,000	1	100,000				
Healthmark Multimedia, LLC	1	116,481	1	116,481				
Howard University	4	3,511,056	2	1,171,119			2	2,339,937
MedStar Research Institute	4	7,604,964	3	6,063,482			1	1,541,482
Smithsonian Institution		50,000		50,000				
State of the Art, Inc.	1	696,843	1	696,843				
U.S. Department of Agriculture	1	175,000	1	175,000				
U.S. Department of Energy	1	90,000					1	90,000
U.S. Department of Veterans Affairs Medical Center	1	158,837					1	158,837
Total District of Columbia	**67**	**35,356,628**	**55**	**25,624,980**	**2**	**92,360**	**10**	**9,639,288**
Florida								
Alpha-1 Foundation	1	30,000	1	30,000				
Florida Agricultural and Mechanical University		320,118		320,118				
Florida Institute of Technology	1	243,250	1	243,250				
Florida International University		192,326		192,326				
Florida State University	3	885,670	3	885,670				
Infinite Biomedical Technologies, LLC	2	789,613	2	789,613				
Mount Sinai Medical Center, Miami Beach		3,000,000		3,000,000				
Nanoptics, Inc.	1	709,308	1	709,308				
Nemours Children's Clinics	1	179,455	1	179,455				
University of Central Florida	1	247,405	1	247,405				
University of Florida	39	12,821,760	35	10,969,695	3	236,264	1	1,615,801
University of Miami	15	5,434,449	12	3,479,042	1	374,919	2	1,580,488
University of Miami, Coral Gables	2	2,205,057	1	2,051,734	1	153,323		
University of South Florida	5	1,113,131	5	1,113,131				
Total Florida	**71**	**28,171,542**	**63**	**24,210,747**	**5**	**764,506**	**3**	**3,196,289**
Georgia								
Atlanta Cardiovascular Research Institute	2	372,847	2	372,847				
Clark Atlanta University	1	131,283	1	123,723		7,560		
Emory University	65	21,581,947	61	19,723,021	3	292,409	1	1,566,517
Georgia Institute of Technology	4	1,947,374	4	1,947,374				
Georgia State University	1	348,247	1	348,247				
Medical College of Georgia	26	11,455,519	24	11,141,798	2	313,721		
Mercer University Macon	1	159,255	1	159,255				
Morehouse School of Medicine	8	3,541,128	7	3,333,187	1	207,941		
U.S. Centers for Disease Control and Prevention	2	755,000					2	755,000
University of Georgia	2	400,512	2	400,512				
Total Georgia	**112**	**40,693,112**	**103**	**37,549,964**	**6**	**821,631**	**3**	**2,321,517**
Hawaii								
Pacific Health Research Institute	1	903,262	1	903,262				
University of Hawaii at Hilo		299,188		299,188				
University of Hawaii at Manoa	2	1,883,248	1	204,450			1	1,678,798
Total Hawaii	**3**	**3,085,698**	**2**	**1,406,900**			**1**	**1,678,798**

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Idaho								
Boise State University	1	127,508	1	127,508				
Total Idaho	**1**	**127,508**	**1**	**127,508**				
Illinois								
AJ Medical Engineering	1	150,000	1	150,000				
American Academy of Pediatrics	1	484,359	1	484,359				
Biomedical Acoustics Research Company	1	353,188	1	353,188				
BioTechPlex Corporation	2	483,978	2	483,978				
Children's Memorial Hospital, Chicago	1	98,010	1	98,010				
cue BIOtech, Inc.	1	99,888	1	99,888				
Evanston Northwestern Healthcare Research Institute	4	1,104,718	4	1,104,718				
Finch University of Health Sciences, Chicago Medical School	2	557,000	2	557,000				
Hektoen Institute for Medical Research	1	595,613	1	595,613				
Illinois Institute of Technology	2	807,754	2	807,754				
Loyola University Medical Center	20	5,908,062	18	5,852,023	2	56,039		
Midwestern University	1	136,720	1	136,720				
Nanosphere, Inc.	1	421,850	1	421,850				
Northwestern University, Chicago	41	13,152,303	37	10,384,584	1	52,084	3	2,715,635
Northwestern University, Evanston	10	3,044,022	9	2,825,903	1	218,119		
Rush-Presbyterian-St. Lukes Medical Center	11	5,524,451	10	4,290,830			1	1,233,621
SloWave Inc.	1	526,236	1	526,236				
Southern Illinois University, Carbondale	1	321,749	1	321,749				
Southern Illinois University School of Medicine	2	446,042	2	446,042				
University of Chicago	42	13,691,689	35	11,775,972	7	1,915,717		
University of Illinois at Chicago	44	15,479,564	38	14,224,463	6	1,255,101		
University of Illinois at Urbana-Champaign	6	2,195,858	6	2,195,858				
Total Illinois	**196**	**65,583,054**	**175**	**58,136,738**	**17**	**3,497,060**	**4**	**3,949,256**
Indiana								
Clarian Health Partners	1	212,491	1	212,491				
Focus Surgery, Inc.	1	162,683	1	162,683				
Indiana University Purdue University Indianapolis	51	17,798,134	46	16,782,905	5	1,015,229		
Indiana University, Bloomington	1	33,161	1	33,161				
Purdue University, West Lafayette	3	884,110	3	884,110				
University of Notre Dame	5	1,930,937	5	1,930,937				
Total Indiana	**62**	**21,021,516**	**57**	**20,006,287**	**5**	**1,015,229**		
Iowa								
Iowa State University of Science and Technology	1	180,625	1	180,625				
Maharishi University of Management	2	785,781	2	785,781				

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Medical Imaging Applications, LLC	1	378,118	1	378,118				
University of Iowa	77	34,092,623	68	29,997,311	8	2,091,848	1	2,003,464
Total Iowa	**81**	**35,437,147**	**72**	**31,341,835**	**8**	**2,091,848**	**1**	**2,003,464**
Kansas								
Kansas State University	5	516,848	2	429,675	3	87,173		
University of Kansas, Lawrence	1	451,625	1	451,625				
University of Kansas Medical Center	9	2,268,922	8	2,224,710	1	44,212		
Wichita State University	1	174,220	1	174,220				
Total Kansas	**16**	**3,411,615**	**12**	**3,280,230**	**4**	**131,385**		
Kentucky								
Academic Edge, Inc.	1	160,251	1	160,251				
ApoImmune, Inc.	1	100,000	1	100,000				
University of Kentucky	35	8,739,442	33	8,492,270	1	48,192	1	198,980
University of Louisville	31	8,018,262	28	7,879,600	3	138,662		
Total Kentucky	**68**	**17,017,955**	**63**	**16,632,121**	**4**	**186,854**	**1**	**198,980**
Louisiana								
Louisiana State University A&M College,								
Baton Rouge	1	367,500	1	367,500				
Louisiana State University Health Sciences,								
New Orleans	6	1,125,507	5	1,000,170			1	125,337
Louisiana State University Health Sciences, Shreveport	6	1,296,923	6	1,296,923				
Louisiana State University Pennington Biomedical Research Center	3	3,011,804	3	3,011,804				
Tulane University of Louisiana	18	6,270,030	17	6,247,824	1	22,206		
Xavier University of Louisiana		105,189		105,189				
Total Louisiana	**34**	**12,176,953**	**32**	**12,029,410**	**1**	**22,206**	**1**	**125,337**
Maine								
Jackson Laboratory	10	7,606,885	10	7,606,885				
Maine Medical Center	4	1,244,150	4	1,244,150				
University of Maine, Orono	1	445,819	1	445,819				
University of New England	1	354,833	1	354,833				
Total Maine	**16**	**9,651,687**	**16**	**9,651,687**				
Maryland								
Amulet Pharmaceuticals, Inc.	1	461,000	1	461,000				
BioSeq, Inc.	1	378,811	1	378,811				
Biotech Research Laboratories (BTRL)	1	932,000					1	932,000
Clinical Trials and Surveys Corporation	2	867,441					2	867,441
EMMES Corporation	1	1,158,282					1	1,158,282
Federation of American Societies for Experimental Biology	2	35,000	2	35,000				
Fogarty International Center	1	300,000					1	300,000
Gallup Indian Medical Center	5	38,823,864					5	38,823,864

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Henry M. Jackson Foundation for the Advancement of Military Medicine	6	4,739,410	5	1,555,964			1	3,183,446
IM Systems	2	589,970	2	589,970				
Johns Hopkins Hospital	1	4,573,542					1	4,573,542
Johns Hopkins University	167	70,589,478	148	60,082,993	11	3,504,864	8	7,001,621
Kennedy Krieger Research Institute, Inc.	1	270,166	1	270,166				
Key Technologies, Inc.	1	194,271	1	194,271				
Maryland Medical Research Institute	2	1,213,106	1	625,106			1	588,000
National Cancer Institute	2	1,100,000					2	1,100,000
National Center for Complementary and Alternative Medicine	1	200,000					1	200,000
National Center for Health Statistics	1	240,000					1	240,000
National Heart, Lung, and Blood Institute	1	1,027,346					1	1,027,346
National Human Genome Research Institute	1	23,250,000					1	23,250,000
National Institute of Allergy and Infectious Diseases	1	500,000					1	500,000
National Institute of Arthritis and Muscloskeletal and Skin Diseases	1	500,000					1	500,000
National Institute of Child Health and Human Development	1	2,000,000					1	2,000,000
National Institute of Diabetes and Digestive and Kidney Diseases	1	4,000,000					1	4,000,000
National Institute of Neurological Disorders and Stroke	1	1,291,100					1	1,291,100
Opto-Gene, Inc.	1	100,007	1	100,007				
Peace Technology, Inc.	1	2,043,634					1	2,043,634
Perinatronics Medical Systems, Inc.	2	890,488	2	890,488				
Prospect Associates, Ltd.	1	1,290,585					1	1,290,585
Quality Biological, Inc.	1	500,882	1	500,882				
Robin Medical, Inc.	1	611,250	1	611,250				
Take Aim Productions, Inc.	1	633,089	1	633,089				
The Institute for Genomic Research (TIGR)	3	2,743,562	3	2,743,562				
University of Maryland, Baltimore County Campus	2	458,237	2	458,237				
University of Maryland, College Park Campus	2	1,097,997	2	1,097,997				
University of Maryland Baltimore Professional School	40	13,646,732	37	13,415,678	2	201,115	1	29,939
University of Maryland Biotechnology Institute	3	967,645	3	967,645				
U.S. Agricultural Research Center	2	850,000					2	850,000
U.S. Bureau of the Census	1	360,000					1	360,000
U.S. Health Resources and Services Administration	1	150,000					1	150,000
U.S. Naval Medical Research Institute	1	77,100					1	77,100
U.S. PHS Public Advisory Groups		2,755,000		2,755,000				
Westat, Inc.	1	2,323,804					1	2,323,804
Total Maryland	**269**	**190,734,799**	**215**	**88,367,116**	**13**	**3,705,979**	**41**	**98,661,704**

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Massachusetts								
ACell, Inc.	1	344,536	1	344,536				
Baystate Medical Center	1	187,997					1	187,997
Beth Israel Deaconess Medical Center	55	22,221,276	49	21,451,958	6	769,318		
Biomod Surfaces	2	350,533	2	350,533				
Biophysics Assay Laboratory, Inc. (Biopal, Inc.)	1	302,008	1	302,008				
Biostream, Inc.	2	334,285	2	334,285				
Boston Biomedical Research Institute	8	3,613,562	8	3,613,562				
Boston Medical Center	14	4,446,928	14	4,446,928				
Boston University	80	43,090,706	70	32,708,266	6	2,120,359	4	8,262,081
Brigham and Women's Hospital	137	58,469,107	112	52,867,839	22	3,503,780	3	2,097,488
Center for Blood Research	9	9,078,553	9	9,078,553				
Children's Hospital Boston	49	16,975,964	43	15,394,223	6	1,581,741		
Covalent Associates, Inc.	1	99,999	1	99,999				
Center for Community Health Education Research and Services	1	599,246	1	599,246				
Dana-Farber Cancer Institute	16	5,427,470	15	5,372,154			1	55,316
E.P., Ltd.	1	568,853	1	568,853				
EIC Laboratories, Inc.	1	100,000	1	100,000				
Foster-Miller, Inc.	1	386,544	1	386,544				
Gene Regulation Laboratories	1	450,000	1	450,000				
Giner, Inc.	2	473,761	2	473,761				
Gwathmey, Inc.	1	473,773	1	473,773				
Harvard Pilgrim Health Care, Inc.	2	1,032,144	2	1,032,144				
Harvard University	1	326,000	1	326,000				
Harvard University Medical School	18	10,873,675	12	9,591,482	6	1,282,193		
Harvard University School of Public Health	19	9,069,804	17	8,431,183	2	638,621		
Hebrew Rehabilitation Center for Aged	1	12,618			1	12,618		
Implant Sciences Corporation	1	99,917	1	99,917				
Innovative Chemical/Environmental Technology	1	424,828	1	424,828				
Inotek Corporation	5	1,275,321	5	1,275,321				
IQuum, Inc.	2	1,565,088	2	1,565,088				
Massachusetts General Hospital	79	28,101,600	70	26,088,409	8	1,090,166	1	923,025
Massachusetts Institute of Technology	15	8,747,225	15	8,747,225				
Massachusetts Mental Health Institute	1	250,550	1	250,550				
Matrix Engineering	1	247,898	1	247,898				
New England Medical Center Hospitals	24	7,591,479	22	7,382,652	1	54,352	1	154,475
New England Research Institutes, Inc.	6	4,289,588	5	4,051,296			1	238,292
Newton Scientific, Inc.	1	451,426	1	451,426				
Northeastern University	2	495,827	2	495,827				
Physical Sciences, Inc.	1	289,050	1	289,050				
Radiation Monitoring Devices, Inc.	1	375,000	1	375,000				
Science Research Laboratory, Inc.	1	99,974	1	99,974				
St. Elizabeth's Medical Center of Boston	8	4,003,186	8	4,003,186				
Stethographics, Inc.	1	100,000	1	100,000				
Tufts University, Boston	11	3,366,543	10	3,297,518	1	69,025		

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
University of Massachusetts Medical School, Worcester	21	7,592,289	18	6,200,161	2	122,639	1	1,269,489
Verax Biomedical, Inc.	1	126,817	1	126,817				
Whalen Biomedical, Inc.	1	373,336	1	373,336				
Whitehead Institute for Biomedical Research	1	234,750	1	234,750				
Total Massachusetts	**610**	**259,411,034**	**536**	**234,978,059**	**61**	**11,244,812**	**13**	**13,188,163**
Michigan								
American National Red Cross SE Michigan	1	540,272					1	540,272
Case Western Reserve University, Henry Ford Health Sciences	11	4,065,895	11	4,065,895				
Henry Ford Health System	1	2,202,362	1	2,202,362				
Hope College	1	102,317	1	102,317				
Mc-Three, Inc.	4	1,120,263	4	1,120,263				
MedArray, Inc.	1	160,699	1	160,699				
Michigan State University	8	1,604,784	8	1,604,784				
Molecular Innovations, Inc.	1	99,600	1	99,600				
Nephros Therapeutics, Inc.	1	395,300	1	395,300				
Oakland University	1	71,000	1	71,000				
Sentec Corporation	1	373,835	1	373,835				
St. Joseph Mercy Oakland	1	345,695	1	345,695				
University of Michigan at Ann Arbor	88	32,290,794	81	30,284,992	6	1,549,482	1	456,320
Wayne State University	18	5,475,590	17	4,243,792		48,148	1	1,183,650
Western Michigan University	1	256,875	1	256,875				
Total Michigan	**139**	**49,105,281**	**130**	**45,327,409**	**6**	**1,597,630**	**3**	**2,180,242**
Minnesota								
Advanced Medical Electronics Corporation	6	1,392,165	6	1,392,165				
CPR X LLC	1	955,713	1	955,713				
Mayo Clinic, Rochester	63	19,157,764	55	17,894,517	7	860,873	1	402,374
Minneapolis Medical Research Foundation, Inc.	3	315,246	2	213,816			1	101,430
Paradigm Pharmaceuticals, LLC	1	100,000	1	100,000				
St. Olaf College	1	130,210	1	130,210				
SurModics, Inc.		30,745		30,745				
University of Minnesota, Twin Cities	87	37,622,024	73	31,247,986	7	1,679,415	7	4,694,623
Total Minnesota	**162**	**59,703,867**	**139**	**51,965,152**	**14**	**2,540,288**	**9**	**5,198,427**
Mississippi								
Tougaloo College		3,780				3,780		
University of Mississippi	1	52,177			1	52,177		
University of Mississippi Medical Center	18	9,001,149	12	5,710,141	3	93,585	3	3,197,423
Total Mississippi	**19**	**9,057,106**	**12**	**5,710,141**	**4**	**149,542**	**3**	**3,197,423**
Missouri								
Barnes-Jewish Hospital	22	7,083,058	21	7,036,866	1	46,192		
Children's Mercy Hospital, Kansas City	2	412,070	2	412,070				

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Lifeline Technologies, Inc.	1	319,031	1	319,031				
MRI Institute for Biomedical Research	1	344,499	1	344,499				
Reliable Biopharmaceutical Corporation	1	134,076	1	134,076				
St. Louis University	22	5,854,177	21	5,651,697			1	202,480
University of Missouri, Columbia	23	6,063,566	19	5,700,283	4	363,283		
University of Missouri, Kansas City	1	346,633	1	346,633				
University of Missouri, St. Louis	1	234,279	1	234,279				
Washington University	94	36,814,994	83	33,900,193	10	2,851,661	1	63,140
Total Missouri	**168**	**57,606,383**	**151**	**54,079,627**	**15**	**3,261,136**	**2**	**265,620**
Montana								
Montana State University, Bozeman	2	630,678	2	630,678				
Total Montana	**2**	**630,678**	**2**	**630,678**				
Nebraska								
Creighton University	1	37,202			1	37,202		
University of Nebraska, Lincoln	1	300,240	1	300,240				
University of Nebraska Medical Center	13	5,160,882	12	4,958,782	1	202,100		
Total Nebraska	**15**	**5,498,324**	**13**	**5,259,022**	**2**	**239,302**		
Nevada								
Sierra Biomedical Research Corporation	2	795,498	2	795,498				
University of Nevada at Reno	11	3,616,867	9	2,350,933	1	46,192	1	1,219,742
Total Nevada	**13**	**4,412,365**	**11**	**3,146,431**	**1**	**46,192**	**1**	**1,219,742**
New Hampshire								
Creare, Inc.	1	361,259	1	361,259				
Dartmouth College	15	3,510,031	13	3,440,312	2	69,719		
University of New Hampshire	2	279,163	2	279,163				
Total New Hampshire	**18**	**4,150,453**	**16**	**4,080,734**	**2**	**69,719**		
New Jersey								
Allied Innovative Systems, LLC	1	120,004	1	120,004				
Collagen Matrix, Inc.	2	811,462	2	811,462				
Continuum Dynamics, Inc.	1	376,215	1	376,215				
Menssana Research, Inc.	1	375,000	1	375,000				
Palatin Technologies, Inc.	1	374,330	1	374,330				
PortaScience Inc.	1	400,046	1	400,046				
Princeton Multimedia Technologies Corporation	1	199,127	1	199,127				
Princeton University	2	603,786	2	603,786				
Public Health Research Institute	3	1,314,519	3	1,314,519				
Rutgers, The State University of New Jersey, New Brunswick	3	480,956	2	265,367	1	215,589		
University of Medicine and Dentistry of New Jersey, Newark	15	6,821,472	14	6,729,456	1	92,016		
University of Medicine and Dentistry of New Jersey, R. W. Johnson Medical School	7	2,289,390	7	2,289,390				

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
University of Medicine and Dentistry of New Jersey, School of Osteopathic Medicine	1	325,035	1	325,035				
VueSonix Sensors, Inc.	1	454,426	1	454,426				
Total New Jersey	**40**	**14,945,768**	**38**	**14,638,163**	**2**	**307,605**		
New Mexico								
InLight Solutions, Inc.	1	150,000	1	150,000				
Lovelace Biomedical and Environmental Research	2	1,013,880	2	1,013,880				
New Mexico Resonance	2	741,923	2	741,923				
Southwest Sciences, Inc.	1	101,383	1	101,383				
U.S. Department of Veterans Affairs Medical Center, Albuquerque	1	1,284,168					1	1,284,168
University of New Mexico, Albuquerque	13	4,245,036	10	3,682,439	2	351,933	1	210,664
Total New Mexico	**20**	**7,536,390**	**16**	**5,689,625**	**2**	**351,933**	**2**	**1,494,832**
New York								
Albany Medical College of Union University	7	1,989,688	6	1,447,142	1	542,546		
Angion Biomedica Corporation	1	1,059,850	1	1,059,850				
Circulatory Technology, Inc.	1	360,916	1	360,916				
City College of New York	3	952,482	3	952,482				
Columbia University Health Sciences	79	34,853,513	70	32,645,410	6	805,189	3	1,402,914
Columbia University, New York Morningside	3	1,398,896	3	1,398,896				
Cornell University, Ithaca	8	1,701,469	6	1,612,262	2	89,207		
CUNY Graduate School and University Center	1	312,500	1	312,500				
Foster-Miller Technologies, Inc.	1	714,266	1	714,266				
Herbert H. Lehman College		145,804		145,804				
Hospital for Special Surgery	1	135,540	1	135,540				
Institute for Basic Research in Developmental Disabilities	1	292,692	1	292,692				
Ithaca College		3,600		3,600				
Lymphatic Research Foundation, Inc.		10,000		10,000				
Masonic Medical Research Laboratory, Inc.	1	432,500	1	432,500				
Mohawk Innovative Technology, Inc.	1	230,567	1	230,567				
Montefiore Medical Center, Bronx	2	433,598	2	433,598				
Mount Sinai School of Medicine	33	18,489,732	30	15,148,140	2	536,155	1	2,805,437
National Hemophilia Foundation	1	10,000	1	10,000				
New York Blood Center	4	2,252,768	4	2,252,768				
New York Medical College	25	10,917,813	25	10,917,813				
New York University	2	511,666	2	511,666				
New York University School of Medicine	19	6,495,426	18	6,350,076	1	145,350		
North Shore University Hospital	1	111,051	1	111,051				
Queens College, CUNY	2	469,450	2	469,450				
Rensselaer Polytechnic Institute	1	257,289	1	257,289				
Rockefeller University	7	3,914,503	7	3,914,503				

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Roswell Park Cancer Institute Corporation	3	1,123,034	3	1,123,034				
Sloan-Kettering Institute for Cancer Research	11	3,391,419	11	3,391,419				
St. Luke's-Roosevelt Hospital Center	1	393,481	1	393,481				
St. Luke's-Roosevelt Institute for Health Sciences	8	2,558,810	8	2,558,810				
State University of New York at Albany	1	257,510	1	257,510				
State University of New York at Buffalo	13	4,681,779	11	3,156,124	1	108,562	1	1,417,093
State University of New York Stony Brook	15	5,650,637	14	4,436,472			1	1,214,165
STS Biopolymers, Inc.	1	396,206	1	396,206				
SUNY Downstate Medical Center	8	2,244,067	7	1,986,366			1	257,701
Syracuse University	1	226,500	1	226,500				
Trudeau Institute, Inc.	5	3,207,439	5	3,207,439				
University of Rochester	52	19,830,365	46	18,439,122	6	1,391,243		
Upstate Medical University	6	3,074,815	5	3,020,463	1	54,352		
V.I. Technologies, Inc. (Vitex)	1	265,000	1	265,000				
Weill Medical College of Cornell University	48	26,146,995	43	24,043,672	4	723,339	1	1,379,984
Winthrop-University Hospital	1	455,129	1	455,129				
Yeshiva University	28	17,148,573	25	14,725,200	2	234,216	1	2,189,157
ZeptoMetrix Corporation	1	379,816	1	379,816				
Total New York	**409**	**179,889,154**	**374**	**164,592,544**	**26**	**4,630,159**	**9**	**10,666,451**
North Carolina								
Carolinas Medical Center	1	300,358	1	300,358				
Clinical Tools, Inc.	2	505,987	2	505,987				
Duke University	123	53,706,387	110	50,050,858	8	1,113,195	5	2,542,334
East Carolina University	2	431,600	2	431,600				
North Carolina Central University	1	371,210	1	371,210				
North Carolina State University at Raleigh	4	1,003,949	4	1,003,949				
StemCo Biomedical, Inc.	1	109,485	1	109,485				
University of North Carolina at Chapel Hill	94	42,683,002	82	34,366,450	7	1,508,057	5	6,808,495
Wake Forest University	14	9,135,182	8	3,525,237			6	5,609,945
Wake Forest University Health Sciences	34	15,466,553	31	15,024,809	3	441,744		
Williams LifeSkills, Inc.	1	369,941	1	369,941				
Winston-Salem State University	1	112,201	1	112,201				
ZyCare, Inc.	1	284,187	1	284,187				
Total North Carolina	**279**	**124,480,042**	**245**	**106,456,272**	**18**	**3,062,996**	**16**	**14,960,774**
North Dakota								
North Dakota State University	1	141,000	1	141,000				
Total North Dakota	**1**	**141,000**	**1**	**141,000**				
Ohio								
BIOMEC, Inc.	4	1,744,737	4	1,744,737				

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
CardioEnergetics, Inc.	1	415,479	1	415,479				
Case Western Reserve University	77	26,280,463	67	24,244,233	9	1,646,620	1	389,610
Celsus Laboratories, Inc.	1	107,000	1	107,000				
Children's Hospital Medical Center of Cincinnati	42	16,669,536	37	16,428,493	5	241,043		
Children's Research Institute	2	432,548	2	432,548				
Cleveland Clinic Foundation	58	18,818,755	52	18,006,288	4	337,031	2	475,436
Cleveland Medical Devices, Inc.	2	992,193	2	992,193				
Medical College of Ohio at Toledo	9	3,129,129	9	3,129,129				
Nova-Ther Technologies	1	257,015	1	257,015				
Ohio State University	33	9,380,324	30	8,644,398	1	203,969	2	531,957
Ohio University, Athens	1	319,861	1	319,861				
Spectra Research, Inc.	1	441,964	1	441,964				
The Lam Foundation	1	25,000	1	25,000				
University of Cincinnati	46	17,728,364	43	16,098,747	2	521,830	1	1,107,787
Wright State University	5	1,053,332	4	973,879	1	79,453		
Total Ohio	**284**	**97,795,700**	**256**	**92,260,964**	**22**	**3,029,946**	**6**	**2,504,790**
Oklahoma								
Ekips Technologies, Inc.	1	100,000	1	100,000				
Langston University	1	343,782	1	343,782				
Oklahoma Blood Institute	1	844,810					1	844,810
Oklahoma Medical Research Foundation	8	3,925,564	8	3,925,564				
Oklahoma State University, Stillwater	1	280,094	1	280,094				
University of Oklahoma Health Sciences Center	12	4,600,084	10	4,518,709	2	81,375		
Total Oklahoma	**24**	**10,094,334**	**21**	**9,168,149**	**2**	**81,375**	**1**	**844,810**
Oregon								
Dimera, LLC	1	392,500	1	392,500				
Helix Research Company	1	421,156					1	421,156
Oregon Health & Science University	42	13,600,896	34	13,036,846	8	564,050		
Oregon Research Institute	1	672,768	1	672,768				
Oregon State University	3	593,542	2	563,587	1	29,955		
University of Oregon	2	668,476	2	668,476				
Virogenomics Inc.	1	96,845	1	96,845				
Total Oregon	**51**	**16,446,183**	**41**	**15,431,022**	**9**	**594,005**	**1**	**421,156**
Pennsylvania								
Allegheny-Singer Research Institute	2	701,938	2	701,938				
Carnegie-Mellon University	4	1,277,358	3	1,227,242	1	50,116		
Children's Hospital of Philadelphia	34	19,364,347	30	18,380,676	4	983,671		
Children's Hospital of Pittsburgh/UPMC Health Systems	3	496,800	3	496,800				
Discovery Laboratories, Inc.	1	453,000	1	453,000				
Drexel University	2	406,993	2	406,993				
Eagle Vision Pharmaceutical Corporation	1	373,353	1	373,353				
Ension Inc.	4	1,433,794	4	1,433,794				
Fox Chase Cancer Center	1	383,250	1	383,250				

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Genaera Corporation	1	422,306	1	422,306				
Green Lights, Inc.	1	97,210	1	97,210				
Guthrie Foundation for Education and Research	2	556,579	2	556,579				
Industrial Science and Technology Network, Inc.	1	363,349	1	363,349				
Institute for Cancer Research	1	439,216	1	439,216				
Lankenau Institute for Medical Research	1	324,512	1	324,512				
Lehigh University	1	145,051	1	145,051				
LifeSensors, Inc.	1	174,746	1	174,746				
Magee-Women's Health Corporation	2	547,433	2	547,433				
MCP Hahnemann University	4	1,191,160	4	1,191,160				
Medical Diagnostic Research Foundation	1	297,452	1	297,452				
Molecular Targeting Technology, Inc.	1	377,300	1	377,300				
Octagen Corporation	2	513,000	2	513,000				
Pennsylvania State University, Milton S. Hershey Medical Center	23	9,754,144	22	9,712,459	1	41,685		
Pennsylvania State University, University Park	6	1,546,569	6	1,546,569				
Spectrasonics Imaging, Inc.	1	334,662	1	334,662				
Temple University	15	5,834,717	12	5,532,400	2	256,557	1	45,760
Thomas Jefferson University	19	6,629,719	17	6,391,573	2	238,146		
University of Pennsylvania	146	55,624,137	125	51,996,397	20	3,246,527	1	381,213
University of Pittsburgh at Pittsburgh	87	39,278,612	76	36,156,540	6	940,730	5	2,181,342
Weis Center for Research, Geisinger Clinic	2	513,749	2	513,749				
Wistar Institute	4	1,204,697	4	1,204,697				
Total Pennsylvania	**374**	**151,061,153**	**331**	**142,695,406**	**36**	**5,757,432**	**7**	**2,608,315**
Rhode Island								
BCR Diagnostics	1	136,210	1	136,210				
Brown University	6	1,330,117	6	1,330,117				
Gordon Research Conferences	5	47,000	5	47,000				
Memorial Hospital of Rhode Island	2	3,063,912	1	707,706			1	2,356,206
Miriam Hospital	7	2,552,828	6	2,514,508	1	38,320		
Pro-Change Behavior Systems, Inc.	2	401,272	2	401,272				
Rhode Island Hospital, Providence	7	2,396,369	7	2,396,369				
Total Rhode Island	**30**	**9,927,708**	**28**	**7,533,182**	**1**	**38,320**	**1**	**2,356,206**
South Carolina								
Clemson University	2	473,487	2	473,487				
Medical University of South Carolina	37	15,323,707	30	12,107,250	5	579,661	2	2,636,796
Organ Recovery Systems, Inc.	3	604,961	3	604,961				
University of South Carolina at Columbia	9	2,785,506	8	2,763,802	1	21,704		
Total South Carolina	**51**	**19,187,661**	**43**	**15,949,500**	**6**	**601,365**	**2**	**2,636,796**
South Dakota								
Missouri Breaks Research, Inc.	2	1,131,532	2	1,131,532				

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
University of South Dakota	4	740,682	3	740,681	1	1		
Total South Dakota	**6**	**1,872,214**	**5**	**1,872,213**	**1**	**1**		
Tennessee								
East Tennessee State University	4	846,418	4	846,418				
GeneRx+, Inc.	2	728,915	2	728,915				
Meharry Medical College	11	2,180,176	8	1,601,664	3	578,512		
St. Jude Children's Research Hospital	7	3,572,065	6	3,304,479			1	267,586
TK TX Company	1	124,366	1	124,366				
University of Memphis	4	1,718,043	4	1,718,043				
University of Tennessee Health Sciences Center	25	8,441,460	22	6,644,160	2	287,636	1	1,509,664
University of Tennessee at Knoxville	2	361,436	2	344,481		16,955		
U.S. Department of Veterans Affairs Medical Center, Memphis	1	316,265					1	316,265
Vanderbilt University	73	29,071,445	62	26,621,202	11	2,450,243		
Total Tennessee	**130**	**47,360,589**	**111**	**41,933,728**	**16**	**3,333,346**	**3**	**2,093,515**
Texas								
Ambion, Inc.	1	402,535	1	402,535				
Baylor College of Medicine	84	35,557,215	72	33,206,984	9	903,702	3	1,446,529
Baylor Research Institute	1	339,750	1	339,750				
BioTex, Inc.	1	373,338	1	373,338				
Chrysalis Biotechnology, Inc.	1	100,000	1	100,000				
Cooper Institute for Aerobics Research	4	1,593,157	4	1,593,157				
Lynntech, Inc.	1	362,777	1	362,777				
Millar Instruments, Inc.	1	106,814	1	106,814				
Prairie View A&M University		135,012		135,012				
Rice University	4	1,033,324	4	1,033,324				
Southwest Foundation for Biomedical Research	9	10,474,429	9	10,474,429				
Texas A&M University Health Science Center	15	3,263,593	12	3,181,060	3	82,533		
Texas A&M University System	6	1,459,410	6	1,459,410				
Texas A&M University, Kingsville		91,347		91,347				
Texas Southern University	2	391,000	2	391,000				
Texas Technical University Health Sciences Center	4	1,049,975	4	1,049,975				
University of Houston, University Park	1	251,485	1	251,485				
University of North Texas Health Sciences Center	10	2,150,902	8	2,032,723	2	118,179		
University of Texas at Dallas	1	307,464	1	307,464				
University of Texas Health Center at Tyler	7	1,573,586	7	1,573,586				
University of Texas Health Sciences Center Houston	35	14,006,447	31	9,722,355	2	163,867	2	4,120,225
University of Texas Health Sciences Center San Antonio	22	5,608,053	19	3,991,964	1	214,392	2	1,401,697
University of Texas M.D. Anderson Cancer Center	1	587,499	1	587,499				
University of Texas Medical Branch Galveston	11	4,460,821	10	2,322,343			1	2,138,478

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
University of Texas Southwestern Medical Center at Dallas	63	28,307,892	54	25,104,158	7	958,057	2	2,245,677
University of Texas-Pan American		356,354		356,354				
Total Texas	**285**	**114,344,179**	**251**	**100,550,843**	**24**	**2,440,730**	**10**	**11,352,606**
Utah								
Brigham Young University	1	219,000	1	219,000				
Thrombodyne, Inc.	1	368,528	1	368,528				
University of Utah	54	19,898,437	48	19,272,826	6	625,611		
Utah Artificial Heart Institute	1	1,062,373	1	1,062,373				
Total Utah	**57**	**21,548,338**	**51**	**20,922,727**	**6**	**625,611**		
Vermont								
University of Vermont and State Agricultural College	45	17,630,018	39	15,341,987	4	717,553	2	1,570,478
Total Vermont	**45**	**17,630,018**	**39**	**15,341,987**	**4**	**717,553**	**2**	**1,570,478**
Virginia								
Arete Associates	1	102,362	1	102,362				
Cottler Technologies, LLC	1	378,785	1	378,785				
CW Optics, Inc.	1	250,708	1	250,708				
Eastern Virginia Medical School of the Medical College of Hampton Roads	4	662,804	3	646,437	1	16,367		
Empirical Technologies Corporation	1	439,154	1	439,154				
Hampton University		96,542		96,542				
Personal Improvement Computer Systems	1	284,254	1	284,254				
Talisman, Ltd.		347,000		347,000				
University of Virginia, Charlottesville	63	22,590,644	57	21,219,172	6	1,371,472		
U.S. National Science Foundation	1	367,000					1	367,000
Virginia Commonwealth University	19	4,745,495	15	4,608,998	4	136,497		
Total Virginia	**92**	**30,264,748**	**80**	**28,373,412**	**11**	**1,524,336**	**1**	**367,000**
Washington								
A.S.T.H.M.A., Inc.	1	132,049					1	132,049
Avatar Design and Development, Inc.	1	480,129	1	480,129				
Barlow Scientific	2	451,466	2	451,466				
Battelle Pacific Northwest Laboratories	1	478,625	1	478,625				
Catch, Inc.	1	100,000	1	100,000				
EKOS Corporation	1	331,168	1	331,168				
Fred Hutchinson Cancer Research Center	18	10,476,725	15	8,430,811			3	2,045,914
Icogen Corporation	1	195,140	1	195,140				
Inologic, Inc.	1	96,935	1	96,935				
Institute for Systems Biology	1	2,093,639					1	2,093,639
King County Emergency Medical Service	1	330,265	1	330,265				
Pathway MRI	1	99,107	1	99,107				
Phantoms By Design	1	616,394	1	616,394				
Puget Sound Blood Center	3	685,737	3	685,737				
Quantigraphics, Inc.	1	255,191	1	255,191				

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Seattle Institute for Cardiac Research	2	3,881,377	2	3,881,377				
Statistics and Epidemiology Research Corporation	1	801,527					1	801,527
The Hope Heart Institute	4	764,143	3	754,611	1	9,532		
Therus Corporation	1	137,965	1	137,965				
University of Washington	117	57,791,957	99	48,863,249	12	2,887,094	6	6,041,614
Washington State University	5	1,058,969	4	1,058,968	1	1		
Total Washington	**165**	**81,258,508**	**139**	**67,247,138**	**14**	**2,896,627**	**12**	**11,114,743**
West Virginia								
Marshall University	1	140,000	1	140,000				
West Virginia University	7	1,562,883	6	1,518,671	1	44,212		
Total West Virginia	**8**	**1,702,883**	**7**	**1,658,671**	**1**	**44,212**		
Wisconsin								
Blood Center of Southeastern Wisconsin	9	4,320,960	7	4,099,227	2	221,733		
Eaker Epidemiology Enterprises, LLC	1	62,500	1	62,500				
Marquette University	2	375,623	2	375,623				
Marshfield Clinic	1	5,250,000					1	5,250,000
Medical College of Wisconsin	59	30,007,411	50	26,197,914	7	566,271	2	3,243,226
Mirus Corporation	2	220,417	2	220,417				
Spectro Con	1	100,000	1	100,000				
TMJ Association		15,000		15,000				
University of Wisconsin, Madison	63	25,235,470	57	23,083,188	5	1,053,034	1	1,099,248
Total Wisconsin	**138**	**65,587,381**	**120**	**54,153,869**	**14**	**1,841,038**	**4**	**9,592,474**
Wyoming								
University of Wyoming	1	172,970	1	172,970				
Total Wyoming	1	172,970	1	172,970				
Puerto Rico								
Ponce School of Medicine	1	138,258	1	138,258				
Universidad Central Del Caribe		229,354		229,354				
University of Puerto Rico Medical Sciences	1	648,385	1	648,385				
University of Puerto Rico Rio Piedras	1	391,789	1	391,789				
Total Puerto Rico	**3**	**1,407,786**	**3**	**1,407,786**				
Total United States	**5,611**	**$2,331,977,050**	**4,933**	**$1,997,936,617**	**473**	**$77,377,198**	**205**	**$256,663,235**
Australia								
Child Health Research Institute	1	250,000	1	250,000				
Children's Hospital at Westmead	1	108,000	1	108,000				
Peter MacCallum Cancer Institute	1	175,000	1	175,000				
Royal Melbourne Hospital	1	175,000	1	175,000				
St. Vincent's Institute of Medical Research	1	105,515	1	105,515				
Victor Chang Cardiac Research Institute	2	134,264	1	95,944	1	38,320		
Total Australia	**7**	**947,779**	**6**	**909,459**	**1**	**38,320**		

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
Belgium								
University of Antwerp	1	120,593	1	120,593				
Total Belgium	**1**	**120,593**	**1**	**120,593**				
Brazil								
Federal University of Bahia		39,000		39,000				
Total Brazil		**39,000**		**39,000**				
Canada								
Clinical Research Institute of Montreal	2	449,030	2	449,030				
Hospital for Sick Children, Toronto	3	963,663	3	963,663				
Institute de Recherches Cliniques de Montreal	1	200,000	1	200,000				
London Health Sciences Center	1	1,396,378					1	1,396,378
McGill University	1	300,000	1	300,000				
McMaster University	1	161,066					1	161,066
Ontario Cancer Institute	1	200,000	1	200,000				
Ottawa Health Research Institute	1	250,000	1	250,000				
Sunnybrook and Women's College Health Sciences Center	1	193,048	1	193,048				
University Health Network	1	225,000	1	225,000				
University of British Columbia	4	878,722	3	798,522			1	80,200
University of Calgary	2	525,763	2	525,763				
University of Manitoba	2	108,524	2	108,524				
Total Canada	**21**	**5,851,194**	**18**	**4,213,550**			**3**	**1,637,644**
China								
Chinese Center, Disease Control and Prevention		24,300		24,300				
Total China		**24,300**		**24,300**				
Finland								
University of Turku	1	46,192			1	46,192		
Total Finland	**1**	**46,192**			**1**	**46,192**		
India								
Center for DNA Fingerprinting/Diagnostics		39,000		39,000				
Total India		**39,000**		**39,000**				
Israel								
Ben-Gurion University of the Negev	1	44,212			1	44,212		
Technion-Israel Institute of Technology	1	125,000	1	125,000				
Total Israel	**2**	**169,212**	**1**	**125,000**	**1**	**44,212**		
Italy								
University of Parma	1	371,789	1	371,789				
Total Italy	**1**	**371,789**	**1**	**371,789**				

Institution	Totals		Grants		Research Development		Research Training and Contracts	
	No.	Dollar	No.	Dollar	No.	Dollar	No.	Dollar
New Zealand								
Canterbury Health Ltd.	1	42,320			1	42,320		
Total New Zealand	**1**	**42,320**			**1**	**42,320**		
Russia								
Central Institute for Tuberculosis	1	204,000	1	204,000				
Total Russia	**1**	**204,000**	**1**	**204,000**				
Sweden								
Migramed	1	446,296	1	446,296				
Total Sweden	**1**	**446,296**	**1**	**446,296**				
Thailand								
Chiang Mai University		16,200		16,200				
Total		**16,200**		**16,200**				
United Kingdom								
University of London King's College London	1	250,000	1	250,000				
University College London	1	276,611	1	276,611				
University of Cambridge	1	272,359	1	272,359				
University of Edinburgh	1	200,000	1	200,000				
University of Leicester	1	36,592			1	36,592		
University of London National Heart and Lung Institute	1	325,381	1	325,381				
University of Sheffield	1	125,000	1	125,000				
University of Southampton	1	298,954	1	298,954				
Total United Kingdom	**8**	**1,784,897**	**7**	**1,748,305**	**1**	**36,592**		
Total Other	**44**	**$10,102,772**	**36**	**$8,257,492**	**5**	**$207,636**	**3**	**$1,637,644**
Grand Total	**5,655**	**$2,342,079,822**	**4,969**	**$2,006,194,109**	**478**	**$77,584,834**	**208**	**$258,300,879**

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 pro-vide 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) GrantsPhase 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) GrantsPhase 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 Centers Grants (P60): To support a multipurpose unit designed to bring together into a common focus divergent but related facilities within a given community; to foster biomedical research and development at both the fundamental and clinical levels; 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, and the Nutrition Academic Award. Currently, only the Sleep Academic Award and the Nutrition 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.

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 (HBCUs) 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 services(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

ACCESS	A Case-Controlled Etiologic Study of Sarcoidosis
ACCORD	Action to Control Cardiovascular Complications in Diabetes
ACE	angiotensin-converting enzyme
ACES	Azithromycin and Coronary Events Study
ACRN	Asthma Clinical Research Network
ACTION	A CHF Trial Investigating Outcomes of Exercise
AFFIRM	Atrial Fibrillation Follow-up: Investigations in Rhythm Management
AIDS	acquired immunodeficiency syndrome
ALLHAT	Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial
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
BARI 2D	Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics
CAMP	Childhood Asthma Management Program
CARDIA	Coronary Artery Risk Development in Young Adults
CARE	Childhood Asthma Research and Education Network
CF	cystic fibrosis
CFAR	Centers for AIDS Research
CHD	coronary heart disease
CHF	congestive heart failure
CHS	Cardiovascular Health Study
CMMP	Clinical and Molecular Medicine Program
COPD	chronic obstructive pulmonary disease
CSCC	Comprehensive Sickle Cell Centers
CSGA	Collaborative Studies on the Genetics of Asthma
CVD	cardiovascular diseases
DASH	Dietary Approaches to Stop Hypertension
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
DLD	Division of Lung Diseases
EDUC	Enhanced Dissemination and Utilization Center
ENRICHD	Enhancing Recovery in Coronary Heart Disease
ESCAPE	Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness
ETS	environmental tobacco smoke
FIRST	First Independent Research Support and Transition
FORTE	Feasibility of Retinoid Treatment in Emphysema

FY	fiscal year
GEMS	Girls Health Enrichment Multisite Studies
GENCAC	Genetics of Coronary Aortic Calcification
GOCADAN	Genetics of Coronary Artery Disease in Alaskan Natives
GVHD	graft versus host disease
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
HRT	hormone replacement therapy
ICD	International Classification of Diseases; also, implantable cardiac defibrillator
JHS	Jackson Heart Study
LDL	low-density lipoprotein
MAGIC	Magnesium in Coronaries
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
MSH	Multicenter Study of Hydroxyurea
NAEPP	National Asthma Education and Prevention Program
NCEP	National Cholesterol Education Program
NCHS	National Center for Health Statistics
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
NRSA	National Research Service Award

OAR	Office of AIDS Research
OAT	Occluded Artery Trial
OD	Office of the Director
OEI	Obesity Education Initiative
OPEC	Office of Prevention, Education, and Control
OSA	obstructive sleep apnea
P2C2	Pediatric Pulmonary Cardiac Complication of HIV
PA	Program Announcement
PAD	Public Access Defibrillation
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
PIOPED	Prospective Investigation of Pulmonary Embolism Diagnosis
R&D	research and development
REDS	Retrovirus Epidemiology Donor Study
RFA	Request for Applications
RFP	Request for Proposals
RMS	research management and support
RPG	research project grant
SANDS	Stop Atherosclerosis in Native Diabetic Study
SBIR	Small Business Innovation Research
SCD	sickle cell disease
SCD-HeFT	Sudden Cardiac Death in Heart Failure Trial
SCOR	Specialized Center(s) of Research
SEP	Special Emphasis Panel
SES	socioeconomic status
SIDS	sudden infant death syndrome
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
WAVE	Women’s Angiographic Vitamin and Estrogen Trial
WHI	Women’s Health Initiative
WHL	World Health League
WISE	Women’s Ischemia Syndrome Evaluation
WHO	World Health Organization