
# FACT BOOK

# FISCAL YEAR

# 2004

FEBRUARY 2005

FOR ADMINISTRATIVE USE

NATIONAL INSTITUTES

OF HEALTH

NATIONAL HEART, LUNG,

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# 1. Directory of Personnel*

| Office of the Director | Bldg. | Room | Phone | MSC†‡ |
|---|---|---|---|---|
| Acting Director, **Barbara M. Alving, M.D.** | 31 | 5A52 | 496–5166 | 2486 |
| Acting Deputy Director, **Lawrence Friedman, 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 | 5A20 | 496–9899 | 2490 |
| Associate Director for Administrative Management, **Donald P. Christoferson** | 31 | 5A46 | 496–2411 | 2490 |
| Associate Director for Scientific Program Operation, **Carl A. Roth, 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 | 4A29 | 496–5375 | 2490 |
| Office of Work Force Development and Recognition Director, **Mishyelle I. Croom** | 31 | 5A28 | 496–1763 | 2490 |
| Office of Minority Health Affairs Director, **Helena Mishoe, Ph.D., M.P.H.** | RKL2§ | 8188 | 451–5081 | 7913 |
| Office of Administrative Management | | | | |
| Director/Executive Officer, **Donald P. Christoferson** | 31 | 5A46 | 496–2411 | 2490 |
| Administrative Officer, **Valery D. Gheen** | 31 | 5A33 | 496–5931 | 2490 |
| Management Policy and Administrative Services Branch | | | | |
| Chief, **Marilyn Jackson** | 31 | 5A33 | 496–5931 | 2490 |
| Freedom of Information/Privacy Act Coordinator, **Suzanne Freeman** | 31 | 5A33 | 496–9737 | 2490 |
| Financial Management Branch | | | | |
| Chief, **Sandra Gault** | 31 | 5A46 | 496–4653 | 2490 |
| Extramural Administrative Management Branch | | | | |
| Chief, **Loretta L. Barnes** | RKL2 | 7026 | 435–6373 | 7921 |
| Intramural Administrative Management Branch | | | | |
| Chief, **Gary Unger** | 10 | 7N220 | 402–3646 | 1670 |
| National Center on Sleep Disorders Research | | | | |
| Director, **Carl E. Hunt, M.D.** | RKL1** | 6022 | 435–0199 | 7993 |
| Administrative Officer, **Stacey Long** | RKL2 | 7026 | 435–6373 | 7921 |
| Women's Health Initiative | | | | |
| Director, **Barbara M. Alving, M.D.** | 31 | 5A52 | 496–5166 | 2486 |
| Administrative Officer, **Charlotte M. Wiltshire** | RKL2 | 7026 | 435–6373 | 7921 |
| Office of Prevention, Education, and Control | | | | |
| Director, **Gregory J. Morosco, Ph.D., M.P.H.** | 31 | 4A10 | 496–5437 | 2480 |

* Current as of October 15, 2004. For locating personnel not listed, the general information number is 301–496–4000. All listed phone numbers are in area code 301. The Personnel Directory, which is periodically updated throughout the year, is located on the NHLBI Home Page under About NHLBI.
† MSC—Mail Stop Code.
‡ Full mailing address formats are located at the end of this chapter.
§ RKL2—Rockledge II Building.
** RKL1—Rockledge I Building.

| **Office of the Director (continued)** | **Bldg.** | **Room** | **Phone** | **MSC** |
|---|---|---|---|---|
| Program Operations Coordinator, **Nancy J. Poole, M.B.A.** | 31 | 4A10 | 496–5437 | 2480 |
| Administrative Officer, **Rebecca Tener** | 31 | 5A33 | 496–5931 | 2490 |
| Health Communications and Information Science | | | | |
| Senior Manager, **Terry C. Long** | 31 | 4A10 | 496–0554 | 2480 |
| Public Health Program Development | | | | |
| Senior Manager, **Robinson Fulwood, 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 K. Schmidt, M.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 |
| NHLBI Women's Heart Health Education Initiative | | | | |
| Coordinator, **Ann Taubenheim, Ph.D., M.S.N.** | 31 | 4A10 | 496–4236 | 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, **Jonelle Drugan, Ph.D., M.P.H.** | 31 | 5A07 | 496–9899 | 2482 |
| Information Resources and Technology Program | | | | |
| Director, **Ralph Van Wey** | RKL1 | 6210 | 435–0119 | 7994 |
| Administrative Officer, **Amy W. Sheetz** | RKL2 | 7026 | 435–6367 | 7921 |
| Office of Technology Transfer and Development | | | | |
| Director, **Lili M. Portilla** | RKL1 | 6018 | 402–5579 | 7992 |
| Administrative Officer, **Stacey A. Long** | RKL2 | 7026 | 435–6373 | 7921 |

## Division of Heart and Vascular Diseases

| | | | | |
|---|---|---|---|---|
| Director, **Stephen C. Mockrin, Ph.D.** | RKL2 | 9160 | 435–0466 | 7940 |
| Deputy Director, **Sonia Skarlatos, 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 Scientific Research Group | | | | |
| 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, **Alice Mascette, M.D.** | RKL2 | 9132 | 435–0555 | 7940 |
| Associate Director, **Susan Old, Ph.D.** | RKL2 | 9137 | 435–1802 | 7940 |

| **Division of Heart and Vascular Diseases (continued)** | **Bldg.** | **Room** | **Phone** | **MSC** |
|---|---|---|---|---|
| Cardiovascular Medicine Scientific Research Group | | | | |
| Leader, **Patrice Desvigne-Nickens, M.D.** | RKL2 | 9178 | 435–0515 | 7940 |
| Bioengineering and Genomic Applications Scientific Research Group | | | | |
| Leader, **Sunil Pandit, Ph.D.** | RKL2 | 9144 | 435–1802 | 7940 |
| Heart Research Program | | | | |
| Director, **John L. Fakunding, Ph.D.** | RKL2 | 9170 | 435–0494 | 7940 |
| Associate Director, **Denis Buxton, Ph.D.** | RKL2 | 9188 | 435–0504 | 7940 |
| Arrhythmias, Ischemia, and Sudden Cardiac Death Scientific Research Group | | | | |
| Leader, **David A. Lathrop, Ph.D.** | RKL2 | 9120 | 435–0507 | 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, **Eser Tolunay, Ph.D.** | RKL2 | 10198 | 435–0545 | 7956 |
| Acting Associate Director, **Deborah Applebaum-Bowden, Ph.D.** | RKL2 | 10190 | 435–0545 | 7956 |
| 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, **Amy W. Sheetz** | 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, **Patricial Noel, Ph.D.** | RKL2 | 10222 | 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 |

| **Division of Lung Diseases (continued)** | **Bldg.** | **Room** | **Phone** | **MSC** |
|---|---|---|---|---|
| Lung Developmental Biology and Pediatric Pulmonary Diseases Scientific Research Group | | | | |
| Leader, **Mary Anne Berberich, Ph.D.** | RKL2 | 10102 | 435–0222 | 7952 |
| Immunology/Fibrosis Scientific Research Group | | | | |
| Leader, **Herbert Y. 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., M.B.A.** | RKL2 | 10160 | 435–0080 | 7950 |
| Deputy Director, **Liana Harvath, Ph.D.** | RKL2 | 10170 | 435–0080 | 7950 |
| Senior Program Analyst, **Susan Pucie** | RKL2 | 10166 | 435–0079 | 7950 |
| Special Assistant, **Henry Chang, M.D.** | RKL2 | 10158 | 435–0080 | 7950 |
| Administrative Officer, **Kathryn Lightbody** | RKL2 | 7158 | 435–6373 | 7921 |
| Blood Diseases Program | | | | |
| Director, **Blaine Moore, Ph.D.** | RKL2 | 10162 | 435–0050 | 7950 |
| Hemoglobinopathies and Genetics Scientific Research Group | | | | |
| Leader, **Greg Evans, Ph.D.** | RKL2 | 10152 | 435–0055 | 7950 |
| Thrombosis and Hemostasis Scientific Research Group | | | | |
| Leader, **Pankaj Ganguly, Ph.D.** | RKL2 | 10176 | 435–0070 | 7950 |
| Research Training, **Ellen Werner, Ph.D.** | RKL2 | 10156 | 435–0061 | 7950 |
| Blood Resources Program | | | | |
| Director, **Jean Henslee-Downey, M.D.** | RKL2 | 10138 | 435–0065 | 7950 |
| Transfusion Medicine and Cell Therapies Scientific Research Group | | | | |
| Leader, **George J. Nemo, Ph.D.** | RKL2 | 10142 | 435–0075 | 7950 |
| Research Training, **Traci Mondoro, Ph.D.** | RKL2 | 10135 | 435–0075 | 7950 |
| Small Business Research, **Phyllis Mitchell, M.S.** | RKL2 | 10163 | 435–0075 | 7950 |
| **Division of Epidemiology and Clinical Applications** | | | | |
| Director, **Peter Savage, M.D.** | RKL2 | 8100 | 435–0422 | 7938 |
| Deputy Director, **Diane Bild, M.D.** | RKL2 | 8104 | 435–0422 | 7938 |
| Senior Advisor, **Jeffrey 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 | | | | |
| Director, **Denise Simons-Morton, M.D., Ph.D.** | RKL2 | 8130 | 435–0414 | 7936 |
| Clinical Prevention and Translation Scientific Research Group | | | | |
| Leader, **Lawrence Fine, M.D., Dr.P.H.** | RKL2 | 8138 | 435–0377 | 7936 |
| Clinical Trials Scientific Research Group | | | | |
| Leader, **Michael Domanski, M.D.** | RKL2 | 8146 | 435–0399 | 7936 |
| Behavioral Medicine and Prevention Scientific Research Group | | | | |
| Leader, **Peter G. Kaufmann, Ph.D.** | RKL2 | 8118 | 435–0404 | 7936 |
| Epidemiology and Biometry Program | | | | |
| Director, **Teri Manolio, M.D., Ph.D.** | RKL2 | 8160 | 435–0707 | 7934 |

| **Division of Epidemiology and Clinical Applications (continued)** | **Bldg.** | **Room** | **Phone** | **MSC** |
|---|---|---|---|---|
| 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 | | | | |
| Leader, **Jean Olson, M.D. M.P.H.** | RKL2 | 8154 | 435–0701 | 7934 |
| Framingham Epidemiology Research Unit | | | | |
| Leader, **Daniel Levy, M.D.** | 73 Mt. Wayte Avenue, Suite 2<br>Framingham, MA 01702–5827<br>508–935–3458 | | | |
| Jackson Heart Study | | | | |
| Leader, **Evelyn Walker, M.D.** | Jackson Medical Mall<br>350 West Woodrow Wilson Drive<br>Jackson, MS 39213<br>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. Vanwagner** | RKL2 | 7112 | 435–6373 | 7921 |
| Review Branch | | | | |
| Chief, **Valerie Prenger, Ph.D.** | RKL2 | 7214 | 435–0270 | 7924 |
| Referral Officer, **Roy White, Ph.D.** | RKL2 | 7192 | 435–0287 | 7924 |
| Heart/Lung Scientific Review Group | | | | |
| Leader, **William Johnson, Ph.D.** | RKL2 | 7178 | 435–0725 | 7924 |
| Vascular/Blood Scientific Review Group | | | | |
| Leader, **Jeffrey H. Hurst, Ph.D.** | RKL2 | 7208 | 435–0303 | 7924 |
| Clinical Studies and Training Scientific Review Group | | | | |
| Leader, **Patricia Haggerty, 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 | 435–0355 | 7902 |
| Heart, Lung, and Vascular Diseases Contracts Section | | | | |
| Chief, **Pamela Lew** | RKL2 | 6106 | 435–0340 | 7902 |
| Epidemiology and Clinical Applications Section | | | | |
| Chief, **John C. Taylor** | RKL2 | 6126 | 435–0345 | 7902 |
| Procurement Section | | | | |
| Chief, **Debra C. Hawkins** | RKL2 | 6150 | 435–0366 | 7902 |
| Grants Operations Branch | | | | |
| Chief, **Suzanne A. White** | RKL2 | 7160 | 435–0144 | 7926 |
| Deputy Chief, **Raymond Zimmerman** | RKL2 | 7174 | 435–0144 | 7926 |
| Heart and Vascular Diseases Grants Management Section | | | | |
| Chief, **David Reiter** | RKL2 | 7172 | 435–0177 | 7926 |
| Lung Diseases Grants Management Section | | | | |
| Chief, **Robert A. Pike** | RKL2 | 7154 | 435–0166 | 7926 |

| **Division of Intramural Research** | **Bldg.** | **Room** | **Phone** | **MSC** |
|---|---|---|---|---|
| Blood Diseases and Resources Grants Management Section | | | | |
| Chief, **Robert Vinson, Jr.** | RKL2 | 7156 | 435–0166 | 7926 |
| Epidemiology and Clinical Application Grants Management Section | | | | |
| Chief, **Holly Atherton** | RKL2 | 7152 | 435–0177 | 7926 |
| Office of the Director | | | | |
| Clinical Research Program | | | | |
| Director, **Elizabeth G. Nabel, 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, **Gary Unger** | 10 | 7N220 | 401–3646 | 1670 |
| Clinical Research Program | | | | |
| Bioinformatics Core Facility | | | | |
| Head, **Eric Billings, Ph.D.** | 10 | 4A17 | 496–6520 | 1412 |
| Flow Cytometry Core Facility | | | | |
| 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 | 1754 |
| Office of Education | | | | |
| Chief, **Herbert Geller, Ph.D.** | 10 | 8C213 | 435–6719 | 1755 |
| Cardiothoracic Surgery Branch | | | | |
| Chief, **Keith Horvath, M.D.** | 10 | 6-5152 | 402–1875 | 1454 |
| Cardiovascular Branch | | | | |
| Chief, **Toren Finkel, M.D., Ph.D.** | 10 | 7B14 | 402–4081 | 1650 |
| Cardiovascular Intervention Program | | | | |
| Chief, **Robert J. Lederman, M.D.** | 10 | 2C713 | 402–6769 | 1538 |
| 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 | 7B14 | 402–4081 | 1650 |
| Vascular Biology Section | | | | |
| Chief, **Elizabeth G. Nabel, M.D.** | 10 | 8C103 | 496–1518 | 1754 |
| Hematology Branch | | | | |
| Chief, **Neal Young, M.D.** | 10 | 7C103 | 496–5093 | 1652 |
| Laboratory of Animal Medicine and 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 |

| **Division of Intramural Research (continued)** | **Bldg.** | **Room** | **Phone** | **MSC** |
|---|---|---|---|---|
| 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 | | | | |
| iRNA Core Facility | | | | |
| Head, **Yongsok Kim, Ph.D.** | 10 | 8N228 | 496–3672 | 1762 |
| Light Microscopy Core Facility | | | | |
| Head, **Christian Combs, Ph.D.** | 10 | 6N309 | 496–3236 | 1412 |
| Pathology Core Facility | | | | |
| Head, **Zu-Xi Yu, Ph.D.** | 10 | 2N240 | 435–4011 | 1650 |
| Proteomics Core Facility | | | | |
| Head, **Rong Fong Shen, Ph.D.** | 10 | 6C208 | 594–1060 | 1597 |
| Transgenics Core Facility | | | | |
| Head, **Chengyu Liu, Ph.D.** | 50 | 3305 | 435–5034 | 8018 |
| Biochemistry and Biophysics Center | | | | |
| Chief, **Boon Chock, Ph.D.** | 50 | 2134 | 496–2073 | 8012 |
| Laboratory of Biochemistry | | | | |
| Chief, **Boon Chock, Ph.D.** | 50 | 2134 | 496–2073 | 8012 |
| Laboratory of Biophysical Chemistry | | | | |
| Chief, **James Ferretti, Ph.D.** | 50 | 3517 | 496–3341 | 8013 |
| Laboratory of Cell Signaling | | | | |
| Chief, **Sue Goo Rhee, Ph.D.** | 50 | 3523 | 594–7225 | 8015 |
| Cell Biology and Physiology Center | | | | |
| Chief, **Edward D. Korn, Ph.D.** | 50 | 2523 | 496–1616 | 8017 |
| Laboratory of Cardiac Energetics | | | | |
| Chief, **Robert S. Balaban, Ph.D.** | 10 | B1D416 | 496–3658 | 1061 |
| Laboratory of Cell Biology | | | | |
| Chief, **Edward D. Korn, Ph.D.** | 50 | 2523 | 496–1616 | 8017 |
| Laboratory of Kidney and Electrolyte Metabolism | | | | |
| Chief, **Mark A. Knepper, M.D., Ph.D.** | 10 | 6N260 | 496–3187 | 1603 |
| Laboratory of Molecular Cardiology | | | | |
| Chief, **Robert S. Adelstein, M.D.** | 10 | 8N202 | 496–1865 | 1762 |
| Genetics and Development Biology Center | | | | |
| Chief, **Cecilia Lo, Ph.D.** | 50 | 4537 | 451–8041 | 8019 |
| Laboratory of Biochemical Genetics | | | | |
| Chief, **Marshall Nirenberg, Ph.D.** | 10 | 7N315 | 496–5208 | 4036 |
| Laboratory of Developmental Biology | | | | |
| Chief, **Cecilia Lo, Ph.D.** | 50 | 4537 | 451–8041 | 8019 |
| Immunology Center | | | | |
| Chief, **Warren Leonard, M.D.** | 10 | 7N252 | 496–0098 | 1674 |
| Laboratory of Molecular Immunology | | | | |
| Chief, **Warren Leonard, M.D.** | 10 | 7N252 | 496–0098 | 1674 |

## NIH Mailing Address Formats

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

Please use the following formats for NIH mailing addresses:

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NHLBI, NIH
Building 10, Room ____
10 Center Drive MSC* ____
Bethesda, MD 20892–MSC†

Building 14E

Full Name
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Building 14E, Room ____
14 Service Road South MSC* ____
Bethesda, MD 20892–MSC†

Building 31

Full Name
NHLBI, NIH
Building 31, Room ____
31 Center Drive MSC*____
Bethesda, MD 20892–MSC†

Building 50

Full Name
NHLBI, NIH
Building 50, Room ____
50 South Drive MSC*
Bethesda, MD 20892–MSC†

Rockledge II Building

Full Name
NHLBI, NIH
Two Rockledge Center, Room ____
6701 Rockledge Drive MSC* ____
Bethesda, MD 20817–MSC†

Rockledge I Building

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NHLBI, NIH
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# 2. Program Overview

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

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

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

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

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

The programs of the NHLBI, as shown on page 10, are implemented through five extramural units: the Division of Heart and Vascular Diseases (DHVD), the Division of Lung Diseases (DLD), the Division of Blood Diseases and Resources (DBDR), the Division of Epidemiology and Clinical Applications (DECA), and the National Center on Sleep Disorders Research (NCSDR); and one intramural unit, the Division of Intramural Research (DIR). Although the NHLBI has primary responsibility for the WHI, it

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

**Heart and Vascular Diseases**

***Heart Research***
Heart Development
Cardiac Function and Heart Failure
Ischemic Heart Disease
Arrhythmias and Sudden Cardiac Death

***Vascular Biology Research***
Atherosclerosis
Hypertension
Biology and Pathophysiology of Blood Vessels
Gene Therapy for Prevention and Treatment of Vascular Diseases

***Clinical and Molecular Medicine***
Cardiovascular Medicine
Bioengineering/Systems
Genomic and Proteomic Applications
Imaging/Nanotechnology
Bioinformatics

**Lung Diseases**

***Airway Biology and Disease***
Asthma
Chronic Obstructive Pulmonary Disease (COPD) and Environmental Lung Diseases
Cystic Fibrosis (CF)
Neurobiology and Sleep

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

**Blood Diseases and Resources**

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

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

**Epidemiology and Clinical Applications**

***Clinical Applications and Prevention***
Clinical Prevention and Translation
Clinical Trials
Behavioral Medicine and Prevention

***Epidemiology and Biometry***
Field Studies and Clinical Epidemiology
Analytical Resources
Genetic Epidemiology

**National Center on Sleep Disorders Research**
Sleep
Sleep Disorders and Related Conditions

**Women's Health Initiative**

**Intramural Research**

***Clinical Research Program***
Cardiovascular
Hematology
Molecular Disease
Pulmonary/Critical Care Medicine
Animal Medicine and Surgery

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

is run by a consortium that includes the National Cancer Institute (NCI), the National Institute on Aging (NIA), and the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS). The Divisions and the Center pursue their own scientific missions but cooperate in areas of common interest. The extramural Divisions and the NCSDR use a variety of funding mechanisms, such as research grants, cooperative agreements, program project grants, Small Business Innovation Research grants, Small Business Technology Transfer grants, Specialized Centers of Research (SCOR) and Specialized Centers of Clinically Oriented Research (SCCOR) grants, comprehensive center grants, contracts, and research training and career development programs. Descriptions of the Division and Center programs, as well as the WHI, follow.

## Division of Heart and Vascular Diseases

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

The Division is organized into three major research programs:

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

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

### Heart Research Program

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

#### *Heart Development, Function, and Failure SRG*

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

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

#### *Arrhythmias, Ischemia, and Sudden Cardiac Death SRG*

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

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

### Vascular Biology Research Program

The Vascular Biology Research Program supports research in atherosclerosis, hypertension, basic vascular biology, and gene therapy for prevention and treatment of vascular diseases. Other targeted areas focus on the etiology, pathogenesis, and treatment of excess CVD in diabetes mellitus and cardiovascular complications of

HIV/AIDS. SCORs support collaborative studies on molecular medicine and atherosclerosis, molecular genetics of hypertension, and basic and clinical gene therapy. The Program comprises the two SRGs described below.

***Atherosclerosis SRG***

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

***Hypertension SRG***

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

## Clinical and Molecular Medicine Program

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

***Cardiovascular Medicine SRG***

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

***Bioengineering and Genomic Applications SRG***

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

## Division of Lung Diseases

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

The Division is organized into two major research programs:

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

### Airway Biology and Disease Program

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

#### *Asthma SRG*

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

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

#### *Chronic Obstructive Pulmonary Disease/Environment SRG*

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

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

#### *Cystic Fibrosis SRG*

The CF SRG oversees basic and clinical research related to the origins and control of infections and inflammatory and immune responses in the lungs of CF patients, loss of CF transmembrane conductance regulation on development of CF, effects of other genes on its manifestation, and genetic and metabolic defects underlying pulmonary complications associated with CF. Developing new genetic, pharmacologic, and nonphar-

macologic (e.g., gene transfer) treatments also is an area of emphasis.

***Sleep and Neurobiology SRG***

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

## Lung Biology and Disease Program

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

***Acquired Immunodeficiency Syndrome/Tuberculosis SRG***

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

***Acute Lung Injury/Critical Care SRG***

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

***Developmental Biology and Pediatrics SRG***

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

***Immunology/Fibrosis SRG***

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

***Lung Cell and Vascular Biology SRG***

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

## Division of Blood Diseases and Resources

The DBDR plans and directs a coordinated research program on the causes and prevention of blood diseases and disorders. Areas of interest encompass a broad spectrum of research from stem cell biology to medical management of blood diseases, with a focus on nonmalignant and premalignant processes. The Division also has a major responsibility to improve the adequacy and safety of the Nation's blood supply. It has recently taken a leading role in developing cell-based therapies, combining the expertise of transfusion medicine and stem cell technology with the exploration of repair and regeneration of human tissues and biological systems.

The Division is organized into two major programs:

- Blood Diseases Program
- Blood Resources Program.

### Blood Diseases Program

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

#### *Hemoglobinopathies and Genetics SRG*

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

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

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

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

#### *Thrombosis and Hemostasis SRG*

The Thrombosis and Hemostasis SRG oversees a comprehensive program of basic research, clinical studies, and technology development in hemostasis, thrombosis, and endothelial cell biology, with a focus on understanding the pathogenesis of both arterial and venous thrombosis in order to improve the diagnosis, prevention, and treatment of thrombosis in heart attack, stroke, and peripheral vascular diseases. A major goal is to find additional platelet inhibitors, anticoagulants, and fibrinolytic agents that will improve specificity and reduce side effects when used in treatment of thrombotic and thromboembolic disorders. SCORs support collaborative studies on hemostatic and thrombotic disorders.

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

### Blood Resources Program

#### *Transfusion Medicine Cell Therapies SRG*

The Blood Resources Program, through its Transfusion Medicine Cell Therapies SRG, plans and directs research and training in transfusion medicine, stem cell biology and disease, and clinical cellular medicine. Areas of interest in transfusion medicine include transmission of disease through transfusion, development of methods to detect and inactivate viruses in donated

blood, improvement of blood donor screening procedures, and emerging diseases that may be transmitted by blood transfusions. Also supported are basic and clinical investigations related to transfusion immunobiology, focusing on graft versus host disease, graft versus leukemia effect, and dendritic cell therapies.

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

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

## Division of Epidemiology and Clinical Applications

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

The Division is organized into two major research programs:

- Clinical Applications and Prevention Program
- Epidemiology and Biometry Program.

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

### Clinical Applications and Prevention Program

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

#### *Behavioral Medicine and Prevention SRG*

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

#### *Clinical Trials SRG*

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

#### *Clinical Prevention and Translation SRG*

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

based guidelines as an integral part of routine medical care.

## Epidemiology and Biometry Program

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

### *Analytical Resources SRG*

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

### *Field Studies and Clinical Epidemiology SRG*

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

### *Genetic Epidemiology SRG*

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

### *Framingham Epidemiology Research Unit*

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

### *Jackson Epidemiology Research Unit*

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

## Office of Biostatistics Research

The Office of Biostatistics Research (OBR) provides statistical expertise to the Institute and performs diverse functions in planning, designing, implementing, and analyzing NHLBI-sponsored studies. It has primary responsibility for providing objective, statistically sound, and medically relevant solutions to problems arising in NHLBI-sponsored studies. The OBR is concerned with designing efficient studies and monitoring data from ongoing studies.

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

## National Center on Sleep Disorders Research

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

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

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

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

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

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

## Women's Health Initiative

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

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

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

Hormone Therapy: Investigate risks and benefits of combined estrogen (conjugated equine estrogen) and progestin (medroxyprogesterone acetate) on CHD,

breast cancer, and osteoporosis risk in women with a uterus, and estrogen alone in women without a uterus.

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

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

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

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

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

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

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

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

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

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

## Division of Intramural Research

The NHLBI DIR conducts clinical research on normal and pathophysiologic functioning of the heart, lung, blood, and vascular systems, and basic research on nor-

mal and abnormal cellular behavior at the molecular level. In FY 2003, the Laboratory Research Program was modified to consolidate some of the research effort. Four Centers—the Genetics and Development Biology Center, the Cell Biology and Physiology Center, the Biochemistry and Biophysics Center, and the Immunology Center—were established, and all Sections were abolished. The new organizational structure of the Program can be found under Division of Intramural Research in Chapter 1, Directory of Personnel.

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

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

## Office of Prevention, Education, and Control

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

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

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

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

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

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

The National Asthma Education and Prevention Program (NAEPP) was initiated in 1989 to raise awareness of asthma as a serious, chronic disease; to promote more effective management of asthma through professional,

patient, and public education; and to provide up-to-date information on asthma care. The Program works with schools, health care professionals, and patients to improve asthma care, prevent disruptions of daily routine, limit hospitalizations, and reduce deaths caused by uncontrolled asthma.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The NHLBI's Asian American and Pacific Islander (AAPI) Cardiovascular Health Outreach effort focuses on four underserved groups with high levels of CVD risk factors such as high blood pressure, obesity, and physical inactivity. Individuals of Philippine, Vietnamese, Cambodian, and Native Hawaiian heritage comprise the targeted audience. To date, cardiovascular health educational materials have been developed for those of Filipino and Vietnamese heritage. A school-based intergenerational cardiovascular health education curriculum to be used to educate Native Hawaiian elementary school children is under way.

## International Activities

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

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

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

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

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

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

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

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

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

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

# 3. Important Events

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**November 22–24, 1964.** The Second National Conference on Cardiovascular Diseases, cosponsored by the American Heart Association, the NHI, and the Heart Disease Control Program of the PHS, is held to evaluate progress since the 1950 Conference and to assess needs and goals for continued and accelerated growth against heart and blood vessel diseases.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**June 12, 1972.** Elliot Richardson, Secretary, HEW, approves a nationwide program for high blood pressure information and education and appoints two committees to implement the program: the Hypertension Information and Education Advisory Committee, chaired by the Director, NIH, and the Interagency Working Group, chaired by the Director, NHLI. A High Blood Pressure Information Center is established within the NHLI Office of Information to collect and disseminate public and professional information about the disease.

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

**July 14, 1972.** Secretary Richardson approves reorganization of the NHLI, with the Institute elevated to Bureau status within the NIH and comprising seven division-level components: Office of the Director, Division of Heart and Vascular Diseases, Division of Lung Diseases, Division of Blood Diseases and Resources, Division of Intramural Research, Division of Technological Applications, and Division of Extramural Affairs.

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

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

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

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

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

**August 2, 1974.** The Secretary, HEW, approves regulations governing the establishment, support, and operation of National Research and Demonstration Centers for heart, blood vessel, lung, and blood diseases, which implement section 415(b) of the PHS Act, as amended by the National Heart, Blood Vessel, Lung, and Blood Act of 1972: (1) to carry out basic and clinical research on heart, blood vessel, lung, and blood diseases; (2) to provide demonstrations of advanced methods of prevention, diagnosis, and treatment; and (3) to supply a training source for scientists and physicians concerned with the diseases.

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

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

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

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

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

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

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

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

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

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

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

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

**October 26, 1983.** The Coronary Artery Surgery Study (CASS) results are released. They demonstrate

that mildly symptomatic patients with coronary artery disease can safely defer coronary artery bypass surgery until symptoms worsen.

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

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

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

**November 1984.** In NHLBI-NIH Clinical Center interagency agreement for studies on the transmission of human immunodeficiency virus (HIV) from humans to chimpanzees leads to the first definitive evidence that the transmission is by blood transfusion.

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

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

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

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

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

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

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

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

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

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

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

**September 1988.** The Strong Heart Study is initiated. It focuses on CVD morbidity and mortality rates

and distribution of CVD risk factors in three geographically diverse American Indian groups.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**June 10, 1993.** The NIH Revitalization Act of 1993 (P.L. 103–43) establishes the National Center on Sleep Disorders Research within the NHLBI.

**June 15, 1993.** The *Second Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults* (ATP II) is released to the public at a press conference held in conjunction with the NCEP Coordinating Committee meeting.

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

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

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

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

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

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

**September 1996.** Findings from the Asthma Clinical Research Network (ACRN) show that for people with asthma, taking an inhaled beta-agonist at regularly scheduled times is safe but provides no greater benefit than taking the medication only when asthma symptoms occur. The recommendation to physicians who treat patients with mild asthma is to prescribe inhaled beta-agonists only on an as-needed basis.

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

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

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

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

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

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

**October 1997.** The NHLBI commemorates the 50th anniversary of the Institute's inception. A publication prepared for the Institute's anniversary, *Vital Signs: Discoveries in diseases of the heart, lungs, and blood* documents the remarkable research advances of the past 50 years.

**October 1, 1997.** The Women's Health Initiative, initiated in 1991, is transferred to the NHLBI.

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

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

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

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

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

**June 17, 1998.** The NHLBI, in cooperation with the NIDDK, releases *Clinical Guidelines on the Identification, Treatment, and Evaluation of Overweight and Obesity in Adults: Evidence Report*.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**February 1, 2001.** The NHLBI, along with the HHS Office of Disease Prevention and Health Promotion, the Office of the Surgeon General, the CDC, the National Institute of Neurological Disorders and Stroke, and the American Heart Association, signs a memorandum of understanding to focus and coordinate their efforts to meet the Healthy People 2010 objectives on cardiovascular health.

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

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

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

**May 2001.** The NHLBI releases the NCEP's new Adult Treatment Panel III (ATP III) guidelines for the detection, evaluation, and treatment of high blood cholesterol in adults.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**December 4, 2002.** Results of the Atrial Fibrillation Follow-up Investigation of Rhythm Management Trial (AFFIRM) indicate that rate control rather than rhythm control may be the preferred approach for patients with atrial fibrillation. The rate control strategy involves the

use of less expensive drugs and results in fewer hospitalizations.

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

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

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

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

**April 23, 2003.** Results of the PREMIER trial of behavioral lifestyle interventions for blood pressure control show that individuals with prehypertension or stage 1 hypertension can lower their blood pressure by making multiple lifestyle changes.

**May 14, 2003.** The *Seventh Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure* (JNC VII) is released.

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

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

**August 2003.** The NHLBI establishes a partnership with the CIHR to advance research on cardiovascular, respiratory, and blood diseases.

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

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

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

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

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

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

# 4. Disease Statistics

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

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

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

## Cardiovascular Diseases

- In 2002, CVD caused 927,000 deaths—38 percent of all deaths (p. 37).
- Heart disease is the leading cause of death; the main form, CHD, caused 495,000 deaths in 2002 (pp. 38, 40).
- The annual number of deaths from CVD increased substantially between 1900 and 1970 and remains high (p. 39).
- The death rate (not age-adjusted) for CVD increased from 1920 until it peaked in 1968. Since then, the trend has been downward. In 2002, the rate was similar to the rate in 1930 (p. 39).
- Cerebrovascular disease, the third leading cause of death, accounted for 163,000 deaths in 2002 (pp. 38, 40).
- Heart disease is second only to all cancers combined in years of potential life lost (p. 40).
- Among minority groups, heart disease ranks first, and stroke ranks fifth or higher as the leading causes of death (p. 40).
- The rapid increase in deaths due to CHF between 1968 and 2002 is a major exception to the mortality decline in CVD (p. 41).
- Between 1985 and 2002, death rates for heart disease and stroke declined in men and women of all racial/ethnic groups with one exception—the death rate for stroke in American Indian females (p. 42).
- Because of the rapid decline in mortality from CHD since the peak in 1968, there were 900,000 fewer deaths from CHD in 2002 than would have occurred if there had been no decline (p. 43).
- Substantial improvements have been made in the treatment of CVD. Since 1975, case-fatality rates from hospitalized acute myocardial infarction (AMI) stroke, cardiac dysrhythmia, and CHF patients declined appreciably (p. 43).
- 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) (p. 44).
- Between 1992 and 2002, the percent decline in death rates for CHD was greatest among white males and least among black females (p. 45).
- In 2002, an estimated 70.1 million persons in the United States had some form of CVD; 65 million had hypertension, and 13 million had CHD (p. 49).
- Since the 1960s, there has been a substantial reduction in the prevalence of CVD risk factors: hypertension, smoking, and high cholesterol, but not overweight. The decline in prevalence of hypertension ceased in 1990; since then the prevalence has increased (p. 50).
- Between 1976–80 and 1999–2002, the percent of persons with hypertension that were aware of their condition, on treatment for it, and having their blood pressure under control increased substantially (p. 51).
- A 1999–2002 national survey showed only about one-third of hypertensive patients (systolic BP $\geq$ 140 mm Hg or diastolic BP $\geq$ 90 mm Hg or on antihypertensive medication) had their condition under control (p. 51).
- Hospitalization rates for CHF increased between 1971 and 2000 (p. 52).
- The estimated economic cost of CVD for 2005 is approximately $393 billion:
  - $242 billion in direct health expenditures
  - $35 billion in indirect cost of morbidity
  - $117 billion in indirect cost of mortality (p. 53).

## Lung Diseases

- Lung diseases, excluding lung cancer, caused an estimated 239,000 deaths in 2002 (p. 37).
- COPD caused 121,000 deaths in 2002 and is the fourth leading cause of death (pp. 38, 40).
- Between 1992 and 2002, death rates for COPD increased substantially in women and decreased slightly in men; mortality for asthma decreased appreciably (p. 45).
- Between 1980 and 2002, infant death rates for various lung diseases declined markedly (p. 45).
- Of the seven leading causes of infant mortality, four are lung diseases or have a lung disease component (p. 46). Between 1992 and 2002, changes in mortality for the causes were:
  - Congenital anomalies (-17 percent)
  - Disorders of short gestation (-3 percent)
  - Sudden infant death syndrome (-57 percent)
  - Respiratory distress syndrome (-54 percent).
- Lung diseases accounted for 21 percent of all deaths under 1 year of age in 2002 (p. 46).
- The COPD death rate for women in the United States is increasing significantly compared with the rates in several other countries (p. 47).
- Between 1985 and 2002, death rates for COPD increased for women in all racial/ethnic groups. For men, they increased in blacks, American Indians, and Hispanics, and were essentially flat in whites and Asians (p. 48).
- Sleep disorders are increasingly being recognized as an important health problem. The number of physician office visits for sleep apnea, insomnia, restless legs syndrome, narcolepsy, and other major sleep disorders increased from 1,046,927 in 1990 to 6,216,000 in 2001 (p. 48).
- Asthma is a common chronic condition, particularly in children (pp. 49, 50, 52).
- The economic cost of lung diseases is expected to be $140 billion in 2005—$81 billion in direct health expenditures and $59 billion in indirect cost of morbidity and mortality (p. 53).

## Blood Diseases

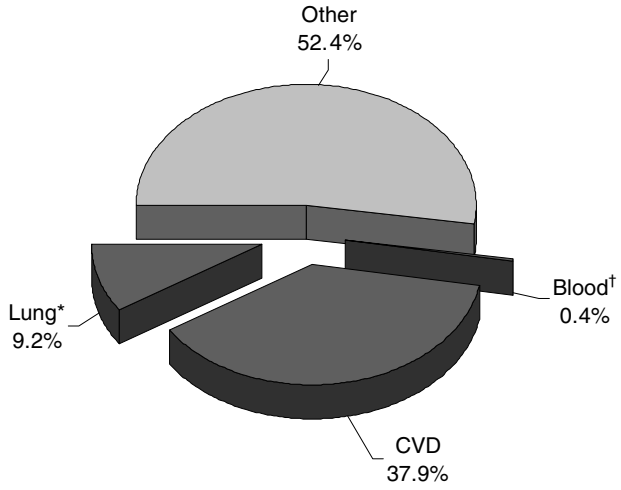
- An estimated 251,000 deaths, 10 percent of all deaths, were attributed to blood diseases in 2002 (p. 37). These include the following:
  - 241,000 due to blood-clotting disorders
  - 10,000 to diseases of the red blood cell and bleeding disorders (p. 38).
- A large proportion of deaths from acute MI and cerebrovascular disease involve blood-clotting problems (p. 38).
- In 2005, blood-clotting disorders are expected to cost the Nation's economy $92 billion, and other blood diseases will cost $12 billion (p. 53).
- The mean age at death for persons with sickle cell anemia increased from about 28 years in 1979 to 37.7 years in 2001 (not shown).

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

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

* Includes 328,000 CVD deaths involving blood-clotting diseases in 1982 and 241,000 in 2002.
† Includes 12,000 CVD deaths due to pulmonary heart disease in 1982 and 14,000 in 2002.
Source: Vital Statistics of the United States, National Center for Health Statistics (NCHS).

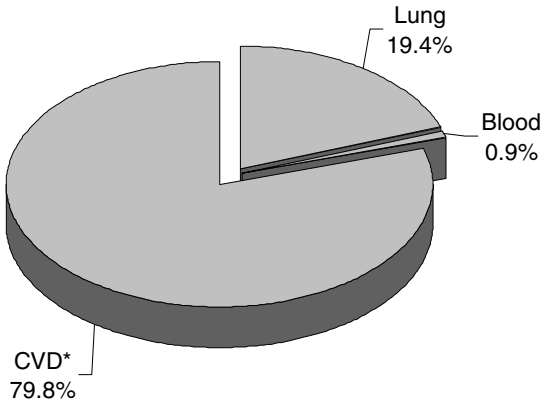
## Deaths by Major Causes, U.S., 2002




Total Cardiovascular, Lung, and Blood Diseases 47.6%

* Excludes deaths from pulmonary heart disease (14,000).
† Excludes deaths from blood-clotting disorders and pulmonary embolism (241,000).

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



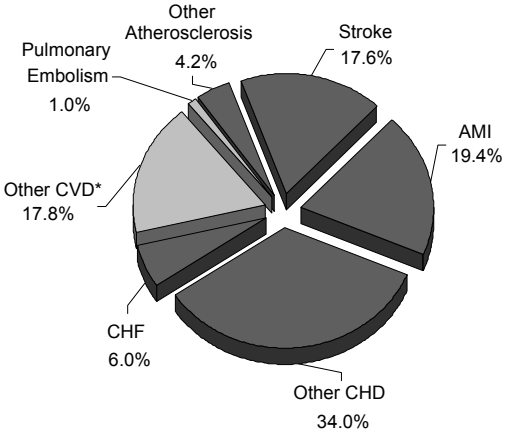

* CVD involving blood clotting (20.7%).

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

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

* Deaths from clotting or pulmonary disorders also are included as cardiovascular deaths.
Note: Total, excluding overlap, is 1,162,000.
Source: Estimated by the NHLBI from Vital Statistics of the United States, NCHS.

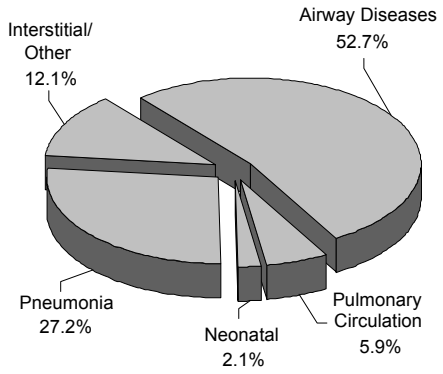
### Deaths From Cardiovascular Diseases, U.S., 2002



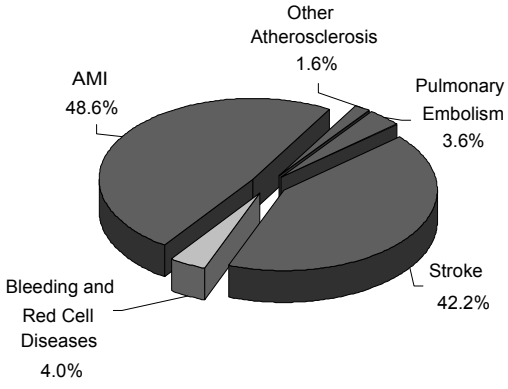

Atherosclerosis-Related Disease 81.2%

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

### Deaths From Lung Diseases, U.S., 2002



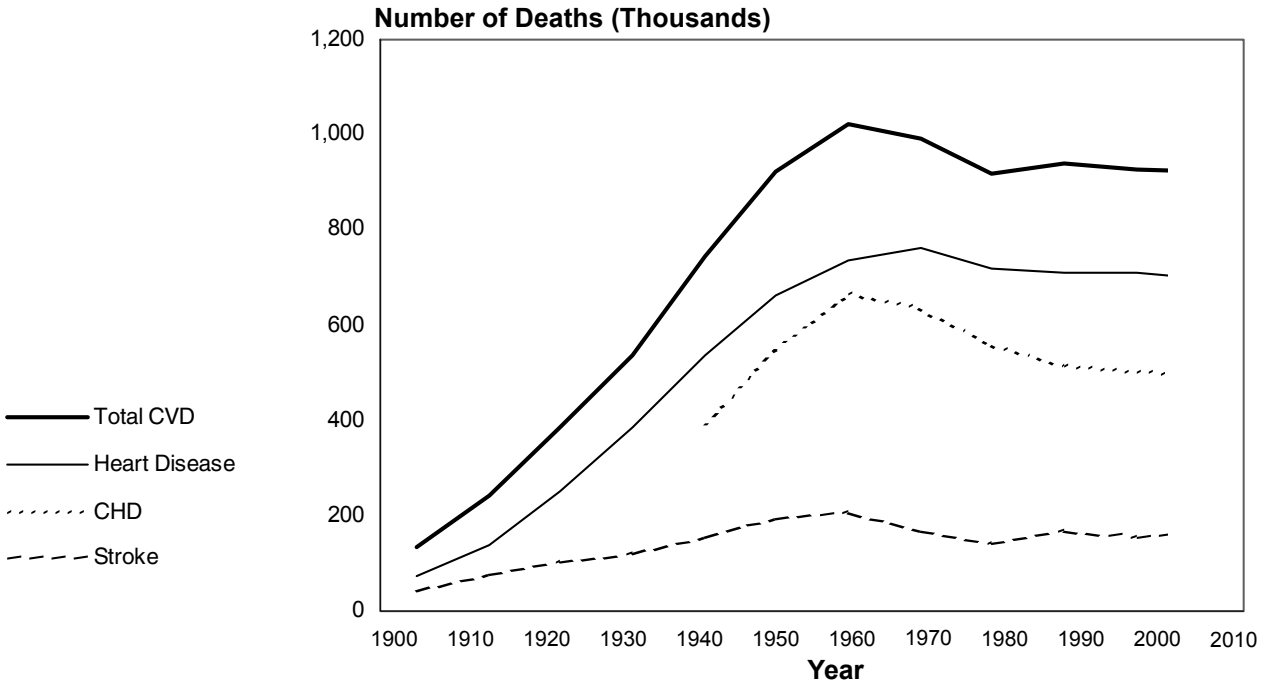

### Deaths From Blood Diseases, U.S., 2002




Blood-Clotting Disorders 96.0%

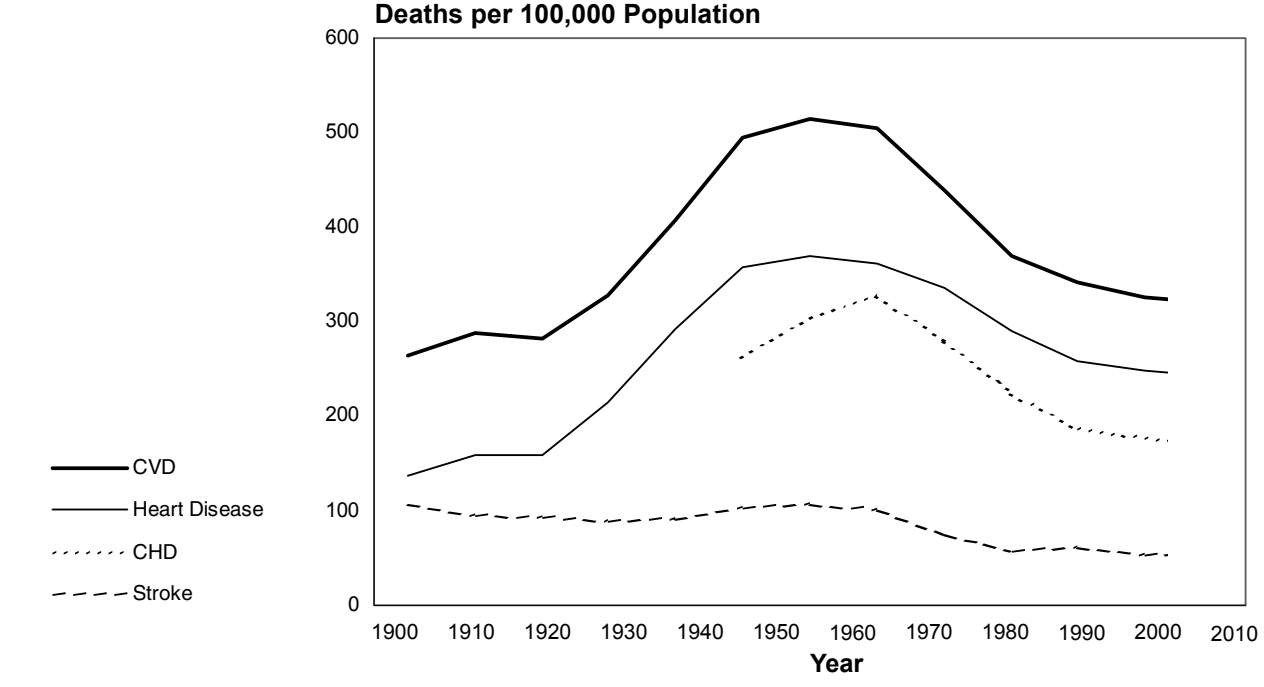
Source: Estimated by the NHLBI from Vital Statistics of the United States, NCHS.

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



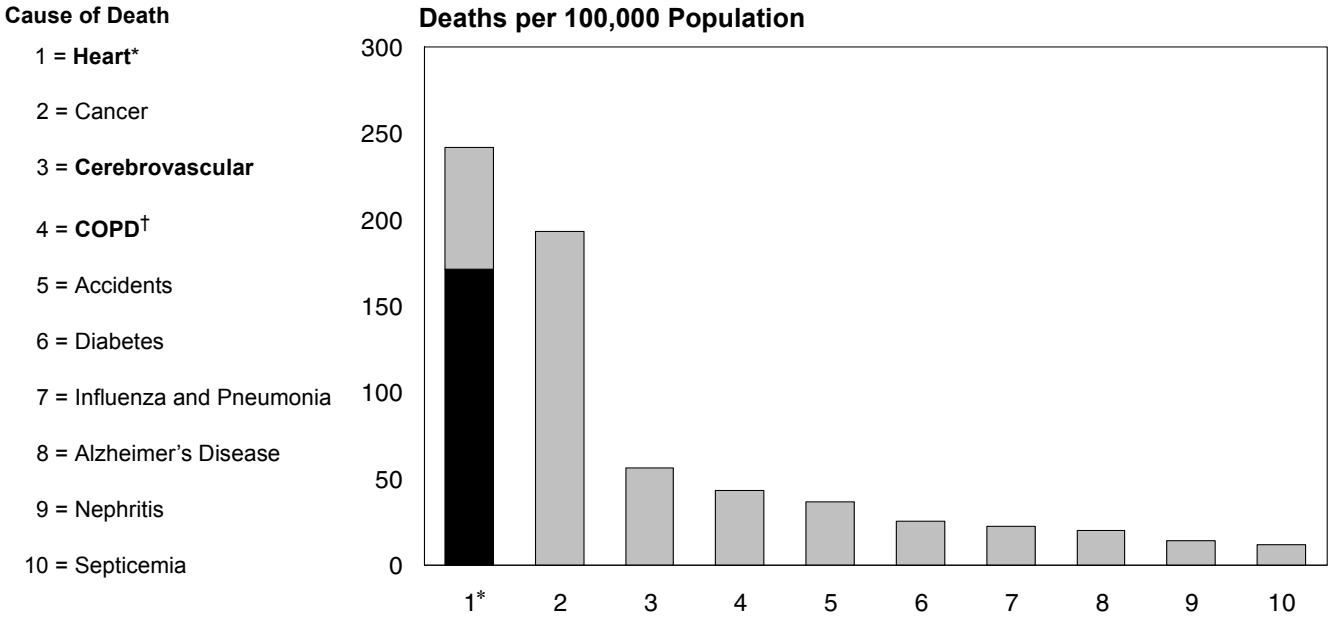

Source: Vital Statistics of the United States, NCHS.

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




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

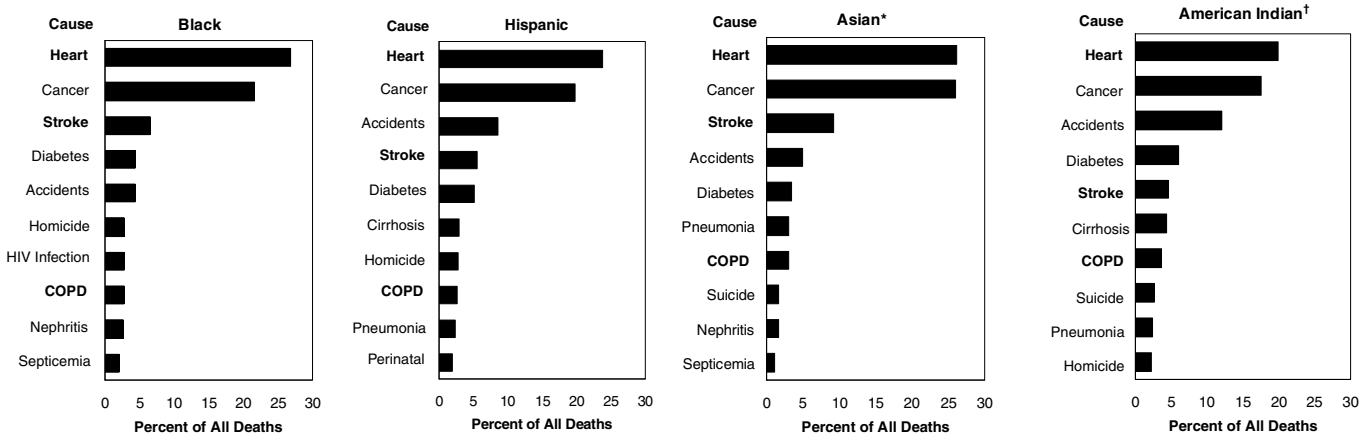
## Ten Leading Causes of Death: Death Rates, U.S., 2002




| | 1* | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Years of potential life lost (millions)‡ | 3.3 | 4.3 | 0.5 | 0.5 | 2.9 | 0.5 | 0.2 | < 0.1 | 0.2 | 0.2 |

* Includes 171.4 deaths per 100,000 population from CHD.
† COPD and allied conditions (including asthma); the term in the ICD/10 is "chronic lower respiratory diseases."
‡ Based on the average remaining years of life up to age 75 years.
Note: Bolded diseases are those addressed in Institute programs.
Source: Vital Statistics of the United States, NCHS.

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



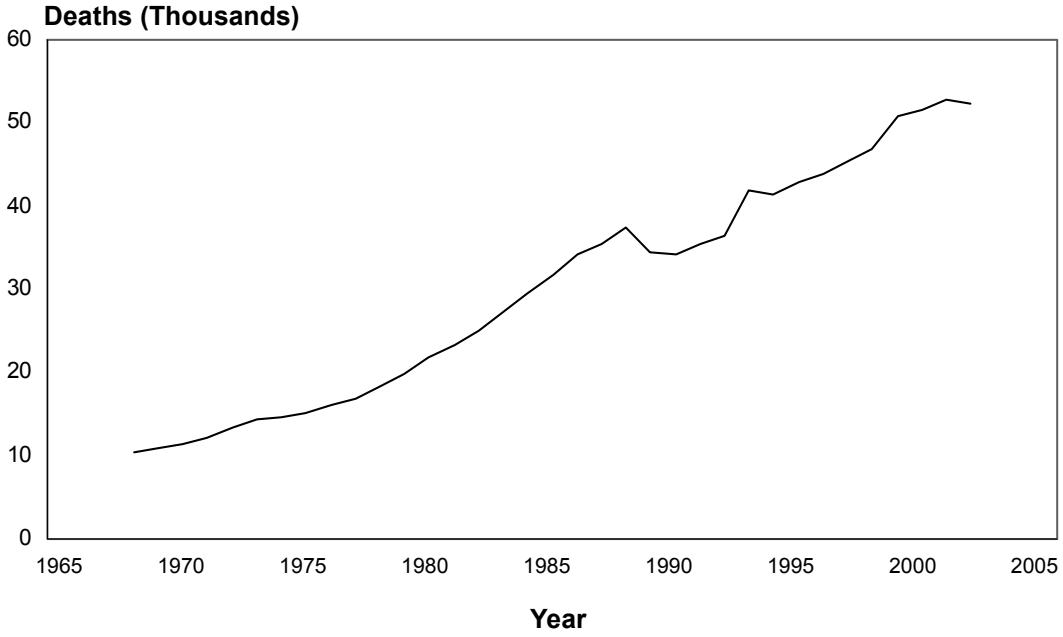

* Includes deaths among individuals of Asian extraction and Asian-Pacific Islanders.
† Includes deaths among Aleuts and Eskimos.
Note: Bolded causes of death are those addressed in Institute programs.
Source: Vital Statistics of the United States, NCHS.

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

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

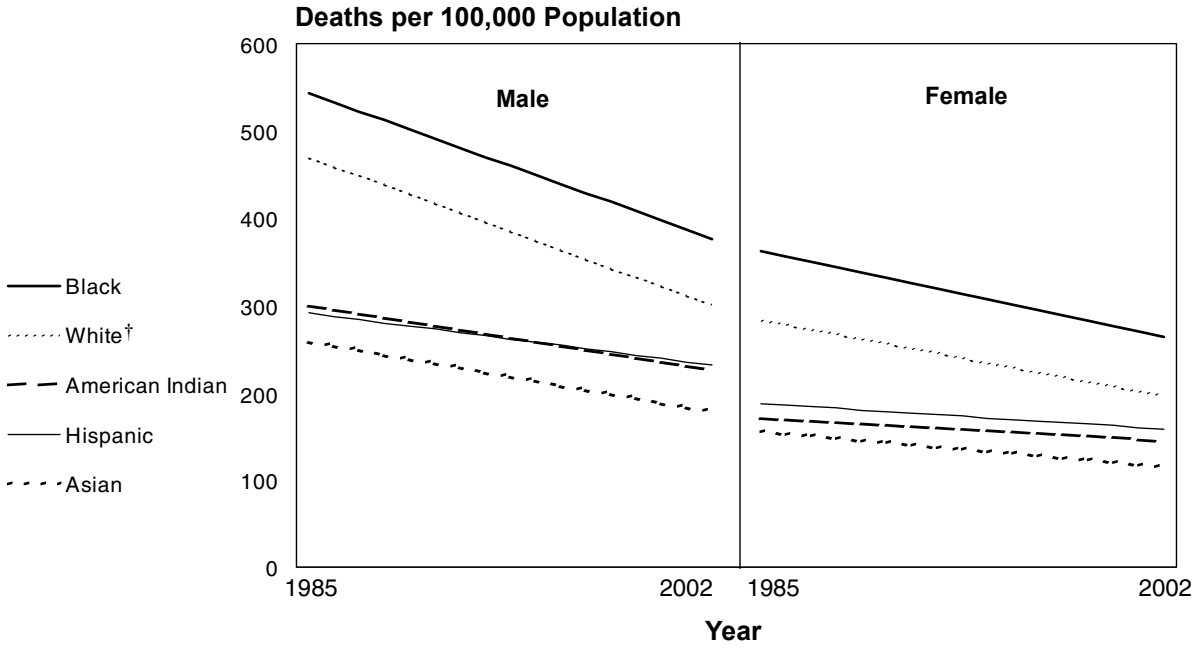
* Age-adjusted; rate per 100,000 population.
† Comparability ratio (1.0588) applied.
Source: Vital Statistics of the United States, NCHS.

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



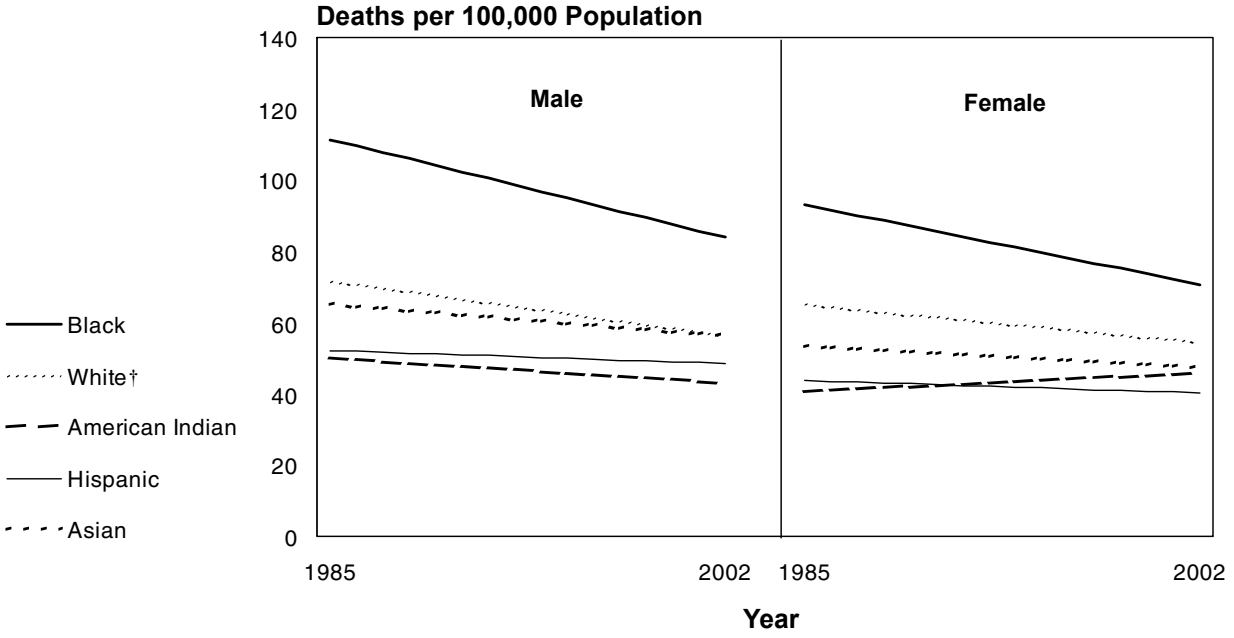

Note: The sharp drop occurring in 1989 is attributed to the revision of the death certificate.
Source: Vital Statistics of the United States, NCHS.

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



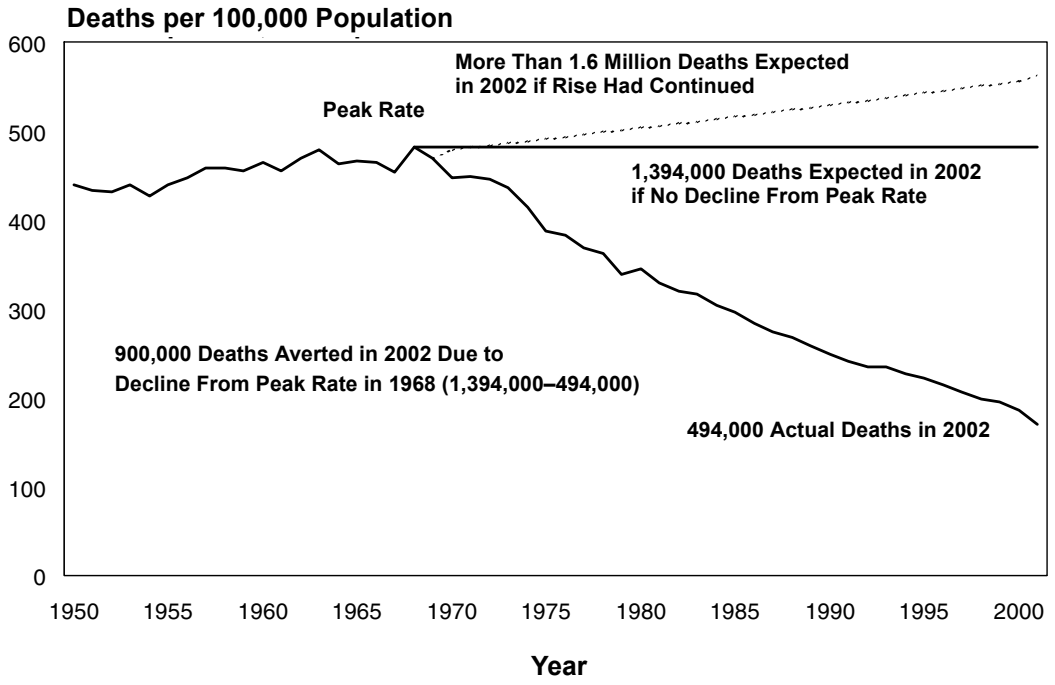

* Age-adjusted.
† Non-Hispanic.
Note: Each line is a log linear regression derived from the actual rates.
Source: Vital Statistics of the United States, NCHS.

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



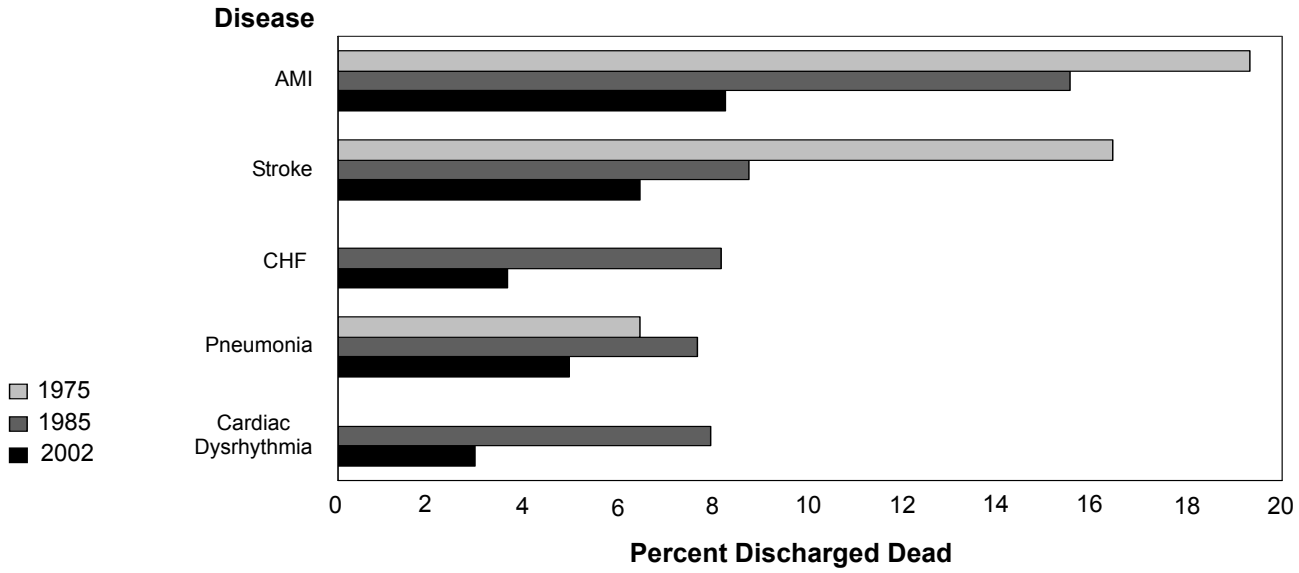

* Age-adjusted.
† Non-Hispanic.
Note: Each line is a log linear regression derived from the actual rates.
Source: Vital Statistics of the United States, NCHS.

## Death Rates* for Coronary Heart Disease, U.S., 1950–2002
### Actual Rate and Expected Rates if Rise Had Continued or Reached a Plateau



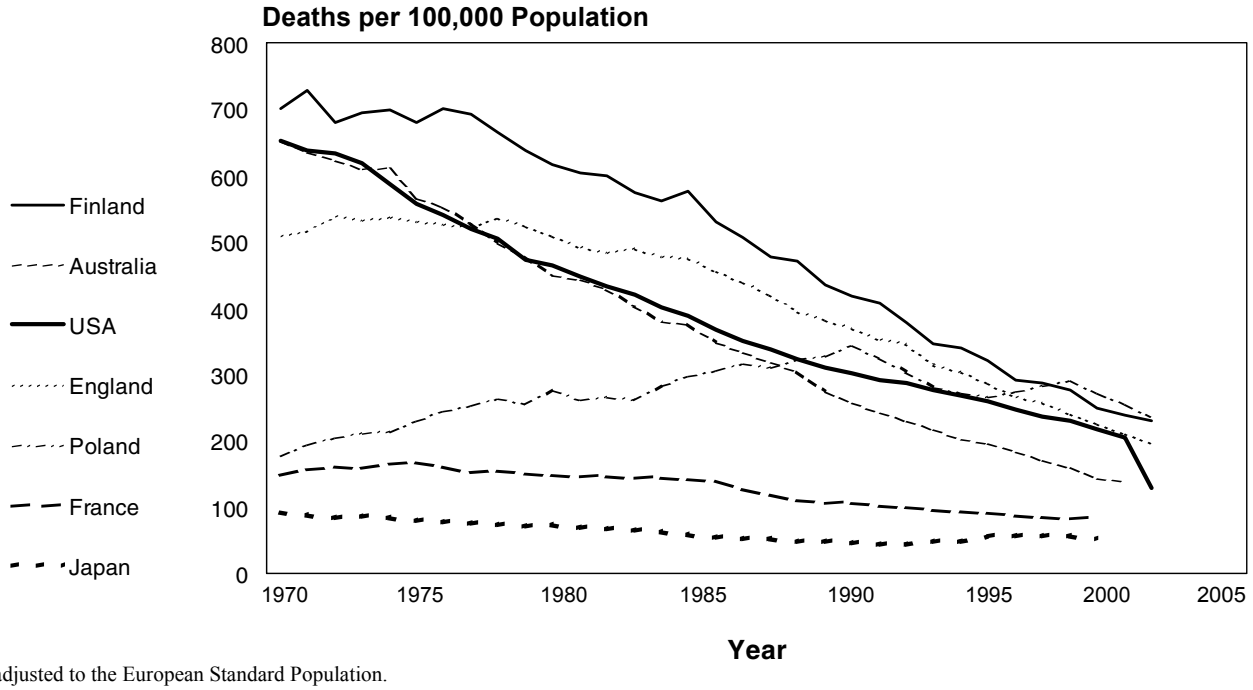

* Age-adjusted.
Source: Vital Statistics of the United States, NCHS.

## Common Cardiovascular and Lung Diseases With High Percentage Discharged Dead From Hospitals, U.S., 1975, 1985, and 2002



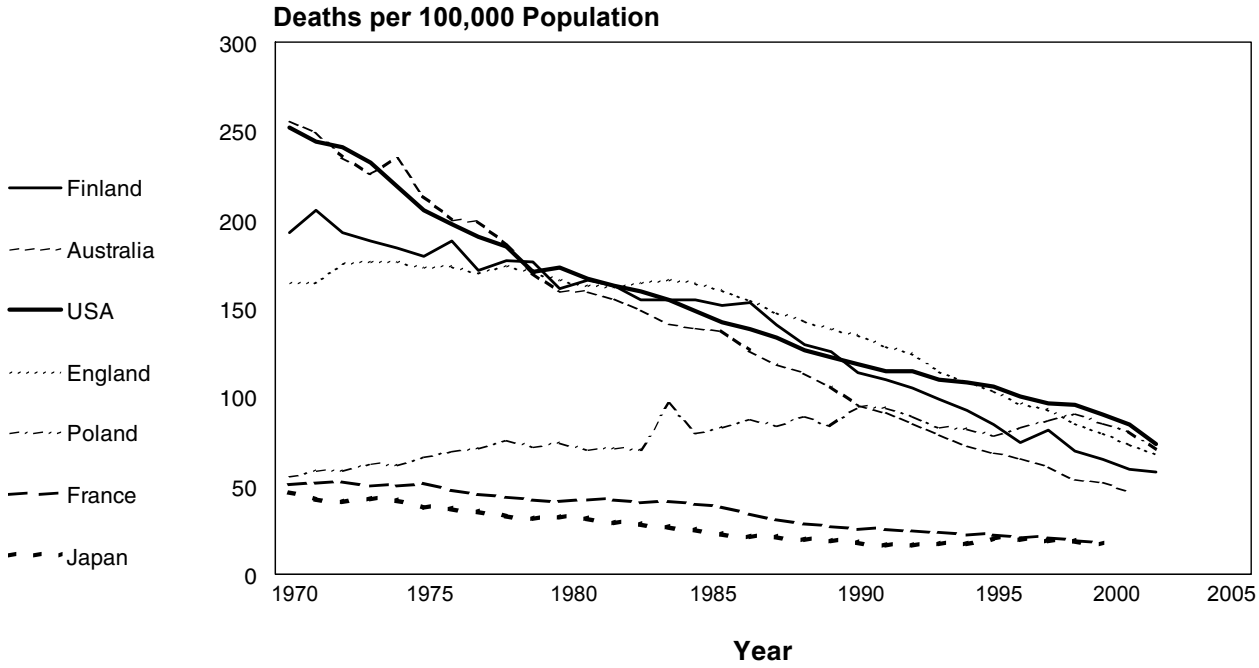

Source: National Hospital Discharge Survey, NCHS.

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



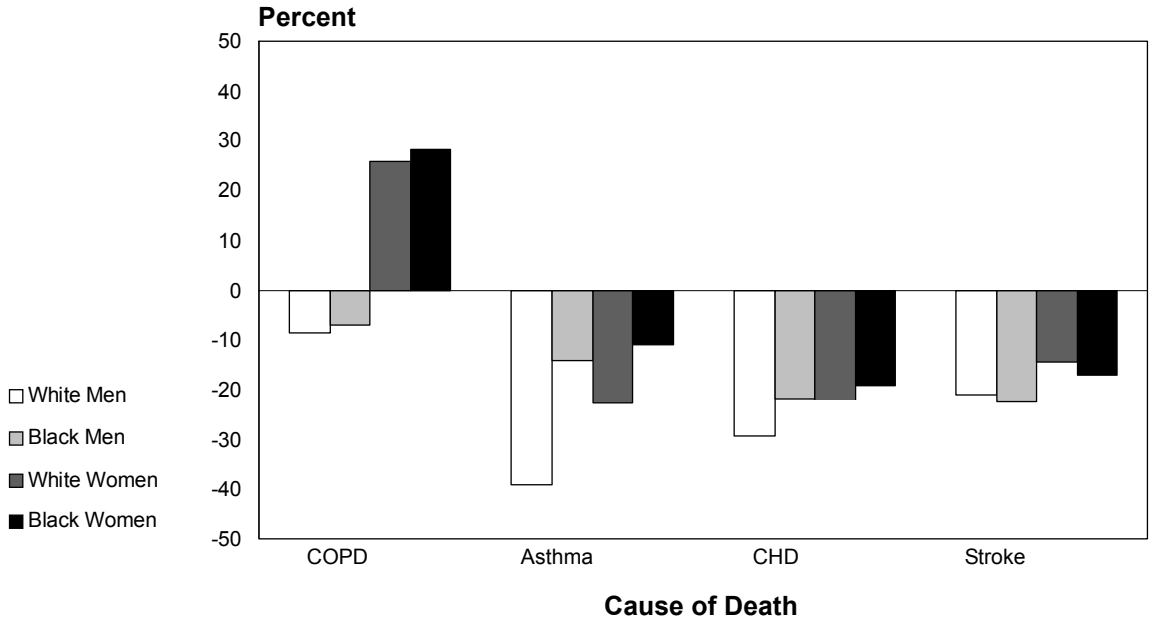

* Age-adjusted to the European Standard Population.
Source: World Health Organization.

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



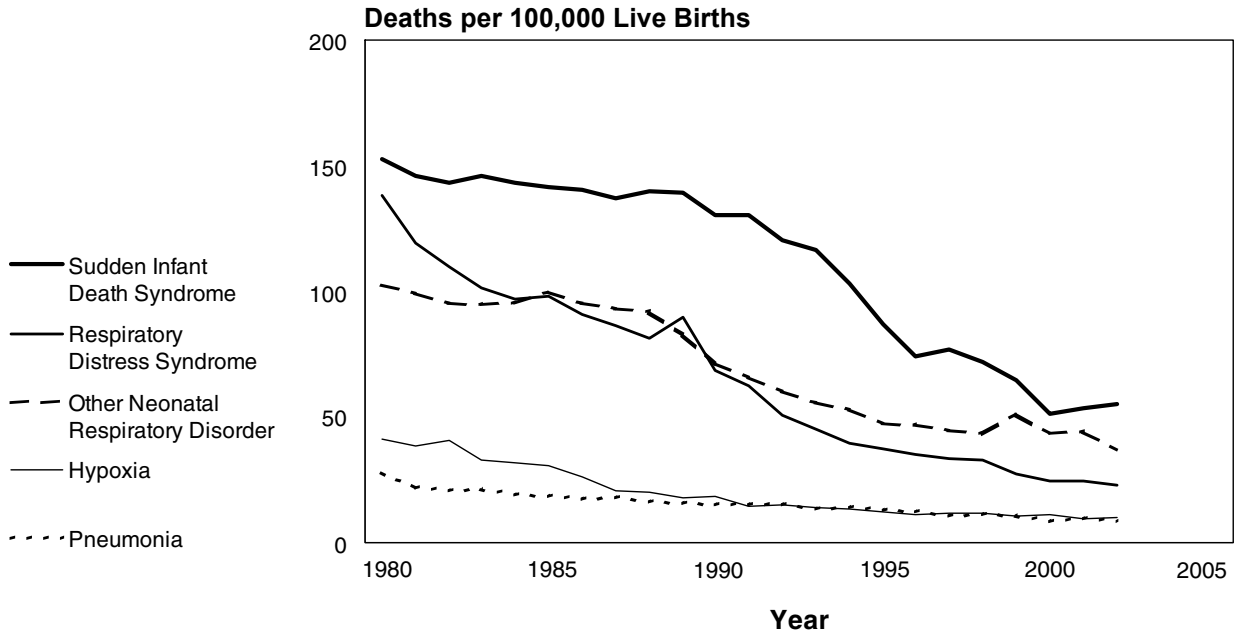

* Age-adjusted to the European Standard Population.
Source: World Health Organization.

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



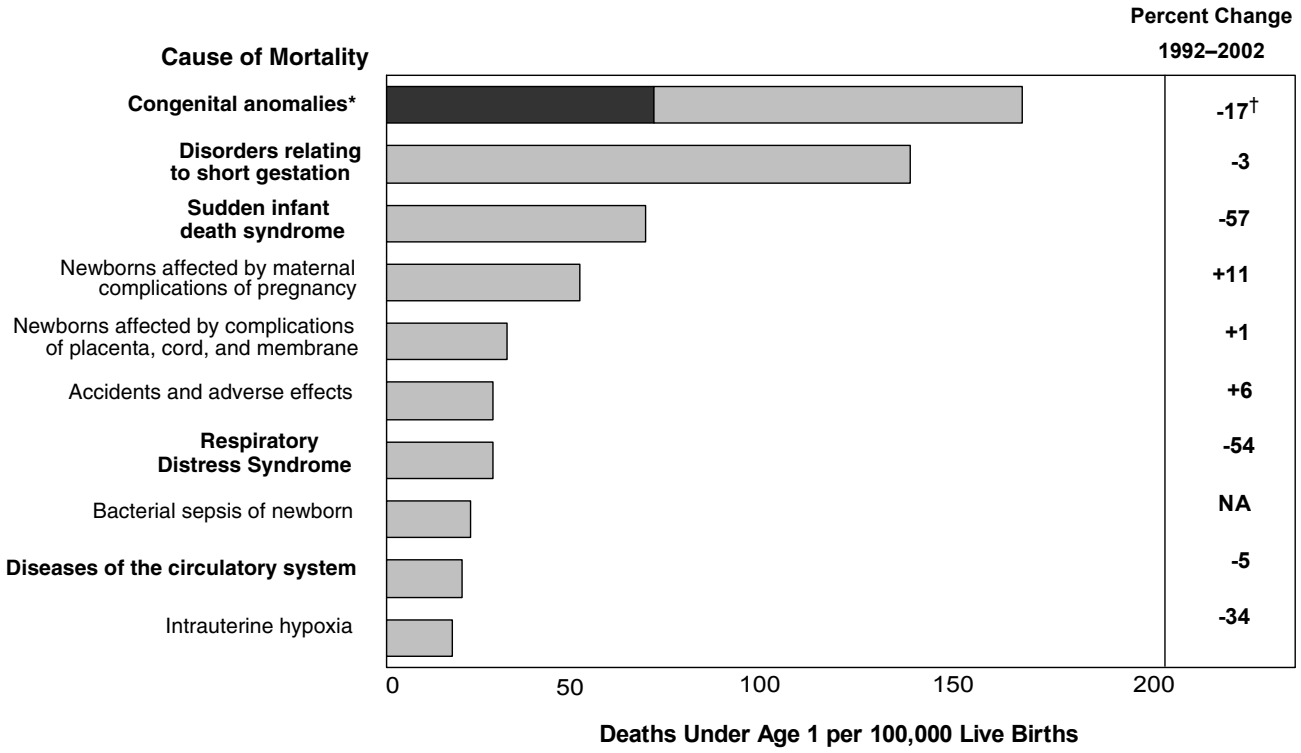

* Age-adjusted.
Source: Vital Statistics of the United States, NCHS.

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




Source: Vital Statistics of the United States, NCHS.

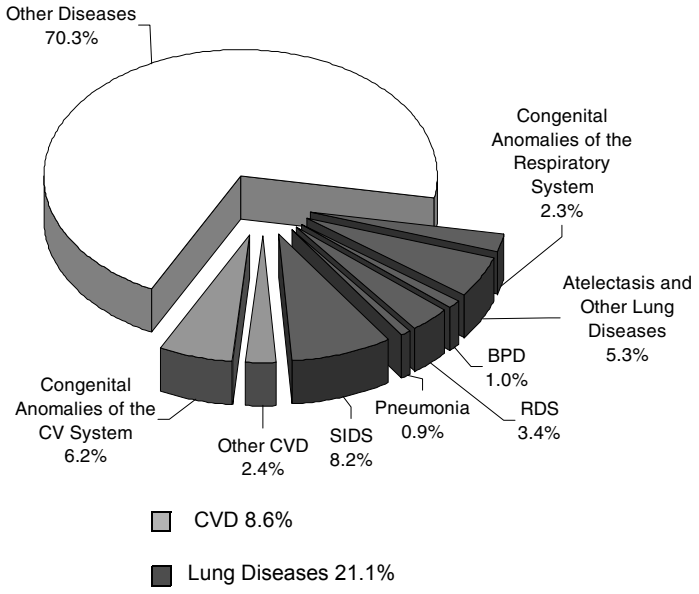
## Ten Leading Causes of Infant Mortality, U.S., 2002




* Congenital CVD and congenital anomalies of the respiratory system (black bar) represented 42 percent of all infant deaths due to congenital anomalies.
† Between 1992 and 2002, congenital CVD declined 35 percent; congenital anomalies of the respiratory system declined 28 percent; other congenital anomalies declined 17 percent.
NA: Not available.
Note: Bolded diseases are those addressed in Institute programs.
Source: Vital Statistics of the United States, NCHS.

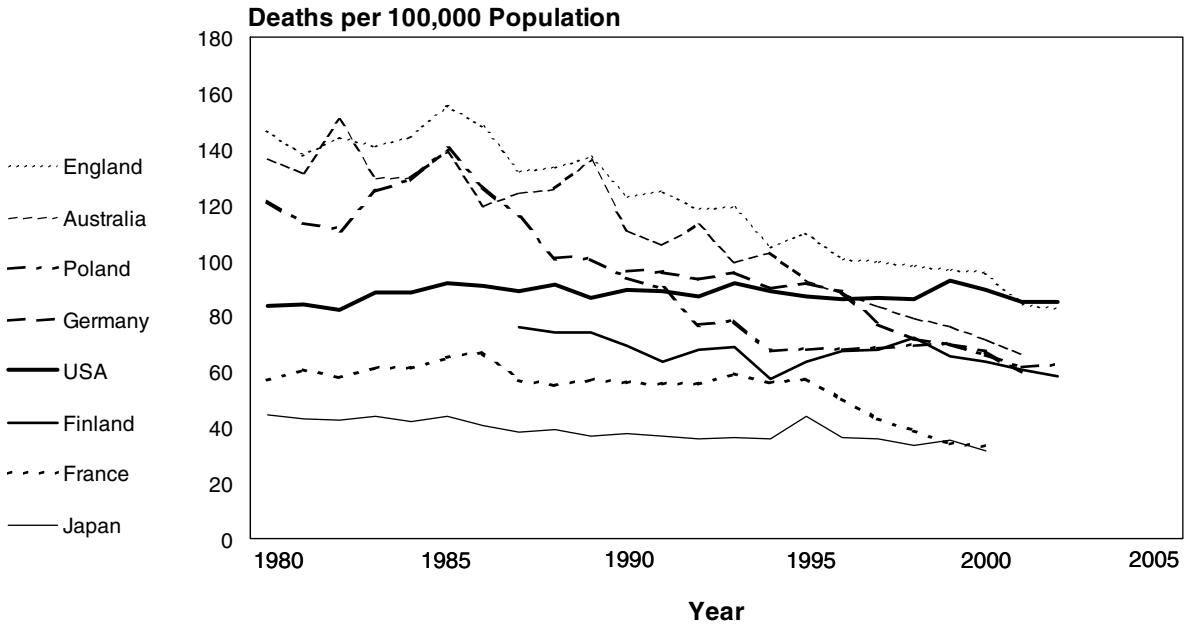
## Deaths Under Age 1 Year Due to Cardiovascular and Lung Diseases, U.S., 2002

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



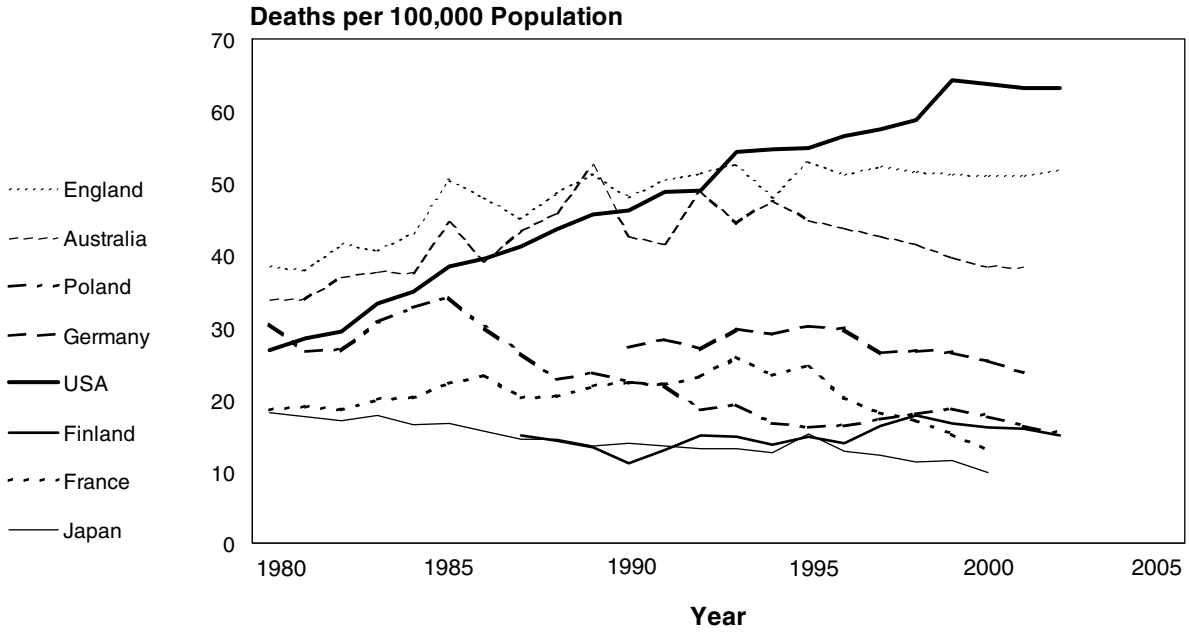

Note: Bolded diseases are those addressed in Institute programs.
Source: Vital Statistics of the United States, NCHS.

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



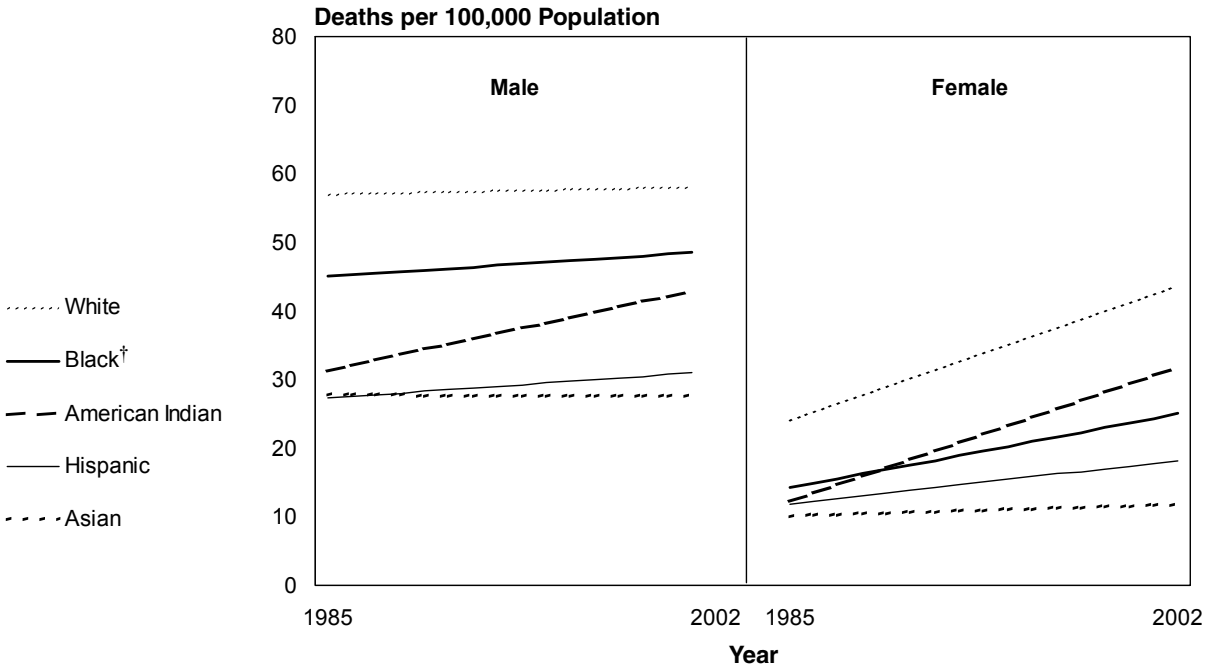

* Age-adjusted to the European Standard Population.
Source: World Health Statistics Annual, WHO.

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



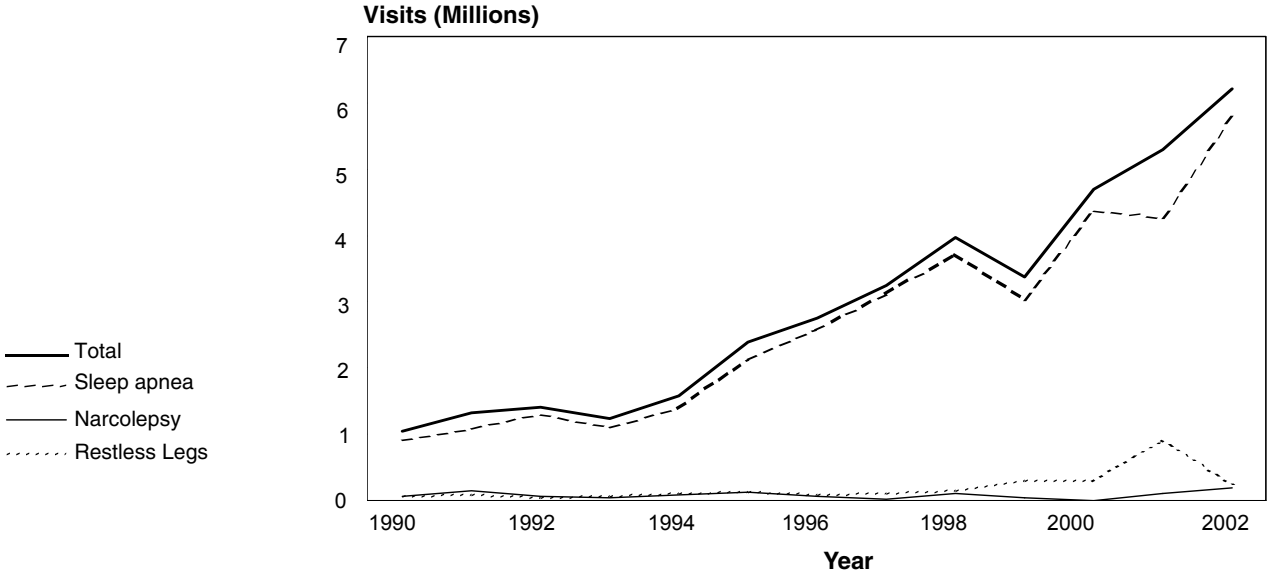

* Age-adjusted to the European Standard Population.
Source: World Health Statistics Annual, WHO.

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




* Age-adjusted.
† Non-Hispanic.
Note: Each line is a log linear regression derived from the actual rates. Rates from 1999–2002 are modified by the ICD revision comparability ratio.
Source: Vital Statistics of the United States, NCHS.

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



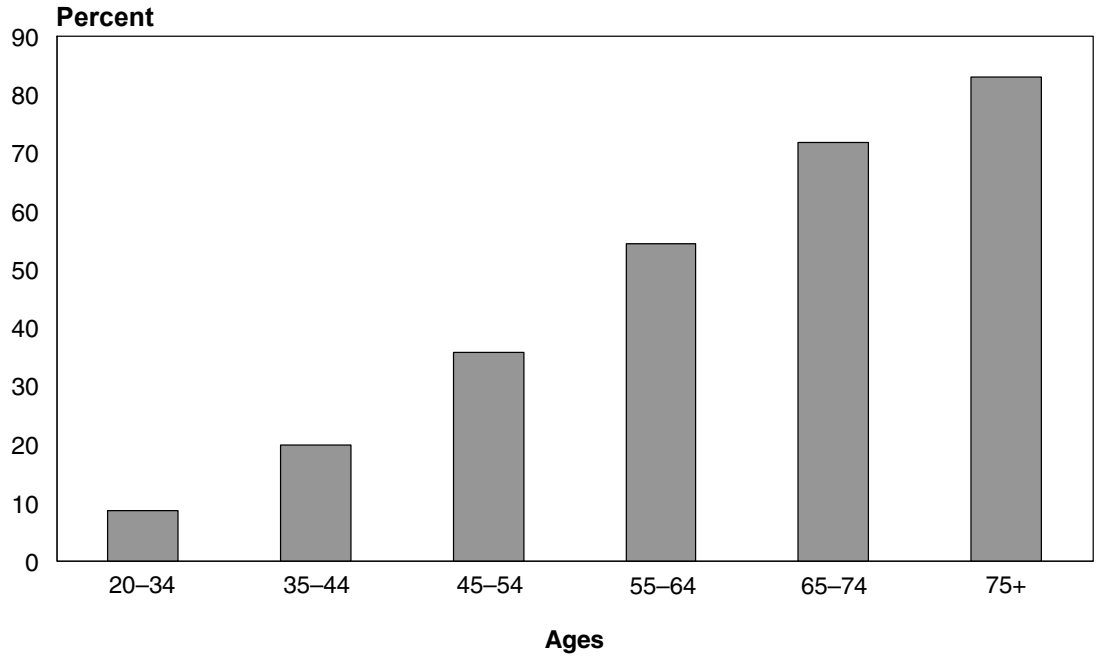

Source: National Ambulatory Medical Care Survey, NCHS.

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

| Disease | Number |
|---|---|
| Total Cardiovascular Diseases | 70,100,000 |
| Hypertension* | 65,000,000 |
| Coronary Heart Disease | 13,000,000 |
| Congestive Heart Failure | 4,900,000 |
| Stroke | 5,400,000 |
| Congenital Heart Disease | 1,000,000 |
| Asthma (2003) | 20,600,000 |
| COPD | 10,800,000 |
| Chronic Bronchitis only (age 18+) | 8,200,000 |
| Emphysema only (age 18+) | 1,700,000 |
| Chronic Bronchitis and Emphysema (age 18+) | 900,000 |
| Anemias (all forms) (1996) | 3,500,000 |

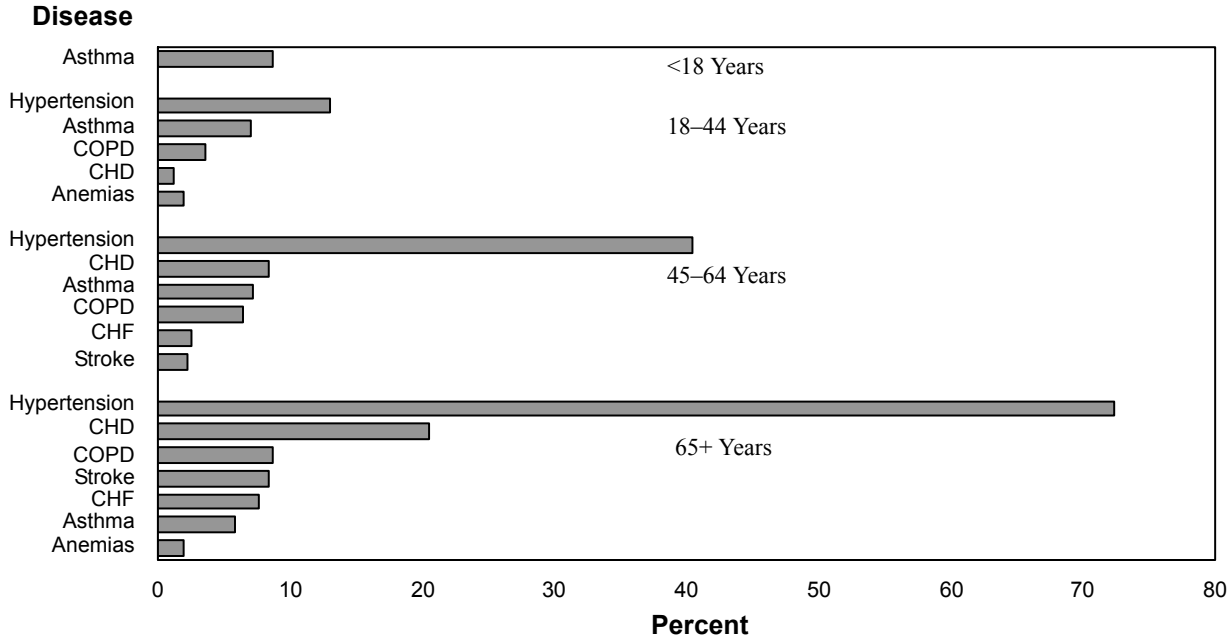
* Systolic blood pressure ≥ 140 mm Hg, diastolic blood pressure ≥ 90 mm Hg, on antihypertensive medication, or told twice of having hypertension.
Note: Some persons are included in more than one diagnostic group, and persons with more than one form of anemia are counted more than once.
Sources: Extrapolated to United States from National Health and Nutrition Examination Survey (NHANES), 1999–2002, and National Health Interview Survey (NHIS), 2002, 2003.

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



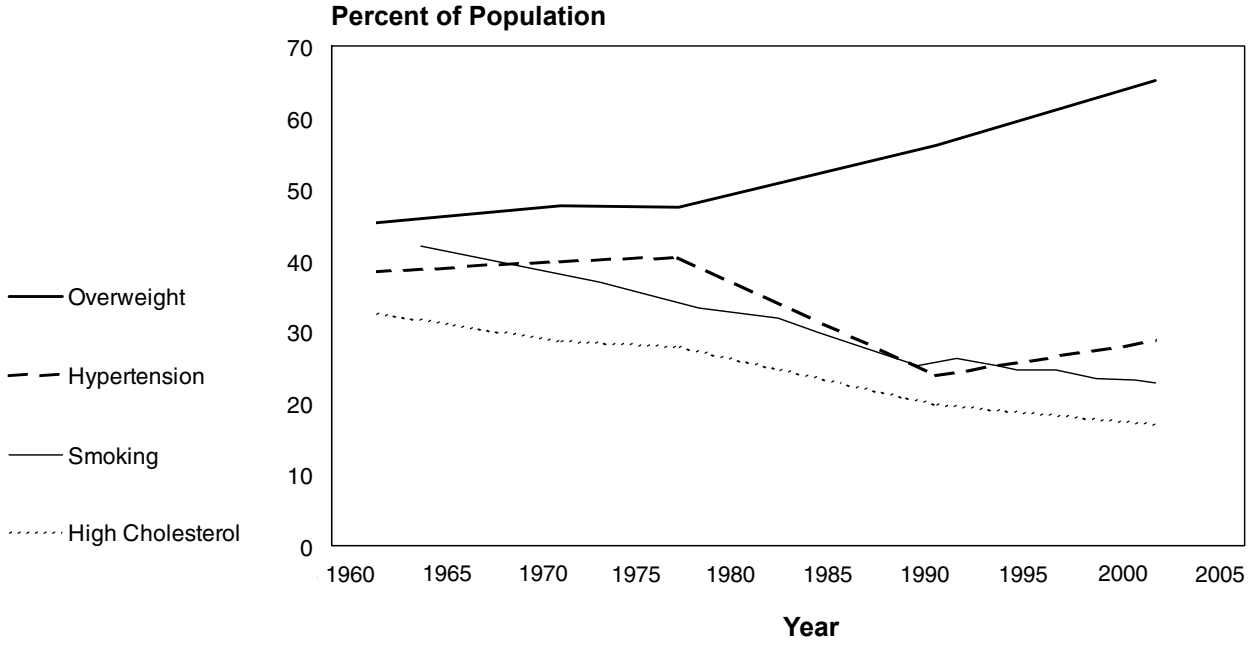

* Hypertension, CHD, cerebrovascular disease, or CHF.
Hypertension = systolic blood pressure ≥ 140 mm Hg, diastolic blood pressure ≥ 90 mm Hg, on antihypertensive medication, or told twice of having hypertension.
Source: NHANES, 1999–2002.

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



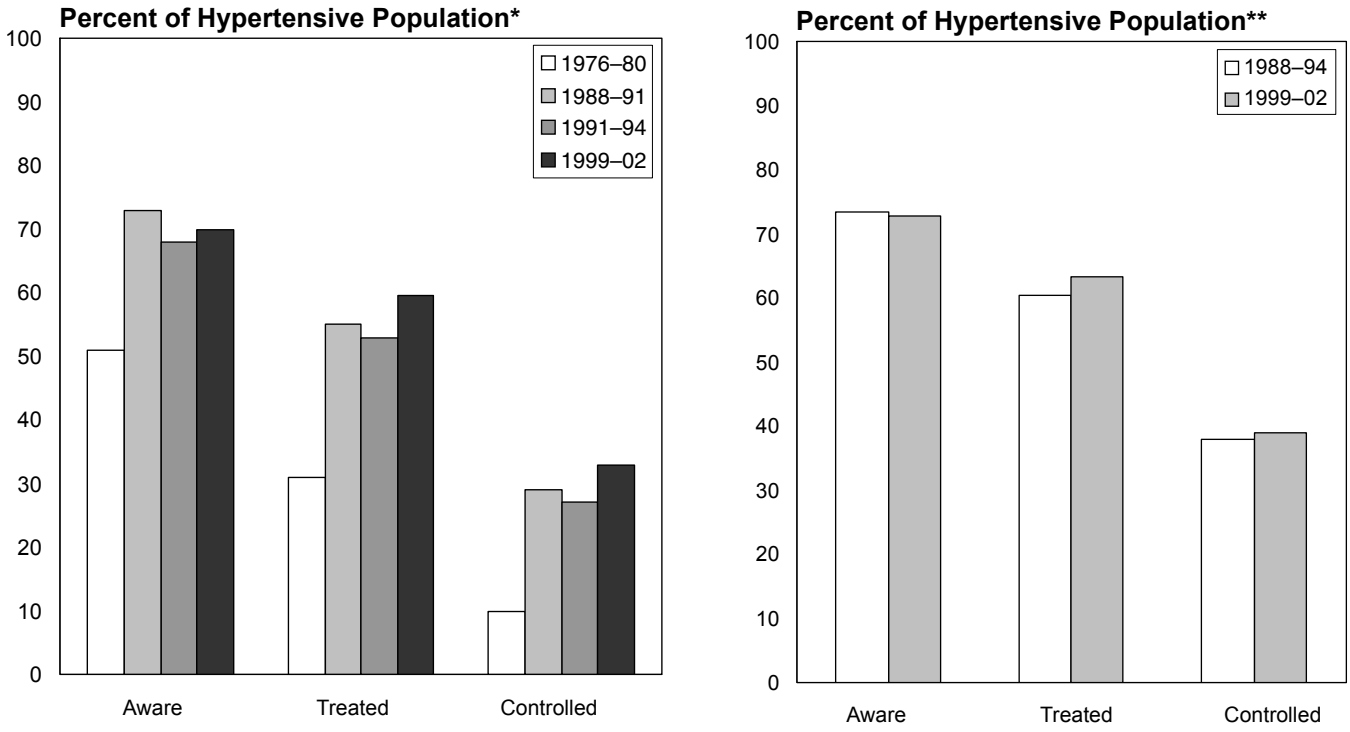

Note: Numbers depicted in bars are not additive by disease because some persons have more than one disease.
Source: NHIS 1996 for anemias, 2002 for lung diseases, and NHANES 1999–2002 for CVD.

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



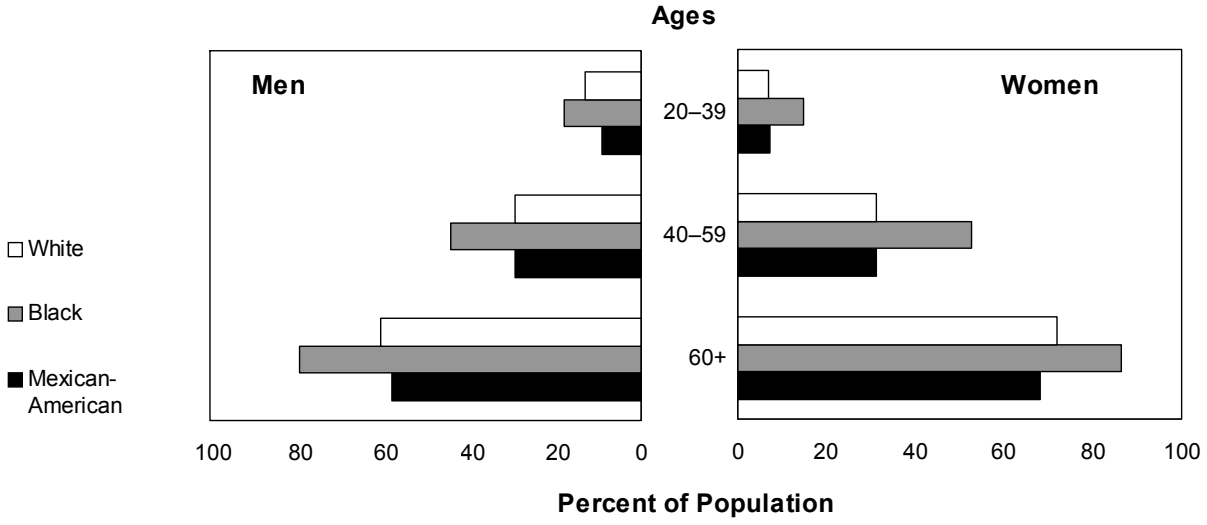

* Age-adjusted.
Note: Hypertension is systolic blood pressure ≥ 140 mm Hg, diastolic blood pressure is ≥ 90 mm Hg, or on antihypertensive medication. High cholesterol is 240+ mg/dl. Overweight is BMI 25+ kg/m$^2$.
Source: NHIS for smoking (age 18+) and NHANES for the other risk factors (ages 20–74).

## Hypertensive Population Aware, Treated, and Controlled, Age 18+, U.S., 1976–80 to 1999–2002



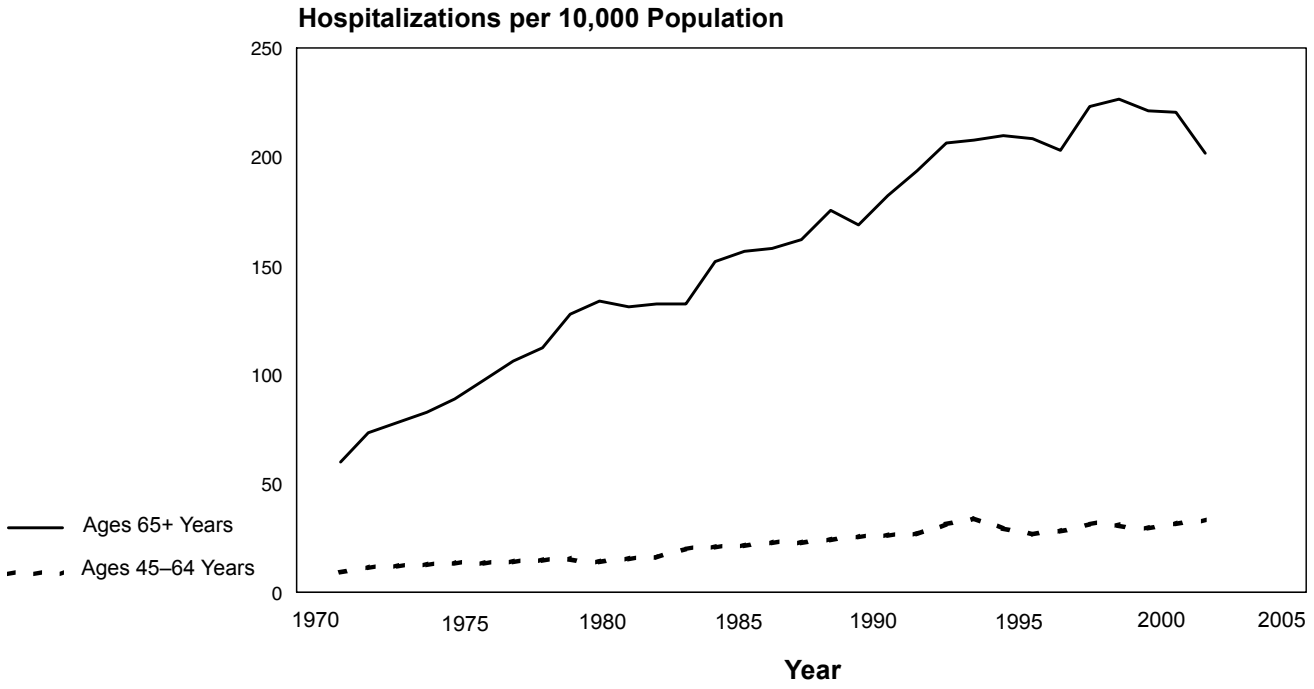

* Systolic blood pressure ≥ 140 mm Hg, diastolic blood pressure ≥ 90 mm Hg, or on antihypertensive medication.
** Systolic blood pressure ≥ 140 mm Hg, diastolic blood pressure ≥ 90 mm Hg, on antihypertensive medication, or told twice of having hypertension. Here, "treated" includes medication use and other means.
Source: NHANES, NCHS.

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



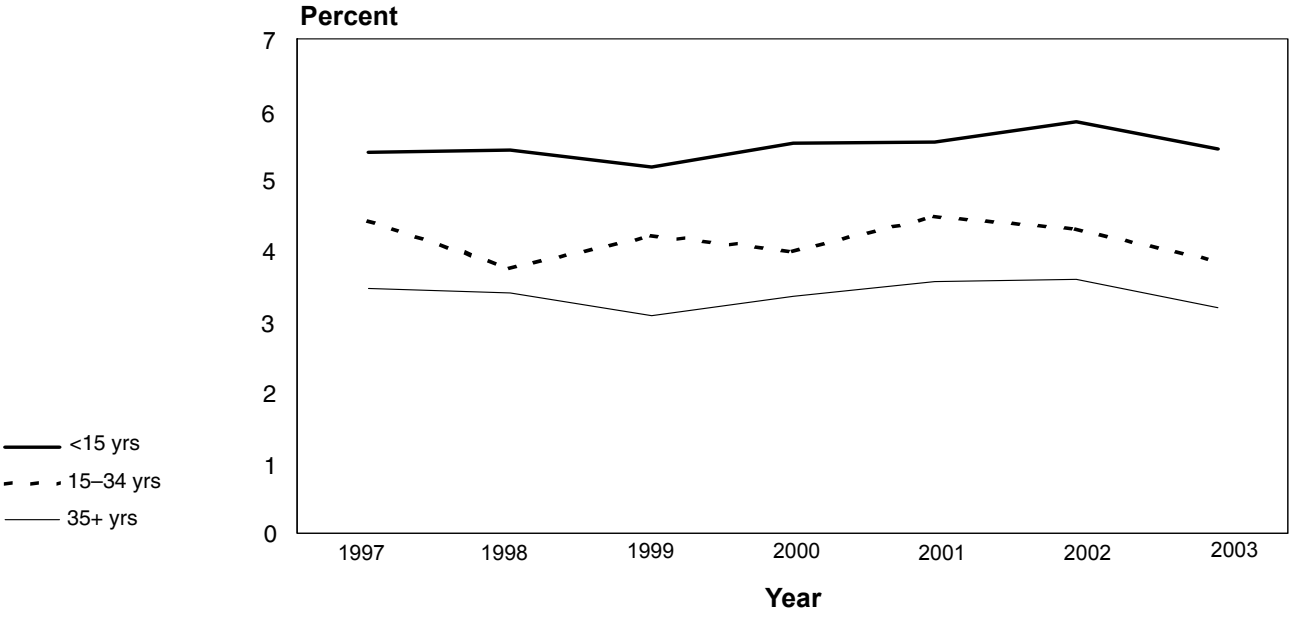

* Systolic blood pressure ≥ 140 mm Hg, diastolic blood pressure ≥ 90 mm Hg, on antihypertensive medication, or told twice of having hypertension.
Source: NHANES, NCHS.

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




Source: National Hospital Discharge Survey, NCHS.

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




Source: National Health Interview Survey, NCHS.

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

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

* Direct costs are personal health care expenditures for hospital and nursing home care, drugs, home care, and physician and other professional services. The estimation method is based on Centers for Medicare & Medicaid Services (CMS) projections for total 2005 health expenditures by type of direct costs and NCHS estimates of direct costs in 1995 for each of the major diagnostic groups. The proportion of costs for 1995 for each diagnostic group is applied to the equivalent 2005 total by type of direct cost.

† Morbidity costs were estimated for 2005 by multiplying NCHS estimates for 1980 by a 1980–2005 percent inflation factor derived from the increase in mean earnings estimated by the Bureau of the Census.

‡ The mortality cost for each disease group was estimated for 2005 by first multiplying the number of deaths in 2001 in each age- and sex-specific group by the 2001 present value of lifetime earnings (latest available) discounted at 3 percent; second, summing these estimates for each diagnostic group; and third, multiplying the estimates by a 2001–2005 inflation factor (1.20) based on change in mean earnings.

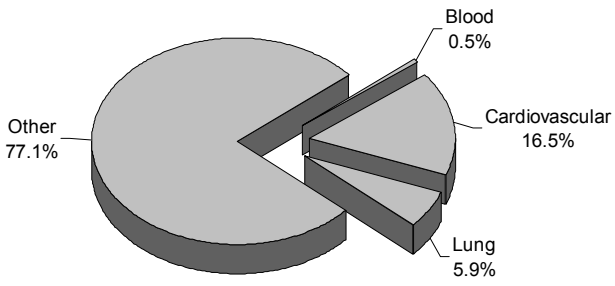
§ Costs of blood-clotting disease are estimated from predetermined proportions of CVD morbidity and mortality statistics for MI, cerebrovascular diseases, and diseases of arteries.

** Does not include lung cancer or leukemia.

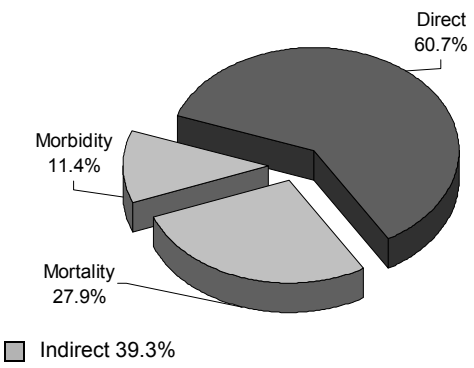
Note: Numbers may not add to totals due to rounding.

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

## Total Economic Costs, U.S., 2005




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



# 5. Institute-Initiated Programs Starting in FY 2004

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

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

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

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

Descriptions of the Institute-initiated programs that began or were renewed (i.e., were funded) in FY 2004 are presented below according to NHLBI scientific program. Also described are trans-NIH and interagency initiatives in which the NHLBI is participating.

## Heart and Vascular Diseases Program

### Initiative Being Renewed

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

The purpose of this renewal is to continue support for research that examines the development of atherosclerosis in adults in their forties, an age when the earliest detectable subclinical disease appears to accelerate. Scientists will use the CARDIA study's 15 years of data and stored samples and the Year 20 exam to address questions pertaining to subclinical disease development that cannot be determined in older cohorts.

### New Initiatives

#### *Interventions To Improve Hypertension Control Rates in African Americans*

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

***Partnership Programs To Reduce Cardiovascular Disparities***

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

***Pediatric Circulatory Support***

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

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

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

## Lung Diseases Program

### Initiative Being Renewed

***Childhood Asthma Research and Education (CARE) Network***

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

### New Initiatives

***Granulomatous Lung Inflammation in Sarcoidosis***

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

***Immune System Development and the Genesis of Asthma***

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

***Lung Tissue Research Consortium***

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

## Blood Diseases and Resources Program

### Initiative Being Renewed

***Retrovirus Epidemiology Donor Study (REDS)***

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

### New Initiative

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

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

# Trans-NHLBI

## Initiatives Being Renewed

### *NHLBI Competitive Supplements for Human Embryonic Stem Cell Research*

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

### *NHLBI Innovative Research Grant Program*

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

### *NHLBI Mentored Minority Faculty Development Award*

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

### *NHLBI Minority Institution Research Scientist Development Award*

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

### *NHLBI Minority Institutional Research Training Program*

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

### *NHLBI Short-Term Training for Minority Students*

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

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

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

### *SBIR/STTR Technologies for Monitoring and Performing Resuscitation*

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

## New Initiatives

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

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

### *Cultural Competence and Health Disparities Academic Award*

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

### *DNA Resequencing and Genotyping Centers*

The purpose of this RFP is to establish high-volume DNA resequencing and genotyping centers to discover and type DNA variations needed to elucidate genomic

components involved in the cause, variable outcome, and progression of heart, lung, blood, and sleep disorders.

***Interrelationships of Sleep, Fatigue, and HIV/AIDS***

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

***Mentored Quantitative Research Career Development Award (K25)***

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

***NHLBI Exploratory and Developmental Research Grants for Investigations in Rare Diseases***

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

***Overweight and Obesity Control at Worksites***

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

## Trans-NIH

### Initiative Being Renewed

***Immune Tolerance: Innovative Grants***

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

### New Initiatives

***Career Enhancement Award for Stem Cell Research***

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

***Progression of Cardiovascular Disease in Type 1 Diabetes***

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

## Interagency

### New Initiatives

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

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

***Clinical Research Consortium To Improve Resuscitation Outcomes***

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

***Exploratory/Developmental Bioengineering Research Grants***

The purpose of this PA is to encourage high-risk, high-impact bioengineering research in new areas that lack

preliminary testing or development and fall within the purview of the NHLBI.

***Hypovolemic Circulatory Collapse: Mechanisms and Opportunities To Improve Resuscitation Outcomes***

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

***Human Embryonic Stem Cell Research Resource Infrastructure Enhancement Award***

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

***Inflammation and Thrombosis***

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

# 6. Institute Public Advisory Committees

## National Heart, Lung, and Blood Advisory Council

### Structure

**Chair:** Barbara M. Alving, M.D., Acting 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 members are leading representatives of the health and scientific disciplines (including public health and behavioral or social sciences), and 6 are from the general public and are leaders in the fields of public policy, law, health policy, economics, and management.

Members are appointed for overlapping terms of 4 years.

The Council includes the following ex officio members:

- Secretary, HHS
- Director, NIH
- Director, NHLBI
- Chief Medical Director, or Designee, Veterans Affairs
- Assistant Secretary of Defense for Health Affairs, or Designee.

### Functions

The NHLBAC reviews applications for research grants, cooperative agreements, and training grants in heart, blood vessel, lung, and blood diseases; sleep disorders; and blood resources, and recommends scientific projects that merit support to the Director, NHLBI.

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

The Council may also make recommendations to the Director, NIH and other authorized officials regarding the acceptance of conditional gifts pursuant to section 2501 of the Public Health Service Act.

### Meetings

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

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

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

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

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

Roberto Bolli, M.D. (2007)
University of Louisville

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

Carolyne Sue Byrnes (2004)
LAM Foundation

Maria R. Costanzo, M.D. (2006)
Edward Cardiovascular Institute

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

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

Kim A. Eagle, M.D. (2006)
University of Michigan

Frances C. Henderson, Ed.D. (2006)
Alcorn State University

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

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

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

Ngai X. Nguyen, M.D. (2006)
Private Practitioner

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

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

**Ex Officio Members**

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

Robert C. Jesse, M.D.
McGuire Veterans Affairs Medical Center

Tommy G. Thompson
Department of Health and Human Services

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

* Current as of October 2004. The current roster, containing full addresses for the NHLBI Advisory Council and Committees, can be obtained from the Internet at http://www.nhlbi.nih.gov/meetings/nhlbac/roster.htm.

## Program Advisory and Review Committee

### Sickle Cell Disease Advisory Committee

**Chair:** Theodore Wun, M.D., University of California, Davis Cancer Center

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

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

**Membership***

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

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

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

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

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

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

Dorothy Moore, M.D. (2007)
University of Medicine and Dentistry of New Jersey

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

**Ex Officio Members**

Joseph Desimone, Ph.D.
Department of Veterans Administration, 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, Jr., 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, MD 20892; 301–435–0199

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

**Membership***

Sarah J. Caddick, Ph.D. (2005)
Wadsworth Foundation

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

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

* Current as of October 2004.

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

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

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

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

Michael H. Smolensky, Ph.D. (2008)
University of Texas

Lorraine L. Wearley, Ph.D. (2007)
Johnson & Johnson

**Ex Officio Members**

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

Cristina Beato, M.D.
Department of Health and Human Services

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

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

Carl E. Hunt, M.D.
NCSDR, National Institutes of Health

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

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

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

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

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

## Heart, Lung, and Blood Initial Review Group

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

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

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

**Chair:** Joe G. Garcia, M.D., The Johns Hopkins University

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

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

**Membership***

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

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

* Current as of October 2004.

Kathy K. Griendling, Ph.D. (2008)
Emory University

Joseph R. Haywood, Ph.D. (2007)
Michigan State University

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

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

K. J. Koa, M.D., Ph.D. (2005)
Synpac North Carolina

Renee C. LeBoeuf, Ph.D. (2007)
University of Washington

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

Jose M. Ordovas, Ph.D. (2007)
Tufts University

Donna Przepiorka, M.D., Ph.D. (2007)
University of Tennessee

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

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

## Clinical Trials Review Committee

**Chair:** James E. Fish, M.D., Aventis Pharmaceuticals

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

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

**Membership***

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

John E. Connett, Ph.D. (2007)
University of Minnesota

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

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

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

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

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

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

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

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

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

The Institute has established the NHLBI SEP to perform initial peer review of applications and proposals that were previously handled by ad hoc committees. Concept review, previously handled by divisional program advisory committees, has also been

* Current as of October 2004.

incorporated into the SEP system. The SEP, which has neither a fixed membership nor a set meeting schedule, is constituted to provide required peer review expertise at precisely the time that it is needed.

## Board of Scientific Counselors

**Chair:** Pamela B. Davis, M.D., Case Western Reserve University

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

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

### Membership*

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

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

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

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

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

Edwin W. Taylor (2008)
University of Chicago

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

* Current as of October 2004.

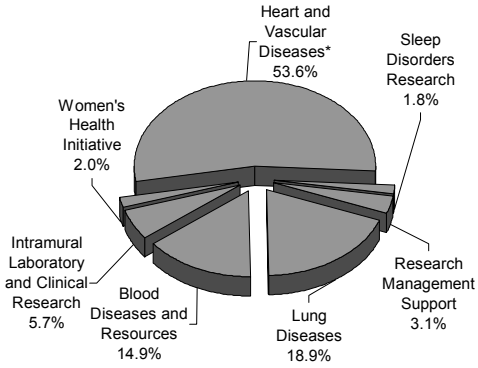
# 7. Fiscal Year 2004 Budget Overview

## NHLBI Obligations by Funding Mechanism: Fiscal Year 2004

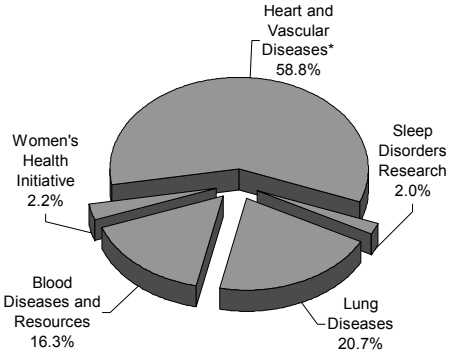
| Funding Mechanism | Obligated Dollars* (Thousands) | Percent of Total NHLBI Budget |
|---|---|---|
| Research Project Grants† | $2,003,769 | 69.5% |
| SCORs/SCCORs | 116,945 | 4.1 |
| Sickle Cell Centers | 21,010 | 0.7 |
| Centers for AIDS Research | 2,645 | 0.1 |
| Other Research Grants | 112,785 | 3.9 |
| *Research Careers Programs‡* | *67,794* | *2.4* |
| Training Programs | 87,192 | 3.0 |
| Research and Development Contracts | 285,472 | 9.9 |
| Intramural Laboratory and Clinical Research | 164,244 | 5.7 |
| Research Management and Support§ | 88,539 | 3.1 |
| Research Facilities Construction Grants | — | — |
| **Total Obligations** | **$2,882,601** | **100%** |

* Excludes funds provided by other agencies by means of a reimbursable agreement.
† Includes $71,530 for Small Business Innovation Research (SBIR) Grants/Small Business Technology Transfer Grants (STTR).
‡ Research Career Programs are a subset of Other Research Grants and are not added as a distinct funding mechanism.
§ Excludes OD and DIR research contracts, which are included in R&D contracts.

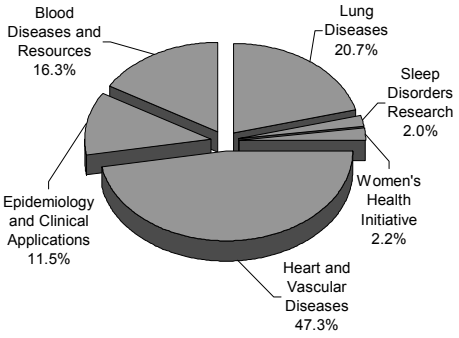
### NHLBI Total Obligations by Budget Category




### NHLBI Extramural Obligations by Program




### NHLBI Extramural Obligations by Division




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

For detailed data on FY 2004:

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

## NHLBI Extramural Obligations by Program: Fiscal Year 2004

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

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

## NHLBI Heart and Vascular Diseases Program* Obligations by Funding Mechanism: Fiscal Year 2004

| Funding Mechanism | Obligated Dollars (Thousands) | Percent of Program Budget |
|---|---|---|
| Research Project Grants | $1,007,940 | 81.1% |
| SCORs/SCCORs | 49,818 | 4.0 |
| Other Research Grants | 35,306 | 2.8 |
| *Research Career Programs†* | *24,045* | *1.9* |
| Training Programs | 43,501 | 3.5 |
| Research and Development Contracts | 105,961 | 8.5 |
| **Total, Heart and Vascular Diseases** | **$1,242,526** | **100%** |

* 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.

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

| Funding Mechanism | Obligated Dollars (Thousands) | Percent of Program Budget |
|---|---|---|
| Research Project Grants | $205,425 | 67.7% |
| SCORs/SCCORs | — | — |
| Other Research Grants | 11,069 | 3.7 |
| *Research Career Programs** | *9,634* | *3.2* |
| Training Programs | 5,671 | 1.9 |
| Research and Development Contracts | 81,083 | 26.7 |
| **Total, Epidemiology and Clinical Applications** | **$303,248** | **100%** |

* 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 2004

| Funding Mechanism | Obligated Dollars (Thousands) | Percent of Program Budget |
|---|---|---|
| Research Project Grants | $419,698 | 77.1% |
| SCORs/SCCORs | 43,686 | 8.0 |
| Other Research Grants | 45,073 | 8.3 |
| *Research Career Programs** | *21,404* | *3.9* |
| Training Programs | 21,479 | 3.9 |
| Research and Development Contracts | 14,130 | 2.6 |
| **Total, Lung Diseases** | **$544,066** | **100%** |

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

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

| Funding Mechanism | Obligated Dollars (Thousands) | Percent of Program Budget |
|---|---|---|
| Research Project Grants | $328,155 | 76.5% |
| SCORs/SCCORs | 17,369 | 4.0 |
| Sickle Cell Centers | 21,010 | 4.9 |
| Centers for AIDS Research | 2,645 | 0.6 |
| Other Research Grants | 19,731 | 4.6 |
| *Research Career Programs** | *11,128* | *2.6* |
| Training Programs | 14,849 | 3.5 |
| Research and Development Contracts | 25,460 | 5.9 |
| **Total, Blood Diseases and Resources Program** | **$429,219** | **100%** |

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

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

| Funding Mechanism | Obligated Dollars (Thousands) | Percent of Program Budget |
|---|---|---|
| Research Project Grants | $42,551 | 82.0% |
| SCORs/SCCORs | 6,072 | 11.7 |
| Other Research Grants | 1,606 | 3.1 |
| *Research Career Programs** | *1,583* | *3.0* |
| Training Programs | 1,692 | 3.3 |
| Research and Development Contracts | — | — |
| **Total, Sleep Disorders Research** | **$51,921** | **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 2004

| Funding Mechanism | Obligated Dollars (Thousands) | Percent of Program Budget |
|---|---|---|
| Research Project Grants | $ — | — % |
| SCORs/SCCORs | — | — |
| Other Research Grants | — | — |
| *Research Career Programs** | — | — |
| Training Programs | — | — |
| Research and Development Contracts | 58,838 | 100 |
| **Total, Women's Health Initiative** | **$58,838** | **100%** |

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

# 8. Long-Term Trends

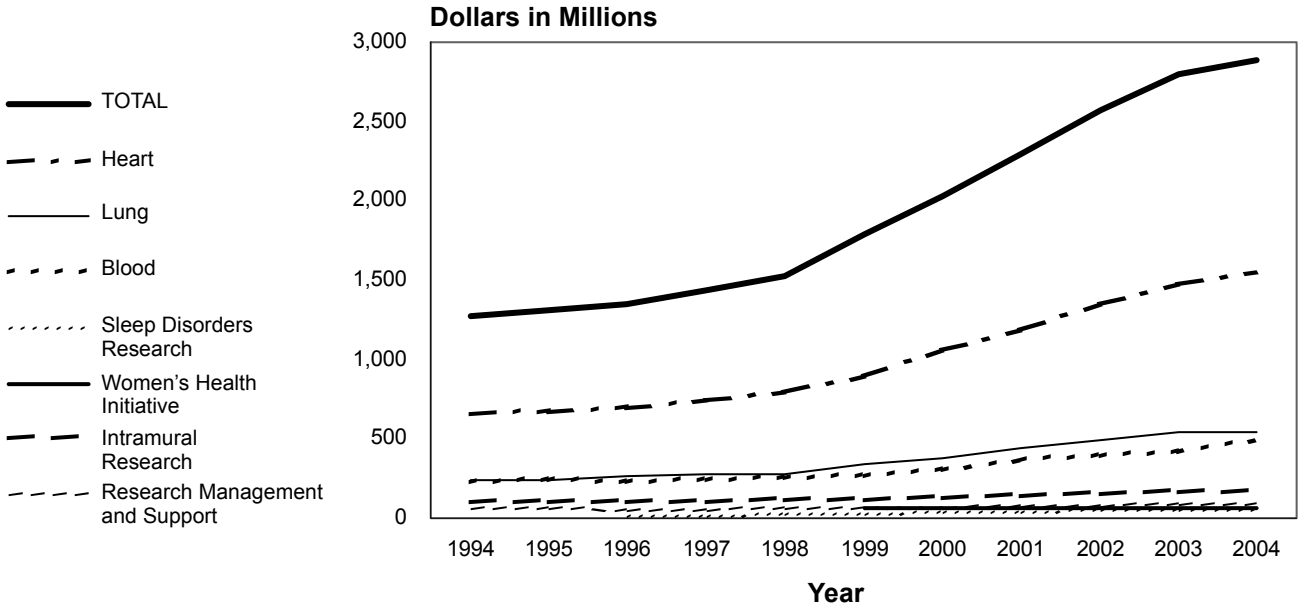
## Budget History of the NHLBI: Fiscal Years 1950–2004

**Dollars (Thousands)**

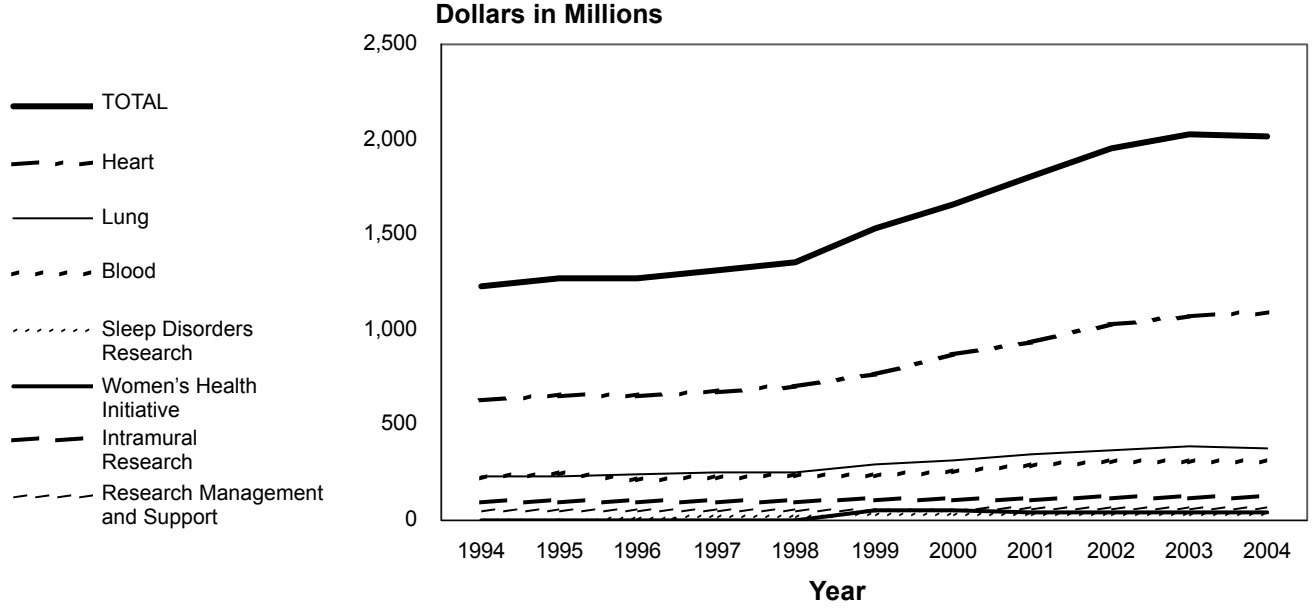
| Fiscal Year | Budget Estimate to Congress | House Allowance | Senate Allowance | Appropriation | Obligations | Cumulative Fiscal Year Obligations |
|---|---|---|---|---|---|---|
| 1950 | $ 34,630 | $ 11,575 | $ 29,117 | $ 16,075 | $ 15,768 | $ 15,768 |
| 1951 | 8,800 | 8,800 | 9,400 | 9,400 | 8,497 | 24,265 |
| 1952 | 10,237 | 10,074 | 10,156 | 10,083 | 9,850 | 34,115 |
| 1953 | 9,779 | 9,623 | 12,000 | 12,000 | 11,398 | 45,513 |
| 1954 | 11,040 | 12,000 | 15,418 | 15,168 | 14,952 | 60,465 |
| 1955 | 14,570 | 16,168 | 17,168 | 16,668 | 16,595 | 77,060 |
| 1956 | 17,454 | 17,398 | 23,976 | 18,808 | 18,838 | 95,898 |
| 1957 | 22,106 | 25,106 | 33,396 | 33,396 | 32,392 | 128,290 |
| 1958 | 33,436 | 33,436 | 38,784 | 35,936 | 35,973 | 164,263 |
| 1959 | 34,820 | 36,212 | 49,529 | 45,613 | 45,468 | 209,731 |
| 1960 | 45,594 | 52,744 | 89,500 | 62,237 | 61,565 | 271,296 |
| 1961 | 63,162 | 71,762 | 125,166 | 86,900 | 86,239 | 357,535 |
| 1962 | 97,073 | 105,723 | 160,000 | 132,912 | 110,849 | 468,384 |
| 1963 | 126,898 | 143,398 | 149,498 | 147,398 | 120,597 | 588,981 |
| 1964 | 130,108 | 129,325 | 130,545 | 132,404 | 117,551 | 706,532 |
| 1965 | 125,640 | 124,521 | 125,171 | 124,824 | 124,412 | 830,944 |
| 1966 | 141,412 | 146,212 | 143,462 | 141,462 | 141,171 | 972,115 |
| 1967 | 148,407 | 154,770 | 164,770 | 164,770 | 164,342 | 1,136,457 |
| 1968 | 167,954 | 167,954 | 177,954 | 167,954 | 162,134 | 1,298,591 |
| 1969 | 169,735 | 164,120 | 172,120 | 166,928 | 161,834 | 1,460,425 |
| 1970 | 160,513 | 160,513 | 182,000 | 171,257 | 160,433 | 1,620,858 |
| 1971 | 171,747 | 178,479 | 203,479 | 194,901 | 194,826 | 1,815,684 |
| 1972 | 195,492 | 211,624 | 252,590 | 232,627 | 232,577 | 2,048,261 |
| 1973 | 255,280 | 300,000 | 350,000 | 300,000 | 255,722 | 2,303,983 |
| 1974 | 265,000 | 281,415 | 320,000 | 302,915 | 327,270 | 2,631,253 |
| 1975 | 309,299 | 321,196 | 330,000 | 327,996 | 327,953 | 2,959,206 |
| 1976 | 324,934 | 329,079 | 379,059 | 370,096 | 368,648 | 3,327,854 |
| TQ[A] | 59,715 | 58,015 | 58,015 | 58,763 | 60,639 | 3,388,493 |
| 1977 | 342,855 | 380,661 | 420,661 | 396,661 | 396,857 | 3,785,350 |
| 1978 | 403,642 | 432,642 | 456,000 | 447,901 | 447,968 | 4,233,318 |
| 1979 | 454,336 | 485,584 | 485,584 | 510,134 | 510,080 | 4,743,398 |
| 1980 | 507,344 | 527,544 | 527,544 | 527,544 | 527,248 | 5,270,646 |
| 1981 | 532,799 | 560,264 | 565,264 | 549,693 | 550,072 | 5,820,718 |
| 1982 | 579,602 | 583,831 | 587,741 | 559,637 | 559,800 | 6,380,518 |
| 1983 | 577,143 | 620,947 | 624,542 | 624,259 | 624,260 | 7,004,778 |
| 1984 | 639,774 | 665,859 | 683,489 | 704,939 | 705,064 | 7,709,842 |
| 1985 | 718,852 | 764,135 | 807,149 | 805,269 | 803,810 | 8,513,652 |
| 1986 | 775,254 | 856,388 | 863,652 | 859,239 | 821,901 | 9,335,553 |
| 1987 | 785,697 | 921,410 | 921,502 | 930,001 | 929,982 | 10,265,535 |
| 1988 | 821,887 | 990,808 | 1,000,349 | 965,536 | 965,283 | 11,230,818 |
| 1989 | 1,054,503 | 1,018,983 | 1,056,003 | 1,045,985 | 1,045,508 | 12,276,326 |
| 1990 | 1,039,846 | 1,090,930 | 1,091,597 | 1,072,354 | 1,070,683 | 13,347,009 |
| 1991 | 1,112,502 | 1,135,589 | 1,137,235 | 1,126,942 | 1,125,915 | 14,472,924 |
| 1992 | 1,209,924 | 1,202,398 | 1,190,396 | 1,191,500 | 1,190,070 | 15,662,994 |
| 1993 | 1,245,396 | 1,228,455 | 1,228,455 | 1,214,693 | 1,214,693 | 16,877,687 |
| 1994 | 1,198,402 | 1,277,880 | 1,277,880 | 1,277,880 | 1,277,852 | 18,155,539 |
| 1995 | 1,266,961 | 1,259,590 | 1,259,590 | 1,258,472 | 1,314,969 | 19,470,508 |
| 1996 | 1,337,021 | 1,355,866 | 1,320,254[B] | 1,355,866 | 1,351,422[C] | 20,821,930 |
| 1997 | 1,320,555[D] | 1,438,265 | 1,344,742[D] | 1,432,529[E] | 1,431,821 | 22,253,751 |
| 1998 | 1,467,189 | 1,513,004 | 1,531,898 | 1,531,061[F] | 1,526,276 | 23,780,027 |
| 1999 | 1,709,328[G] | 1,720,344 | 1,793,697 | 1,793,697[F] | 1,788,008 | 25,568,035 |
| 2000 | 1,759,806 | 1,937,404 | 2,001,185 | 2,040,291[F] | 2,027,286 | 27,595,321 |
| 2001 | 2,069,582 | 2,328,102 | 2,328,105 | 2,299,866[H] | 2,298,035 | 29,893,356 |
| 2002 | 2,567,429 | 2,547,675 | 2,618,966 | 2,576,125[I] | 2,569,794 | 32,463,150 |
| 2003 | 2,791,411 | 2,812,011 | 2,818,684 | 2,812,011[J] | 2,793,681 | 35,256,831 |
| 2004 | 2,867,995 | 2,867,995 | 2,897,595 | 2,882,715[K] | 2,882,601 | 38,139,432 |

A TQ=Transition Quarter, July 1–September 30, 1976.
B Senate Allowance reflects the Institute share of the Government-wide rescission and the HHS rescission.
C Obligations reflect the Institute share of the Government-wide rescission, the HHS rescission, and a transfer to other NIH Institutes through the NIH Director's 1 percent transfer authority.
D Excludes funds for AIDS research activities consolidated in the NIH Office of AIDS Research (OAR).
E Excludes enacted administrative reduction.
F Excludes Director transfer, Secretary transfer, and rescission.
G Includes Bioterrorism reduction.
H Excludes Office of Human Research Protection transfer, Secretary transfer, and rescission.
I Excludes Government-wide rescission, Labor/HHS/Education rescission, from HHS to OMB rescission, and Secretary 1 percent transfer.
J Excludes Government-wide rescission.
K Includes Roadmap adjustments.

## NHLBI Total Obligations by Budget Category: Fiscal Years 1994–2004
### Current Dollars




## NHLBI Total Obligations by Budget Category: Fiscal Years 1994–2004
### Constant 1994 Dollars



## NHLBI Total Obligations by Budget Category: Fiscal Years 1994–2004

**Current Dollars (Millions)**

| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Budget Category** | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| Extramural Research | | | | | | | | | | | |
| Heart | $ 651.7 | $ 668.9 | $ 692.8 | $ 737.9 | $ 795.6 | $ 898.0 | $1,058.0 | $1,186.6 | $1,353.4 | $1,475.6 | $1,545.9 |
| Lung | 238.7 | 243.0 | 261.9 | 273.4 | 281.7 | 346.2 | 380.4 | 444.0 | 490.5 | 541.1 | 544.1 |
| Blood | 227.4 | 244.6 | 224.3 | 242.7 | 257.5 | 266.1 | 305.9 | 364.0 | 396.0 | 419.3 | 429.2 |
| Sleep Disorders Research | — | — | 15.9 | 18.7 | 22.3 | 31.2 | 35.1 | 37.0 | 44.7 | 49.4 | 51.9 |
| Women's Health Initiative | — | — | — | — | — | 63.1 | 57.7 | 59.2 | 59.0 | 63.2 | 58.8 |
| Intramural Research | 101.7 | 98.9 | 101.8 | 104.4 | 111.6 | 119.5 | 122.3 | 133.7 | 146.7 | 157.8 | 164.2 |
| Research Management and Support | 58.4 | 59.5 | 54.8 | 54.6 | 57.6 | 63.9 | 67.9 | 73.5 | 79.4 | 87.3 | 88.5 |
| **Total** | **$1,277.9** | **$1,314.9** | **$1,351.5** | **$1,431.7** | **$1,526.3** | **$1,788.0** | **$2,027.3** | **$2,298.0** | **$2,569.8** | **$2,793.7** | **$2,882.6** |

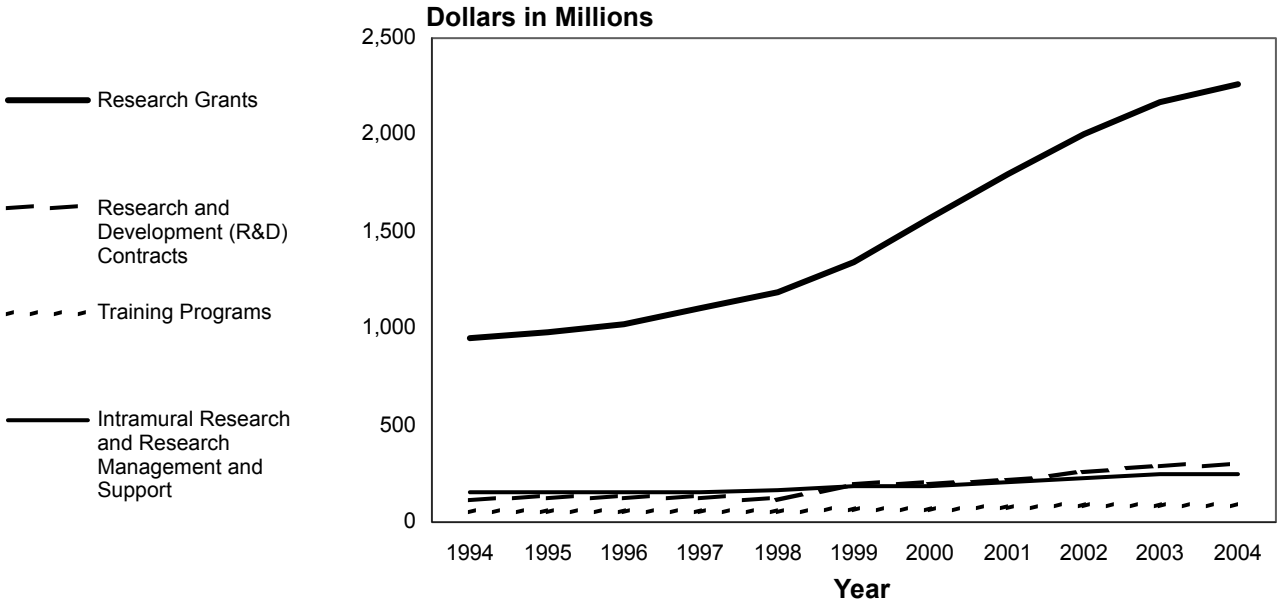
## NHLBI Total Obligations by Budget Category: Fiscal Years 1994–2004

**Constant 1994 Dollars (Millions)**

| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Budget Category** | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| Extramural Research | | | | | | | | | | | |
| Heart | $ 627.2 | $ 646.5 | $ 652.9 | $ 676.6 | $ 705.6 | $ 768.0 | $ 867.3 | $ 933.5 | $ 1,027.6 | $1,070.6 | $1,080.6 |
| Lung | 229.7 | 234.9 | 246.8 | 250.7 | 249.8 | 296.1 | 311.8 | 349.3 | 372.4 | 392.6 | 380.3 |
| Blood | 218.9 | 236.4 | 211.4 | 222.5 | 228.4 | 227.6 | 250.8 | 286.4 | 300.7 | 304.2 | 300.0 |
| Sleep Disorders Research | — | — | 15.0 | 17.1 | 19.8 | 26.7 | 28.8 | 29.1 | 33.9 | 35.8 | 36.3 |
| Women's Health Initiative | — | — | — | — | — | 54.0 | 47.3 | 46.6 | 44.8 | 45.9 | 41.1 |
| Intramural Research | 97.9 | 95.6 | 95.9 | 95.7 | 99.0 | 102.2 | 100.3 | 105.2 | 111.4 | 114.5 | 114.8 |
| Research Management and Support | 56.2 | 57.5 | 51.6 | 50.1 | 51.1 | 54.7 | 55.7 | 57.8 | 60.3 | 63.3 | 61.9 |
| **Total** | **$1,229.9** | **$1,270.9** | **$1,273.6** | **$1,312.7** | **$1,353.7** | **$1,529.3** | **$1,662.0** | **$1,807.9** | **$1,951.1** | **$2,026.9** | **$2,015.0** |

This table is based on the Biomedical Research & Development Price Index through 2003.

## NHLBI Total Obligations by Budget Mechanism: Fiscal Years 1994–2004




## NHLBI Total Obligations by Budget Mechanism: Fiscal Years 1994–2004

**Current Dollars (Millions)**

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

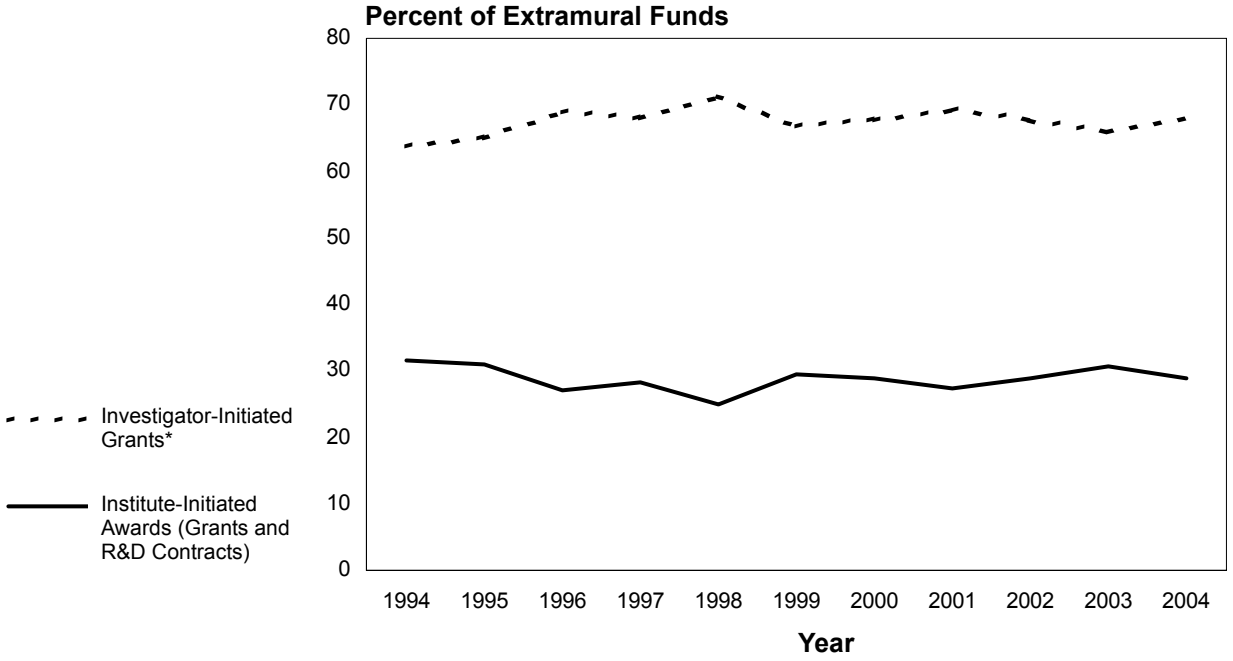
* Includes Research Career Programs.
† Excludes Office of the Director and DIR research contracts, which are included in R&D contracts.

## NHLBI Employment: Fiscal Years 1994–2004

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

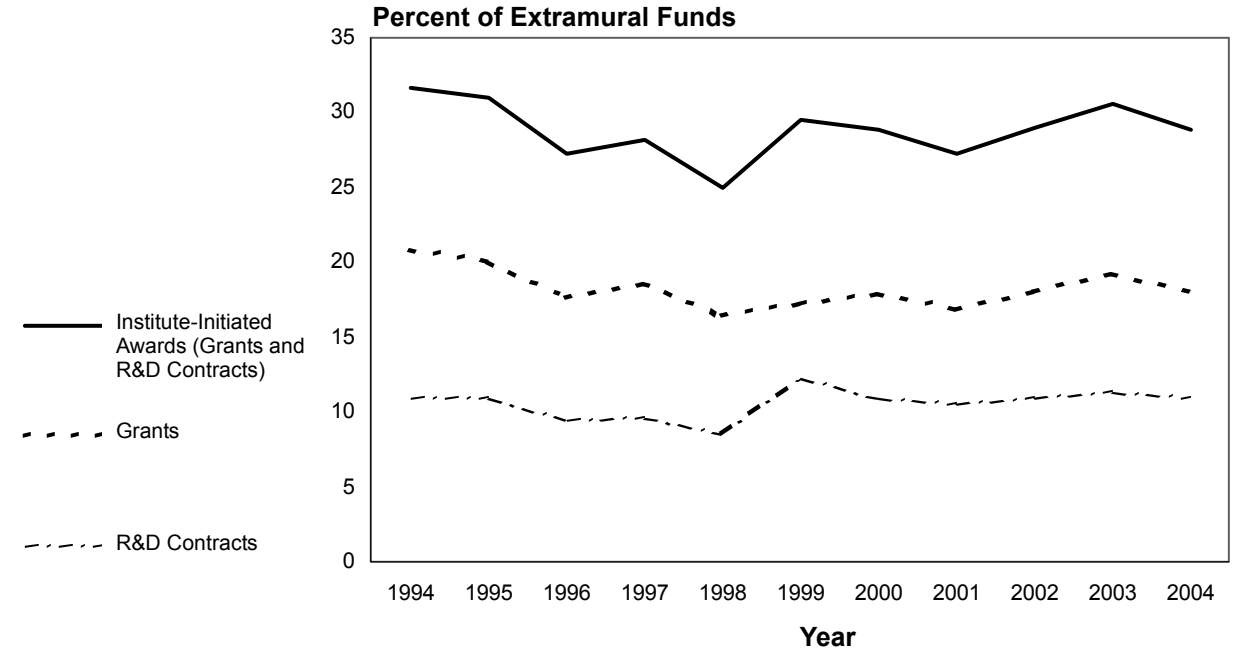
* Full-time equivalents.

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




* Includes Research Career Programs.

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



## NHLBI Extramural Programs: Fiscal Years 1994–2004

**Dollars (Millions)**

| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Funding Mechanism** | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| Investigator-Initiated Awards | | | | | | | | | | | |
| Investigator-Initiated Grants* | $ 669.7 | $ 725.0 | $ 815.5 | $ 835.3 | $ 930.5 | $1,023.6 | $1,188.6 | $1,388.8 | $1,521.4 | $1,616.1 | $1,716.8 |
| Research Career Programs | 25.1 | 25.7 | 28.9 | 28.9 | 36.1 | 46.3 | 53.0 | 57.5 | 63.5 | 65.8 | 67.8 |
| Subtotal, Investigator-Initiated Awards | 694.8 | 750.7 | 844.4 | 864.2 | 966.6 | 1,069.9 | 1,241.6 | 1,446.3 | 1,584.9 | 1,681.9 | 1,784.6 |
| Institute-Initiated Awards | | | | | | | | | | | |
| Institute-Initiated Grants (RFA) | 226.4 | 231.9 | 216.8 | 236.8 | 223.2 | 276.7 | 328.9 | 350.7 | 421.3 | 490.4 | 472.5 |
| *Centers†* | *101.5* | *107.0* | *87.5* | *87.7* | *114.4* | *119.9* | *123.8* | *127.2* | *128.2* | *138.9* | *140.6* |
| R&D Contracts (RFP) | 118.3 | 125.9 | 116.7 | 121.9 | 116.7 | 197.2 | 201.3 | 220.1 | 258.3 | 290.5 | 285.5 |
| Subtotal, Institute-Initiated Awards | 344.7 | 357.8 | 333.5 | 358.7 | 339.9 | 473.9 | 530.2 | 570.8 | 679.6 | 780.9 | 758.0 |
| Training | | | | | | | | | | | |
| Individual Awards | 7.2 | 7.1 | 7.3 | 6.8 | 7.6 | 9.2 | 8.9 | 8.9 | 9.5 | 8.6 | 8.8 |
| Institutional Awards | 40.0 | 40.0 | 40.2 | 42.0 | 42.0 | 50.3 | 55.2 | 63.4 | 69.7 | 75.5 | 76.6 |
| Subtotal, Training‡ | 48.2 | 48.0 | 48.5 | 49.8 | 50.6 | 60.8 | 65.4 | 73.7 | 79.2 | 85.8 | 87.2 |
| **Total, Extramural** | **$1,087.7** | **$1,156.5** | **$1,226.4** | **$1,272.7** | **$1,357.1** | **$1,604.6** | **$1,837.2** | **$2,090.8** | **$2,343.7** | **$2,548.6** | **$2,629.8** |

* 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.

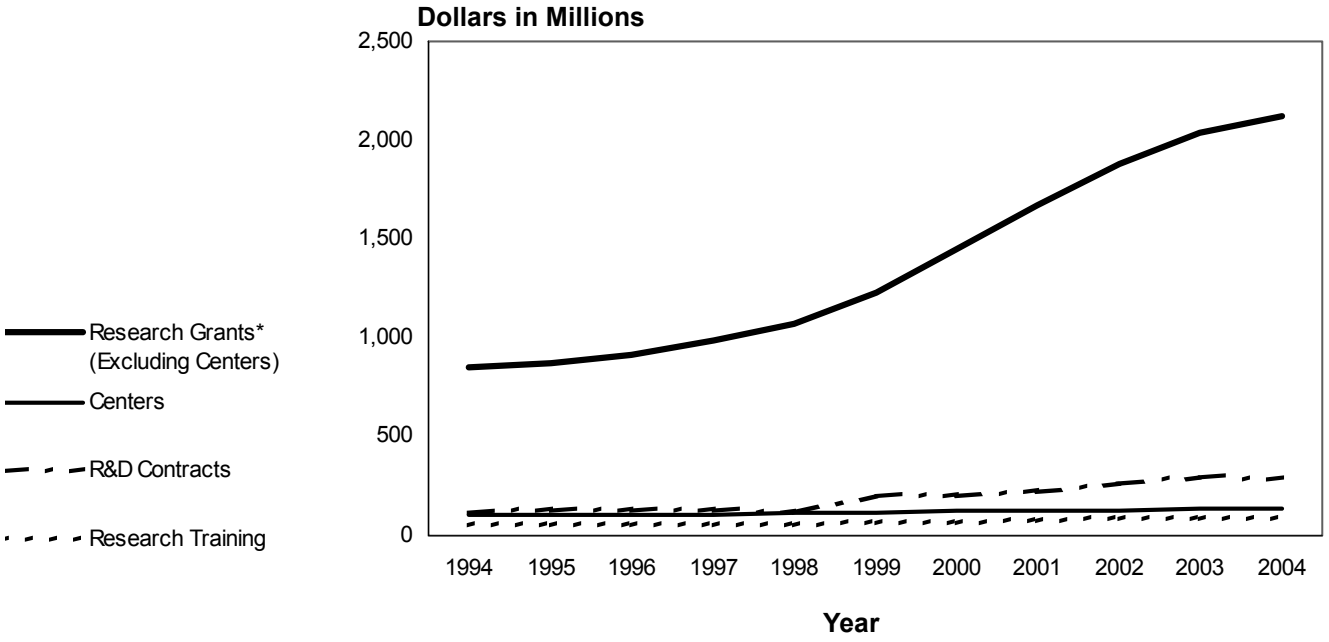
## NHLBI Extramural Programs: Fiscal Years 1994–2004

**Percent of Total Extramural Budget**

| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Funding Mechanism** | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| Investigator-Initiated Awards | | | | | | | | | | | |
| Investigator-Initiated Grants* | 61.6% | 62.7% | 66.5% | 65.6% | 68.6% | 63.8% | 64.7% | 66.4% | 64.9% | 63.4% | 65.3% |
| Research Career Programs (K04, K06) | 2.3 | 2.2 | 2.4 | 2.3 | 2.7 | 2.9 | 2.9 | 2.8 | 2.7 | 2.6 | 2.6 |
| Subtotal, Investigator-Initiated Awards | 63.9 | 64.9 | 68.9 | 67.9 | 71.2 | 66.7 | 67.6 | 69.2 | 67.6 | 66.0 | 67.9 |
| Institute-Initiated Awards | | | | | | | | | | | |
| Institute-Initiated Grants (RFA) | 20.8 | 20.1 | 17.7 | 18.6 | 16.4 | 17.2 | 17.9 | 16.8 | 18.0 | 19.2 | 18.0 |
| *Centers†* | *9.3* | *9.3* | *7.1* | *6.9* | *8.4* | *7.5* | *6.7* | *6.1* | *5.5* | *5.5* | *5.3* |
| R&D Contracts (RFP) | 10.9 | 10.9 | 9.5 | 9.6 | 8.6 | 12.3 | 11.0 | 10.5 | 11.0 | 11.4 | 10.9 |
| Subtotal, Institute-Initiated Awards | 31.7 | 30.9 | 27.2 | 28.2 | 25.0 | 29.5 | 28.9 | 27.3 | 29.0 | 30.6 | 28.8 |
| Training | | | | | | | | | | | |
| Individual Awards | 0.7 | 0.6 | 0.6 | 0.5 | 0.6 | 0.6 | 0.5 | 0.4 | 0.4 | 0.4 | 0.3 |
| Institutional Awards | 3.7 | 3.5 | 3.3 | 3.3 | 3.1 | 3.1 | 3.0 | 3.0 | 3.0 | 3.0 | 2.9 |
| Subtotal, Training‡ | 4.4 | 4.2 | 4.0 | 3.9 | 3.7 | 3.8 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 |
| **Total, Extramural** | **100%** | **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.

## NHLBI Extramural Research Funding Mechanism: Fiscal Years 1994–2004



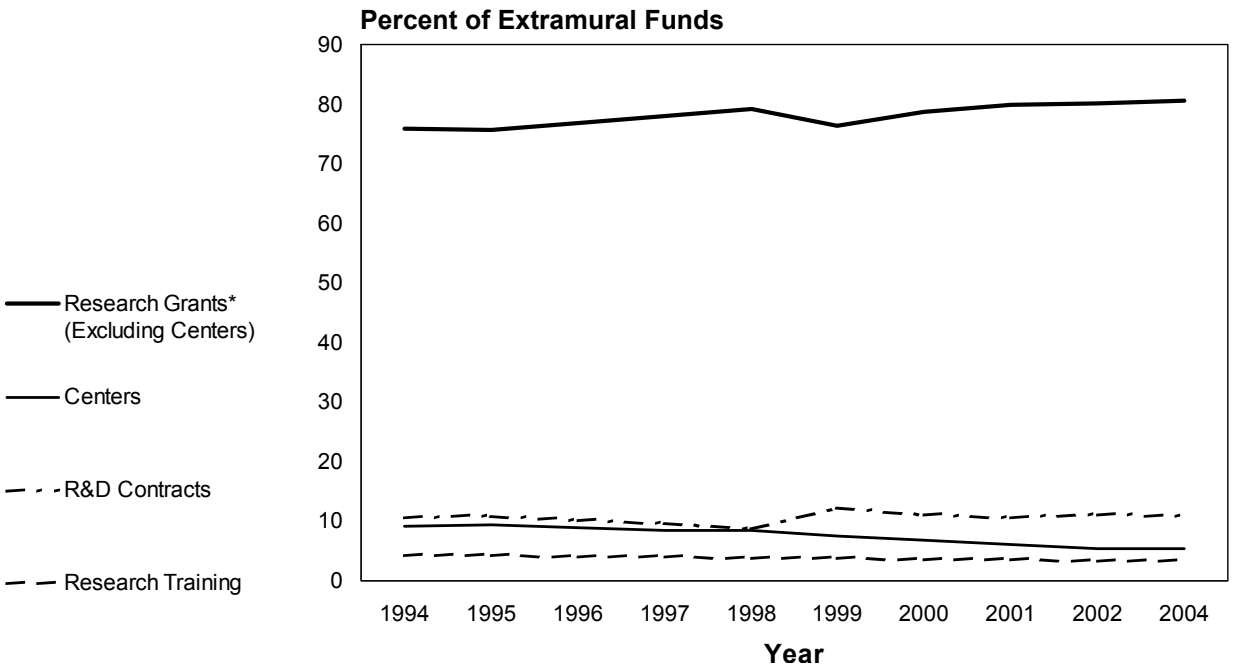

## NHLBI Extramural Research Funding Mechanism: Fiscal Years 1994–2004

**Dollars (Millions)**

| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Funding Mechanism** | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| Research Grants* | $ 849.7 | $ 875.7 | $ 918.7 | $ 992.3 | $1,075.4 | $1,226.7 | $1,446.7 | $1,669.8 | $1,878.0 | $2,033.4 | $2,116.6 |
| Centers | 101.5 | 107.0 | 106.7 | 108.7 | 114.4 | 119.9 | 123.8 | 127.2 | 128.2 | 138.9 | 140.6 |
| R&D Contracts | 118.3 | 125.9 | 120.9 | 121.9 | 116.7 | 197.2 | 201.3 | 220.1 | 258.3 | 290.5 | 285.5 |
| Research Training | 48.2 | 48.0 | 48.5 | 49.8 | 50.6 | 60.8 | 65.4 | 73.7 | 79.2 | 85.8 | 87.1 |
| **Total, Extramural** | **$1,117.7** | **$1,156.6** | **$1,194.8** | **$1,272.7** | **$1,357.1** | **$1,604.6** | **$1,837.2** | **$2,090.8** | **$2,343.7** | **$2,548.6** | **$2,629.8** |

* Includes Research Career Programs; does not include Centers.

## NHLBI Extramural Research Funding Mechanism: Fiscal Years 1994–2004




## NHLBI Extramural Research Funding Mechanism: Fiscal Years 1994–2004

**Percent of Total Extramural Budget**

| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Funding Mechanism** | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| Research Grants* | 76.0% | 75.7% | 76.9% | 78.0% | 79.2% | 76.4% | 78.7% | 79.9% | 80.1% | 79.8% | 80.5% |
| Centers | 9.1 | 9.3 | 8.9 | 8.5 | 8.4 | 7.5 | 6.7 | 6.1 | 5.5 | 5.5 | 5.3 |
| R&D Contracts | 10.6 | 10.9 | 10.1 | 9.6 | 8.6 | 12.3 | 11.0 | 10.5 | 11.0 | 11.4 | 10.9 |
| Research Training | 4.3 | 4.2 | 4.1 | 3.9 | 3.7 | 3.8 | 3.6 | 3.5 | 3.4 | 3.4 | 3.3 |
| **Total, Extramural** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** |

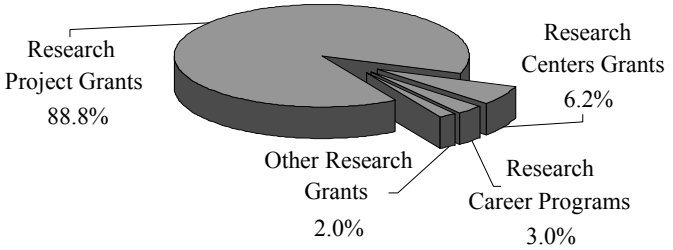
* Includes Research Career Programs; does not include Centers.
Note: Numbers may not add to total due to rounding.

# 9. Research Grants

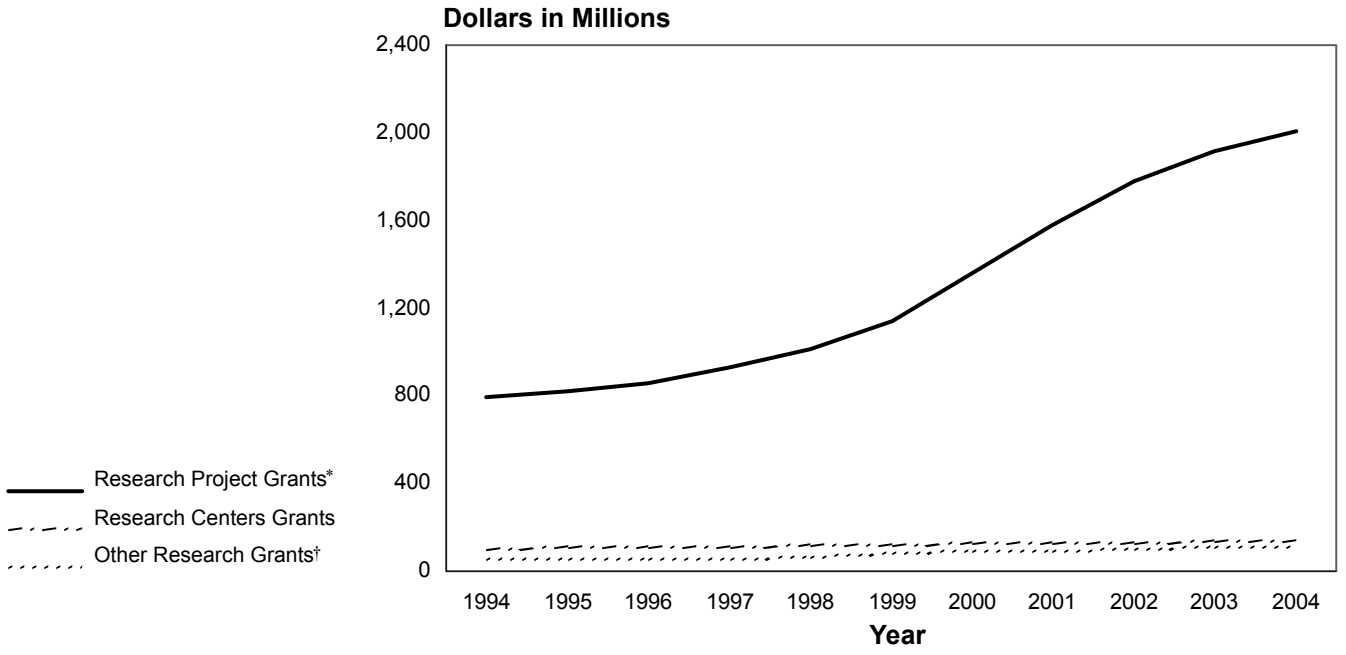
## NHLBI Research Grants by Funding Mechanism: Fiscal Year 2004

| | Number of Grants | Total Cost (Dollars in Thousands) | Percent of Total NHLBI Research Grant Dollars |
|---|---|---|---|
| **Research Project Grants (RPGs)** | | | |
| **Research Project Grants (Excluding Small Business RPGs)** | | | |
| Regular Research Grants (R01) | 3,572 | $1,328,958 | 58.88% |
| Small Research Grants (R03) | 1 | 80 | 0.00 |
| Program Project Grants (P01) | 194 | 361,903 | 16.03 |
| Cooperative Agreements (U01) | 235 | 185,602 | 8.22 |
| Area Grants (R15) | 19 | 3,838 | 0.17 |
| Explorative Developmental Grant (R21) | 93 | 18,165 | 0.80 |
| Method to Extend Research in Time (R37) | 83 | 32,891 | 1.46 |
| Exploratory/Developmental Grants Phase II (R33) | 2 | 802 | 0.04 |
| Subtotal, Research Project Grants (Excluding Small Business RPGs) | 4,199 | 1,932,239 | 85.60 |
| **Small Business Research Project Grants** | | | |
| Small Business Technology Transfer (STTR Phase I) (R41) | 37 | 5,142 | 0.23 |
| Small Business Technology Transfer (STTR Phase II) (R42) | 8 | 2,761 | 0.12 |
| Small Business Innovation Research (SBIR Phase I) (R43) | 115 | 15,239 | 0.68 |
| Small Business Innovation Research (SBIR Phase II) (R44) | 115 | 48,388 | 2.14 |
| Subtotal, Small Business Research Project Grants | 275 | 71,530 | 3.17 |
| Subtotal, Research Project Grants | 4,474 | 2,003,769 | 88.77 |
| **Research Center Grants** | | | |
| Specialized Centers of Research (SCOR) | 58 | 115,304 | 5.11 |
| Animal Model and Animal and Biological Material Resource Grants (P40) | — | 125 | 0.01 |
| Sickle Cell Centers (U54) | 11 | 21,010 | 0.93 |
| Center for AIDS Research (P30) | — | 2,646 | 0.12 |
| Specialized Centers (Cooperative Agreements) (U54) | 1 | 1,215 | 0.05 |
| National Swine Research and Resource Center (U42) | — | 300 | 0.01 |
| Subtotal, Research Center Grants | 70 | 140,600 | 6.23 |
| **Research Career Programs** | | | |
| Mentored Research Development Award for Minority Faculty (K01) | 46 | 6,150 | 0.27 |
| Minority Institution Faculty Mentored Research Scientist Award (K01) | 6 | 867 | 0.04 |
| Mentored Scientist Development Award in Research Ethics (K01) | 2 | 253 | 0.01 |
| Independent Scientist Award (K02) | 31 | 3,079 | 0.14 |
| Research Career Award (K06) | 1 | 34 | 0.00 |
| Nutrition Academic Award (K07) | 9 | 1,516 | 0.07 |
| Cultural Competence and Health Disparities Academic Award (K07) | 8 | 925 | 0.04 |
| Clinical Investigator Scientist Award (K08) | 229 | 29,037 | 1.29 |
| Career Enhancement Award for Stem Cell Research (K18) | 5 | 980 | 0.04 |
| Mentored Patient-Oriented Research Career Development Award (K23) | 122 | 16,216 | 0.72 |
| Midcareer Investigator Award in Patient-Oriented Research (K24) | 32 | 3,815 | 0.17 |
| Mentored Quantitative Research Career Development Award (K25) | 12 | 1,622 | 0.07 |
| Clinical Research Curriculum Award (K30) | 55 | 3,115 | 0.14 |
| Career Transition Award (K22) | 1 | 185 | 0.01 |
| Subtotal, Research Career Programs | 559 | 67,794 | 3.01 |
| **Other Research Grants** | | | |
| Cooperative Clinical Research (U10, R10) | 26 | 20,565 | 0.91 |
| Minority Biomedical Research Support (S06, S14, R25) | — | 2,806 | 0.12 |
| Other (R09, R13, R18, R24, R25, T15, U09, U24, UH1) | 64 | 21,620 | 0.96 |
| Subtotal, Other Research Grants | 90 | 44,991 | 1.99 |
| **Total, NHLBI Research Grants** | **5,193** | **$2,257,154** | **100%** |

## NHLBI Total Research Grants by Category



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




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

**Dollars (Thousands)**

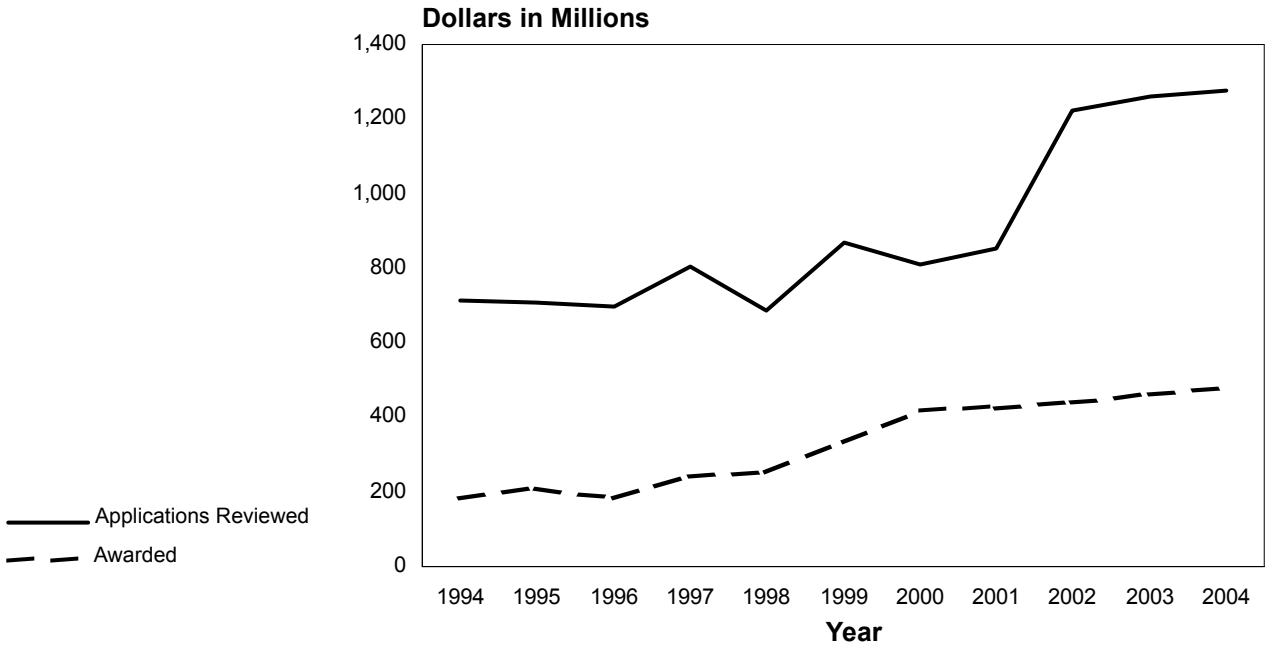
| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| Research Project Grants* | $797,092 | $819,674 | $ 862,027 | $ 935,322 | $1,009,152 |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

* Includes R01, R03, U01, P01, R37, R41, R43, and R44; R29 in 1994–2002; R55 in 1995–1996; 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 1994–2004
### Total Cost Dollars Reviewed and Awarded



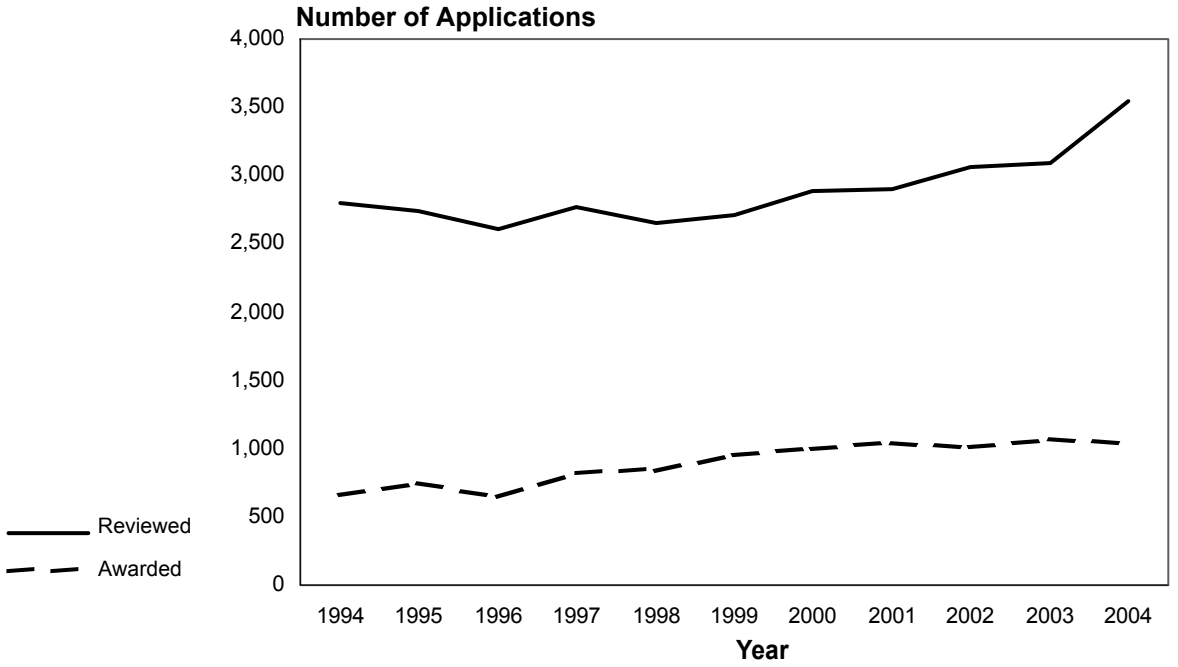

## NHLBI Competing Research Project Grant Applications*: Fiscal Years 1994–2004
### Total Cost Dollars Reviewed and Awarded

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

* Includes R01, R03, U01, P01, and R37; R29 in 1994–2002; R55 in 1995–1996; R15 beginning in 1996; R21 beginning in 1997; and R33 beginning in 2001.
† The number for applications reviewed is based on preliminary data.

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

### Number Reviewed and Awarded

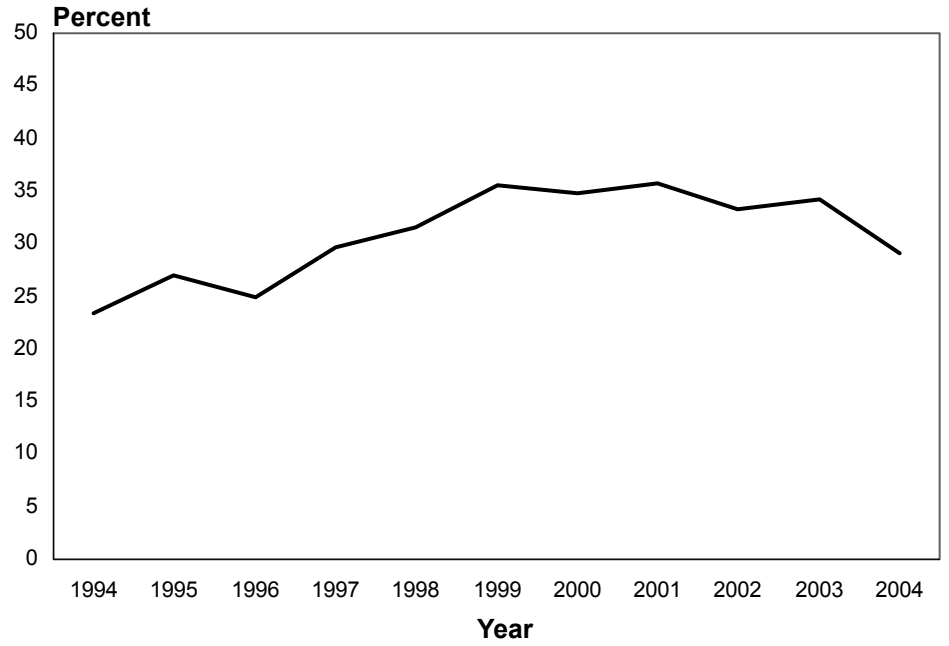



### Number Reviewed and Awarded and Percent Funded

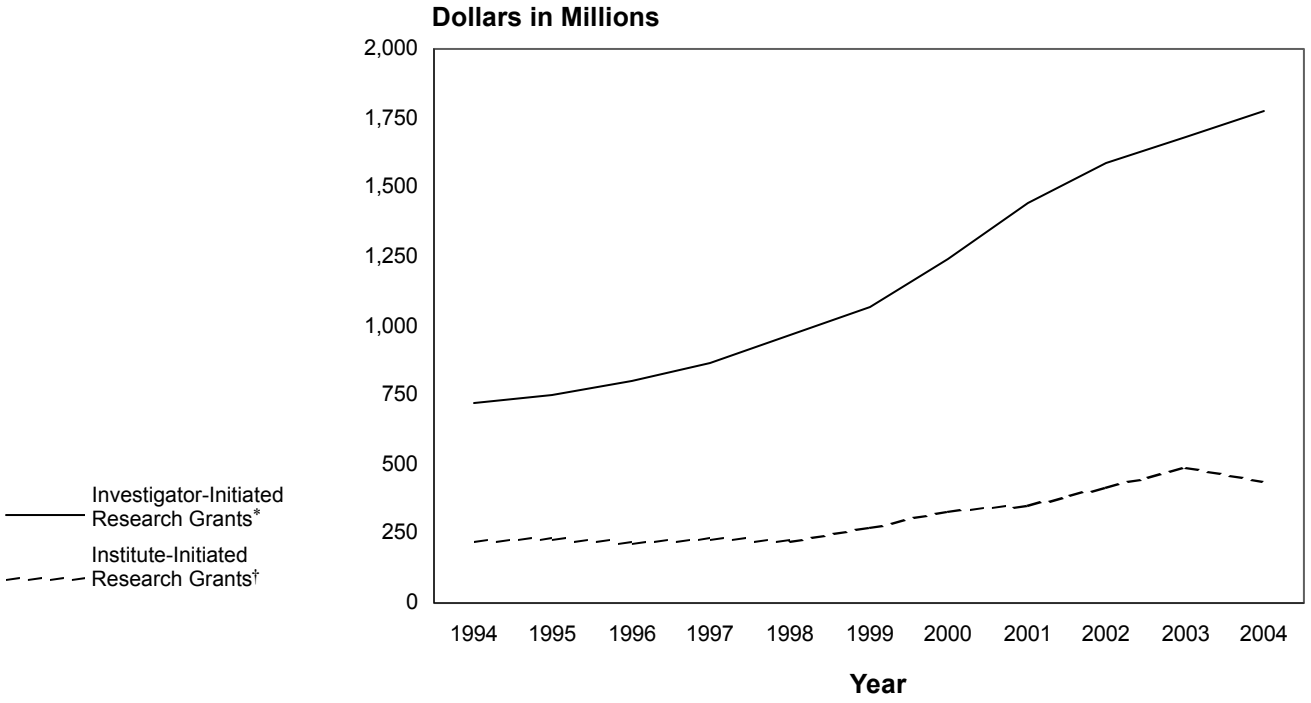
| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004†** |
| Applications Reviewed | 2,801 | 2,744 | 2,605 | 2,771 | 2,657 | 2,704 | 2,893 | 2,895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

* Includes R01, R03, U01, P01, and R37; R29 in 1994–2002; R55 in 1995–1996; R15 beginning in 1996; R21 beginning in 1997; and R33 beginning in 2001.
† The number of applications reviewed is based on preliminary data.

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



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




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

**Dollars (Millions)**

| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| Investigator-Initiated* | $724.8 | $750.7 | $ 804.1 | $ 867.9 | $ 966.6 | $1,069.9 | $1,241.6 | $1,446.2 | $1,584.9 | $1,681.9 | $1,773.4 |
| Institute-Initiated† | 226.4 | 231.9 | 216.8 | 233.0 | 223.2 | 276.7 | 328.9 | 350.7 | 421.3 | 490.4 | 483.8 |
| **Total** | **$951.2** | **$982.6** | **$1,020.9‡** | **$1,100.9** | **$1,189.8** | **$1,346.6** | **$1,570.5** | **$1,796.9** | **$2,006.2** | **$2,172.3** | **$2,257.2** |

* Includes R01, R03, U01, P01, R37, R41, R43, and R44; R29 in 1994–2002; R55 in 1995–1996; 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 1994–2004

**Dollars (Millions)**

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

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

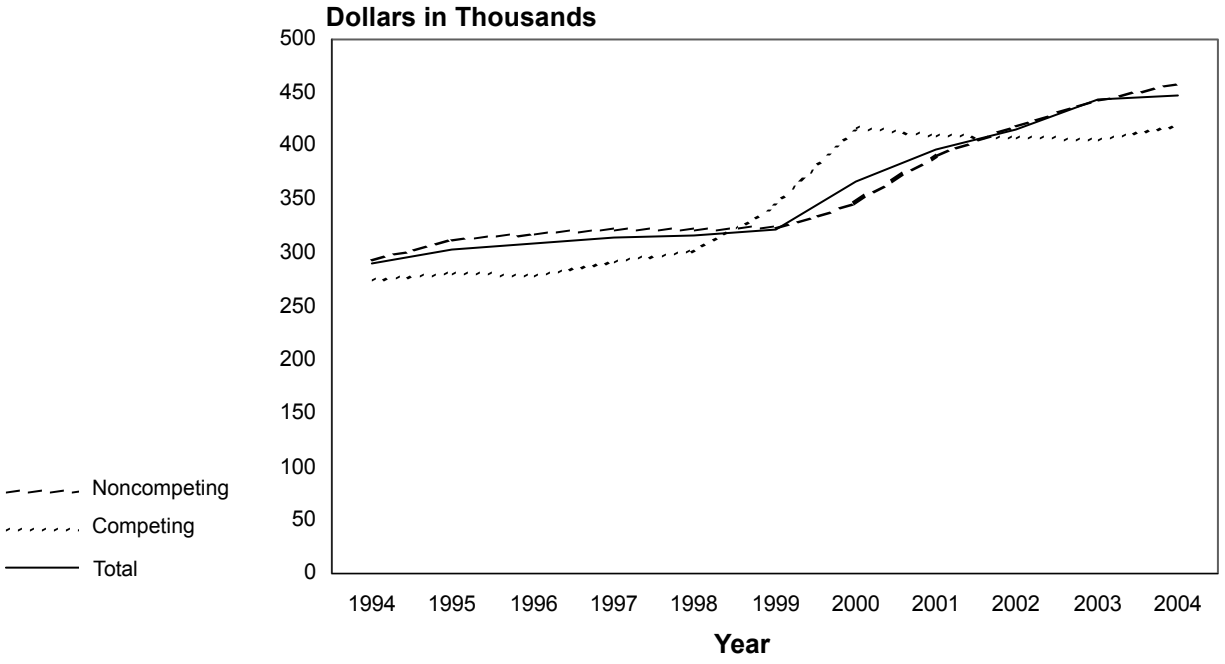
## Facility and Administrative (F&A)* Costs of NHLBI Research Project Grants†: Fiscal Years 1994–2004

**Dollars (Thousands)**

| Fiscal Year | Direct Cost | F&A Cost† | Total Cost | F&A Cost as a Percent of Direct Cost |
|---|---|---|---|---|
| 1994 | $ 534,374 | $ 245,965 | $ 780,339 | 46.0% |
| 1995 | 543,502 | 252,423 | 795,925 | 46.4 |
| 1996 | 564,219 | 267,785 | 832,004 | 47.5 |
| 1997 | 611,576 | 290,915 | 902,491 | 47.6 |
| 1998 | 660,009 | 313,765 | 973,774 | 47.5 |
| 1999 | 764,198 | 336,756‡ | 1,100,954 | 44.1 |
| 2000 | 891,244 | 417,312 | 1,308,556 | 46.8 |
| 2001 | 1,045,144 | 480,673 | 1,525,817 | 46.0 |
| 2002 | 1,182,408 | 536,324 | 1,718,732 | 45.4 |
| 2003 | 1,276,819 | 577,131 | 1,853,950 | 45.2 |
| 2004 | 1,385,567 | 618,202 | 2,003,769 | 44.6 |

* Previously called Indirect Cost.
† Includes R01, R03, U01, P01, and R37; R29 in 1994–2002; R55 in 1995–1996; R15 beginning in 1996; R21 beginning in 1997; and R33 beginning in 2001.
‡ Excludes Program Evaluation Assessment of $1,216,000.

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




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

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

* Includes R01, R03, U01, P01, R37, R41, R43, and R44; R29 in 1994–2002; R55 in 1995–1996; R15 and R42 beginning in 1996; R21 beginning in 1997; and R33 beginning in 2001.

## NHLBI Cooperative Agreements (U01, U10) Programs

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

| | Total Obligations Prior to FY 2004 | Total FY 2004 Obligations | Total Obligations to Date |
|---|---|---|---|
| **Heart and Vascular Diseases** | | | |
| A CHF Trial Investigating Outcomes of Exercise (ACTION) | $ 17,071,082 | $ 7,973,471 | $ 25,044,553 |
| Atherosclerosis, Plaque, and CVD in Communities | — | 4,099,685 | 4,099,685 |
| Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics (BARI 2D) | 27,288,936 | 8,265,037 | 35,553,973 |
| Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL) | — | 4,343,389 | 4,343,389 |
| Center for Fetal Monkey Gene Transfer for Heart, Lung, and Blood Diseases | 1,857,162 | 969,939 | 2,827,101 |
| Dynamic Evaluation of Percutaneous Coronary Intervention | 3,971,722 | 742,499 | 4,714,221 |
| Family Blood Pressure Program | 76,405,079 | 8,433,080 | 84,838,159 |
| Family Heart Study–Subclinical Atherosclerosis Network (FHS–SCAN) | 8,864,463 | 1,696,913 | 10,561,376 |
| Genetics of Coronary Artery Disease in Alaskan Natives (GOCADAN) | 7,218,810 | 652,865 | 7,871,675 |
| Girls Health Enrichment Multisite Studies (GEMS) | 12,698,544 | 2,399,948 | 15,098,492 |
| Hematocrit Strategy in Infant Heart Surgery | 2,215,845 | 492,411 | 2,708,256 |
| Home Automatic External Defibrillator Trial (HAT) | 8,999,887 | 4,263,755 | 13,263,642 |
| IMMEDIATE Trial: Immediate Myocardial Metabolic Enhancement During Initial Assessment and Treatment in Emergency Care | — | 5,170,411 | 5,170,411 |
| Interaction of Genes and Environment in Shaping Risk Factors for Heart, Lung, Blood, and Sleep Disorders | 25,116,214 | 10,409,084 | 35,525,298 |
| Multidisciplinary Study of Right Ventricular Dysplasia | 4,778,935 | 1,473,384 | 6,252,319 |
| Partnership Programs To Reduce Cardiovascular Health Disparities | — | 6,468,544 | 6,468,544 |
| Pediatric Cardiovascular Clinical Research Network | 13,650,229 | 4,947,982 | 18,598,211 |
| Pharmacogenetics Research Network | 25,021,286 | 8,185,611 | 33,206,897 |
| Preventing Overweight Using Novel Dietary Strategies (POUNDS LOST) | 1,211,724 | 1,687,588 | 2,899,312 |
| Programs of Excellence in Gene Therapy | 49,160,962 | 11,979,088 | 61,140,050 |
| Programs of Genomic Applications (PGAs) for Heart, Lung, and Blood Diseases | 147,177,847 | 18,604,345 | 165,782,192 |
| Resuscitation Outcome Improvement Consortium | — | 6,886,109 | 6,886,109 |
| Stop Atherosclerosis in Native Diabetics Study (SANDS) | 4,574,684 | 2,106,653 | 6,681,337 |
| Strong Heart Study | 43,283,445 | 3,154,859 | 46,438,304 |
| Surgical Treatment for Ischemic Heart Failure (STICH) | 12,251,409 | 1,613,238 | 13,864,647 |
| Trial of Activity for Adolescent Girls (TAAG) | 21,853,035 | 6,349,902 | 28,202,937 |
| Weight Loss Maintenance (WLM) | 3,686,738 | 4,367,750 | 8,054,488 |
| Women's Ischemia Syndrome Evaluation (WISE) | 4,314,911 | 1,302,449 | 5,617,360 |
| Subtotal, Heart and Vascular Diseases | 522,672,949 | 139,039,989 | 661,712,938 |
| **Lung Diseases** | | | |
| Asthma Clinical Research Network (ACRN), Phase II | 8,181,429 | 8,424,129 | 16,605,558 |
| Centers for Reducing Asthma Disparities | 12,051,824 | 5,217,367 | 17,269,191 |
| Childhood Asthma Management Program–Continuation Study (CAMP–CS)/Phase 2 | 1,489,491 | 2,043,311 | 3,532,802 |
| Childhood Asthma Research and Education (CARE) Network | 26,106,032 | 5,292,305 | 31,398,337 |
| Collaborative Programs in Bronchopulmonary Dysplasia | 21,135,687 | 5,166,906 | 26,302,593 |
| COPD Clinical Research Network | 6,843,405 | 6,848,345 | 13,691,750 |
| Early Antipseudomonal Therapy in Cystic Fibrosis | — | 1,064,237 | 1,064,237 |
| Inhaled Nitric Oxide for the Prevention of Chronic Lung Disease | 6,968,259 | 1,245,274 | 8,213,533 |
| Inhaled Nitric Oxide in Prevention of Chronic Lung Disease | 6,732,859 | 903,335 | 7,636,194 |
| Linkage Study in Familial Pulmonary Fibrosis | 2,755,951 | 714,001 | 3,469,952 |
| Pharmacogenetics of Asthma Treatment | 10,847,376 | — | 10,847,376 |
| Subtotal, Lung Diseases | 103,112,313 | 36,919,210 | 140,031,523 |

| | Total Obligations Prior to FY 2004 | Total FY 2004 Obligations | Total Obligations to Date |
|---|---|---|---|
| **Blood Diseases and Resources** | | | |
| Blood and Marrow Transplant Clinical Research Network | $ 17,209,287 | $ 5,972,521 | $ 23,181,808 |
| Functional Outcomes in Cardiovascular Patients Undergoing Surgical Hip Fracture Repair (FOCUS) | 1,639,478 | 1,795,724 | 3,435,202 |
| Induction of Stable Chimerism for Sickle Cell Anemia | 1,541,037 | 550,666 | 2,091,703 |
| Reference Laboratory to Evaluate Therapies for Sickle Cell Disease | 1,437,153 | 409,694 | 1,846,847 |
| Sibling Donor Cord Blood Banking and Transplantation | 3,731,256 | 1,352,571 | 5,083,827 |
| Stroke Prevention in Sickle Cell Anemia (STOP 2) | 13,147,352 | 2,366,346 | 15,513,698 |
| Thalassemia (Cooley's Anemia) Clinical Research Network | 8,999,883 | 2,374,805 | 11,374,688 |
| Transfusion Medicine/Hemostasis Clinical Research Network | 12,293,630 | 6,092,846 | 18,386,476 |
| Subtotal, Blood Diseases and Resources | 59,999,076 | 20,915,173 | 80,914,249 |
| **National Center on Sleep Disorders Research** | | | |
| Apnea Positive Pressure Long-Term Efficacy Study (APPLES) | 6,244,439 | 3,109,570 | 9,354,009 |
| Sleep Heart Health Study | 16,631,681 | 1,477,676 | 18,109,357 |
| Subtotal, National Center on Sleep Disorders Research | 22,876,120 | 4,587,246 | 27,463,366 |
| **Total, NHLBI Cooperative Agreements** | **$708,660,458** | **$201,461,618** | **$910,122,076** |

## Heart and Vascular Diseases Program

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

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

#### Obligations

Funding History:
Fiscal Year 2004—$7,973,471
Fiscal Years 2002–2003—$17,071,082
Total Funding to Date—$25,044,553

#### Current Active Organizations and Grant Numbers

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

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

The purpose of this study is to identify correlates of atherosclerotic plaque characteristics and early changes in the vascular wall in a subset of the bi-ethnic Atherosclerosis Risk in Communities (ARIC) cohort. Investigators will use stored DNA samples to test genomic correlates of plaque characteristics and their ability to predict coronary heart disease and stroke.

#### Obligations

Funding History:
Fiscal Year 2004—$4,099,685
Total Funding to Date—$4,099,685

#### Current Active Organizations and Grant Numbers

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

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

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

#### Obligations

Funding History:
Fiscal Year 2004—$8,265,037
Fiscal Years 2000–2003—$27,288,936
Total Funding to Date—$35,553,973

#### Current Active Organizations and Grant Numbers

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

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

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

### Obligations

Funding History:
Fiscal Year 2004—$4,343,389
Total Funding to Date—$4,343,389

### Current Active Organizations and Grant Numbers

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

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

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

### Obligations

Funding History:
Fiscal Year 2004—$969,939
Fiscal Years 2001–2003—$1,857,162
Total Funding to Date—$2,827,101

### Current Active Organization and Grant Number

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

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

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

### Obligations

Funding History:
Fiscal Year 2004—$742,499
Fiscal Years 1997–2003—$3,971,722
Total Funding to Date—$4,714,221

### Current Active Organization and Grant Number

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

## Family Blood Pressure Program, Initiated in Fiscal Year 1995

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

### Obligations

Funding History:
Fiscal Year 2004—$8,433,080
Fiscal Years 1995–2003—$76,405,079
Total Funding to Date—$84,838,159

### Current Active Organizations and Grant Numbers

1. University of Michigan at Ann Arbor
   Ann Arbor, Michigan —HL-054457
2. University of Mississippi Medical Center
   Jackson, Mississippi —HL-054463
3. Mayo Foundation
   Rochester, Minnesota —HL-054464
4. The Johns Hopkins University
   Baltimore, Maryland —HL-054466
5. University of Utah
   Salt Lake City, Utah —HL-054471
6. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HL-054472
7. Washington University
   St. Louis, Missouri —HL-054473

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

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

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

### Obligations

Funding History:
Fiscal Year 2004—$1,696,913
Fiscal Years 2001–2003—$8,864,463
Total Funding to Date—$10,561,376

### Current Active Organizations and Grant Numbers

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

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

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

### Obligations

Funding History:
Fiscal Year 2004—$652,865
Fiscal Years 2000–2003—$7,218,810
Total Funding to Date—$7,871,675

### Current Active Organization and Grant Number

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

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

The objective of this project is to develop and test interventions to prevent obesity by decreasing weight gain during the high-risk transitional period from pre-

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

puberty to puberty in black girls who are at risk for developing obesity. Phase 1 (developmental and pilot studies) was completed in FY 2002. Two sites began Phase 2 trials in FY 2003.

**Obligations**

Funding History:
Fiscal Year 2004—$2,399,948
Fiscal Years 2001–2003—$12,698,544
Total Funding to Date—$15,098,492

**Current Active Organizations and Grant Numbers**

1. University of Memphis
Memphis, Tennessee —HL-062662
1. Stanford University
Stanford, Califorinia —HL-062663

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

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

**Obligations**

Funding History:
Fiscal Year 2004—$492,411
Fiscal Years 2000–2003—$2,215,845
Total Funding to Date—$2,708,256

**Current Active Organization and Grant Number**

1. Children's Hospital, Boston
Boston, Massachusetts —HL-063411

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

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

**Obligations**

Funding History:
Fiscal Year 2004—$4,263,755
Fiscal Years 2002–2003—$8,999,887
Total Funding to Date—$13,263,642

**Current Active Organization and Grant Number**

1. Seattle Institute for Cardiac Research
Seattle, Washington —HL-067972

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

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

**Obligations**

Funding History:
Fiscal Year 2004—$5,170,411
Total Funding to Date—$5,170,411

**Current Active Organizations and Grant Numbers**

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

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

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

most likely to benefit from targeted environmental changes designed to reduce the development or progression of heart, lung, blood, or sleep diseases.

**Obligations**

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

**Current Active Organizations and Grant Numbers**

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

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

The purpose of this multidisciplinary, multicenter study is to investigate the cardiac, clinical, and genetic aspects of arrhythmogenic right ventricular dysplasia (ARVD). A North American ARVD registry of patients and their families will be established. Researchers seek to identify chromosomal loci and specific genetic mutations associated with this disorder.

**Obligations**

Funding History:
Fiscal Year 2004—$1,473,384
Fiscal Years 2001–2003—$4,778,935
Total Funding to Date—$6,252,319

**Current Active Organizations and Grant Numbers**

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

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

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

**Obligations**

Funding History:
Fiscal Year 2004—$6,468,544
Total Funding to Date—$6,468,544

**Current Active Organizations and Grant Numbers**

1. Bon Secours Hospital Baltimore, Inc.
Baltimore, Maryland —HL-079150
2. University of Maryland Baltimore Professional School
Baltimore, Maryland —HL-079151
3. Queen's Medical Center
Honolulu, Hawaii —HL-079152
4. Cooper Green Hospital (Birmingham)
Birmingham, Alabama —HL-079153
5. Emory University
Atlanta, Georgia —HL-079156
6. Denver Health and Hospital Authority
Denver, Colorado —HL-079160
7. University of Hawaii at Manoa
Honolulu, Hawaii —HL-079163
8. University of Alabama at Birmingham
Birmingham, Alabama —HL-079171
9. University of Colorado Health Sciences Center
Denver, Colorado —HL-079208
10. Morehouse School of Medicine
Atlanta, Georgia —HL-079214
11. Jackson Hinds Comprehensive Health Center
Jackson, Mississippi —HL-079378
12. University of Mississippi Medical Center
Jackson, Mississippi —HL-079458

## Pediatric Cardiovascular Clinical Research Network, Initiated in Fiscal Year 2001

See Chapter 11. Clinical Trials.

## Pharmacogenetics Research Network, Initiated in Fiscal Year 2001

The purpose of this study is to establish a network to systematically evaluate candidate genes that may influence pharmacologic response to drug treatments for arrhythmia, heart failure, hypertension, and lipid disorders. Investigators seek to identify gene polymorphisms capable of predicting drug toxicity and efficacy. One of the projects has 50 percent minority participation.

### Obligations

Funding History:
Fiscal Year 2004—$8,185,611
Fiscal Years 2001–2003—$25,021,286
Total Funding to Date—$33,206,897

### Current Active Organizations and Grant Numbers

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

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

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

### Obligations

Funding History:
Fiscal Year 2004—$1,687,588
Fiscal Year 2003—$1,211,724
Total Funding to Date—$2,899,312

### Current Active Organization and Grant Number

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

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

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

### Obligations

Funding History:
Fiscal Year 2004—$11,979,088
Fiscal Years 2000–2003—$49,160,962
Total Funding to Date—$61,140,050

### Current Active Organizations and Grant Numbers

1. University of Washington
   Seattle, Washington —HL-066947
2. Stanford University
   Stanford, California —HL-066948
3. University of Pittsburgh
   Pittsburgh, Pennsylvania —HL-066949
4. Weill Medical College of Cornell University
   New York, New York —HL-066952
5. Weill Medical College of Cornell University
   New York, New York —HL-067738

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

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

### Obligations

Funding History:
Fiscal Year 2004—$18,604,345
Fiscal Years 2000–2003—$147,177,847
Total Funding to Date—$165,782,192

### Current Active Organizations and Grant Numbers

1. Medical College of Wisconsin
   Milwaukee, Wisconsin —HL-066579
2. Institute for Genomic Research
   Rockville, Maryland —HL-066580
3. Harvard University School of Medicine
   Boston, Massachusetts —HL-066582
4. The Johns Hopkins University
   Baltimore, Maryland —HL-066583
5. University of California, San Francisco
   San Francisco, California —HL-066600
6. Jackson Laboratory
   Bar Harbor, Maine —HL-066611
7. Institute for Genomic Research
   Rockville, Maryland —HL-066619
8. J. David Gladstone Institutes
   San Francisco, California —HL-066621
9. Fred Hutchinson Cancer
   Research Center
   Seattle, Washington —HL-066642
10. Massachusetts General Hospital
    Boston, Massachusetts —HL-066678
11. University of California, Berkley
    Lawrence Berkeley Laboratory
    Berkeley, California —HL-066681
12. University of Washington
    Seattle, Washington —HL-066682
13. Brigham and Women's Hospital
    Boston, Massachusetts —HL-066795
14. University of Arizona
    Tucson, Arizona —HL-066801
15. Brigham and Women's Hospital
    Boston, Massachusetts —HL-066804
16. Brigham and Women's Hospital
    Boston, Massachusetts —HL-066805
17. University of Arizona
    Tucson, Arizona —HL-066806
18. University of Texas
    Southwestern Medical Center
    Dallas, Texas —HL-066880

## Resuscitation Outcome Improvement Consortium, Initiated in Fiscal Year 2004

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

### Obligations

Funding History:
Fiscal Year 2004—$6,886,109
Total Funding to Date—$6,886,109

### Current Active Organizations and Grant Numbers

1. University of Washington
   Seattle, Washington —HL-077863
2. University of Iowa
   Iowa City, Iowa —HL-077865
3. Medical College of Wisconsin
   Milwaukee, Wisconsin —HL-077866
4. University of Washington
   Seattle, Washington —HL-077867
5. University of Pittsburgh
   Pittsburgh, Pennsylvania —HL-077871
6. St. Michael's Hospital
   Toronto, Ontario —HL-077872
7. Oregon Health & Science University
   Portland, Oregon —HL-077873
8. University of Alabama at Birmingham
   Birmingham, Alabama —HL-077881
9. Ottawa Health Research Institute
   Ottawa, Ontario —HL-077885
10. University of Texas
    Southwestern Medical Center
    Dallas, Texas —HL-077887
11. University of California, San Diego
    La Jolla, California —HL-077908

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

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

### Obligations

Funding History:
Fiscal Year 2004—$2,106,653
Fiscal Year 2003—$4,574,684
Total Funding to Date—$6,681,337

### Current Active Organization and Grant Number

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

## Strong Heart Study, Initiated in Fiscal Year 1988

The objectives of this study are to survey CVD morbidity and mortality rates among three geographically diverse groups of American Indians and to estimate their levels of CVD risk factors. Phases II and III of the cohort study extended surveillance of community mortality and assessed development of CVD and changes in CVD risk factors. In Phase III, investigators added a

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

**Obligations**

Funding History:
Fiscal Year 2004—$3,154,859
Fiscal Years 1988–2003—$43,283,445
Total Funding to Date—$46,438,304

**Current Active Organizations and Grant Numbers**

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

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

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

**Obligations:**

Funding History:
Fiscal Year 2004—$1,613,238
Fiscal Years 2002–2003—$12,251,409
Total Funding to Date—$13,864,647

**Current Active Organizations and Grant Numbers**

1. Thomas Jefferson University
Philadelphia, Pennsylvania —HL-069009
2. Mayo Clinic
Rochester, Minnesota —HL-069010
3. Duke University
Durham, North Carolina —HL-069011
4. Northwestern University
Chicago, Illinois —HL-069012
5. Duke University
Durham, North Carolina —HL-069013
6. Duke University
Durham, North Carolina —HL-069015
7. University of Southern California
Los Angeles, California —HL-072683

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

See Chapter 11. Clinical Trials.

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

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

**Obligations**

Funding History:
Fiscal Year 2004—$4,367,750
Fiscal Year 2003—$3,686,738
Total Funding to Date—$8,054,488

**Current Active Organizations and Grant Numbers**

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

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

The purpose of this study is to extend the follow-up of WISE patients to determine the incremental long-term

prognostic value of novel testing developed in WISE, develop sex-specific incremental outcome models to evaluate the prognostic value of female reproductive variables, and maintain a WISE database and infrastructure to facilitate further investigations into the mechanisms underlying ischemic syndromes in women.

**Obligations**

Funding History:
Fiscal Year 2004—$1,302,449
Fiscal Years 2001–2003—$4,314,911
Total Funding to Date—$5,617,360

**Current Active Organizations and Grant Numbers**

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

## Lung Diseases Program

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

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

**Obligations**

Funding History:
Fiscal Year 2004—$8,424,129
Fiscal Year 2003—$8,181,429
Total Funding to Date—$16,605,558

**Current Active Organizations and Grant Numbers**

1. National Jewish Medical and Research Center
Denver, Colorado —HL-074073
2. University of California, San Francisco
San Francisco, California —HL-074204
3. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-074206
4. Washington University
St. Louis, Missouri —HL-074208
5. University of Wisconsin
Madison, Wisconsin —HL-074212
6. University of California, San Diego
La Jolla, California —HL-074218
7. Wake Forest University
Winston-Salem, North Carolina —HL-074225
8. Brigham and Women's Hospital
Boston, Massachusetts —HL-074227
9. Pennsylvania State University
Hershey, Pennsylvania —HL-074231

### Centers for Reducing Asthma Disparities, Initiated in Fiscal Year 2002

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

**Obligations**

Funding History:
Fiscal Year 2004—$5,217,367
Fiscal Years 2002–2003—$12, 051,824
Total Funding to Date—$17,269,191

**Current Active Organizations and Grant Numbers**

1. Meharry Medical College
Nashville, Tennessee —HL-072431
2. Howard University
Washington, DC —HL-072433
3. Rhode Island Hospital
Providence, Rhode Island —HL-072438
4. The Johns Hopkins University
Baltimore, Maryland —HL-072455
5. Vanderbilt University
Nashville, Tennessee —HL-072471
6. Northwestern University
Chicago, Illinois —HL-072478
7. Hektoen Institute for Medical Research
Chicago, Illinois —HL-072496
8. University of Puerto Rico Medical Sciences
San Juan, Puerto Rico —HL-072519

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

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

### Obligations

Funding History:
Fiscal Year 2004—$2,043,311
Fiscal Year 2003—$1,489,491
Total Funding to Date—$3,532,802

### Current Active Organizations and Grant Numbers

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

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

See Chapter 11. Clinical Trials.

## Collaborative Program in Bronchopulmonary Dysplasia, Initiated in Fiscal Year 1999

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

### Obligations

Funding History:
Fiscal Year 2004—$5,166,906
Fiscal Years 1999–2003—$21,135,687
Total Funding to Date—$26,302,593

### Current Active Organizations and Grant Numbers

1. Southwest Foundation for Biomedical Research
   San Antonio, Texas —HL-052636
2. Brigham and Women's Hospital
   Boston, Massachusetts —HL-052638
3. University of California, San Francisco
   San Francisco, California —HL-056061
4. National Jewish Medical and Research Center
   Denver, Colorado —HL-056263
5. Barnes Jewish Hospital
   St. Louis, Missouri —HL-063387
6. National Jewish Medical and Research Center
   Denver, Colorado —HL-063397
7. University of Texas Southwestern Medical Center
   Dallas, Texas —HL-063399
8. University of Rochester
   Rochester, New York —HL-063400
9. Children's Hospital of Philadelphia
   Philadelphia, Pennsylvania —HL-075900
10. Children's Hospital
    Boston, Massachusetts —HL-075904

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

See Chapter 11. Clinical Trials.

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

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

### Obligations

Funding History:
Fiscal Year 2004—$1,064,237
Total Funding to Date—$1,064,237

**Current Active Organization and Grant Number**

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

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

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

**Obligations**

Funding History:
Fiscal Year 2004—$1,245,274
Fiscal Years 2000–2003—$6,968,259
Total Funding to Date—$8,213,533

**Current Active Organization and Grant Number**

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

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

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

**Obligations**

Funding History:
Fiscal Year 2004—$903,335
Fiscal Years 2000–2003—$6,732,859
Total Funding to Date—$7,636,194

**Current Active Organization and Grant Number**

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

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

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

**Obligations**

Funding History:
Fiscal Year 2004—$714,001
Fiscal Years 2000–2003—$2,755,951
Total Funding to Date—$3,469,952

**Current Active Organization and Grant Number**

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

### Pharmacogenetics of Asthma Treatment, Initiated in Fiscal Year 2000

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

**Obligations**

Funding History:
Fiscal Year 2004—$0
Fiscal Years 2000–2003—$10,847,376
Total Funding to Date—$10,847,376

**Current Active Organization and Grant Number**

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

## Blood Diseases and Resources

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

See Chapter 11. Clinical Trials.

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

The purpose of this trial is to test whether a more aggressive transfusion strategy that maintains postoperative Hgb levels above 10 g/dl improves functional out-

come in cardiovascular patients who are over age 50 and undergoing surgical hip fracture surgery compared to a more conservative strategy that withholds blood transfusion until the patient develops symptoms of anemia.

**Obligations**

Funding History:
Fiscal Year 2004—$1,795,724
Fiscal Year 2003—$1,639,478
Total Funding to Date—$3,435,202

**Current Active Organizations and Grant Numbers**

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

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

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

**Obligations**

Funding History:
Fiscal Year 2004—$550,666
Fiscal Years 2001–2003—$1,541,037
Total Funding to Date—$2,091,703

**Current Active Organization and Grant Number**

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

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

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

**Obligations**

Funding History:
Fiscal Year 2004—$409,694
Fiscal Years 1997–2003*—$1,437,153
Total Funding to Date—$1,846,847

**Current Active Organization and Grant Number**

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

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

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

**Obligations**

Funding History:
Fiscal Year 2004—$1,352,571
Fiscal Years 2001–2003—$3,731,256
Total Funding to Date—$5,083,827

**Current Active Organization and Grant Number**

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

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

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

**Obligations**

Funding History:
Fiscal Year 2004—$2,366,346
Fiscal Years 2000–2003—$13,147,352
Total Funding to Date—$15,513,698

**Current Active Organizations and Grant Numbers**

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

## Thalassemia (Cooley's Anemia) Clinical Research Network

See Chapter 11. Clinical Trials.

* Became U01 in 2001.

### Transfusion Medicine/Hemostasis Clinical Research Network

See Chapter 11. Clinical Trials.

## National Center on Sleep Disorders Research

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

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

#### Obligations

Funding History:
Fiscal Year 2004—$3,109,570
Fiscal Year 2002–2003—$6,244,439
Total Funding to Date—$9,354,009

#### Current Active Organization and Grant Number

1. Stanford University
   Stanford, California —HL-068060

### Sleep Heart Health Study, Initiated in Fiscal Year 1999

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

#### Obligations

Funding History:
Fiscal Year 2004—$1,477,676
Fiscal Years 1999–2003—$16,631,681
Total Funding to Date—$18,109,357

#### Current Active Organizations and Grant Numbers

1. University of California, Davis
   Davis, California —HL-053916
2. New York University Medical Center
   New York, New York —HL-053931
3. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HL-053934
4. The Johns Hopkins University
   Baltimore, Maryland —HL-053937
5. University of Arizona
   Tucson, Arizona —HL-053938
6. Boston University
   Boston, Massachusetts —HL-053941
7. Missouri Breaks Research, Inc.
   Timberlake, South Dakota —HL-063429
8. Case Western Reserve University
   Cleveland, Ohio —HL-063463
9. The Johns Hopkins University
   Baltimore, Maryland —HL-064360
10. University of Pittsburgh
    Pittsburgh, Pennsylvania —HL-077813

# NHLBI Research Centers (P50, U54, P30) Programs

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

The NHLBI initiated the Specialized Centers of Research (SCOR) program in 1971 to encourage translational research—converting basic science findings to the clinic—in high priority areas. The SCOR concept emphasizes multidisciplinary research (i.e., basic science and clinical investigations) on diseases relevant to the Institute's mission. In 2002, the NHLBI revised the SCOR program—primarily on recommendation from the NHLBAC—to place more emphasis on clinical research projects. The newly developed SCCOR program still requires clinical and basic scientists to work together on a unified theme, but now requires at least 50 percent of the projects to be clinical. Listed below is the funding history for the individual SCORs/SCCORs supported by the Institute.

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

## Heart and Vascular Diseases Program

### Ischemic Heart Disease in Blacks

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

**Obligations**

Fiscal Year 2004—$3,083,183

**Current Active Organizations and Grant Numbers**

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

### Ischemic Heart Disease, Sudden Cardiac Death, Heart Failure

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

**Obligations**

Fiscal Year 2004—$14,473,066

**Current Active Organizations and Grant Numbers**

1. The Johns Hopkins University
   Baltimore, Maryland —HL-052307
2. University of Cincinnati
   Cincinnati, Ohio —HL-052318
3. University of California, Los Angeles
   Los Angeles, California —HL-052319
4. Brigham and Women's Hospital
   Boston, Massachusetts —HL-052320
5. University of Utah
   Salt Lake City, Utah —HL-052338
6. University of California, San Diego
   La Jolla, California —HL-053773
7. Baylor College of Medicine
   Houston, Texas —HL-054313
8. New England Medical Center
   Boston, Massachusetts —HL-063494
9. Harvard University
   Boston, Massachusetts —HL-063609

### Molecular Genetics of Hypertension

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

**Obligations**

Fiscal Year 2004—$9,972,655

**Current Active Organizations and Grant Numbers**

1. Medical College of Wisconsin
   Milwaukee, Wisconsin —HL-054998
2. Brigham and Women's Hospital
   Boston, Massachusetts —HL-055000
3. Boston University Medical Center
   Boston, Massachusetts —HL-055001
4. University of Iowa Hospitals
   Iowa City, Iowa —HL-055006
5. Yale University School of Medicine
   New Haven, Connecticut —HL-055007

### Molecular Medicine and Atherosclerosis

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

**Obligations**

Fiscal Year 2004—$8,382,971

**Current Active Organizations and Grant Numbers**

1. Columbia University
   New York, New York —HL-056984
2. Brigham and Women's Hospital
   Boston, Massachusetts —HL-056985
3. University of California, San Diego
   La Jolla, California —HL-056989
4. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-070128

### Pediatric Heart Development and Disease

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

**Obligations**

Fiscal Year 2004—$13,244,817

**Current Active Organizations and Grant Numbers**

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

## Lung Diseases Program

### Airway Biology and Pathogenesis of Cystic Fibrosis

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

**Obligations**

Fiscal Year 2004—$3,512,149

**Current Active Organizations and Grant Numbers**

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

### Cellular and Molecular Mechanisms of Asthma

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

**Obligations**

Fiscal Year 2004—$15,649,934

**Current Active Organizations and Grant Numbers**

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

### Pathobiology of Fibrotic Lung Disease

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

**Obligations**

Fiscal Year 2004—$5,295,879

**Current Active Organizations and Grant Numbers**

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

### Pathobiology of Lung Development

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

**Obligations**

Fiscal Year 2004—$7,403,692

**Current Active Organizations and Grant Numbers**

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

### Translational Research in Acute Lung Injury

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

#### Obligations

Fiscal Year 2004—$11,824,005

#### Current Active Organizations and Grant Numbers

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

## Blood Diseases and Resources Program

### Hematopoietic Stem Cell Biology

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

#### Obligations

Fiscal Year 2004—$5,741,924

#### Current Active Organizations and Grant Numbers

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

### Hemostatic and Thrombotic Disorders

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

#### Obligations

Fiscal Year 2004—$7,392,619

#### Current Active Organizations and Grant Numbers

1. Mt. Sinai School of Medicine
   New York, New York —HL-054469
2. University of Pennsylvania
   Philadelphia, Pennsylvania —HL-054500
3. University of Oklahoma
   Oklahoma City, Oklahoma —HL-054502
4. Baylor College of Medicine
   Houston, Texas —HL-065967

### Transfusion Biology and Medicine

The purpose of this SCOR is to foster new approaches for improving the availability, efficacy, safety, and quality of blood and blood products for therapeutic uses. One of the centers has a large minority population.

#### Obligations

Fiscal Year 2004—$3,255,812

#### Current Active Organizations and Grant Numbers

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

## National Center on Sleep Disorders Research

### Neurobiology of Sleep and Sleep Apnea

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

#### Obligations

Fiscal Year 2004—$6,071,676

#### Current Active Organizations and Grant Numbers

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

## Comprehensive Sickle Cell Centers (U54) Program

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

### Obligations

Fiscal Year 2004—$21,010,342

### Current Active Organizations and Grant Numbers

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

## Centers for AIDS Research (P30) Program

The NHLBI, along with five other NIH Institutes, contributes to the support of six Centers for AIDS Research that were established to provide a multidisciplinary environment that promotes basic, clinical, behavioral, and translational research activities in the prevention, detection, and treatment of HIV infection and AIDS. Almost half of the patient population comes from minority groups.

### Obligations

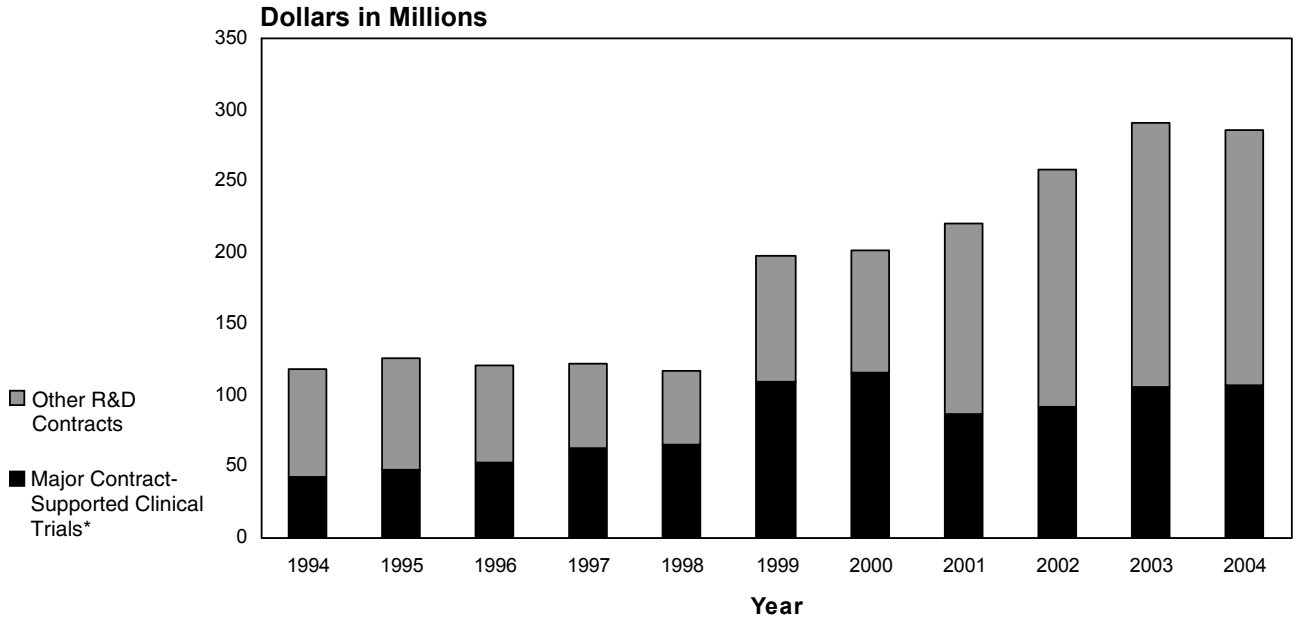
Fiscal Year 2004—$2,645,483

### Current Active Organizations and Grant Numbers

1. New York University
   School of Medicine
   New York, New York —AI-27742
2. University of Washington
   Seattle, Washington —AI-27757
3. University of California, San Francisco
   San Francisco, California —AI-27763
4. University of Alabama at Birmingham
   Birmingham, Alabama —AI-27767
5. University of California, Los Angeles
   Los Angeles, California —AI-28697
6. Baylor University
   Houston, Texas —AI-36211
7. University of California, San Diego
   La Jolla, California —AI-36214
8. Case Western Reserve University
   Cleveland, Ohio —AI-36219
9. University of Massachusetts
   Medical School
   Worcester, Massachusetts —AI-42845
10. Miriam Hospital
    Providence, Rhode Island —AI-42853
13. The Johns Hopkins University
    Baltimore, Maryland —AI-42855
12. University of Pennsylvania
    Philadelphia, Pennsylvania —AI-45008
13. Emory University
    Atlanta, Georgia —AI-50409
14. University of North Carolina
    at Chapel Hill
    Chapel Hill, North Carolina —AI-50410
15. Yeshiva University
    New York, New York —AI-51519
16. University of Colorado
    Health Sciences Center
    Denver, Colorado —AI-54907
17. Vanderbilt University
    Nashville, Tennessee —AI-54999
18. Harvard Medical School
    Boston, Massachusetts —AI-60354

# 10. Research and Development Contracts

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




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

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

**Dollars (Thousands)**

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

A Includes Program Evaluation Assessment of $4,250,000.
B Includes Program Evaluation and IMPAC II Assessments of $8,986,000.
C Includes Program Evaluation and IMPAC II Assessments of $12,589,000.
D Includes Program Evaluation and IMPAC II Assessments of $14,904,000.
E Includes Program Evaluation and IMPAC II Assessments of $17,944,000.
F Includes Program Evaluation and IMPAC II Assessments of $24,579,000.
G Includes Program Evaluation and IMPAC II Assessments of $35,827,000.
H Includes Program Evaluation and IMPAC II Assessments of $54,550,000
I Includes Program Evaluation Assessment of $57,545,722.

## Major NHLBI Research and Development Contracts by Program

| | Total Obligations Prior to FY 2004 | Total FY 2004 Obligations | Total Obligations to Date |
|---|---|---|---|
| **Heart and Vascular Diseases** | | | |
| Atherosclerosis Risk in Communities (ARIC) | $118,463,152 | $162,979 | $118,626,131 |
| Cardiovascular Health Study (CHS) | 72,602,830 | 1,557,410 | 74,160,240 |
| Coronary Artery Risk Development in Young Adults (CARDIA) | 60,197,437 | 10,373,960 | 70,571,397 |
| DNA Resequencing and Genotyping | — | 4,000,000 | 4,000,000 |
| Framingham Study | 56,148,221 | 6,018,417 | 62,166,638 |
| Jackson Heart Study (JHS) | 14,291,000 | 378,854 | 14,669,854 |
| Mammalian Genotyping Service (MGS) | 21,519,750 | 3,600,000 | 25,119,750 |
| Multi-Ethnic Study of Atherosclerosis (MESA) | 48,741,999 | 5,528,000 | 54,269,999 |
| Pediatric Circulatory Support | — | 4,808,544 | 4,808,544 |
| Proteomics Initiative | 72,997,890 | — | 72,997,890 |
| Translational Behavioral Science Research Consortium | 10,000,000 | 4,312,876 | 14,312,876 |
| **Lung Diseases** | | | |
| Lung Tissue Research Consortium | — | 3,999,995 | 3,999,995 |
| Tuberculosis Curriculum Coordinating Center | 2,700,000 | 300,000 | 3,000,000 |
| **Blood Diseases and Resources** | | | |
| Hemochromatosis and Iron Overload Screening Study (HEIRS) | 23,932,652 | 2,046,635 | 25,979,287 |
| Maintenance of NHLBI Biological Specimen Repository | 5,603,820 | — | 5,603,820 |
| Refinement of New Assays for Direct Detection of Viral Nucleic Acids in Donated Organs | 11,221,950 | 4,300,029 | 15,521,979 |
| Retrovirus Epidemiology Donor Study (REDS) | 68,774,125 | 5,000,000 | 73,774,125 |
| Somatic Cell Therapy Processing Facilities | 4,095,764 | 5,638,502 | 9,734,266 |

## Heart and Vascular Diseases Program

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

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

#### Obligations

Funding History:
Fiscal Year 2004—$162,979
Fiscal Years 1985–2003—$118,463,152
Total Funding to Date—$118,626,131

#### Current Active Organizations and Contract Numbers

1. University of North Carolina at Chapel Hill
   Chapel Hill, North Carolina —HC-55015
2. Baylor College of Medicine
   Houston, Texas —HC-55016
3. University of North Carolina at Chapel Hill
   Chapel Hill, North Carolina —HC-55018
4. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HC-55019
5. The Johns Hopkins University
   Baltimore, Maryland —HC-55020
6. Mississippi Medical Center
   Jackson, Mississippi —HC-55021
7. University of Texas Health Science Center
   Houston, Texas —HC-55022

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

The CHS is a population-based, longitudinal study of risk factors for the development and progression of CHD

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

**Obligations**

Funding History:
Fiscal Year 2004—$1,557,410
Fiscal Years 1988–2003—$72,602,830
Total Funding to Date—$74,160,240

**Current Active Organizations and Contract Numbers**

1. The Johns Hopkins University
Baltimore, Maryland —HC-15103
2. University of Wisconsin
Madison, Wisconsin —HC-75150
3. University of Washington
Seattle, Washington —HC-85079
4. Wake Forest University
Winston-Salem, North Carolina —HC-85080
5. The Johns Hopkins University
Baltimore, Maryland —HC-85081
6. University of Pittsburgh
Pittsburgh, Pennsylvania —HC-85082
7. University of California, Davis
Davis, California —HC-85083
8. University of Vermont
Burlington, Vermont —HC-85086

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

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

**Obligations**

Funding History:
Fiscal Year 2004—$10,373,960
Fiscal Years 1984–2003—$60,197,437
Total Funding to Date—$70,571,397

**Current Active Organizations and Contract Numbers**

1. Harbor-UCLA Research and
Education Institute
Torrance, California —HC-05187
2. University of California at Irvine
Irvine, California —HC-45134
3. New England Medical Center Hospitals, Inc.
Boston, Massachusetts —HC-45204
4. Wake Forest University Health Sciences
Winston-Salem, North Carolina —HC-45205
5. University of Alabama at Birmingham
Birmingham, Alabama —HC-48047
6. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HC-48048
7. Northwestern University
Chicago, Illinois —HC-48049
8. Kaiser Permanente Division of Research
Oakland, California —HC-48050
9. University of Alabama at Birmingham
Birmingham, Alabama —HC-95095

## DNA Resequencing and Genotyping, Initiated in Fiscal Year 2004

The purpose of this program is to obtain rapid, reliable, and cost-efficient DNA sequencing and genotyping of candidate genomic regions potentially important in the disease pathways of heart, lung, and blood diseases and sleep disorders. This information will assist ongoing investigations of genetic components involved in the causes, variable outcome, and progression of the diseases and disorders.

**Obligations**

Funding History:
Fiscal Year 2004—$4,000,000
Total Funding to Date—$4,000,000

**Current Active Organizations and Contract Numbers**

1. Constella Group, Inc.
Bethesda, Maryland —HV-48193
2. University of Washington
Seattle, Washington —HV-48194

3. The Johns Hopkins University
   Baltimore, Maryland —HV-48195
4. Center for the Advancement of Genetics, Inc.
   Rockville, Maryland —HV-48196

## Framingham Study

The orginal Framingham Study was designed as a longitudinal investigation of constitutional and environmental factors influencing the development of CVD in individuals free of these conditions at the outset. Of the original 5,209 subjects, about 500 members remain alive. In 1971, the Framingham Offspring Study was initiated to assess familial and genetic factors associated with CHD. More than 5,000 offspring (and their spouses) were included. A third-generation cohort consisting of 3,500 grandchildren has been added to permit examination of numerous hypotheses about the familial clustering of CVD and CVD risk factors. Additional goals include identifying new risk factors for cardiovascular, lung, and blood diseases and developing new imaging tests that can detect very early stages of coronary atherosclerosis in otherwise healthy adults.

### Obligations

Funding History:
Fiscal Year 2004—$6,018,417
Fiscal Years 1983–2003—$56,148,221
Total Funding to Date—$62,166,638

### Current Active Organizations and Contract Numbers

1. Boston University Medical Center
   Boston, Massachusetts —HC-25195
2. Boston University Medical Center
   Boston, Massachusetts —HC-38038

## Jackson Heart Study (JHS), Initiated in Fiscal Year 1998

The JHS is a single-site epidemiologic study of CVD in blacks, similar to established studies in Framingham, Massachusetts, and Honolulu, Hawaii, with primary goals of identifying risk factors for development and progression of CVD; enhancing recruitment, cohort retention, and scientific productivity of the existing Jackson site of the ARIC study; building research capabilities at minority institutions; developing partnerships between minority and majority institutions; and expanding minority investigator participation in large-scale epidemiologic studies.

### Obligations

Funding History:
Fiscal Year 2004—$378,854*
Fiscal Years 1998–2003—$14,291,000
Total Funding to Date—$14,669,854

### Current Active Organizations and Contract Numbers

1. Jackson State University
   Jackson, Mississippi —HC-95170
2. Mississippi Medical Center
   Jackson, Mississippi —HC-95171
3. Tougaloo College
   Tougaloo, Mississippi —HC-95172

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

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

### Obligations

Funding History:
Fiscal Year 2004—$3,600,000
Fiscal Years 1994–2003—$21,519,750
Total Funding to Date—$25,119,750

### Current Active Organization and Contract Number

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

## Multi-Ethnic Study of Atherosclerosis (MESA), Initiated in Fiscal Year 1999

The purpose of this study is to investigate the prevalence, correlates, and progression of subclinical CVD, i.e., disease detected noninvasively before it has produced clinical signs and symptoms, in a population that is 38 percent white, 28 percent black, 22 percent Hispanic, and 12 percent Asian.

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

**Obligations**

Funding History:
Fiscal Year 2004—$5,528,000
Fiscal Years 1999–2003—$48,741,999
Total Funding to Date—$54,269,999

**Current Active Organizations and Contract Numbers**

1. University of Washington
Seattle, Washington —HC-95159
2. University of California, Los Angeles
Los Angeles, California —HC-95160
3. Columbia University
New York, New York —HC-95161
4. The Johns Hopkins University
Baltimore, Maryland —HC-95162
5. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HC-95163
6. Northwestern University
Chicago, Illinois —HC-95164
7. Wake Forest University
Winston-Salem, North Carolina —HC-95165
8. University of Vermont
Colchester, Vermont —HC-95166
9. New England Medical Center
Boston, Massachusetts —HC-95167
10. The Johns Hopkins University
Baltimore, Maryland —HC-95168
11. Harbor-UCLA Research and Education Institute
Los Angeles, California —HC-95169

## Pediatric Circulatory Support, Initiated in Fiscal Year 2004

The purpose of this program is to establish multidisciplinary teams to develop innovative circulatory assist devices or other bioengineered systems for infants and children with congenital and acquired CVD who experience cardiopulmonary failure and circulatory collapse.

**Obligations**

Funding History:
Fiscal Year 2004—$4,808,544
Total Funding to Date—$4,808,544

**Current Active Organizations and Contract Numbers**

1. Cleveland Clinic Lerner College of Medicine
Cleveland, Ohio —HV-48188
2. Ension, Inc.
Pittsburgh, Pennsylvania —HV-48189
3. Jarvik Heart, Inc.
New York, New York —HV-48190
4. Pennsylvania State University
Hershey, Pennsylvania —HV-48191
5. University of Pittsburgh
Pittsburgh, Pennsylvania —HV-48192

## Proteomics Initiative, Initiated in Fiscal Year 2002

The purpose of this program is to establish highly interactive, multidisciplinary centers to enhance and develop innovative proteomic technologies directed to relevant biologic questions associated with heart, lung, blood, and sleep health and disease. Scientists will focus on the cells' protein machinery directed toward understanding the molecular basis of the causes and progression of heart, lung, blood, and sleep disorders and identifying targets for therapeutic interventions.

**Obligations**

Funding History:
Fiscal Year 2004—$0
Fiscal Year 2002–2003—$72,997,890
Total Funding to Date—$72,997,890

**Current Active Organizations and Contract Numbers**

1. Boston University
Boston, Massachusetts —HV-28178
2. Institute for Systems Biology
Seattle, Washington —HV-28179
3. The Johns Hopkins University
Baltimore, Maryland —HV-28180
4. Medical University of South Carolina
Charleston, South Carolina —HV-28181
5. Medical College of Wisconsin
Milwaukee, Wisconsin —HV-28182
6. Stanford University
Stanford, California —HV-28183
7. University of Texas
Galveston, Texas —HV-28184
8. University of Texas Southwestern Medical Center
Dallas, Texas —HV-28185
9. Yale University
New Haven, Connecticut —HV-28186
10. Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc.
Rockville, Maryland —HV-28187

## Translational Behavioral Science Research Consortium, Initiated in Fiscal Year 2002

The purpose of this program is to establish a consortium of interdisciplinary basic and applied social scien-

tists to conduct research related to developing and testing theories from the behavioral or social sciences concerning cognitive, affective, motivational, developmental, and other factors and processes underlying human behavior. Acquired knowledge will be used to develop and test methods to encourage individuals to adopt and maintain a healthy lifestyle and manage behavioral risk factors for heart, lung, and blood diseases and sleep disorders.

**Obligations**

Funding History:
Fiscal Year 2004—$4,312,876
Fiscal Year 2002–2003—$10,000,000
Total Funding to Date—$14,312,876

**Current Active Organizations and Contract Numbers**

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

## Lung Diseases Program

### Lung Tissue Resource Consortium, Initiated in Fiscal Year 2004

The purpose of this program is to establish a resource consortium for collecting lung tissues and preparing and distributing them for research. Scientists seek to improve management of lung diseases by increasing understanding of the pathogenetic mechanisms of lung diseases through molecular histopathological studies on tissues with and without disease. Primary emphases will be on COPD and idiopathic pulmonary fibrosis.

**Obligations**

Funding History:
Fiscal Year 2004—$3,999,995
Total Funding to Date—$3,999,995

**Current Active Organizations and Contract Numbers**

1. Mayo Clinic College of Medicine
Rochester, New York —HR-46158
2. University of Colorado Health Science Center
Denver, Colorado —HR-46159
3. University of Colorado Health Science Center
Denver, Colorado —HR-46160
4. Mayo Clinic College of Medicine
Rochester, New York —HR-46161
5. University of Michigan
Ann Arbor, Michigan —HR-46162
6. University of Pittsburgh
Pittsburgh, Pennsylvania —HR-46163
7. Clinical Trials and Survey Corporation
Baltimore, Maryland —HR-46164

### Tuberculosis Curriculum Coordinating Center, Initiated in Fiscal Year 2003

The purpose of this program is to establish a consortium of five Tuberculosis Curriculum Centers to strengthen and increase access to the best ongoing educational and training opportunities in TB for medical, nursing, and allied health schools, especially those that provide primary care to communities where TB is endemic and the population is at high risk.

**Obligations**

Funding History:
Fiscal Year 2004—$300,000
Fiscal Year 2003—$2,700,000
Total Funding to Date—$3,000,000

**Current Active Organization and Contract Number**

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

## Blood Diseases and Resources Program

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

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

**Obligations**

Funding History:
Fiscal Year 2004—$2,046,635
Fiscal Years 2000–2003—$23,932,652
Total Funding to Date—$25,979,287

**Current Active Organizations and Contract Numbers**

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

4. Kaiser Foundation Research Institute
   Oakland, California —HC-05189
5. University of California at Irvine
   Irvine, California —HC-05190
6. London Health Science Centre
   Ontario, Canada —HC-05191
7. Wake Forest University
   Winston-Salem, North Carolina —HC-05192

## Maintenance of NHLBI Biological Specimen Repository, Initiated in Fiscal Year 1998

The purpose of this project is to establish an NHLBI Biological Specimen Repository for blood specimens from Institute-supported research. The Repository monitors storage, labeling, and testing of the specimens, as well as administers safe shipment of precise sample aliquots to approved investigators for future studies.

### Obligations

Funding History:
Fiscal Year 2004—$0
Fiscal Years 1998–2003—$5,603,820
Total Funding to Date—$5,603,820

### Current Active Organization and Contract Number

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

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

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

### Obligations

Funding History:
Fiscal Year 2004—$4,300,029
Fiscal Years 2000–2003—$11,221,950
Total Funding to Date—$15,521,979

### Current Active Organization and Contract Number

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

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

This program was established to determine the prevalence of retrovirus positivity in blood donors, a majority of whom are minority. Researchers are evaluating the demographic, risk factor, and behavioral characteristics of blood donors with high risks who continue to donate. A blood specimen repository also is being established as a mechanism for evaluating new tests for known viruses and as a sentinel for as-yet-unrecognized viruses.

### Obligations

Funding History:
Fiscal Year 2004—$5,000,000
Fiscal Years 1989–2003—$68,774,125
Total Funding to Date—$73,774,125

### Current Active Organizations and Contract Numbers

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

## Somatic Cell Therapy Processing Facilities, Initiated in Fiscal Year 2003

This program is designed to develop novel somatic cellular therapies in areas ranging from basic science through animal studies to proof-of-principle and eventually human trials for heart, lung, and blood diseases and sleep disorders. The goal is to provide rapid, safe translation of basic research ideas into clinical practice.

### Obligations

Funding History:
Fiscal Year 2004—$5,638,502
Fiscal Year 2003—$4,095,764
Total Funding to Date—$9,734,266

### Current Active Organizations and Contract Numbers

1. Baylor College of Medicine
   Houston, Texas —HB-37163
2. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HB-37164
3. University of Pittsburgh
   Pittsburgh, Pennsylvania —HB-37165

# 11. Clinical Trials

A clinical trial is defined as a scientific research study undertaken with human subjects to evaluate prospectively the diagnostic, prophylactic, or therapeutic effect of a drug, device, regimen, or procedure used or intended ultimately for use in the practice of medicine or the prevention of disease. A clinical trial is planned and conducted prospectively and includes a concurrent control group or other appropriate comparison group.

## NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 1994–2004

**Research Grants and Cooperative Agreements (Dollars in Thousands)**

| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
| **Heart and Vascular Diseases** | | | | | | | | | | | |
| Program on Surgical Control of Hyperlipidemias (POSCH) | $ 500 | $ 538 | $ 566 | $ 294 | $ — | $ — | $ — | $ — | $ — | $ — | $ — |
| Emory Angioplasty Versus Surgery Trial (EAST) | 288 | 296 | 296 | — | — | — | — | — | — | — | — |
| Asymptomatic Carotid Artery Plaque Study (ACAPS) | — | 66 | 70 | — | — | — | — | — | — | — | — |
| Infant Heart Surgery: Central Nervous System Sequelae of Circulatory Arrest | 516 | 598 | 699 | 685 | 582 | 584 | 392 | 75 | — | — | — |
| Prevention of Early Readmission in Elderly Congestive Heart Failure Patients | 77 | — | — | — | — | — | — | — | — | — | — |
| MRFIT Follow-up and Analysis | 418 | — | — | — | — | — | — | — | — | — | — |
| Multicenter Unsustained Tachycardia Trial* | 2,095 | 1,958 | 504 | — | — | — | — | — | — | — | — |
| Trial of Aspirin and Vitamin E in Nurses | 1,488 | 1,426 | 1,434 | 1,473 | 1,536 | 1,530 | 1,594 | — | — | — | — |
| Diet and Exercise for Elevated Risk (DEER) | 703 | — | — | — | — | — | — | — | — | — | — |
| Cardiovascular Risk Factors and the Menopause | 601 | 451 | 478 | 494 | 528 | 186 | — | — | — | — | — |
| Sodium Sensitivity in African Americans | 97 | 249 | — | — | — | — | — | — | — | — | — |
| Montreal Heart Attack Readjustment Trial (M-HART) | 340 | — | — | — | — | — | — | — | — | — | — |
| Stress Reduction in Elderly Blacks With Hypertension | 338 | 321 | — | — | — | — | — | — | — | — | — |
| Trial of Nonpharmacologic Intervention in the Elderly (TONE) | 796 | 729 | — | — | — | — | — | — | — | — | — |
| CABG Patch Trial* | 3,117 | 1,344 | 988 | 1,171 | — | — | — | — | — | — | — |
| Women's Antioxidant and Cardiovascular Study (WACS) | 612 | 620 | 643 | 501 | 525 | 540 | 556 | 572 | 598 | 592 | 599 |
| Oral Calcium in Pregnant Women With Hypertension | 290 | 306 | 320 | 332 | — | — | — | — | — | — | — |
| Stress Reduction and Atherosclerotic CVD in Blacks | 219 | 330 | 403 | 407 | 40 | 326 | 339 | 360 | 376 | 394 | — |
| Enalapril After Anthracycline Cardiotoxicity | 587 | 647 | 707 | 724 | 789 | — | — | — | — | — | — |
| Stress and Anger Management for Blacks With Hypertension | 221 | 232 | 241 | 250 | — | — | — | — | — | — | — |
| Estrogen Replacement and Atherosclerosis (ERA) Trial* | 1,123 | 260 | 1,213 | 965 | 1,668 | 1,017 | — | — | — | — | — |
| Shock Trial: Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock? | 1,070 | 1,022 | 1,008 | 826 | 874 | — | 440 | 362 | 298 | 291 | 296 |
| HDL-Atherosclerosis Treatment Study | 484 | 480 | 427 | 445 | 340 | — | 326 | — | — | — | — |
| Influence of Cardiopulmonary Bypass (CPB) Temperature on CABG Morbidity | 118 | 107 | 118 | — | — | — | — | — | — | — | — |
| Women's Estrogen/Progestin Lipid Lowering Hormone Atherosclerosis Regression Trial (WELL-HART)* | — | 798 | 508 | 1,196 | 1,269 | 1,131 | — | 32 | — | — | — |

* Paid by U01/U10.

# NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 1993–2003 (continued)

**Research Grants and Cooperative Agreements (Dollars in Thousands)**

| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| **Heart and Vascular Diseases (continued)** | | | | | | | | | | | |
| Mode Selection Trial in Sinus Node Dysfunction (MOST)* | — | 2,163 | 1,857 | 2,096 | 1,700 | 2,879 | 1,136 | 154 | — | — | — |
| Antioxidants and Prevention of Early Atherosclerosis* | — | 793 | 240 | 603 | — | — | — | — | — | — | — |
| Postmenopausal Hormone Therapy In Unstable Angina | — | 253 | 258 | 264 | 271 | 276 | — | — | — | — | — |
| Estrogen and Graft Atherosclerosis Research Trial (EAGER)* | — | — | 476 | 488 | 305 | — | 361 | 371 | — | — | — |
| Soy Estrogen Alternative Study (SEA) | — | — | 219 | 217 | 221 | — | — | — | — | — | — |
| REMATCH Trial* | — | — | — | 1,258 | 1,798 | 1,333 | 825 | 750 | — | — | — |
| Dietary Patterns, Sodium Intake, and Blood Pressure (DASH Sodium)*† | — | — | — | 2,233 | 3,693 | 3,646 | 1,247 | 151 | 387 | 376 | 395 |
| Sudden Cardiac Death in Heart Failure Trial (SCD-HeFT)* | — | — | — | 1,571 | 1,667 | 1,709 | 1,698 | 1,798 | 1,412 | 1,930 | — |
| CVD Risk and Health in Post-Menopausal Phytoestrogen Users | — | — | — | 631 | 662 | 574 | 244 | — | 304 | 152 | — |
| 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 | 1,137 | — |
| Antiarrhythmic Effects of N-3 Fatty Acids | — | — | — | — | — | 514 | 542 | 529 | 647 | — | — |
| Fatty Acid Antiarrhythmia Trial (FAAT) | — | — | — | — | — | 519 | 605 | — | — | — | — |
| Occluded Artery Trial (OAT)* | — | — | — | — | — | 4,892 | 5,079 | 2,604 | 1,724 | 1,963 | — |
| Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics (BARI 2D)* | — | — | — | — | — | — | 3,942 | 6,515 | 9,342 | 8,189 | 8,265 |
| Hematocrit Strategy in Infant Heart Surgery* | — | — | — | — | — | — | 473 | 557 | 596 | 590 | 492 |
| Angiotensin-II Blockade in Mitral Regurgitation | — | — | — | — | — | — | — | 553 | 610 | 629 | 500 |
| Heart Failure Adherence and Retention Trial (HART) | — | — | — | — | — | — | — | 795 | 1,617 | 1,453 | 1,174 |
| Reduction of Triglycerides in Women on HRT | — | — | — | — | — | — | — | 708 | 746 | 555 | 544 |
| Women's Ischemia Syndrome Evaluation (WISE)*† | — | — | — | — | — | — | — | 1,502 | 1,506 | 1,306 | 1,303 |
| ACE Inhibition and Novel Cardiovascular Risk Factors | — | — | — | — | — | — | — | — | 694 | 656 | 602 |
| A CHF Trial Investigating Outcomes of Exercise (Action)* | — | — | — | — | — | — | — | — | 7,471 | 9,582 | 7,973 |
| Clinical Trial of Dietary Protein on Blood Pressure* | — | — | — | — | — | — | — | — | 655 | 610 | 612 |
| Home Automatic External Defibrillator Trial (HAT)* | — | — | — | — | — | — | — | — | 3,567 | 5,433 | 4,264 |
| Perioperative Interventional Neuroprotection Trial (POINT) | — | — | — | — | — | — | — | — | 553 | 553 | 562 |
| Stop Atherosclerosis in Native Diabetics Study (SANDS)* | — | — | — | — | — | — | — | — | 2,410 | 2,165 | 2,107 |
| Surgical Treatment for Ischemic Heart Failure (STICH)* | — | — | — | — | — | — | — | — | 5,709 | 4,495 | 1,613 |
| Girls Health Enrichment Multisite Studies (GEMS) | — | — | — | — | — | — | — | — | — | 2,461 | 2,400 |
| Treatment of Depression Following Bypass Surgery | — | — | — | — | — | — | — | — | — | 964 | 1,132 |

* Paid by U01/U10

† Previously an Institute-Initiated Clinical Trial.

# NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 1994–2004 (continued)

**Research Grants and Cooperative Agreements (Dollars in Thousands)**

| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| **Heart and Vascular Diseases (continued)** | | | | | | | | | | | |
| Weight Loss Maintenance (WLM)* | — | — | — | — | — | — | — | — | — | 3,687 | 4,368 |
| Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL)* | — | — | — | — | — | — | — | — | — | — | 4,343 |
| FREEDOM Trial: Future Revascularization Evaluation in Patients with Diabetes Mellitus: Optional Management of Multivessel Disease | — | — | — | — | — | — | — | — | — | — | 3,663 |
| IMMEDIATE Trial: Immediate Myocardial Metabolic Enhancement During Initial Assessment and Treatment in Emergency Care* | — | — | — | — | — | — | — | — | — | — | 5,170 |
| Subtotal, Heart and Vascular Diseases | 16,098 | 15,987 | 13,673 | 19,483 | 23,265 | 29,111 | 26,578 | 22,996 | 45,253 | 50,163 | 52,377 |
| **Lung Diseases** | | | | | | | | | | | |
| Emphysema: Physiologic Effects of Nutritional Support | 155 | — | — | — | — | — | — | — | — | — | — |
| Cardiopulmonary Effects of Ibuprofen in Human Sepsis* | 683 | — | — | — | — | — | — | — | — | — | — |
| Inhaled Beclomethasone to Prevent Chronic Lung Disease* | 690 | 738 | 551 | 436 | — | — | — | — | — | — | — |
| Lung Health Study II*† | 3,307 | 4,434 | 3,183 | 3,508 | 980 | — | — | — | — | — | — |
| Lung Health Study III*† | — | — | — | — | 1,997 | 1,986 | 1,616 | 1,672 | 927 | — | — |
| Asthma Clinical Research Network (ACRN)*† | — | — | — | — | 4,934 | 5,399 | 5,686 | 5,705 | 5,863 | — | 8,424 |
| Fetal Tracheal Occlusion for Severe Diaphragmatic Hernia* | — | — | — | — | — | 419 | 429 | 181 | — | — | — |
| Scleroderma Lung Study* | — | — | — | — | — | 1,040 | 1,501 | 1,761 | 1,501 | 1,055 | — |
| Inhaled Nitric Oxide for Prevention of Chronic Lung Disease* | — | — | — | — | — | — | 1,959 | 1,803 | 1,764 | 1,442 | 1,245 |
| Inhaled Nitric Oxide in Prevention of Chronic Lung Disease* | — | — | — | — | — | — | 1,548 | 1,742 | 1,839 | 1,604 | 903 |
| Prospective Investigation of Pulmonary Embolism Diagnosis II (PIOPED II)* | — | — | — | — | — | — | 2,190 | 3,667 | 3,388 | 472 | — |
| Randomized Trial to Reduce ETS in Children With Asthma | — | — | — | — | — | — | 555 | 545 | 468 | 277 | — |
| Apnea Positive Pressure Long-Term Efficacy Study (APPLES)* | — | — | — | — | — | — | — | — | 3,224 | 3,021 | 3,110 |
| Childhood Asthma Management Program–Continuation Study (CAMP–CS)/Phase 2*† | — | — | — | — | — | — | — | — | — | 1,489 | 2,043 |
| Clinical Trial of Acid Reflux Therapy in Asthma* | — | — | — | — | — | — | — | — | — | 736 | 783 |
| Impact of CPAP on Functional Outcomes in Milder Obstructive Sleep Apnea (CATNAP) | — | — | — | — | — | — | — | — | — | 682 | 612 |
| Outcomes of Sleep Disorders in Older Men | — | — | — | — | — | — | — | — | — | 4,163 | 4,262 |
| Supplemental Selenium and Vitamin E and Pulmonary Function | — | — | — | — | — | — | — | — | — | 698 | 610 |
| Early Antipseudomonal Therapy in Cystic Fibrosis* | — | — | — | — | — | — | — | — | — | — | 1,064 |
| Improving Asthma Care in Minority Children in Head Start | — | — | — | — | — | — | — | — | — | — | 721 |
| Subtotal, Lung Diseases | 4,835 | 5,172 | 3,734 | 3,944 | 7,911 | 8,844 | 15,484 | 17,076 | 18,974 | 15,639 | 23,777 |

* Paid by U01/U10

† Previously an Institute-Initiated Clinical Trial.

## NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 1994–2004 (continued)

**Research Grants and Cooperative Agreements (Dollars in Thousands)**

| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| **Blood Diseases and Resources** | | | | | | | | | | | |
| Multicenter Study of Hydroxyurea in Patients With Sickle Cell Anemia—Phase II* | 3,271 | 1,238 | — | — | — | — | — | — | — | — | — |
| Trial to Reduce Alloimmunization to Platelets (TRAP)—Extension† | 2,510 | 1,246 | 263 | — | — | — | — | — | — | — | — |
| Stroke Prevention in Sickle Cell Anemia (STOP)* | 2,751 | 3,257 | 2,435 | 2,584 | 2,036 | — | 293 | — | — | — | — |
| Pediatric Hydroxyurea in Sickle Cell Anemia (PED HUG) | 146 | 250 | 260 | 270 | — | — | — | — | — | — | — |
| Stroke Prevention in Sickle Cell Anemia (STOP 2)* | — | — | — | — | — | — | 4,200 | 3,166 | 3,168 | 2,320 | 2,366 |
| Induction of Stable Chimerism for Sickle Cell Anemia | — | — | — | — | — | — | — | 489 | 525 | 527 | 551 |
| Sibling Donor Cord Blood Banking and Transplantation | — | — | — | — | — | — | — | 1,222 | 1,224 | 1,286 | 1,353 |
| FOCUS | — | — | — | — | — | — | — | — | — | 1,639 | 1,796 |
| Subtotal, Blood Diseases and Resources | 8,678 | 5,991 | 2,958 | 2,854 | 2,036 | — | 4,493 | 4,877 | 4,917 | 5,772 | 6,066 |
| **Total, NHLBI** | **$29,611** | **$27,150** | **$20,365** | **$26,281** | **$33,212** | **$37,955** | **$46,555** | **$44,949** | **$69,144** | **$71,574** | **82,220** |

* Paid by U01/U10.

† Previously an Institute-Initiated Clinical Trial.

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

| | Total Obligations Prior to FY 2004 | FY 2004 Obligations | Total Obligations to Date |
|---|---|---|---|
| **Heart and Vascular Diseases** | | | |
| A CHF Trial Investigating Outcomes of Exercise (ACTION)* | $ 17,052,481 | $ 7,973,471 | $ 25,025,952 |
| ACE Inhibition and Novel Cardiovascular Risk Factors | 1,349,463 | 602,458 | 1,951,921 |
| Angiotensin-II Blockade in Mitral Regurgitation | 1,793,146 | 499,427 | 2,292,573 |
| Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics (BARI 2D)* | 27,988,936 | 8,265,037 | 36,253,973 |
| Cardiovascular Outcomes in Renal Atherosclerotic Lesions (CORAL)* | — | 4,343,389 | 4,343,389 |
| Clinical Trial of Dietary Protein on Blood Pressure | 1,265,418 | 611,758 | 1,877,176 |
| Dietary Patterns, Sodium Intake, and Blood Pressure (DASH Sodium)* | 11,732,933 | 395,068 | 12,128,001 |
| FREEDOM Trial: Future Revascularization Evaluation in Patients with Diabetes Mellitus: Optimal Management of Multivessel Disease | — | 3,663,095 | 3,663,095 |
| Girls Health Enrichment Multi-Site Studies* | 2,461,487 | 2,399,948 | 4,861,435 |
| Heart Failure Adherence and Retention Trial (HART) | 3,864,646 | 1,173,937 | 5,038,583 |
| Hematocrit Strategy in Infant Heart Surgery* | 2,215,845 | 492,411 | 2,708,256 |
| Home Automatic External Defibrillator Trial (HAT)* | 8,999,887 | 4,263,755 | 13,263,642 |
| IMMEDIATE Trial: Immediate Myocardial Metabolic Enhancement During Initial Assessment and Treatment in Emergency Care* | — | 5,170,411 | 5,170,411 |
| Perioperative Interventional Neuroprotection Trial (POINT) | 1,105,701 | 562,346 | 1,688,047 |
| Reduction of Triglycerides in Women on HRT | 2,010,214 | 544,281 | 2,554,495 |
| Shock Trial: Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock? | 6,189,213 | 295,949 | 6,485,162 |
| Stop Atherosclerosis in Native Diabetics Study (SANDS)* | 4,574,684 | 2,106,653 | 6,681,337 |
| Surgical Treatment for Ischemic Heart Failure (STICH)* | 10,204,028 | 1,613,058 | 11,817,086 |
| Treatment of Depression Following Bypass Surgery | 963,830 | 1,132,182 | 2,096,012 |
| Weight Loss Maintenance (WLM)* | 3,686,738 | 4,367,750 | 8,054,488 |
| Women's Antioxident and Cardiovasular Study (WACS) | 6,344,116 | 598,635 | 6,942,751 |
| Women's Ischemia Syndrome Evaluation (WISE)*† | 4,314,911 | 1,302,449 | 5,617,360 |
| Subtotal, Heart and Vascular Diseases | 129,488,841 | 52,377,468 | 181,866,309 |
| **Lung Diseases** | | | |
| Apnea Positive Pressure Long-Term Efficacy Study (APPLES)* | 6,244,439 | 3,109,570 | 9,354,009 |
| Asthma Clinical Research Network (ACRN)* | 27,584,539 | 8,424,129 | 36,008,668 |
| Childhood Asthma Management Program II (CAMP II)* | 1,489,491 | 2,043,311 | 3,532,802 |
| Clinical Trial of Acid Reflux Therapy in Asthma* | 736,466 | 783,078 | 1,519,544 |
| Early Antipseudomonal Therapy in Cystic Fibrosis* | — | 1,064,237 | 1,064,237 |
| Impact of CPAP on Functional Outcomes in Milder Obstructive Sleep Apnea (CATNAP) | 681,633 | 612,378 | 1,294,011 |
| Improving Asthma Care for Minority Children in Head Start | — | 721,025 | 721,025 |
| Inhaled Nitric Oxide for Prevention of Chronic Lung Disease* | 6,968,259 | 1,245,274 | 8,213,533 |
| Inhaled Nitric Oxide in Prevention of Chronic Lung Disease* | 6,732,859 | 903,335 | 7,636,194 |
| Outcomes of Sleep Disorders in Older Men | 4,162,661 | 4,261,833 | 8,424,494 |
| Supplemental Selenium and Vitamin E and Pulmonary Function | 698,489 | 609,585 | 1,308,074 |
| Subtotal, Lung Diseases | 55,298,836 | 23,777,755 | 79,076,591 |
| **Blood Diseases and Resources** | | | |
| FOCUS* | 1,639,478 | 1,795,724 | 3,435,202 |
| Induction of Stable Chimerism for Sickle Cell Anemia* | 1,541,037 | 550,666 | 2,091,703 |
| Sibling Donor Cord Blood Banking and Transplantation* | 3,731,256 | 1,352,571 | 5,083,827 |
| Stroke Prevention in Sickle Cell Anemia (STOP 2)* | 12,854,790 | 2,366,346 | 15,221,136 |
| Subtotal, Blood Diseases and Resources | 19,766,561 | 6,065,307 | 25,831,868 |
| **Total, NHLBI** | **$204,554,238** | **$82,220,530** | **$286,774,768** |

* Paid by U01/U10

† Previously an Institute-Initiated Clinical Trial.

# Institute-Initiated Clinical Trials: Fiscal Years 1994–2004

## Contracts

**Dollars (Thousands)**

| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| **Heart and Vascular Diseases** | | | | | | | | | | | |
| Lipid Research Clinics | $ 622 | $ 583 | $ 660 | $ 650 | $ 685 | $ — | $ — | $ — | $ — | $ — | $ — |
| Cardiac Arrythmia Suppression Trial (CAST) | 29 | — | — | — | — | — | — | — | — | — | — |
| Effects of Digitalis on Survival in Patients With Congestive Heart Failure | 270 | 2,235 | — | — | — | — | — | — | — | — | — |
| Asymptomatic Cardiac Ischemia Pilot Study (ACIP) | 210 | 7 | — | — | — | — | — | — | — | — | — |
| Psychophysiological Investigations of Myocardial Ischemia (PIMI) | 433 | 165 | — | — | — | — | — | — | — | — | — |
| Arterial Disease Multifactorial Intervention Trial (ADMIT) | 2,341 | 395 | — | — | — | — | — | — | — | — | — |
| Raynaud's Treatment Study | 2,532 | 1,664 | 221 | 19 | — | — | — | — | — | — | — |
| Antiarrhythmic vs. Implantable Defibrillator (AVID) | 1,068 | 5,348 | 2,475 | — | 871 | 548 | — | — | — | — | — |
| Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT) | 10,914 | 3,412 | 9,676 | 15,943 | 17,119 | — | 6,259 | 7,000 | 3,980 | 2,761 | 3,346 |
| Activity Counseling Trial (ACT) | 1,260 | 5,000 | — | 2,167 | 2,439 | — | — | — | — | — | — |
| Postmenopausal Estrogen/Progestin Interventions (PEPI) | 600 | 1,305 | — | 3 | 170 | — | — | — | — | — | — |
| Enhancing Recovery in Coronary Heart Disease Patients (ENRICHD) | — | 1,871 | 6,993 | 6,837 | 5,904 | 3,303 | 3,487 | 596 | 425 | 70 | — |
| Atrial Fibrillation Follow-up: Investigation in Rhythm Management (AFFIRM) | — | 883 | 2,510 | 6,330 | — | 3,785 | 1,239 | 2,401 | 802 | — | — |
| Beta-Blocker Evaluation Survival Trial (BEST) | — | 2,500 | 1,435 | 2,300 | 2,448 | — | — | — | — | — | — |
| Women's Angiographic Vitamin and Estrogen Trial (WAVE) | — | — | 731 | 2,891 | 1,917 | 3,878 | 886 | 756 | — | 32 | — |
| Women's Ischemia Syndrome Evaluation (WISE) | — | — | 1,577 | 133 | 2,932 | 856 | 1,424 | 10 | 50 | — | — |
| Prevention of Events With Angiotensin Converting Enzyme Inhibitor Therapy (PEACE) | — | — | 3,632 | 2,838 | 2,836 | 2,850 | 5,988 | — | 2,849 | 558 | — |
| Magnesium in Coronaries (MAGIC) | — | — | — | — | 1,169 | 2,009 | 1,243 | — | 238 | — | — |
| Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness (ESCAPE) | — | — | — | — | — | 1,750 | 1,820 | — | 1,129 | — | — |
| Action to Control Cardiovascular Risk in Diabetes (ACCORD) | — | — | — | — | — | 4,130 | 6,590 | — | 1,750 | 18,521 | 33,779 |
| Public Access Defibrillation (PAD) Community Trial | — | — | — | — | — | 2,923 | 2,414 | 3,058 | 1,101 | — | — |
| Aldosterone Antagonist for Treatment of Heart Failure | — | — | — | — | — | — | — | — | — | — | 837 |
| Subtotal, Heart and Vascular Diseases | 20,279 | 25,368 | 29,910 | 40,111 | 38,490 | 26,032 | 31,350 | 13,821 | 12,324 | 21,942 | 37,962 |
| **Lung Diseases** | | | | | | | | | | | |
| Lung Health Study I | 3,398 | 650 | 350 | — | — | — | — | — | — | — | — |
| Pediatric Pulmonary and Cardiac Complications of HIV Infection (P2C2) | 10,550 | 2,627 | 4,033 | 668 | 1,979 | — | 315 | — | 113 | — | — |

## Institute-Initiated Clinical Trials: Fiscal Years 1994–2004

### Contracts (continued)

**Dollars (Thousands)**

| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| **Lung Diseases (continued)** | | | | | | | | | | | |
| Childhood Asthma Management Program (CAMP) | 9,745 | 5,096 | 7,977 | 5,695 | — | 6,551 | 729 | 1,330 | 2,786 | 2,287 | 1,475 |
| Acute Respiratory Distress Syndrome Clinical Network (ARDSNET) | 1,800 | 4,170 | 4,337 | 4,510 | 4,880 | 6,837 | 5,587 | 2,667 | 1,502 | 4,402 | 5,517 |
| National Emphysema Treatment Trial (NETT) | — | — | — | 2,710 | 3,367 | 7,545 | 4,047 | 6,989 | 7,910 | 1,630 | 1,648 |
| Feasibility of Retinoid Treatment in Emphysema (FORTE) | — | — | — | — | — | 884 | 7,711 | — | 2,429 | 725 | 507 |
| Subtotal, Lung Diseases | 25,493 | 12,543 | 16,697 | 13,583 | 10,226 | 21,817 | 18,389 | 10,986 | 14,740 | 9,044 | 9,147 |
| **Blood Diseases and Resources** | | | | | | | | | | | |
| Clinical Course of Sickle Cell Disease | 2,390 | 4,375 | 376 | 205 | 2,144 | 350 | 106 | — | — | — | — |
| Penicillin Prophylaxis in Sickle Cell Disease (PROPS II) | 226 | — | — | — | — | — | — | — | — | — | — |
| Anti-HIV Immunoglobulin (HIVIG) in Prevention of Maternal-Fetal HIV Transmission | 3,016 | 1,819 | 706 | — | — | — | — | — | — | — | — |
| T-Cell Depletion in Unrelated Donor Marrow Transplantation | 1,310 | 1,917 | 1,461 | 639 | 2,228 | 690 | 1,085 | 1,144 | 557 | 774 | 164 |
| Viral Activation Transfusion Study (VATS) | — | 5,000 | 5,647 | 2,353 | 1,668 | — | 339 | — | — | — | — |
| Cord Blood Stem Cell Transplantation Study (COBLT) | — | — | 1,419 | 6,573 | 12,530 | 1,456 | 5,122 | 1,846 | 2,166 | 588 | 707 |
| Multicenter Study of Hydroxyurea (MSH) in Sickle Cell Anemia Adult Follow-up | — | — | 703 | 472 | 475 | 469 | — | — | 588 | 994 | 1,136 |
| Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG) | — | — | — | — | — | — | 1,606 | 405 | 3,100 | 1,112 | 1,964 |
| Subtotal, Blood Diseases and Resources | 6,942 | 13,111 | 10,312 | 10,242 | 19,045 | 2,965 | 8,258 | 3,395 | 6,411 | 3,468 | 3,971 |
| **Women's Health Initiative** | | | | | | | | | | | |
| Subtotal, Women's Health Initiative | — | — | — | — | — | 59,100 | 57,700 | 59,200 | 59,010 | 63,222 | 57,483 |
| **Total, NHLBI Clinical Trials Contracts** | **$52,714** | **$51,022** | **$56,919** | **$63,936** | **$67,761** | **$109,914** | **$115,697** | **$87,402** | **$92,485** | **$97,676** | **$108,563** |

## Institute-Initiated Clinical Trials: Fiscal Years 1994–2004 (continued)

### Cooperative Agreements

**Dollars (Thousands)**

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

* Investigator-Initiated from 1998 to 2002.

## Institute-Initiated Clinical Trials: Fiscal Years 1994–2004 (continued)

### Cooperative Agreements (continued)

**Dollars (Thousands)**

| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| **Lung Diseases (continued)** | | | | | | | | | | | |
| Childhood Asthma Research and Education (CARE) Network | — | — | — | — | — | 4,175 | 5,002 | 5,314 | 6,005 | 5,610 | 5,292 |
| COPD Clinical Research Network | — | — | — | — | — | — | — | — | — | 6,843 | 6,848 |
| Subtotal, Lung Diseases | 4,694 | 4,631 | 5,526 | 5,392 | — | 4,175 | 5,002 | 5,314 | 6,005 | 20,634 | 20,564 |
| **Blood Diseases and Resources** | | | | | | | | | | | |
| Thalassemia (Cooley's Anemia) Clinical Research Network | — | — | — | — | — | — | 2,192 | 2,219 | 2,269 | 2,320 | 2,375 |
| Blood and Marrow Transplant Clinical Research Network | — | — | — | — | — | — | — | 5,360 | 5,899 | 5,950 | 5,292 |
| Transfusion Medicine/ Hemostasis Clinical Research Network | — | — | — | — | — | — | — | — | 6,053 | 6,241 | 6,093 |
| Subtotal, Blood Diseases and Resources | — | — | — | — | — | — | 2,192 | 7,579 | 14,221 | 14,511 | 14,440 |
| **Total, NHLBI-Initiated Clinical Trials, Cooperative Agreements** | **$28,248** | **$26,543** | **$23,025** | **$20,263** | **$6,373** | **$12,472** | **$18,926** | **$25,597** | **$35,136** | **$48,815** | **$54,198** |
| **Total, NHLBI-Initiated Clinical Trials** | **$80,962** | **$77,565** | **$79,944** | **$84,199** | **$74,134** | **$122,386** | **$134,623** | **$112,999** | **$127,621** | **$146,491** | **$162,761** |

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

## Contracts

| | Total Obligations Prior to FY 2004 | Total FY 2004 Obligations | Total Obligations to Date |
|---|---|---|---|
| **Heart and Vascular Diseases** | | | |
| Action to Control Cardiovascular Risk in Diabetes (ACCORD) | $ 30,990,133 | $ 33,779,345 | $64,769,478 |
| Aldosterone Antagonists for Treatment of Heart Failure | — | 837,227 | 837,227 |
| Antihypertensive and Lipid-Lowering Treatment To Prevent Heart Attack Trial (ALLHAT) | 79,824,059 | 3,346,000 | 83,170,059 |
| Enhancing Recovery in Coronary Heart Disease Patients (ENRICHD) | 29,486,924 | — | 29,486,924 |
| Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness (ESCAPE) | 4,699,537 | — | 4,699,537 |
| Prevention of Events With Angiotensin Converting Enzyme Inhibitor Therapy (PEACE) | 21,550,000 | — | 21,550,000 |
| Subtotal, Heart and Vascular Diseases | 166,550,653 | 37,962,572 | 204,513,225 |
| **Lung Diseases** | | | |
| Acute Respiratory Distress Syndrome Clinical Network (ARDSNET) | 40,692,155 | 5,516,811 | 46,208,966 |
| Childhood Asthma Management Program (CAMP) | 54,845,605 | 1,475,006 | 56,320,611 |
| Feasibility of Retinoid Treatment in Emphysema (FORTE) | 11,749,283 | 506,758 | 12,256,041 |
| National Emphysema Treatment Trial (NETT) | 34,198,310 | 1,648,000 | 35,846,310 |
| Subtotal, Lung Diseases | 141,485,353 | 9,146,575 | 150,631,928 |
| **Blood Diseases and Resources** | | | |
| Cord Blood Stem Cell Transplantation Study (COBLT) | 31,699,365 | 707,000 | 32,406,365 |
| Multicenter Study of Hydroxyurea (MSH) in Sickle Cell Anemia Adult Follow-up | 3,700,743 | 1,136,093 | 4,836,836 |
| Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG) | 6,223,568 | 1,963,630 | 8,187,198 |
| T-Cell Depletion in Unrelated Donor Marrow Transplantation | 11,804,918 | 163,598 | 11,968,516 |
| Subtotal, Blood Diseases and Resources | 53,428,594 | 3,970,321 | 57,398,915 |
| **Women's Health Initiative** | | | |
| Subtotal, Women's Health Initiative | 615,132,161 | 57,483,316 | 672,615,477 |
| **Total, NHLBI-Initiated Clinical Trials, Contracts** | **$976,596,761** | **$108,562,784** | **$1,085,159,545** |

## Cooperative Agreements

| | Total Obligations Prior to FY 2004 | Total FY 2004 Obligations | Total Obligations to Date |
|---|---|---|---|
| **Heart and Vascular Diseases** | | | |
| Clinical Research Consortium to Improve Resuscitation Outcome | $ — | $ 6,886,109 | $6,886,109 |
| Dynamic Assessment of Patient-Reported Chronic Disease Outcomes | — | 1,009,694 | 1,009,694 |
| Pediatric Cardiovascular Clinical Research Network | 13,650,229 | 4,947,982 | 18,598,211 |
| Trial of Activity for Adolescent Girls (TAAG) | 21,853,035 | 6,349,902 | 28,202,937 |
| Subtotal, Heart and Vascular Diseases | 35,503,264 | 19,193,687 | 54,696,951 |
| **Lung Diseases** | | | |
| Asthma Clinical Research Network | 8,181,429 | 8,424,129 | 16,605,558 |
| Childhood Asthma Research and Education (CARE) Network | 26,106,032 | 5,292,305 | 31,398,337 |
| COPD Clinical Research Network | 6,843,405 | 6,848,345 | 13,691,750 |
| Subtotal, Lung Diseases | 41,130,866 | 20,564,779 | 61,695,645 |
| **Blood Diseases and Resources** | | | |
| Blood and Marrow Transplant Clinical Research Network | 17,209,287 | 5,972,521 | 23,181,808 |
| Thalassemia (Cooley's Anemia) Clinical Research Network | 8,999,883 | 2,374,805 | 11,374,688 |
| Transfusion Medicine/Hemostasis Clinical Research Network | 12,293,630 | 6,092,846 | 18,386,476 |
| Subtotal, Blood Diseases and Resources | 38,502,800 | 14,440,172 | 52,942,972 |
| **Total, NHLBI-Initiated Clinical Trials, Cooperative Agreements** | **$115,136,930** | **$54,198,638** | **$169,335,568** |
| **Total, NHLBI-Initiated Clinical Trials** | **$1,091,733,691** | **$162,761,422** | **$1,254,495,113** |

## Heart and Vascular Diseases Program

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

The purpose of this study is to evaluate three diabetic treatment strategies (intensive glycemic control, blood pressure control, and fibrate treatment to raise HDL-cholesterol and lower triglycerides) to prevent major cardiovascular events in patients with Type 2 diabetes mellitus. The primary outcome measure is CVD mortality or major morbidity (MI and stroke). A vanguard phase of about 1,000 participants was completed in FY 2002, and the main trial proceeded in FY 2003.

**Obligations**

Funding History:
Fiscal Year 2004—$33,779,345
Fiscal Years 1999–2003—$30,990,133
Total Funding to Date—$64,769,478

**Current Active Organizations and Contract Numbers**

1. Veteran Affairs Medical Center, Albuquerque
   Albuquerque, New Mexico —HC-10100
2. Veteran Affairs Medical Center, Memphis
   Memphis, Tennessee —HC-90350
3. Wake Forest University
   Winston-Salem, North Carolina —HC-95178
4. McMaster University
   Hamilton, Ontario —HC-95179
5. University of Washington
   Seattle, Washington —HC-95180
6. Case Western Reserve University
   Cleveland, Ohio —HC-95181
7. Wake Forest University
   Winston-Salem, North Carolina —HC-95182
8. Minneapolis Medical Research Foundation
   Minneapolis, Minnesota —HC-95183
9. Trustees of Columbia University of New York
   New York, New York —HC-95184

### Aldosterone Antagonists for Treatment of Heart Failure, Initiated in Fiscal Year 2004

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

**Obligations**

Funding History:
Fiscal Year 2004—$837,227
Total Funding to Date—$837,227

**Current Active Organization and Contract Number**

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

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

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

In February 2000, the alpha blocker arm of the study was discontinued at the recommendation of the Data Safety Monitoring Committee and an 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 2004—$3,346,000
Fiscal Years 1993–2003—$79,824,059
Total Funding to Date—$83,170,059

**Current Active Organization and Contract Number**

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

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

The purpose of this study is to establish a resuscitation research consortium to conduct research in cardiopulmo-

nary arrest and traumatic injury leading to arrest. The consortium will facilitate the rapid translation of promising scientific and clinical advances to improve resuscitation outcomes.

**Obligations**

Funding History:
Fiscal Year 2004—$6,886,109
Total Funding to Date—$6,886,109

**Current Active Organizations and Grant Numbers:**

1. University of Washington
   Seattle, Washington —HL-077863
2. University of Iowa
   Iowa, City, Iowa —HL-077865
3. Medical College of Wisconsin
   Milwaukee, Wisconsin —HL-077866
4. University of Washington
   Seattle, Washington —HL-077867
5. University of Pittsburgh
   Pittsburgh, Pennsylvania —HL-077871
6. St. Michael's Hospital
   Toronto, Ontario —HL-077872
7. Oregon Health and Science University
   Portland, Oregon —HL-077873
8. University of Alabama at Birmingham
   Birmingham, Alabama —HL-077881
9. Ottawa Health Research Institute
   Ottawa, Ontario —HL-077885
10. University of Texas
    Southwestern Medical Center
    Dallas, Texas —HL-077887
11. University of California, San Diego
    La Jolla, California —HL-077908

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

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

**Obligations**

Funding History:
Fiscal Year 2004—$1,009,694
Total Funding to Date—$1,009,694

**Current Active Organizations and Grant Numbers**

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

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

The objective of this multicenter, randomized clinical trial was to test whether treating symptoms of depression and low social support with cognitive behavior therapy and selective serotonin 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 34 percent minorities. Results showed that the treatment did not lower mortality or the risk of a second heart attack. However, the intervention reduced patients' depression and increased their level of social support.

**Obligations**

Funding History:
Fiscal Year 2004—$0
Fiscal Years 1995–2003—$29,486,924
Total Funding to Date—$29,486,924

**Current Active Organizations and Contract Numbers**

1. University of North Carolina
   at Chapel Hill
   Chapel Hill, North Carolina —HC-55140

2. Duke University
   Durham, North Carolina —HC-55142
3. Washington University
   St. Louis, Missouri —HC-55146

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

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

### Obligations

Funding History:
Fiscal Year 2004—$0
Fiscal Years 1999–2003—$4,699,537
Total Funding to Date—$4,699,537

### Current Active Organization and Contract Number

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

## Pediatric Cardiovascular Clinical Research Network, Initiated in Fiscal Year 2001

The objective of this study is to establish a clinical network to evaluate novel treatment methods and management strategies for children with structural congenital heart disease, inflammatory heart disease, heart muscle disease, or arrhythmias.

### Obligations

Funding History:
Fiscal Year 2004—$4,947,982
Fiscal Years 2001–2003—$13,650,229
Total Funding to Date—$18,598,211

### Current Active Organizations and Grant Numbers

1. Duke University
   Durham, North Carolina —HL-068269
2. New England Research Institute, Inc.
   Watertown, Massachusetts —HL-068270
3. Children's Hospital of Philadelphia
   Philadelphia, Pennsylvania —HL-068279
4. Medical University of South Carolina
   Charleston, South Carolina —HL-068281
5. Children's Hospital
   Boston, Massachusetts —HL-068285
6. Hospital for Sick Children
   Toronto, Ontario —HL-068288
7. Columbia University
   Health Sciences
   New York, New York —HL-068290
8. University of Utah
   Salt Lake City, Utah —HL-068292

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

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

### Obligations

Funding History:
Fiscal Year 2004—$0
Fiscal Years 1996–2003—$21,550,000
Total Funding to Date—$21,550,000

### Current Active Organization and Contract Number

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

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

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

### Obligations

Funding History:
Fiscal Year 2004—$6,349,902
Fiscal Years 2000–2003—$21,853,035
Total Funding to Date—$28,202,937

### Current Active Organizations and Grant Numbers

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

## Lung Diseases Program

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

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

#### Obligations

Funding History:
Fiscal Year 2004—$5,516,811
Fiscal Years 1994–2003—$40,692,155
Total Funding to Date—$46,208,966

#### Current Active Organizations and Contract Numbers

1. Vanderbilt University
   Nashville, Tennessee —HR-46054
2. University of Washington
   Seattle, Washington —HR-46055
3. Duke University Medical Center
   Durham, North Carolina —HR-46056
4. University of Michigan at Ann Arbor
   Ann Arbor, Michigan —HR-46057
5. University of Pennsylvania Hospital
   Philadelphia, Pennsylvania —HR-46058
6. University of California, San Francisco
   San Francisco, California —HR-46059
7. Cleveland Clinic Foundation
   Cleveland, Ohio —HR-46060
8. University of Colorado
   Denver, Colorado —HR-46061
9. Latter Day Saints Hospital
   Salt Lake City, Utah —HR-46062
10. University of Maryland
    Baltimore, Maryland —HR-46063
11. Coordinating Center
    Massachusetts General Hospital
    Boston, Massachusetts —HR-46064
12. Baylor College of Medicine
    Houston, Texas —HR-16146
13. Baystate Medical Center
    Springfield, Massachusetts —HR-16147
14. University of British Columbia
    Vancouver, Canada —HR-16148
15. University of Chicago
    Chicago, Illinois —HR-16149
16. Louisiana State University
    New Orleans, Louisiana —HR-16150
17. University of Pittsburgh
    Pittsburgh, Pennsylvania —HR-16152
18. University of Texas
    San Antonio, Texas —HR-16153
19. University of Virginia
    Charlottesville, Virginia —HR-16154
20. Wake Forest University
    Winston-Salem, North Carolina —HR-16155

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

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

#### Obligations

Funding History:
Fiscal Year 2004—$8,424,129
Fiscal Year 2003—$8,181,429
Total Funding to Date—$16,605,558

#### Current Active Organizations and Grant Numbers

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

6. University of California, San Diego
La Jolla, California —HL-074218
7. Wake Forest University Health Sciences
Winston-Salem, North Carolina —HL-074225
8. Brigham and Women's Hospital
Boston, Massachusetts —HL-074227
9. Pennsylvania State University
Hershey Medical Center
Hershey, Pennsylvania —HL-074231

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

The purpose of this study is to evaluate the long-term effects of anti-inflammatory therapy compared to bronchodilator therapy on the course of asthma, particularly on lung function and bronchial hyperresponsiveness, and on physical and psychosocial growth and development. Results showed that 4 ½ to 6 years of daily treatment with inhaled corticosteroids was safe and provided superior control of asthma compared to a different 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 2004—$1,475,006
Fiscal Years 1991–2003—$54,845,605
Total Funding to Date—$56,320,611

### Current Active Organizations and Contract Numbers

1. The Johns Hopkins University
Baltimore, Maryland —HR-16044
2. University of California, San Diego
La Jolla, California —HR-16045
3. University of New Mexico
Albuquerque, New Mexico —HR-16046
4. Hospital for Sick Children
Toronto, Ontario —HR-16047
5. National Jewish Medical
and Research Center
Denver, Colorado —HR-16048
6. Brigham and Women's Hospital
Boston, Massachusetts —HR-16049
7. Asthma, Inc.
Seattle, Washington —HR-16050
8. Washington University
St. Louis, Missouri —HR-16051
9. The Johns Hopkins University
Baltimore, Maryland —HR-16052

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

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

### Obligations

Funding History:
Fiscal Year 2004—$5,292,305
Fiscal Years 1999–2003—$26,106,032
Total Funding to Date—$31,398,337

### Current Active Organizations and Grant Numbers

1. Washington University
St. Louis, Missouri —HL-064287
2. National Jewish Medical and
Research Center
Denver, Colorado —HL-064288
3. University of California, San Diego
La Jolla, California —HL-064295
4. University of Wisconsin
Madison, Wisconsin —HL-064305
5. University of Arizona
Tucson, Arizona —HL-064307
6. Pennsylvania State University
Hershey, Pennsylvania —HL-064313

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

The purpose of this network is to investigate disease management approaches in patients with moderate-to-severe COPD and to ensure that the findings are rapidly disseminated to the medical community.

### Obligations

Funding History:
Fiscal Year 2004—$6,848,345
Fiscal Year 2003—$6,843,405
Total Funding to Date—$13,691,750

### Current Active Organizations and Grant Numbers

1. Harbor-UCLA Research
and Education Institute
Torrance, California —HL-074407
2. Denver Health and Hospital Authority
Denver, Colorado —HL-074409
3. Minnesota Veterans Research Institute
Minneapolis, Minnesota —HL-074416

4. University of Alabama at Birmingham
Birmingham, Alabama —HL-074418
5. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HL-074424
6. Brigham and Women's Hospital
Boston, Massachusetts —HL-074428
7. University of California, San Francisco
San Francisco, California —HL-074431
8. University of Maryland
Baltimore Professional School
Baltimore, Maryland —HL-074441

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

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

### Obligations

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

### Current Active Organizations and Contract Numbers

1. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HR-96140
2 Boston University
Boston, Massachusetts —HR-96141
3. University of Pittsburgh
Pittsburgh, Pennsylvania —HR-96142
4. University of California, Los Angeles
Los Angeles, California —HR-96143
5. University of California, San Diego
La Jolla, California —HR-96144
6. Columbia University
New York, New York —HR-96145

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

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

### Obligations

Funding History:
Fiscal Year 2004—$1,648,000
Fiscal Years 1997–2003—$34,198,310
Total Funding to Date—$35,846,310

### Current Active Organizations and Contract Numbers

1. Baylor College of Medicine
Houston, Texas —HR-76101
2. Brigham and Women's Hospital
Boston, Massachusetts —HR-76102
3. University of California, San Diego
La Jolla, California —HR-76103
4. Cedars-Sinai Medical Center
Los Angeles, California —HR-76104
5. Cleveland Clinic Foundation
Cleveland, Ohio —HR-76105
6. Columbia University
New York, New York —HR-76106
7. Duke University Medical Center
Durham, North Carolina —HR-76107
8. University of Maryland
Baltimore, Maryland —HR-76108
9. Mayo Foundation
Rochester, Minnesota —HR-76109
10. University of Michigan at Ann Arbor
Ann Arbor, Michigan —HR-76110
11. National Jewish Medical
and Research Center
Denver, Colorado —HR-76111
12. The Ohio State University
Columbus, Ohio —HR-76112
13. University of Pennsylvania
Philadelphia, Pennsylvania —HR-76113
14. University of Pittsburgh
Pittsburgh, Pennsylvania —HR-76114
15. Saint Louis University
St. Louis, Missouri —HR-76115
16. Temple University
Philadelphia, Pennsylvania —HR-76116
17. University of Washington
Seattle, Washington —HR-76118
18. The Johns Hopkins University
Baltimore, Maryland —HR-76119

## Blood Diseases and Resources Program

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

The purpose of this network is to promote the efficient comparison of novel treatment methods and management strategies of potential benefit for children and adults undergoing blood or marrow transplantation.

**Obligations**

Funding History:
Fiscal Year 2004—$5,972,521
Fiscal Years 2001–2003—$17,209,287
Total Funding to Date—$23,181,808

**Current Active Organizations and Grant Numbers**

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

### Cord Blood Stem Cell Transplantation Study (COBLT), Initiated in Fiscal Year 1996

This multicenter study is designed to show whether umbilical cord blood stem cell transplants from unrelated, newborn donors are a safe and efficient alternative to bone marrow transplantation for children and adults with a variety of cancers, blood diseases, and genetic disorders.

**Obligations**

Funding History:
Fiscal Year 2004—$707,000
Fiscal Years 1996–2003—$31,699,365
Total Funding to Date—$32,406,365

**Current Active Organizations and Contract Numbers**

1. The EMMES Corporation
   Potomac, Maryland —HB-67132
2. Dana Farber Cancer Institute
   Boston, Massachusetts —HB-67133
3. Fred Hutchinson Cancer Research Center
   Seattle, Washington —HB-67134
4. University of California, Los Angeles
   Los Angeles, California —HB-67135
5. Indiana University
   Indianapolis, Indiana —HB-67137
6. Duke University Medical Center
   Durham, North Carolina —HB-67138
7. University of Minnesota, Twin Cities
   Minneapolis, Minnesota —HB-67139
8. Duke University Medical Center
   Durham, North Carolina —HB-67141
9. University of California, Los Angeles
   Los Angeles, California —HB-67142

### Multicenter Study of Hydroxyurea (MSH) in Sickle Cell Anemia Adult Follow-up, Initiated in Fiscal Year 1996

The purpose of this trial is to determine the long-term effects of hydroxurea. Patients were examined annually to determine their health status, quality of life, incidence of malignancies, and birth defects in their offspring(s). Mortality rates from this cohort were compared to mortality data from the CSSCD cohort and the normal black population mortality. Results showed that patients who took hydroxyurea over a 9-year period experienced a 40 percent reduction in deaths. Improved survival was related to benefits of drug therapy—an increase in fetal hemoglobin level and reduced episodes of severe pain "crises" and acute chest syndrome.

**Obligations**

Funding History:
Fiscal Year 2004—$1,136,093
Fiscal Years 1996–2003—$3,700,743
Total Funding to Date—$4,836,836

**Current Active Organization and Contract Number**

1. Maryland Medical Research Institute
Baltimore, Maryland —HB-67129

## Pediatric Hydroxyurea Phase III Clinical Trial (BABY HUG), Initiated in Fiscal Year 2000

The objective of this clinical trial is to determine if hydroxyurea therapy is effective in prevention of chronic end organ damage in pediatric patients with sickle cell anemia.

**Obligations**

Funding History:
Fiscal Year 2004—$1,963,630
Fiscal Years 2000–2003—$6,223,568
Total Funding to Date—$8,187,198

**Current Active Organizations and Contract Numbers**

1. Children's Research Institute
Washington, DC —HB-07150
2. Duke University Medical Center
Durham, North Carolina —HB-07151
3. Howard University
Washington, DC —HB-07152
4. The Johns Hopkins University
Baltimore, Maryland —HB-07153
5. Medical University of South Carolina
Charleston, South Carolina —HB-07154
6. St. Jude Children's Research Hospital
Memphis, Tennessee —HB-07155
7. The Research Foundation of SUNY
New York, New York —HB-07156
8. University of Miami
Miami, Florida —HB-07157
9. University of Mississippi Medical Center
Jackson, Mississippi —HB-07158
10. University of Texas
Southwestern Medical Center
Dallas, Texas —HB-07159
11. Clinical Trials and Surveys Corporation
Baltimore, Maryland —HB-07160

## T-Cell Depletion in Unrelated Donor Marrow Transplantation, Initiated in Fiscal Year 1994

The purpose of this randomized multicenter clinical trial is to determine whether a reduction in morbidity and mortality from acute and chronic graft-versus-host disease can be achieved without a counterbalancing increase in relapse of leukemia in patients receiving an unrelated donor marrow transplant.

**Obligations**

Funding History:
Fiscal Year 2004—$163,598
Fiscal Years 1994–2003—$11,804,918
Total Funding to Date—$11,968,516

**Current Active Organizations and Contract Numbers**

1. The EMMES Corporation
Potomac, Maryland —HB-47094
2. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HB-47095
3. University of Kentucky
Lexington, Kentucky —HB-47097
4. Sloan-Kettering Institute
for Cancer Research
New York, New York —HB-47098

## Thalassemia (Cooley's Anemia) Clinical Research Network, Initiated Fiscal Year 2000

The purpose of this network is to accelerate research in the management of thalassemia, standardize existing treatments, and evaluate new ones in a network of clinical centers.

**Obligations**

Funding History:
Fiscal Year 2004—$2,374,805
Fiscal Years 2000–2003—$8,999,883
Total Funding to Date—$11,374,688

**Current Active Organizations and Grant Numbers**

1. Children's Hospital of Philadelphia
Philadelphia, Pennsylvania —HL-065232
2. Hospital for Sick Children
Toronto, Ontario —HL-065233
3. New England Research Institute, Inc.
Watertown, Massachusetts —HL-065238

4. Children's Hospital Oakland
Oakland, California —HL-065239
5. Weill Medical College
of Cornell University
New York, New York —HL-065244
6. Children's Hospital
Boston, Massachusetts —HL-065260

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

The purpose of this network is to promote the efficient comparison of new management strategies for individuals with hemostatic disorders, such as idiopathic thrombocytopenia and thrombotic thrombocytopenic purpura, and to evaluate new and existing blood products and cytokines for treatment of hematologic disorders.

### Obligations

Funding History:
Fiscal Year 2004—$6,092,846
Fiscal Years 2002–2003—$12,293,630
Total Funding to Date—$18,386,476

### Current Active Organizations and Grant Numbers

1. University of Iowa
Iowa City, Iowa —HL-072028
2. Case Western Reserve University
Cleveland, Ohio —HL-072033
3. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HL-072072
4. The Johns Hopkins University
Baltimore, Maryland —HL-072191
5. Weill Medical College
of Cornell University
New York, New York —HL-072196
6. Emory University
Atlanta, Georgia —HL-072248
7. New England Research Institutes, Inc.
Watertown, Massachusetts —HL-072268
8. Tulane University of Louisiana
New Orleans, Louisiana —HL-072274
9. University of Oklahoma
Health Sciences Center
Oklahoma City, Oklahoma —HL-072283
10. Duke University
Durham, North Carolina —HL-072289
11. Blood Center of Southeastern Wisconsin
Milwaukee, Wisconsin —HL-072290
12. Children's Hospital Boston
Boston, Massachusetts —HL-072291
13. Massachusetts General Hospital
Boston, Massachusetts —HL-072299
14. Puget Sound Blood Center
Seattle, Washington —HL-072305
15. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-072331
16. University of Pennsylvania
Philadelphia, Pennsylvania —HL-072346
17. University of North Carolina
at Chapel Hill
Chapel Hill, North Carolina —HL-072355
18. University of Maryland
Baltimore Professional School
Baltimore, Maryland —HL-072359

## Women's Health Initiative, Initiated in Fiscal Year 1992

The purpose of the WHI is to study cardiovascular disease, cancer, and osteoporosis in postmenopausal women. The program consists of three major components: a randomized controlled clinical trial of HRT, dietary modification, and calcium/vitamin D supplementation; an observational study to identify predictors of disease; and a study of community approaches to developing healthful behaviors.

### Obligations

Funding History:
Fiscal Year 2004—$57,483,316
Fiscal Years 2000–2003*—$615,132,161
Total Funding to Date—$672,615,477

### Current Active Organizations and Contract Numbers

1. Fred Hutchinson Cancer Research Center, Seattle, Washington —WH-22110
2. University of Medicine and Dentistry of New Jersey, Newark, New Jersey —WH-24152
3. Fred Hutchinson Cancer Research Center, Seattle, Washington —WH-32100
4. University of Minnesota, Twin Cities, Minneapolis, Minnesota —WH-32101
5. University of Iowa College of Medicine, Iowa City, Iowa —WH-32102
6. University of Alabama at Birmingham, Birmingham, Alabama —WH-32105
7. Wake Forest University, Winston-Salem, North Carolina —WH-32106
8. Northwestern University, Chicago, Illinois —WH-32108
9. Brigham and Women's Hospital, Boston, Massachusetts —WH-32109
10. University of Medicine and Dentistry of New Jersey, Newark, New Jersey —WH-32110
11. Emory University, Atlanta, Georgia —WH-32111
12. University of Pittsburgh, Pittsburgh, Pennsylvania —WH-32112
13. University of California, Davis, Davis, California —WH-32113
14. University of Arizona, Tucson, Arizona —WH-32115
15. University of Tennessee, Memphis, Tennessee —WH-32118
16. Memorial Hospital of Rhode Island, Pawtucket, Rhode Island —WH-32119
17. University of California, San Diego, La Jolla, California —WH-32120
18. State University of New York at Buffalo, Buffalo, New York —WH-32122
19. American College of Obstetricians and Gynecologists, Washington, DC —WH-34205
20. University of California, Irvine, Irvine, California —WH-42107
21. The George Washington University, Washington, DC —WH-42108
22. Stanford University, Stanford, California —WH-42109
23. Baylor College of Medicine, Houston, Texas —WH-42110
24. University of Texas Health Science Center, San Antonio, Texas —WH-42111
25. The Ohio State University, Columbus, Ohio —WH-42112
26. University of Nevada School of Medicine, Reno, Nevada —WH-42113
27. Kaiser Foundation Research Institute, Oakland, California —WH-42114
28. State University of New York at Stony Brook, Stony Brook, New York —WH-42115
29. University of Massachusetts Medical School, Worcester, Massachusetts —WH-42116
30. University of North Carolina at Chapel Hill, Chapel Hill, North Carolina —WH-42117
31. Wayne State University, Detroit, Michigan —WH-42118
32. Albert Einstein College of Medicine, New York, New York —WH-42119
33. Harbor-UCLA Research and Education Institute, Torrance, California —WH-42120

* This figure reflects funding for the clinical trials and observational studies only. From 1992–98, major support was provided through the Office of the Director, NIH. The Community Prevention Study receives funding through an interagency agreement with the CDC: $4,000,000 in FY 1999 and $12,000,000 from FY 1996–98.

34. Kaiser Foundation Research Institute
    Oakland, California —WH-42121
35. Medical College of Wisconsin
    Milwaukee, Wisconsin —WH-42122
36. Medlantic Research Institute
    Washington, DC —WH-42123
37. Rush-Presbyterian-St. Luke's
    Medical Center
    Chicago, Illinois —WH-42124
38. University of California, Los Angeles
    School of Medicine
    Los Angeles, California —WH-42125
39. University of Cincinnati
    Medical Center
    Cincinnati, Ohio —WH-42126
40. University of Florida
    College of Medicine
    Gainesville, Florida —WH-42129
41. University of Hawaii at Manoa
    Honolulu, Hawaii —WH-42130
42. University of Miami
    Miami, Florida —WH-42131
43. University of Wisconsin
    Madison, Wisconsin —WH-42132

# 12. Minority Activities

Throughout its history, the NHLBI has been a leader in conducting and supporting research to eliminate health disparities that exist between various segments of the U.S. population. The Institute has not only initiated research projects with significant minority participation in order to compare health status between various populations, but also given high priority to programs that focus exclusively on minority health issues.

Since FY 1991, the Institute has had procedures in place to ensure full compliance with the NIH Policy on Inclusion of Women and Minorities as Subjects in Clinical Research. As a result, all NHLBI-supported research that involves human subjects includes minorities, with the exception of a very few projects for which a compelling justification for limited diversity in the study population exists. Thus, all segments of the population, both minority and nonminority, stand to benefit from the Institute's research programs.

It has long been a goal of the NHLBI to increase the number of individuals from underrepresented groups in biomedical and behavioral research. Selected FY 2004 activities addressing this goal include:

- Minority K–12 Initiative for Teachers and Students (MKITS): Supports research, development, and evaluation of innovative science training programs to provide minority students in grades K–12 with the exposure, skills, and knowledge that will encourage them to pursue advanced studies in biomedical and behavioral sciences.
- Historically Black Colleges and Universities (HBCU) Research Scientist Award: Supports efforts by HBCU to recruit an established research scientist in cardiovascular, lung, or blood health and disease; transfusion medicine; or sleep disorders.
- Sickle Cell Scholars Program: Supports career development of young or new investigators in SCD research.
- Summer for Sickle Cell Science Program: As part of the Comprehensive Sickle Cell Centers program, supports research training and mentoring of individuals from high school to junior investigator level.
- Student National Medical Association Externship in Sickle Cell Disease: Supports an 8-week clinical rotation in SCD for third- and fourth-year medical students at an NHLBI-funded medical institution engaged in sickle cell research and patient care.
- Research Scientist Award for Minority Institutions: Strengthens the biomedical and behavioral research capabilities and resources of minority institutions by recruiting an established scientist with expertise in areas related to cardiovascular, lung, or blood health and disease; transfusion medicine; or sleep disorders.
- Cultural Competence and Health Disparity Academic Award: Enhances the ability of physicians and other health care professionals to reduce disparities—in a culturally sensitive manner—in cardiovascular, lung, and blood diseases, and sleep disorders among various population groups.
- Partnership Programs To Reduce Cardiovascular Disparities: Expand the capacity of research institutions to reduce health disparities, encourage more researchers to focus on minority health, and improve minority acceptance and community willingness to participate in research by pairing research-intensive medical centers that have a track record of NIH-supported research and patient care with minority health care serving institutions that lack a strong research program. Research will focus on the complex biological, behavioral, and societal factors that result in cardiovascular health disparities in their target populations (e.g., African Americans, Hispanics, Native Hawaiians, and Pacific Islanders).

The Office of Minority Health Affairs (OMHA) within the OD provides oversight for, and coordinates, supports, and evaluates Institute programs related to minority health outcomes, including

research, research training and career development, public outreach, and translation of research findings. The OMHA also coordinates activities to foster greater participation of underrepresented minorities in NHLBI research and research training programs. Selected FY 2004 activities include:

- Issuing four minority training and career development RFAs to increase the number of highly trained minority individuals conducting biomedical and behavioral research.
- Participating in HHS-Endorsed Minority Organization Internship Programs by providing positions in NHLBI extramural divisions to students from the National Association for Equal Opportunity in Higher Education, the Hispanic Association of Colleges and Universities, and the Washington Internships for Native Students programs.
- Cosponsoring with the NIH, the Cherokee Elementary School Project: Out of the Box, which is designed to create awareness and interest in the importance of science, medicine, and health; eliminate gaps in quality of health among minorities by encouraging health-related careers; and encourage youngsters to take responsibility for their own health.
- Supporting the African American, Hispanic, and Native American Youth Initiatives to bring minority students to the NIH campus for scientific presentations, an introduction to NHLBI research training and career development programs, and a tour of NHLBI laboratories.
- Providing undergraduate Tougaloo College Scholars the opportunity to observe biomedical research at the NHLBI during a 3-day tour of the NIH that included learning about the NIH and available research training opportunities.

See Chapter 13 for additional NHLBI-supported minority research training and career development programs.

The following text describes selected current projects that focus on minority populations and reflect the Institute's research portfolio related to minority health; additional information can be found in Chapters 9 through 11.

## Heart and Vascular Diseases

### Risk Factors

#### *Epidemiology*

Long-term epidemiologic studies are critical to uncovering risk factors that lead to disease. The Institute has initiated several major studies of heart disease focused significantly or completely on minority populations.

- CARDIA (see Chapter 10): To determine the evolution of CHD risk factors and lifestyle characteristics in young adults that may influence development of risk factors prior to middle age; 50 percent of the participants are black.
- ARIC (see Chapter 10): To investigate the association of CHD risk factors with development of atherosclerosis and CVD in an adult population; 30 percent of the participants are black.
- CHS (see Chapter 10): To examine risk factors for CHD and stroke in the elderly; 16 percent of the participants are minorities.
- Strong Heart Study (see Chapter 9): To compare risk factor levels and morbidity and mortality from CVD among American Indians from three different geographic locations.
- JHS (see Chapter 10): To identify environmental and genetic factors influencing evolution and progression of CVD in blacks.
- MESA (see Chapter 10): To examine the characteristics of subclinical CVD that predict progression to clinically overt CVD and related risk factors that predict subclinical disease in blacks, whites, Hispanics, and Asians; 62 percent of the participants are minorities.
- GOCADAN (see Chapter 9): To document CVD risk factors and measures of subclinical disease and to identify and characterize genes that contribute to CVD in approximately 40 extended Alaska Native families.
- HEIRS (see Chapter 10): To determine the prevalence of hereditary hemochromatosis; to identify genetic and environmental determinants and potential clinical, personal, and societal impacts of iron overload in an adult population consisting of 28 percent blacks, 13 percent Asians, and 13 percent Hispanics.

Several investigator-initiated epidemiologic studies are examining gene–environment interactions that increase CVD risk factors among various racial groups. Included among them are studies that compare gene–environment interactions in black populations in Africa, the Caribbean, and selected areas of the United States; determine the genes responsible for CVD risk factor response to dietary fat changes in blacks; investigate genes influencing changes in blood pressure in response to high- and low-salt diets in a rural Chinese population; and identify and map specific genes that contribute to CVD risk in Mexican Americans.

A study of the etiology of atherosclerosis focusing on diet and oxidative mechanisms is examining new risk factors that promote or inhibit LDL damage and inflammatory responses in the artery wall. Investigators seek to determine the relationship between longitudinal change in atherosclerosis and dietary antioxidants, antioxidant enzymes, and genetic polymorphisms; 43 percent of the participants are Hispanic.

The NHLBI supports research on the impact of adolescent lifestyle on the development of CVD. One project being conducted in youths, half of whom are black, is assessing the influences of diet and exercise on adiposity and regional fat distribution and the subsequent relationship between the two factors and development of CVD. Another is tracking the development of cardiovascular, behavioral, and physiological risk factors in Hispanic children and adolescents.

An ancillary study to MESA is seeking to determine whether impairment of myocardial perfusion reserve can serve as a marker of CHD. Scientists hypothesize that impaired myocardial perfusion reserve indicates the presence of subclinical coronary atherosclerosis and coronary microvascular disease. Developing a new measure of subclinical disease would enable early interventions and lifestyle modifications to prevent CHD. Fifty percent of the population will be Hispanic. Other ancillary studies to MESA are investigating progression of carotid atherosclerosis, association of risk factors with arteriosclerosis measured in retinal vessels, and the relationship of sex hormones to subclinical CVD and other risk factors in men and women.

Additional epidemiologic studies being supported include (1) a multicenter study to investigate cardiovascular and metabolic responses to endurance training, contribution of genetic factors to the accompanying response of CVD, and type 2 diabetes risk factors in a population that is 46 percent black; (2) a study of Chagas' disease—a leading cause of heart disease throughout Latin America—to identify genetic determinants of susceptibility to infection and differential disease pathogenesis in a black population residing in rural Brazil; (3) a project to use pooled data from nine existing U.S. studies to compare between blacks and whites, CHD incidence and mortality rates, exposure–outcome relationship, patterns of comorbidity, and population attributable risk; and (4) a project to examine the relationship between neighborhood socioeconomic characteristics and the prevalence and progression of subclinical atherosclerosis in an ethnically diverse population consisting of approximately 30 percent blacks, 10 percent Asians, and 20 percent Hispanics.

### *Treatment and Prevention*

Many evidence-based guidelines for treatment of risk factors or disease have been developed, but they often are not adhered to by patients—especially minority populations—or adopted in routine clinical practice. The Institute has initiated the following activities to address this important problem:

- Trials Assessing Innovative Strategies To Improve Clinical Practice Through Guidelines in Heart, Lung, and Blood Diseases: To identify obstacles to implementing national evidence-based guidelines and test interventions to promote their use in clinical practice. Several approaches will be tested, including use of decision support tools; interactive seminars; internet learning; a computerized patient activation tool placed in the waiting room of primary care offices; and performance feedback and practice profiling.
- Overcoming Barriers to Treatment Adherence in Minorities and Persons Living in Poverty: To overcome barriers to treatment adherence for lifestyle changes and pharmacologic therapy in minorities and persons living in poverty. Studies are testing several approaches, such as telephone-based interventions, nurse case management and counseling, and patient and physician education intervention in clinical and community settings designed to overcome patient, provider, and medical systems barriers that impede treatment adherence. Urban and rural blacks, Hispanics, Asian Americans, and women are the targeted groups.

## Education

The NHLBI, through its education programs (see Chapter 2), disseminates health information to physi-

cians, health care professionals, patients, and the public on ways to prevent or treat diseases within the Institute's mandate. It has developed the following programs to combat cardiovascular health disparities among four major cultural/ethnic groups: blacks, Hispanics, American Indians and Alaska Natives, and Asian Americans and Pacific Islanders. In addition, the NHLBI is exploring opportunities to reach residents of public housing communities nationally with science-based information on lifestyles and behaviors that can prevent, treat, and manage CVD.

- Cardiovascular Health Outreach and Education in Public Housing Communities: To empower blacks who reside in Baltimore City public housing developments to take charge of improving their cardiovascular health by adopting a heart healthy lifestyle.
- Salud para su Corazón: To disseminate information on CVD prevention, intervention, and treatment and promote heart healthy behaviors in Hispanic communities.
- NHLBI-Indian Health Service Partnership to Strengthen the Heartbeat of American Indian and Alaska Native (AI/AN) Communities: To develop and implement effective approaches to improve the cardiovascular health, including implementation of tailored heart health strategies, in three tribal communities and creation of a national cardiovascular health training program, "Honoring the Gift of Heart Health," with the Indian Health Service.

NHLBI Asian American and Pacific Islanders Heart Health Outreach Project: To develop culturally and linguistically appropriate outreach activities and tools (e.g., CVD risk factor fact sheets) to increase community awareness of heart disease and its associated risk factors and to promote heart healthy lifestyles among a diverse Asian American and Pacific Islander population.

In addition to the activities mentioned above, the Institute has prepared publications on CVD prevention for minority populations. Examples include:

- *Improving Cardiovascular Health in African Americans—Package of Seven Easy-To-Read Booklets*
- *Heart-Healthy Home Cooking African American Style*
- Nine Easy-to-Read Booklets in Spanish and English on Heart Health
- *Bringing Heart Health to Latinos: A Guide for Building Community Programs*
- *Filipinos Aspire for Healthy Hearts Fact Sheets* in Tagalog and English
- *Vietnamese Aspire for Healthy Hearts Fact Sheets* in Vietnamese and English
- *Filipinos Take It To Heart: A How-To Guide for Bringing Heart Health to Your Community*
- *Treat Your Heart to a Healthy Celebration.*

The educational materials listed throughout this chapter may be obtained from the NHLBI public Web site or through the NHLBI online catalog.

## High Blood Pressure

### *Etiology and Pathophysiology*

High blood pressure is a serious health problem that is especially prevalent and severe among minorities. Institute-initiated studies addressing the etiology and pathophysiology of high blood pressure include:

- Molecular Genetics of Hypertension (see Chapter 9): To determine the etiology and pathogenesis of hypertension and its complications in order to improve diagnosis and treatment of the disease. Many of the subprojects have a high percentage of minority participation; others target blacks or Hispanics exclusively.
- Family Blood Pressure Program (see Chapter 9): To use a network of investigators to identify genes associated with high blood pressure and to examine interactions between genetic and environmental determinants of hypertension in specific minority populations: blacks, Mexican Americans, and Asian Americans.

The Institute supports a number of investigator-initiated projects to examine antecedents of hypertension in children to determine racial differences in blood pressure regulation. One study is determining relationships between cardiovascular reactivity in adolescent normotensive blacks and development of pathobiologic markers of hypertension risk (i.e., increased resting blood pressure, left ventricular mass, and relative wall thickness) later in life. Another is investigating the genetics of cardiovascular reactivity in black youth.

Impaired sodium regulation also appears to be linked to the development of hypertension. Scientists are investigating the effects of stress on salt retention and measur-

ing hormonal variables known to influence sodium regulation in a population of obese and nonobese black youths. They are seeking to determine whether the mechanisms regulating sodium retention differ between the two groups. Another group of scientists is examining the role of sodium and obesity in hypertension development among blacks living in three different environments: Nigeria, Jamaica, and Chicago.

Investigators have observed that blacks have an augmented blood pressure response to salt. A study has been initiated to improve understanding of the genetic basis and phenotypic characterization of salt-sensitive hypertension in blacks.

Researchers also are examining the influence of SES and ethnic discrimination on stress reactivity to determine if it provides a pathophysiologic link to CVD in blacks. One group is studying the combined influence of low SES and ethnicity on development of behavioral risk factors and testing the extent to which they mediate associations between sociodemographic factors, stress, and cardiovascular markers in adolescents. Another group is assessing the relationship between early life exposure to socioeconomic stressors such as adverse socioeconomic conditions, low levels of social integration, and racial discrimination, and development of hypertension in blacks.

Stress may be a major contributor to CVD among American Indians. Investigators are evaluating the long-term effects of posttraumatic stress disorder—a common disorder among reservation-dwelling Indians—on the cardiovascular system and the role of lifestyle, cultural, and biological mediators in the relationship of posttraumatic stress disorders with coronary flow reserve and heart rate variability.

The role of dietary factors, particularly macronutrients, in the etiology of high blood pressure is another area of investigation. Scientists are conducting epidemiologic studies among participants with diverse ethnicity, SES, and dietary habits in four countries to determine the impact of selected dietary components (proteins, lipids, carbohydrates, amino acids, calcium, magnesium, sodium, potassium, antioxidants, fiber, and caffeine) on blood pressure.

The NHLBI supports a number of studies to identify genes linked to hypertension in blacks, Mexican Americans, and whites to determine if part of the disparity in prevalence can be attributed to genetic differences among the groups. Genes under investigation include those associated with the renin-angiotensin system, the kallikrein-kinin system, and sodium transport.

***Treatment and Prevention***

Identifying effective treatment strategies for various populations requires large-scale studies with representative populations in sufficient numbers.

- ALLHAT (see Chapter 11): To compare the combined incidence of fatal CHD and nonfatal MI among patients receiving ACE inhibitors, calcium antagonists, or alpha-1 blockers and patients in a control group receiving a diuretic. Also, in a subset of these groups, to determine whether cholesterol-lowering therapy reduces mortality in moderately hypercholesterolemic individuals compared with a control group; 32 percent of the participants are black and 19 percent are Hispanic. Research findings demonstrated that the less expensive traditional diuretics are at least as effective as newer medicines in treating high blood pressure and preventing some forms of heart disease.

Although it is well known that reducing hypertension will reduce CVD rates, the implementation of evidence-based guidelines for hypertension treatment in clinical practice is not very high. To address this issue, the NHLBI initiated a program to improve hypertension control rates in blacks, a group with the highest prevalence and earliest onset of hypertension and disparately high premature cardiovascular mortality and morbidity:

- Interventions To Improve Hypertension Control Rates in African Americans: To evaluate the feasibility of clinical interventions directed at the medical care delivery system to increase the proportion of blacks who have their blood pressure controlled to levels specified by the JNC VII guidelines.

Understanding racial differences in blood pressure control is an area of major interest for the Institute. Scientists are examining whether variations in genes of the renin-angiotensin-aldosterone system predict differences in blood pressure response to diuretic therapy among hypertensive blacks and whites. Research also is being focused on variations in the ACE gene between blacks and whites to explain racial differences in the antihypertensive responsiveness to ACE inhibitors.

### *Education*

The NHLBI (see Chapter 2) has developed a number of outreach activities to inform minority populations of the importance of blood pressure control. Included among them are a toll-free number that provides materials on hypertension in English or Spanish; mini telenovelas (Más vale prevenir que lamentar), "health moments" to reinforce CVD prevention for local Spanish-language television stations; a Spanish version of the High Blood Pressure Education Month Kit; and several publications for health professionals, patients, and the public. Below are some examples:

- *Sí se Puede: Prevenir y Controlar la Presión Arterial Alta con Actividad Física*
- *Plan de Alimentación Saludable Contra la Hipertensión: Prevenir y Controlar la Presión Arterial Alta Siguiendo el Plan de Alimentación Conocida Como DASH*
- *Sí se Puede: Prevenir y Controlar la Presión Arterial Alta. Lo Que Usted Debe Saber Sobre la Prevention y Control de la Presión Arterial Alta*
- *Sí se Puede: Prevenir y Controlar la Presión Arterial Alta. Lo Que los Médicos Deben Saber*
- *Take Steps To Prevent High Blood Pressure* in English and Spanish
- *Cut Down on Salt and Sodium* in English and Spanish
- *Churches as an Avenue to High Blood Pressure Control*
- *Working With Religious Congregations: A Guide for Health Professionals*
- *Protect Your Heart! Prevent High Blood Pressure*
- *Spice up Your Life! Eat Less Salt and Sodium*
- *Keep the Harmony Within You—Check Your Blood Pressure*
- *Keep Your Heart in Check—Know Your Blood Pressure Number* in Tagalog and English and in Vietnamese and English.

### *NHBPEP Coordinating Committee Activities*

The organizations that belong to the NHBPEP coordinating committee have continuing education programs on the prevention and treatment of hypertension that are focused on their minority members. They also support hypertension prevention and awareness in community-based settings such as screening and church activities, community awareness campaigns, and media events.

## High Serum Cholesterol

### *Etiology*

The Institute supports a number of investigator-initiated projects to identify genes that influence the lipoprotein profile within various racial and ethnic groups. Research findings could offer an explanation for differences in susceptibility to CHD found between various racial and ethnic groups.

Scientists also are interested in the protective effect of HDL. One study is focusing on isolating and characterizing native HDL species to determine their structure and function. Research findings may lead to new strategies to prevent and treat arteriosclerotic heart disease. Thirty-eight percent of the participants are minorities.

Variation in hepatic lipase activity is associated with differences in plasma concentrations of HDL and LDL synthesis and catabolism. Researchers are investigating whether ethnic differences in hepatic lipase activity are responsible for the well-known differences in plasma HDL concentrations found in blacks and whites. Genetic studies are being conducted on a population that is 39 percent black.

### *Prevention*

The NHLBI is supporting an investigator-initiated study among minority preschool children to track the long-term effectiveness of nutrition interventions on blood cholesterol and diet. Additional potential risk factors, such as increased blood pressure, obesity, and intention to smoke, also will be monitored.

### *Education*

The NCEP (see Chapter 2) has prepared the following publications on blood cholesterol for minority audiences.

- *Learn Your Cholesterol Number* in Spanish and English
- *Protect Your Heart—Lower Your Blood Cholesterol* in Spanish and English
- *Heart-Healthy Home Cooking African American Style*
- *Delicious Heart-Healthy Latino Recipes*
- *Cut Down on Fat—Not on Taste* in Spanish and English
- *Empower Yourself! Learn Your Cholesterol Number*
- *Be Heart Smart! Eat Foods Lower in Saturated Fats and Cholesterol*

- *American Indian and Alaska Native People: Treat Your Heart to a Healthy Celebration*
- *Serve Up a Healthy Life—Give the Gift of Good Nutrition* in Tagalog and English
- *Serve Up a Healthy Life With Good Nutrition* in Vietnamese and English.

## Obesity

### *Etiology*

The latest NHANES data show a continued rise in the proportion of Americans who are overweight; black women are especially at risk. To understand the reasons for the racial disparity among women, the Institute initiated a long-term program, the NHLBI Growth and Health Study (NGHS), to examine the development of obesity and CVD risk factors in a biracial cohort of young girls. The study, which ended in FY 2000, found black girls consumed more calories and a higher percentage of calories from fat and watched more television than white girls. An investigator-initiated study using the NGHS cohort, starting at ages 18 to 19 years, is examining the changes in cardiac output and total peripheral resistance that occur with developing obesity and their influence on ethnic difference in blood pressure regulation. Another project, using data from the NGHS, is examining CHD risk factors in black and white girls to identify genes involved in black–white differences in lipid metabolism and obesity.

Pregnancy is often associated with excess weight gain and postpartum weight retention that can lead to obesity. Understanding the determinants of pregnancy-associated weight gain and retention is the focus of a project being conducted within a predominantly black and Hispanic population of pregnant adolescents.

### *Prevention and Treatment*

The NHLBI has initiated a program to prevent obesity in high-risk children.

- GEMS (see Chapter 9): To test the effectiveness of weight-control interventions (involving diet, physical activity, and psychosocial and familial influences) administered during the critical transition period from prepuberty to puberty in black girls at high risk for obesity.

The Institute supports a number of investigator-initiated studies on the effectiveness of obesity prevention and control interventions among diverse populations. Black and Hispanic parents and children at Head Start sites are participating in a nutrition education and weight-control program; 70 percent of the participants will be minorities. Another study will test the effectiveness of a family-based intervention to prevent obesity in low-income Latino children.

A school-based study involving predominantly minority children is determining whether reducing the amount of time children spend watching television and videos and playing video games prevents obesity. A project with a subject population consisting of Asians, Hispanics, and whites is testing an integrated school- and community-based intervention involving physical activity and diet to reduce the prevalence of obesity. An ancillary study to an Institute-initiated program to reduce the decline in physical activity in adolescent girls (TAAG) is investigating the influence of community characteristics (e.g., street design, access to public transportation, facilities for physical activity, population mix, and socioeconomic mix of the neighborhood) on physical activity levels and body mass index; approximately 50 percent of the girls are minority.

The Institute is supporting a weight loss maintenance trial to test the effectiveness of two strategies to promote the long-term maintenance of weight loss in adults who recently lost weight; about 40 percent of the population will be black. Another study will evaluate the effectiveness of diets of different macronutrient compositions to promote and sustain weight loss in adults; approximately 25 percent of the population will be black.

Black women are the subjects of a weight management program specifically tailored to their psychosocial, sociocultural, and health perspectives and life circumstances. A study using data from the NHANES III is seeking to determine whether multiple perceptions and behaviors related to weight loss cluster according to sociodemographic characteristics. Research findings may lead to the design of culturally sensitive intervention strategies for minorities. Blacks and Mexican Americans at various SES levels constitute the major portion of the population surveyed.

### *Education*

The NHLBI OEI (see Chapter 2) has prepared health information on losing excess weight for minorities.

- *Watch Your Weight* in English and Spanish
- *Embrace Your Health! Lose Weight if You Are Overweight.*

## Physical Inactivity

The Institute has initiated research on the effectiveness of intervention programs to encourage greater physical activity within selected groups.

- TAAG (see Chapter 11): To test the effectiveness of school–community-linked interventions to reduce the decline in physical activity in adolescent girls, from grades 6 through 8. Of 3,600 girls from 36 schools, approximately 30 percent will be minorities.

The NHLBI supports several investigator-initiated studies on strategies to increase physical activity among minority populations. Included among them are studies to examine the effect of vigorous exercise on reduction of childhood obesity in black girls. Adolescent girls are the focus of a number of projects to determine the optimal amount of exercise required for primary prevention of CHD, provide culturally relevant physical activities, enhance social support for exercise, and test the effects of different amounts and intensities of physical activity on CVD risk factors. Hispanic women and women with low SES and literacy skills are subjects in two intervention projects to encourage sustained increases in physical activity among sedentary and underserved groups. One of the projects also is seeking to determine the degree of generalization of activity from wife to husband and mother to child.

### *Education*

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

- *Stay Active and Feel Better* in English and Spanish
- *Energize Yourself! Stay Physically Active*
- *American Indian and Alaska Native People: Be Active for Your Heart!*
- *Be Active for a Healthy Heart* in Tagalog and English
- *Be Active for a Healthier Heart* in Vietnamese and English.

The Institute also has developed a Web-based application on physical activity for lay health educators in English and Spanish, which can be found at http://hin.nhlbi.nih.gov/salud/pa/index.htm.

## Smoking

The Institute supports a number of investigator-initiated smoking intervention and follow-up cessation maintenance studies that specifically target minorities. Two studies are evaluating the effectiveness of two smoking cessation programs for smokers who seek treatment at the hospital emergency department. One study involves patients who suffer from acute respiratory illness; approximately 35 percent are minorities. The other targets Chinese American patients hospitalized with CVD, pulmonary disease, or diabetes mellitus.

Other projects being supported include a study to assess the extent of smoking onset and cessation in minority youths, identify determinants of smoking onset, and determine predictors of cessation; a study of elderly smokers (40 percent minority) to evaluate the effectiveness of three smoking cessation strategies; and an intervention study tailored to an underserved population at risk for smoking relapse, smoking onset, and smokeless tobacco use.

### *Education*

The Institute has prepared the following publications on smoking cessation for minorities.

- *Kick the Smoking Habit* in English and Spanish
- *Refresh Yourself! Stop Smoking*
- A*merican Indian and Alaska Native People: Help Your Heart*
- *Don't Burn Your Life Away—Be Good to Your Heart* in Tagalog and English and in Vietnamese and English.

## Psychosocial Factors

The NHLBI has initiated research on the effect of depression, anxiety, and lack of social support on prognosis after a CHD event.

- ENRICHD (see Chapter 11): To determine the effects of psychosocial interventions on morbidity and mortality in post-MI patients who were depressed and socially isolated and/or who perceived themselves as lacking support from family and friends; 34 percent of the participants were minorities. Despite the treatment group's improvement in psychological and social functioning and quality of life, no difference in heart disease survival or second heart attack rate was demonstrated compared to the control group, who also reported improvement in their psychological well-being.

The Institute supports investigator-initiated research on the role of race and ethnicity, psychosocial and envi-

ronmental factors, and low SES in the development of CHD. Scientists are investigating the contribution of biobehavioral factors in the etiology, pathogenesis, and course of CHD. Racial differences in stress-induced physiologic responses also are being examined.

Investigators are interested in the effects of race and psychosocial factors, such as hostility, on glucose metabolism. A study was initiated to determine how hostility is differentially related to glucose metabolism in blacks and whites. Research findings may increase understanding of the differences in the etiology of diabetes in the two groups.

Additional areas of focus include the genetic basis of aggression and the relationships between risk-promoting variables (psychosocial stress, smoking, poor diet, physical inactivity); presumed mediating variables (sympathetic nervous system activity and insulin metabolism); and CHD risk factors. Fifty to sixty percent of the participants are black or Hispanic.

## Ischemic Heart Disease

The NHLBI supports a major multicenter program involving basic and clinical research on ischemic heart disease in blacks.

- Ischemic Heart Disease in Blacks (see Chapter 9): To elucidate the pathophysiological basis for excess morbidity and mortality from ischemic heart disease in blacks, and subsequently to develop appropriate therapeutic strategies.

## Diabetes

Blacks, Hispanics, and American Indians have a high prevalence of diabetes. The NHLBI supports research to elucidate the pathogenic mechanisms involved in the relationship between diabetes and elevated risk for CVD.

Several investigator-initiated studies are examining the genetic relationships between noninsulin-dependent diabetes mellitus (NIDDM) and atherosclerosis. They include a study between two sets of Hispanic families with NIDDM, one with CHD and one without; a study in Mexican Americans to determine common genes linking insulin resistance and coronary artery disease; a project in Japanese American families to characterize the genetic epidemiology of CHD risk factors (high LDL, risk factors that characterize the insulin resistance syndrome and NIDDM, and lipoprotein(a) levels and apo-lipoprotein(a) phenotypes); and a project in blacks and Hispanics to examine genetic determinants of insulin resistance and visceral adiposity as intermediate components in the pathways that lead to type 2 diabetes and atherosclerosis.

In addition, the Institute supports research on the role of hyperglycemia and insulin resistance in the development of vascular disease. A study in American Indians with NIDDM is seeking to elucidate the underlying biological processes and their interaction in the acceleration of atherogenesis. A project in a diverse diabetic patient population of blacks, whites, and Hispanics with and without carotid atherosclerosis is seeking to understand the atherogenicity of hypertriglyceridemia in diabetes by focusing on the size and number of triglyceride-rich lipoproteins.

Hypertension and diabetes are major contributors to CVD and occur disproportionately in blacks. In particular, black women seem to have earlier disease onset and poorer outcomes. Scientists are investigating the link between hypertension and type 2 diabetes and the relative excess of androgen found in black women to determine whether insulin resistance, excess androgen, and endothelial dysfunction contribute to accelerated vascular injury in blacks.

Other investigator-initiated studies on diabetes and CVD risk among minority populations include a survey to compare the prevalence of diabetes and CVD risk factors among native Mexicans and Mexican Americans, and a study among blacks, whites, and Hispanics with existing insulin resistance, including impaired glucose tolerance and NIDDM, to identify dietary factors that may contribute to elevated CVD risk.

### *Treatment*

The NHLBI supports clinical trials to determine the benefits of various strategies to reduce CVD among patients with diabetes or treat patients with coronary artery disease and diabetes.

- ACCORD (see Chapter 11): To evaluate the benefits of different therapies to reduce CVD in type 2 diabetes; over one-third of the participants are minorities.
- BARI 2D (see Chapter 9): To evaluate whether urgent revascularization offers an advantage over medical therapy in patients with coronary artery disease and diabetes. In addition, for a given level of glycemic control, to determine whether insulin-providing drugs offer advantages or risks compared to insulin sensitizers (drugs that enhance insulin

action); 33 percent of the participants are from minority populations.
- SANDS (see Chapter 9): To compare intensive treatment (pharmacologic agents, such as ACE inhibitors and simvastatin for high blood pressure and LDL cholesterol) to conventional treatment in 488 American Indians with diabetes, ages 40 or older. The primary outcome measure is change in carotid intimal-medial thickness.

## Lung Diseases

The NHLBI supports research on a number of lung diseases, such as asthma, sarcoidosis, and TB, that disproportionately affect minorities. The following section provides examples of research to address health disparities in lung diseases.

### Asthma

#### *Etiology and Pathophysiology*

Asthma is a chronic lung disease characterized by inflammation of the airways. Various genetic and environmental factors contribute to the severity of symptoms. The Institute has launched a collaborative program to investigate the mechanistic basis for severe asthma and to determine how it differs from mild-to-moderate asthma.

The NHLBI is supporting a number of investigator-initiated projects on the etiology and pathophysiology of asthma. Two studies are using genomic screening to search for the genetic basis of asthma, one in a large sample of Asian siblings who are already known to differ widely in their airway responsiveness (sensitivity to histamine) and lung function and another in a homogeneous Hispanic population in Costa Rica. A third study is identifying genes contributing to asthma severity in blacks, a population disproportionately affected in the United States.

Other projects are focusing on understanding the mechanisms by which environmental factors trigger the onset of asthma. One study is investigating the role of viruses in the exacerbation of asthma; 50 percent of the participants are minorities. Another is examining how pulmonary infection caused by mycoplasma pneumoniae exacerbates asthma and prolongs abnormalities in lung function; 40 percent of the participants are minority. A third study is seeking to understand the role of gene–environment interactions in the development of immune responses in a pediatric population that is genetically predisposed to asthma; 40 percent of the participants are Hispanic.

Occupational- or environmental-induced asthma is a major problem, especially among low-income, urban blacks and Hispanics. The NHLBI is supporting a project to examine work-related asthma in those populations.

Circadian change in airway function is an important aspect of asthma; more than 70 percent of deaths and 80 percent of respiratory arrests occur during sleep. Researchers are investigating the mechanisms that cause the changes in airway function in nocturnal asthma that lead to exacerbation of symptoms; 36 percent of the participants are minority.

#### *Treatment and Control*

The Institute has initiated research to identify optimal drug strategies for treatment and management of asthma. Because the disorder disproportionately affects minority children, it is important for them to be well represented in clinical trials.

- ACRN (see Chapter 9): To establish an interactive network of asthma clinical research groups to conduct studies of new therapies for asthma and disseminate findings to the practicing community. Overall, 37 percent of the participants are from minority populations.
- CAMP (see Chapter 11): To determine whether inhaled corticosteroids are safe and effective for long-term treatment of children with mild-to-moderate asthma. The therapy proved more effective than nonsteroidal anti-inflammatory medication and significantly reduced airway hyperresponsiveness. The only side-effect was a transient slowing in growth rate during the first year of treatment; 31 percent of the participants were minorities.
- CARE (see Chapter 11): To establish a network of pediatric clinical care centers to determine optimal treatment and management strategies for children with asthma. The study will attempt to customize therapy based on specific asthma phenotypes and genotypes; 30 percent of the population will be minorities.
- Centers for Reducing Asthma Disparities (see Chapter 9): To establish partnerships between minority-serving institutions and research-intensive institutions to conduct studies on causes of and corrections for disparities in asthma among racial/

ethnic and low SES populations. Reciprocal training is encouraged to ensure culturally sensitive projects and enhance research capabilities.

The Institute also is supporting an investigator-initiated study on the effect of steroids on enhanced alpha-adrenergic vascular responsiveness in asthma; 77 percent of the participants are minority.

***Translational Activities***

Ensuring full use of modern asthma treatment strategies is an important goal of the NHLBI. An investigator-initiated study, conducted in black communities in Baltimore, is examining the effectiveness of two asthma interventions to reduce emergency room visits, improve adherence to medication schedules, and lower asthma morbidity. One strategy provides assistance to families in accessing medical care; the other combines this assistance with a family intervention to encourage consistent use of asthma medication. Another study is determining whether shared decisionmaking between patients and physicians in choosing asthma therapy improves adherence; 82 percent of the participants are minority.

Two studies are evaluating the benefits of administering drug treatment to children at school. One is a Birmingham-based study involving a predominately black population with moderate-to-severe asthma. The other is a New York City-based study that is establishing a collaboration between school nurses and primary care physicians to form a network to prevent asthma attacks. The project is identifying school children with asthma and working with their families and physicians to develop an asthma management plan that includes supervision of drug treatment at school. It refers children who lack continuing care to physicians who follow the NAEPP Guidelines.

In Detroit, investigators are developing and evaluating computer-based instructions and peer counseling for teens with asthma. All of the participants enrolled are black.

In San Diego, scientists are evaluating an intervention project to reduce tobacco-related morbidity among low SES Hispanic children with asthma. By collaborating with Hispanic counselors, researchers have developed a behavioral program that seeks to reduce environmental tobacco smoke (ETS) exposure in children with asthma.

In Ohio, investigators are testing the effects of reducing indoor ETS on asthma symptoms, pulmonary function, airway inflammation, and health services use; 44 percent of the participants are minorities.

Another ETS intervention program is being tested among predominately low SES black and Hispanic children in Los Angeles. Researchers are evaluating the effectiveness of two low-cost interventions (one involving counseling and booster telephone calls and the other involving a video and household reminder kit) to reduce asthma morbidity.

In St. Louis, a randomized controlled trial is being conducted among young black children recruited at the time of an emergency department visit for asthma exacerbation. Investigators are testing the effectiveness of an intervention strategy that includes case management, telephone contacts, and a monetary incentive to increase follow-up visits to primary care providers.

***Education***

The NAEPP (see Chapter 2) has developed easy-to-read materials on asthma treatment and control directed to audiences with low literacy.

- *Facts About Controlling Your Asthma*
- *El asthma: Cómo Controlar Esta Enfermedad.*

## Chronic Lung Disease in Premature Infants

The NHLBI supports research on prevention of chronic lung disease (bronchopulmonary dysplasia) in preterm infants.

- Inhaled Nitric Oxide (NO) for the Prevention of Chronic Lung Disease (CLD) (see Chapter 9): To determine if low-dose inhaled NO will reduce CLD in premature newborns (gestational age less than 34 weeks and birth weight between 500 and 1,250 grams at birth) with respiratory failure that required mechanical ventilation in the first 48 hours of life; 27 percent of the infants will be from minority populations.
- Inhaled Nitric Oxide in Prevention of Chronic Lung Disease (see Chapter 9): To investigate whether low-dose inhaled NO administered to preterm infants between 500 and 1,250 grams birth weight who continue to require mechanical ventilation at 10 days of age increases survival without CLD at 36 weeks postmenstrual age; 55 percent of the infants will be from minority populations.

## Sarcoidosis

Sarcoidosis is an inflammatory disease of unknown etiology that affects the lungs. The Institute has initiated a study to elucidate the mechanism involved in the disease.

Investigator-initiated studies on the causes of sarcoidosis include a study to identify genes linked to sarcoidosis susceptibility in blacks and to determine if hereditary susceptibility predisposes blacks to sarcoidosis, and a project to elucidate the mechanisms involved in the immunologic and inflammatory processes that ultimately lead to end-stage fibrosis in progressive pulmonary sarcoidosis; 50 percent of the participants are black.

## Sleep Disorders

The NHLBI supports research on the etiology, pathophysiology, and consequences of sleep-disordered breathing (SDB), a condition characterized by repetitive interruptions in breathing. Sleep apnea, a common disorder that disproportionately affects blacks, is associated with an increased risk of CVD, and is particularly prevalent in heart failure patients. An Institute-initiated program is assessing the interrelationship between sleep disorders and heart, lung, and blood diseases. Another study will examine the interrelationship between sleep apnea and heart failure and the mechanisms leading to cardiovascular stress when they occur together.

The Institute also supports a wide spectrum of investigator-initiated projects to elucidate cardiovascular and other health consequences of SDB. Ongoing studies in various community settings are assessing the health risks of SDB within specific ethnic populations, including blacks, Hispanics, Asians, and American Indians. A study of sleep in black families will investigate whether sleep problems contribute to diabetes, and the potential relationship to CVD. Characterization of how SDB occurs within family groups is helping to identify potential genetic risk factors that may allow early identification and treatment of high-risk individuals.

Treatment strategies for SDB are another area of interest. A multisite clinical trial was initiated to determine whether continuous positive airway pressure is an effective treatment for excessive daytime sleepiness and cognitive impairment associated with moderate-to-severe SDB; 30 percent of the participants are minority.

## Tuberculosis

Beginning in 1993, the NHLBI funded five annual competitions for Tuberculosis Academic Awards (TBAAs). The goal of the TBAA program was to improve prevention, management, and control of TB by supporting increased opportunities for health care practitioners to learn modern principles and practices. The TBAA program promoted coordinated clinical approaches to the care of patients of various ethnic backgrounds who have TB; raised awareness among health care providers of unique ethnic, cultural, and socioeconomic dimensions of TB; focused educational efforts in areas where TB incidence is persistently high (e.g., immigrant communities, refugee centers, homeless shelters, correctional facilities); promoted development of minority faculty capable of providing appropriate instruction in diagnosis and management of TB; and enhanced TB education programs in minority medical schools and in the communities they serve. The program ended in 2002.

Building on the foundation laid by the TBAA program, the NHLBI funded a contract for a TB Curriculum Coordinating Center to provide access to the best TB educational and training opportunities in the United States. The program is directed at medical schools, nursing schools, and allied health schools—especially those that provide primary care to communities where TB is endemic and the population is at high risk.

In 2001, the Institute initiated a program on Genetic Aspects of Tuberculosis in the Lung. Four of the ten awards were to institutions conducting genetic studies in humans to characterize genes associated with TB susceptibility and host immune responses to infection. A large number of the participants being recruited are from minority populations.

The NHLBI supports a number of investigator-initiated studies focused on understanding the relationship of the immune system to TB. Most of the patients are from minority populations with HIV. One group is seeking to identify the correlates of protective immunity in a Mexican population in order to aid development of anti-TB vaccines. Another group will conduct a Phase I safety trial on a vaccine with a patient population consisting of 85 percent minorities. A third group is examining the role of interferon-gamma in the pathogenesis of TB among Hispanics with and without HIV. A fourth group

is identifying and characterizing host factors that predispose Asians to develop TB. In predominately minority populations in the United States and South Africa, a new study will compare the effectiveness of adding aerosolized interferon-gamma to the usual treatment regimen for advanced TB.

The NHLBI also supports research to improve TB control among minority populations. One project is evaluating educational strategies to improve adherence to medication regimens and regular clinic visits among TB-infected adolescents in California. The program, based in San Diego, is directed at Hispanic adolescents. Another study, located in the Harlem community of New York City, is testing a new strategy to promote adherence to therapy among inner-city TB patients. Both programs are outgrowths of behavioral research programs begun by the Institute in 1995.

## Blood Diseases

### Sickle Cell Disease

SCD is an inherited blood disorder that produces chronic anemia, end organ damage, and periodic episodes of pain. It affects about 1 in 500 blacks and 1 in 1,000 Hispanics. Since 1972, the NHLBI has supported an extensive research program to improve understanding of the pathophysiology of SCD and uncover better approaches for its diagnosis and treatment and for prevention of complications.

- Comprehensive Sickle Cell Centers Program (see Chapter 9): To provide a multidisciplinary and multilevel research approach to expedite development and application of new knowledge for improved diagnosis and treatment of SCD and prevention of its complications.
- Reference Laboratory to Evaluate Therapies for SCD (see Chapter 9): To use a battery of standardized tests for preclinical evaluation of potential new therapeutic agents for SCD.

#### *Basic Research*

SCD is caused by hemoglobin polymerization that causes red blood cells to become hard, sticky, and shaped like sickles or cresents. When sickled cells go through small blood vessels, they tend to get stuck and block the flow of blood. This can cause pain, damage, and low blood count or anemia. Finding improved treatments and ultimately a cure for SCD is a major commitment of the Institute. NHLBI-supported scientists have learned a great deal about sickle cell anemia—what causes it, how it affects the patient, and how to treat some of its complications. They also have begun to have success in developing drugs to prevent the symptoms of sickle cell anemia and procedures that should ultimately provide a cure.

Advances in basic research include unraveling the molecular pathways that lead to sickling, thus allowing investigators to test compounds that might interrupt the sickling process; discovering the beneficial role of fetal hemoglobin in patients with SCD that prevents sickling and comfirming the need to find fetal hemoglobin-enhancing drugs; developing the transgenic mouse model for SCD that allows investigators to study the effects of sickle cell anemia in a living organism and evaluate experimental treatments that cannot be done in humans; and curing a sickle mouse model through gene therapy, a significant achievement that brings us close to human gene therapy.

Basic research advances reported in FY 2004 include:

- Developing high-throughput robotic screening methods to identify active compounds for further mechanistic and preclinical evaluation as potential therapeutic agents for sickle cell anemia.
- Identifying nitrite as a major bioavailable pool of NO, a known vasodilator that could increase blood flow to oxygen-deprived tissue. Therapeutic application of nitrite could potentially be used to treat diseases associated with oxygen-starved tissue, such as SCD.
- Establishing the link between a candidate genetic modifier in an endothelial NO synthase gene and acute chest syndrome (ACS) in female patients with SCD. Identifying genetic modifiers of ACS will aid in choosing potential therapeutic targets and enable individualized treatment.
- Developing the first gene therapy cure of a hemoglobinopathy mouse model using purified hematopoietic stem cells.
- Treating transgenic SCD mice with vanillin, a food additive that binds with sickle hemoglobin, prolongs survival under hypoxia, and correlates with a reduced number of sickle red cells. Study results demonstrate the potential of vanillin to be a new and safe antisickling agent for SCD patients.

In 2004, the NHLBI participated in a trans-NIH conference on "New Directions for Sickle Cell Therapy in the Genome Era." One of the recommendations from the conference was for the Institute to develop a joint initia-

tive with the National Human Genome Research Institute to apply chemical genomics approaches to SCD pathophysiology and therapy.

***Clinical Research***

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

- Multicenter Study of Hydroxyurea (MSH) Patients' Follow-up (see Chapter 11): To determine the toxic effects of long-term hydroxyurea use in the patients who participated in the adult hydroxyurea clinical trial that ended successfully in 1995; 100 percent of the participants are black. A significant finding of the study was that patients who took hydroxyurea for 9 years experienced a 40 percent reduction in deaths.
- BABY HUG (see Chapter 11): To assess the effectiveness of hydroxyurea in preventing onset of chronic organ damage in young black children with sickle cell anemia.
- STOP 2 (see Chapter 9): To determine the optimal primary prevention strategy for the transfusion treatment shown to be effective in STOP 1 in a minority pediatric population. The trial is designed to determine how long transfusions are needed for primary stroke prevention.

An article in the July 2004 issue of the journal *Blood* highlighted a stroke prevention outcome from the NHLBI-supported STOP 1 Trial on the efficacy of blood transfusion in primary stroke prevention. The study showed a strong causal relationship between the publication of the STOP 1 Clinical Alert by the NHLBI and a dramatic reduction in the the rate of first-time stroke in California children with SCD.

The NHLBI is supporting several transplant-related clinical studies that are seeking to reach minority populations. To ensure increased awareness and equitable opportunities for participation, the studies support bilingual transplant center personnel and provide public Web pages, educational materials, and informed consent documents in Spanish, Japanese, Korean, Chinese, and Vietnamese. In addition, focus groups have been held to identify barriers to participation.

- Cord Blood Stem Cell Transplantation Study (COBLT) (see Chapter 11): To establish ethnically diverse cord blood banks and to determine the utility of umbilical cord blood cells as a hematopoietic stem cell source for patients diagnosed with malignant and nonmalignant blood diseases. The COBLT bank contains more than 8,000 cord blood units; approximately 57 percent are from minority donors. Approximately 30 percent of the patients are minority.
- Blood and Marrow Transplant Clinical Research Network (see Chapter 11): In collaboration with the NCI, to promote the efficient comparison of innovative treatments and management strategies for patients undergoing blood or marrow transplantation. It has developed strategies and implemented procedures to enroll patients from minority groups.

Each year in the United States approximately 1,500 children are diagnosed with sickle cell anemia, and 30 to 50 children with thalassemia. A recent retrospective analysis of 44 children who were transplanted with sibling cord blood for SCD or thalassemia showed that matched sibling cord blood transplantation offers the potential for a cure.

- Sibling Donor Cord Blood Banking and Transplantation Study (see Chapter 9): To establish a cord blood bank for collecting sibling donor cord blood in families that currently have a child with sickle cell anemia or thalassemia. Investigators will evaluate the safety and effectiveness of matched sibling cord blood transplantation for treatment of children with SCD or thalassemia. A majority of the participants are black.

Transplants for patients with sickle cell anemia are performed at many centers across the United States, with few performed at a single center. To promote a unified strategy for sharing data, the NHLBI, with support from the National Center for Minority Health and Health Disparities, awarded a grant supplement to the International Bone Marrow Transplant Registry (IBMTR) to collect data on demographics and outcomes of patients with sickle cell anemia who received a blood or marrow transplant. Recognizing that the registry by itself may not be sufficient to instill a sense of collaboration among investigators, the Institute, with support from the NIH Office of Rare Diseases, recently sponsored a meeting to bring

together transplant investigators to review data collected by the IBMTR and to develop a systematic plan to sustain an infrastructure for collaboration among U.S. centers treating and transplanting patients with sickle cell anemia.

Although medical progress has increased the lifespan of patients with SCD, translating research advances to clinical practice remains a challenge. Adult patients continue to have difficulty receiving advanced care. To address this need, the NHLBI held a workshop in June 2004 to focus on the major unmet needs faced by adults with SCD and to develop strategies to address them. This fall, the Institute issued an initiative to establish a SCD Network that will develop and evaluate safe and effective therapies to treat and prevent complications of SCD.

***Education***

The NHLBI has developed a number of publications on SCD that target minorities.

- *Datos Sobre La Anemia Falciforme* (Facts About Sickle Cell Anemia)
- *Fact Sheet: Hydroxyurea in Pediatric Patients With Sickle Cell Disease*
- *Facts About Sickle Cell Anemia*
- *Patient Fact Sheet: The Multicenter Study of Hydroxyurea in Sickle Cell Anemia (MSH)*
- *Management and Therapy of Sickle Cell Disease.*

## Cooley's Anemia

Cooley's anemia is an inherited disorder of red blood cells that affects primarily people of Mediterranean, African, Southeast Asian, Chinese, and Asiatic Indian origin. In 2000, the Institute initiated a program to establish a network of clinical research centers to evaluate new therapeutic agents. Research efforts include developing oral chelators to remove iron overload caused by repetitive transfusion therapy, testing drugs to enhance fetal hemoglobin production, and examining gene therapy approaches to cure the disease.

- Thalassemia (Cooley's Anemia) Clinical Research Network (see Chapter 11): To establish a group of clinical centers to accelerate research in the management of thalassemia, standardize existing treatments, and evaluate new ones.

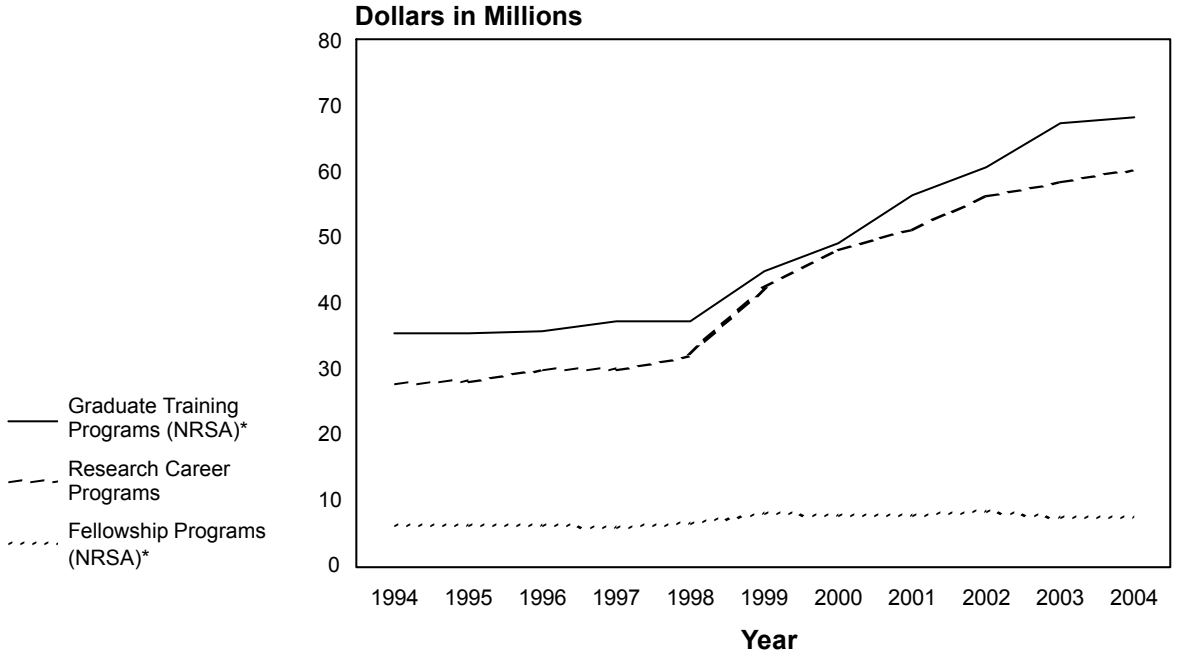
Investigator-initiated studies include efforts to develop oral chelators to remove the iron overload caused by repetitive transfusion therapy; exploration of hormone therapy for patients surviving into their teens; testing of drugs intended to enhance fetal hemoglobin production (hydroxyurea and butyrate); investigation of gene therapy approaches to cure the disease; prevention of bone diseases; optimum treatment of hepatitis; treatment of heart disease and iron overload; noninvasive ways of measuring iron burden; and efforts to improve the safety of the Nation's blood supply.

## Women's Health Initiative

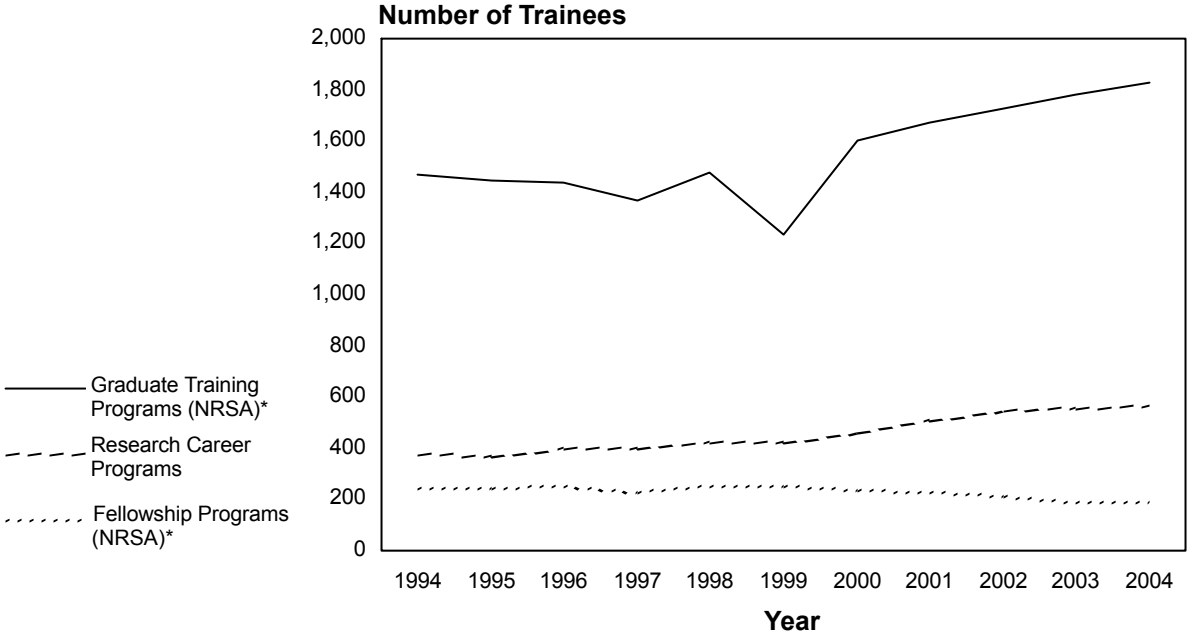
Coronary heart disease, cancer, and osteoporosis are the most common causes of death, disability, and impaired quality of life in postmenopausal women. The WHI (see Chapters 2 and 11) is addressing the benefits and risks of HT, changes in dietary patterns, and calcium/vitamin D supplements in disease prevention. Several of the centers have recruited primarily minority populations: blacks, Hispanics, Asian Americans, Pacific Islanders, and American Indians. The Clinical Trial recruited 12,607 minorities and the Observational Study recruited 15,658. Overall, of the 161,809 postmenopausal women recruited into the WHI, 17 percent were minorities.

# 13. Research Training and Career Development Programs

## NHLBI Research Training and Career Development Obligations: Fiscal Years 1994–2004




## NHLBI Full-Time Training Positions: Fiscal Years 1994–2004




* National Research Service Awards (NRSA).

Note: Numbers of awards and trainees may not agree with other tables due to the method of counting supplements.

## Training Awards, Full-Time Training Positions, and Obligations by Activity: Fiscal Year 2004

| | Number of Awards Obligated | Trainees (Full-time Training Positions) | Direct Cost | Indirect Cost | Total Cost | Percent of Total NHLBI Training Program Dollars |
|---|---|---|---|---|---|---|
| **Fellowship Programs** | | | | | | |
| Predoctoral Fellowship Award (F31) | 18 | 18 | $ 549,661 | $ — | $ 549,661 | 0.6% |
| Individual NRSA (F32) | 168 | 168 | 8,127,743 | — | 8,127,743 | 9.5 |
| Senior Fellowships NRSA (F33) | 3 | 3 | 144,090 | — | 144,090 | 0.2 |
| Subtotal, Fellowships | 189 | 189 | 8,821,494 | — | 8,821,494 | 10.3 |
| **Graduate Training Programs** | | | | | | |
| Institutional NRSA (T32) | 218 | 1,578 | 65,873,312 | 5,355,826 | 71,229,138 | 83.4 |
| Minority Institutional NRSA (T32) | 5 | 32 | 665,397 | 68,683 | 734,080 | 0.9 |
| Off-Quarter Professional Student Training NRSA (T34, T35) | 18 | 99 | 1,819,027 | 173,609 | 1,992,636 | 2.3 |
| Short-Term Training for Minority Students (T35M) | 35 | 119 | 2,428,792 | 242,610 | 2,671,402 | 3.1 |
| Subtotal, Graduate Training Programs | 276 | 1,828 | 70,786,528 | 5,840,728 | 76,627,256* | 89.7 |
| **Total, Training Programs** | **465** | **2,017** | **$79,608,022** | **$5,840,728** | **$85,448,750** | **100.0%** |

* Excludes assessment of $1,744,000.

# History of Training Obligations by Activity: Fiscal Years 1994–2004

| | Dollars (Thousands) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| **Fellowship Programs** | | | | | | | | | | | |
| Predoctoral Fellowship Award (F31) | $ 199 | $ 304 | $ 551 | $ 388 | $ 466 | $ 346 | $ 248 | $ 264 | $ 478 | $ 563 | $ 549 |
| Individual NRSA (F32) | 6,853 | 6,651 | 6,483 | 6,281 | 6,969 | 8,807 | 8,517 | 8,515 | 8,887 | 7,868 | 8,128 |
| Senior Fellowships NRSA (F33) | 99 | 99 | 233 | 179 | 125 | 90 | 92 | 147 | 84 | 112 | 144 |
| Intramural NRSA (F35) | 69 | 49 | — | — | — | — | — | — | — | — | — |
| Subtotal, Fellowships | 7,220 | 7,103 | 7,267 | 6,848 | 7,560 | 9,243 | 8,857 | 8,926 | 9,449 | 8,543 | 8,821 |
| **Graduate Training Programs** | | | | | | | | | | | |
| Institutional NRSA (T32) | 36,534[A] | 36,270[B] | 36,718[C] | 38,253[D] | 37,904[E] | 45,551[F] | 50,507[G] | 58,516[H] | 62,999[I] | 69,951[J] | 71,229[K] |
| Minority Institutional NRSA (T32) | 735 | 982 | 679 | 898 | 706 | 901 | 1,167 | 996 | 1,092 | 1,006 | 734 |
| Off-Quarter Professional Student Training NRSA (T34, T35) | 1,132 | 951 | 1,001 | 1,216 | 1,435 | 1,384 | 966 | 1,974 | 1,987 | 1,975 | 1,993 |
| MARC (T36) | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | — | — | — |
| Short-Term Training for Minority Students (T35M) | 1,616 | 1,760 | 1,834 | 1,612 | 1,964 | 2,494 | 2,570 | 1,877 | 2,057 | 2,594 | 2,671 |
| Subtotal, Training Grants | 40,022 | 39,968 | 40,237 | 41,984 | 42,014 | 50,335 | 55,215 | 63,368 | 68,135 | 75,526 | 76,627 |
| **Total, Training Programs** | **$47,242[A]** | **$47,071[B]** | **$47,504[C]** | **$48,832[D]** | **$49,574[E]** | **$59,578[F]** | **$64,072[G]** | **$72,294[H]** | **$77,584[I]** | **$84,069[J]** | **$85,448[K]** |

A Excludes Assessment of $864,000.
B Excludes Assessment of $964,000.
C Excludes Assessment of $982,000.
D Excludes Assessment of $1,004,000.
E Excludes Assessment of $1,032,000.
F Excludes Assessment of $1,216,000.
G Excludes Assessment of $1,280,000.
H Excludes Assessment of $1,424,000.
I Excludes Assessment of $1,584,000.
J Excludes Assessment of $1,716,000.
K Excludes Assessment of $1,744,000.

## Full-Time Training Positions by Activity: Fiscal Years 1994–2004

**Number of Positions**

| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| **Fellowship Programs** | | | | | | | | | | | |
| Predoctoral Fellowship Award (F31) | 7 | 13 | 21 | 15 | 19 | 13 | 11 | 12 | 18 | 19 | 18 |
| Individual NRSA (F32) | 229 | 222 | 220 | 210 | 225 | 237 | 225 | 208 | 194 | 164 | 168 |
| Senior Fellowships NRSA (F33) | 4 | 4 | 7 | 5 | 4 | 2 | 2 | 3 | 2 | 2 | 3 |
| Intramural NRSA (F35) | 2 | 2 | — | — | — | — | — | — | — | — | — |
| Subtotal, Fellowships | 242 | 241 | 248 | 230 | 248 | 252 | 238 | 223 | 214 | 185 | 189 |
| **Graduate Training Programs** | | | | | | | | | | | |
| Institutional NRSA (T32) | 1,237 | 1,201 | 1,216 | 1,179 | 1,423 | 1,185 | 1,368 | 1,425 | 1,482 | 1,542 | 1,578 |
| Minority Institutional NRSA (T32) | 30 | 47 | 30 | 43 | 52 | 53 | 48 | 43 | 39 | 42 | 32 |
| Off-Quarter Professional Student Training NRSA (T34, T35) | 100 | 76 | 78 | 68 | — | — | 51 | 109 | 179 | 93 | 99 |
| Short-Term Training for Minority Students (T35M) | 102 | 125 | 113 | 75 | — | — | 136 | 93 | 30 | 107 | 119 |
| Subtotal, Training Grants | 1,469 | 1,449 | 1,437 | 1,365 | 1,475 | 1,238 | 1,603 | 1,670 | 1,730 | 1,784 | 1,828 |
| **Total, Training Positions** | **1,711** | **1,690** | **1,685** | **1,595** | **1,723** | **1,490** | **1,841** | **1,893** | **1,944** | **1,969** | **2,017** |

## NHLBI Research Career Programs: Fiscal Years 1994–2004

**Number of Awards**

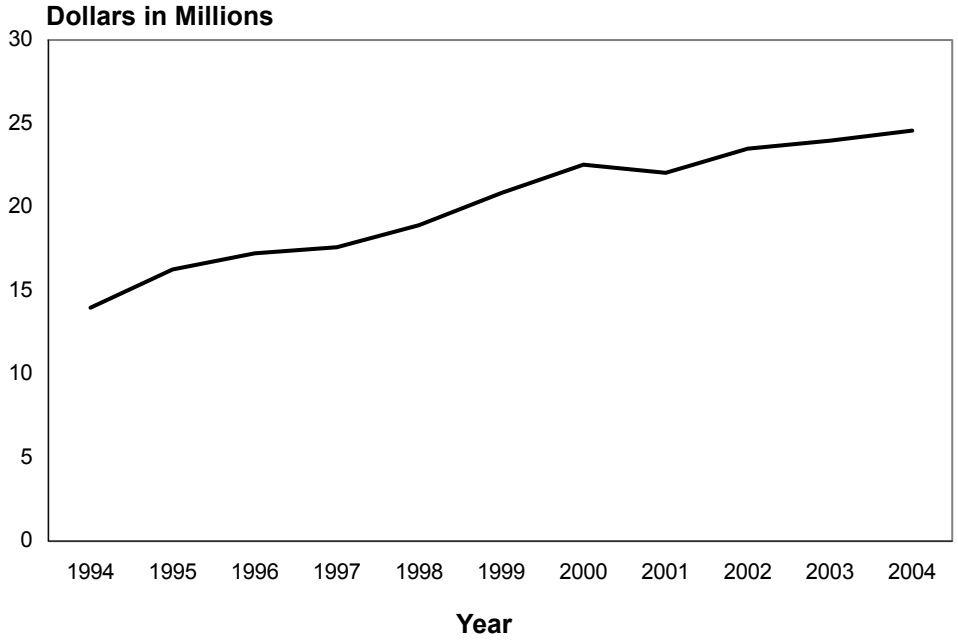
| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| Mentored Research Scientist Development Award for Minority Faculty (K01) | — | — | — | 5 | 19 | 30 | 29 | 44 | 54 | 47 | 46 |
| Minority Institution Faculty Mentored Research Scientist Development Award (K01) | — | — | — | 1 | — | — | 11 | 9 | 2 | 7 | 6 |
| Mentored Scientist Development Award in Research Ethics (K01) | — | — | — | — | — | — | — | — | — | 2 | 2 |
| Independent Scientist Award (K02) | — | — | 3 | 8 | 14 | 18 | 27 | 34 | 33 | 32 | 31 |
| Research Career Development Award (K04) | 34 | 30 | 25 | 18 | 10 | 6 | 1 | — | — | — | — |
| Research Career Award (K06) | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 1 |
| Preventive Cardiology Academic Award (K07) | 11 | 7 | — | — | — | — | — | — | — | — | — |
| Preventive Pulmonary Academic Award (K07) | 8 | 4 | — | — | — | — | — | — | — | — | — |
| Transfusion Medicine Academic Award (K07) | 9 | 5 | 2 | — | — | — | — | — | — | — | — |
| Systemic Pulmonary and Vascular Disease Academic Award (K07) | 11 | 15 | 11 | 9 | 3 | 3 | 1 | — | — | — | — |
| Asthma Academic Award (K07) | 6 | 9 | 9 | 9 | 6 | 3 | — | — | — | — | — |
| Tuberculosis Academic Award (K07) | 12 | 15 | 19 | 23 | 20 | 13 | 9 | 5 | — | — | — |
| Sleep Academic Award (K07) | — | — | 8 | 12 | 20 | 20 | 20 | 12 | 8 | — | — |
| Nutrition Academic Award (K07) | — | — | — | — | 10 | 10 | 19 | 19 | 19 | 9 | 9 |
| Cultural Competence and Health Disparities Academic Award (K07) | — | — | — | — | — | — | — | — | — | — | 8 |
| Clinical Investigator Development Award (K08) | 208 | 222 | 254 | 267 | 278 | 262 | 257 | 241 | 236 | 240 | 229 |
| Physician Scientist Award (K11) | 46 | 22 | 12 | — | — | — | — | — | — | — | — |
| Minority School Faculty Development Award (K14) | 12 | 11 | 15 | 9 | — | — | 4 | 1 | — | — | — |
| Research Development Award for Minority Faculty (K14) | 13 | 28 | 36 | 34 | 37 | 22 | 7 | — | — | — | — |
| Career Enhancement Award for Stem Cell Research (K18) | — | — | — | — | — | — | — | — | — | 1 | 5 |
| NHLBI Career Transition Award (K22) | — | — | — | — | — | — | — | — | — | — | 1 |
| Mentored Patient-Oriented Research Career Development Award (K23) | — | — | — | — | — | 13 | 36 | 58 | 90 | 110 | 122 |
| Midcareer Investigator Award in Patient-Oriented Research (K24) | — | — | — | — | — | 11 | 20 | 27 | 37 | 38 | 32 |
| Mentored Quantitative Research Career Development Award (K25) | — | — | — | — | — | — | — | 2 | 7 | 9 | 12 |
| Clinical Research Curriculum Award (K30) | — | — | — | — | — | 9 | 16 | 55 | 55 | 55 | 55 |
| **Total, Research Career Programs** | **373** | **371** | **397** | **398** | **420** | **422** | **459** | **509** | **543** | **552** | **559** |

# NHLBI Research Career Program Obligations: Fiscal Years 1994–2004

**Dollars (Thousands)**

| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| Mentored Research Scientist Development Award for Minority Faculty (K01) | $ — | $ — | $ — | $ 460 | $ 1,723 | $ 2,738 | $ 3,650 | $ 5,556 | $ 5,711 | $ 6,156 | $ 6,150 |
| Minority Institution Faculty Mentored Research Scientist Award (K01) | — | — | — | 106 | 101 | 905 | 1,300 | 1,143 | 1,703 | 991 | 867 |
| Mentored Scientist Development Award in Research Ethics (K01) | — | — | — | — | — | — | — | — | — | 255 | 253 |
| Independent Scientist Award (K02) | — | — | 207 | 545 | 933 | 1,548 | 2,350 | 3,202 | 3,130 | 3,099 | 3,079 |
| Research Career Development Award (K04) | 2,224 | 2,006 | 1,693 | 1,226 | 684 | 568 | 69 | — | — | — | — |
| Research Career Award (K06) | 102 | 104 | 105 | 103 | 103 | 70 | 70 | 70 | 69 | 69 | 34 |
| Preventive Cardiology Academic Award (K07) | 1,397 | 957 | — | — | — | — | — | — | — | — | — |
| Preventive Pulmonary Academic Award (K07) | 726 | 309 | — | — | — | — | — | — | — | — | — |
| Transfusion Medicine Academic Award (K07) | 868 | 485 | 326 | — | — | — | — | — | — | — | — |
| Systemic Pulmonary and Vascular Diseases Academic Award (K07) | 1,863 | 2,295 | 1,715 | 1,415 | 386 | 423 | 113 | — | — | — | — |
| Asthma Academic Award (K07) | 502 | 749 | 740 | 764 | 509 | 248 | — | — | — | — | — |
| Tuberculosis Academic Award (K07) | 906 | 1,155 | 1,496 | 1,831 | 1,566 | 1,161 | 745 | 396 | — | — | — |
| Sleep Academic Award (K07) | — | — | 699 | 1,027 | 1,734 | 1,736 | 1,760 | 1,081 | 722 | — | — |
| Nutrition Academic Award (K07) | — | — | — | — | 1,491 | 1,480 | 2,829 | 2,869 | 2,906 | 1,472 | 1,516 |
| Cultural Competence and Health Disparities Academic Award (K07) | — | — | — | — | — | — | — | — | — | — | 925 |
| Clinical Investigator Development Award (K08) | 16,635 | 18,090 | 21,093 | 22,238 | 23,122 | 29,741 | 30,189 | 29,263 | 29,295 | 30,288 | 29,037 |
| Physician Scientist Award (K11) | 3,993 | 1,903 | 1,023 | — | — | — | — | — | — | — | — |
| Minority School Faculty Development Award (K14) | 893 | 810 | 1,158 | 729 | 618 | 445 | 862 | 98 | — | — | — |
| Research Development Award for Minority Faculty (K14) | 1,289 | 2,812 | 3,607 | 3,468 | 3,099 | 2,093 | 393 | — | — | — | — |
| Career Enhancement Award for Stem Cell Research (K18) | — | — | — | — | — | — | — | — | — | 243 | 980 |
| NHLBI Career Transition Award (K22) | — | — | — | — | — | — | — | — | — | — | 185 |
| Mentored Patient-Oriented Research Career Development Award (K23) | — | — | — | — | — | 1,687 | 4,619 | 7,570 | 11,909 | 14,571 | 16,216 |
| Midcareer Investigator Award in Patient-Oriented Research (K24) | — | — | — | — | — | 1,054 | 2,072 | 2,877 | 4,058 | 4,368 | 3,815 |
| Mentored Quantitative Research Career Development Award (K25) | — | — | — | — | — | — | — | 272 | 921 | 1,195 | 1,622 |
| Clinical Research Curriculum Award (K30) | — | — | — | — | — | 1,772 | 3,163 | 3,073 | 3,090 | 3,110 | 3,115 |
| **Total, Research Career Program Obligations** | **$31,398** | **$31,675** | **$33,862** | **$33,912** | **$36,069** | **$47,669** | **$54,184** | **$57,470** | **$63,514** | **$65,817** | **$67,794** |

## NHLBI Minority Biomedical Research Training, Career Development, and Research Supplements Program Obligations: Fiscal Years 1994–2004




## NHLBI Minority Biomedical Research Training, Career Development, and Research Supplements Program Obligations: Fiscal Years 1994–2004

| | Dollars (Thousands) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fiscal Year | | | | | | | | | | |
| | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| MARC Summer Research Training Program | $ 31 | $ 28 | $ 32 | $ 17 | $ — | $ 10 | $ 4 | $ 20 | $ 15 | $ 4 | $ — |
| Mentored Research Scientist Development Award for Minority Faculty | — | — | — | 460 | 1,723 | 2,738 | 3,650 | 5,556 | 5,711 | 6,156 | 6,150 |
| MARC | — | — | 5 | 5 | 5 | — | 5 | 5 | — | — | — |
| Minority Biomedical Research Support (MBRS) | 2,433 | 2,313 | 2,503 | 2,722 | 2,978 | 3,423 | 3,873 | 3,165 | 2,793 | 3,600 | 2,806 |
| Minority Institution Faculty Mentored Research Scientist Development Award | — | — | — | 106 | 101 | 905 | 1,300 | 1,143 | 1,703 | 991 | 867 |
| Minority Institution Research Training Program | 735 | 982 | 679 | 898 | 706 | 901 | 1,167 | 996 | 1,092 | 1,006 | 734 |
| Minority Predoctoral Fellowship | 199 | 304 | 551 | 388 | 436 | 345 | 248 | 264 | 278 | 308 | 374 |
| Minority Research Supplements Program | 6,754 | 7,265 | 6,714 | 7,070 | 7,043 | 7,440 | 8,304 | 8,587 | 9,822 | 9,323 | 10,938 |
| Minority School Faculty Development Award | 893 | 810 | 1,158 | 729 | 618 | 445 | 862 | 98 | — | — | — |
| Reentry Supplements | — | — | 140 | 152 | 249 | 106 | 176 | 384 | — | — | — |
| Research Development Award for Minority Faculty | 1,289 | 2,812 | 3,607 | 3,468 | 3,099 | 2,093 | 393 | — | — | — | — |
| Short-Term Training for Minority Students | 1,616 | 1,760 | 1,834 | 1,612 | 1,964 | 2,494 | 2,570 | 1,876 | 2,057 | 2,594 | 2,671 |
| **Total, Minority Programs** | **$13,950** | **$16,274** | **$17,223** | **$17,627** | **$18,922** | **$20,900** | **$22,552** | **$22,094** | **$23,471** | **$23,982** | **$24,540** |

## NHLBI Research Supplements Program by Award Type: Fiscal Years 1994–2004

**Number of Awards**

| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| Minority Supplements | | | | | | | | | | | |
| Investigator | 46 | 49 | 42 | 38 | 31 | 32 | 33 | 33 | 46 | 47 | 35 |
| Postdoctoral | 31 | 39 | 49 | 47 | 50 | 47 | 42 | 41 | 33 | 38 | 37 |
| Graduate | 55 | 42 | 37 | 36 | 48 | 53 | 47 | 43 | 45 | 57 | 61 |
| Undergraduate | 35 | 27 | 12 | 23 | 25 | 17 | 19 | 12 | 17 | 18 | 17 |
| High School | 15 | 10 | 8 | 9 | 11 | 6 | — | 3 | 3 | 4 | 3 |
| Post-Master/Post-Baccalaureate | — | — | — | — | — | — | — | — | 2 | 8 | 17 |
| Reentry Supplements | — | — | 2 | 2 | 3 | 2 | 1 | 3 | — | — | 3 |
| Disability Supplements | 8 | 4 | 3 | 3 | 2 | 1 | 5 | 4 | 5 | 4 | 3 |
| **Total, Research Supplements Program** | **190** | **171** | **153** | **158** | **170** | **158** | **147** | **139** | **151** | **176** | **176** |

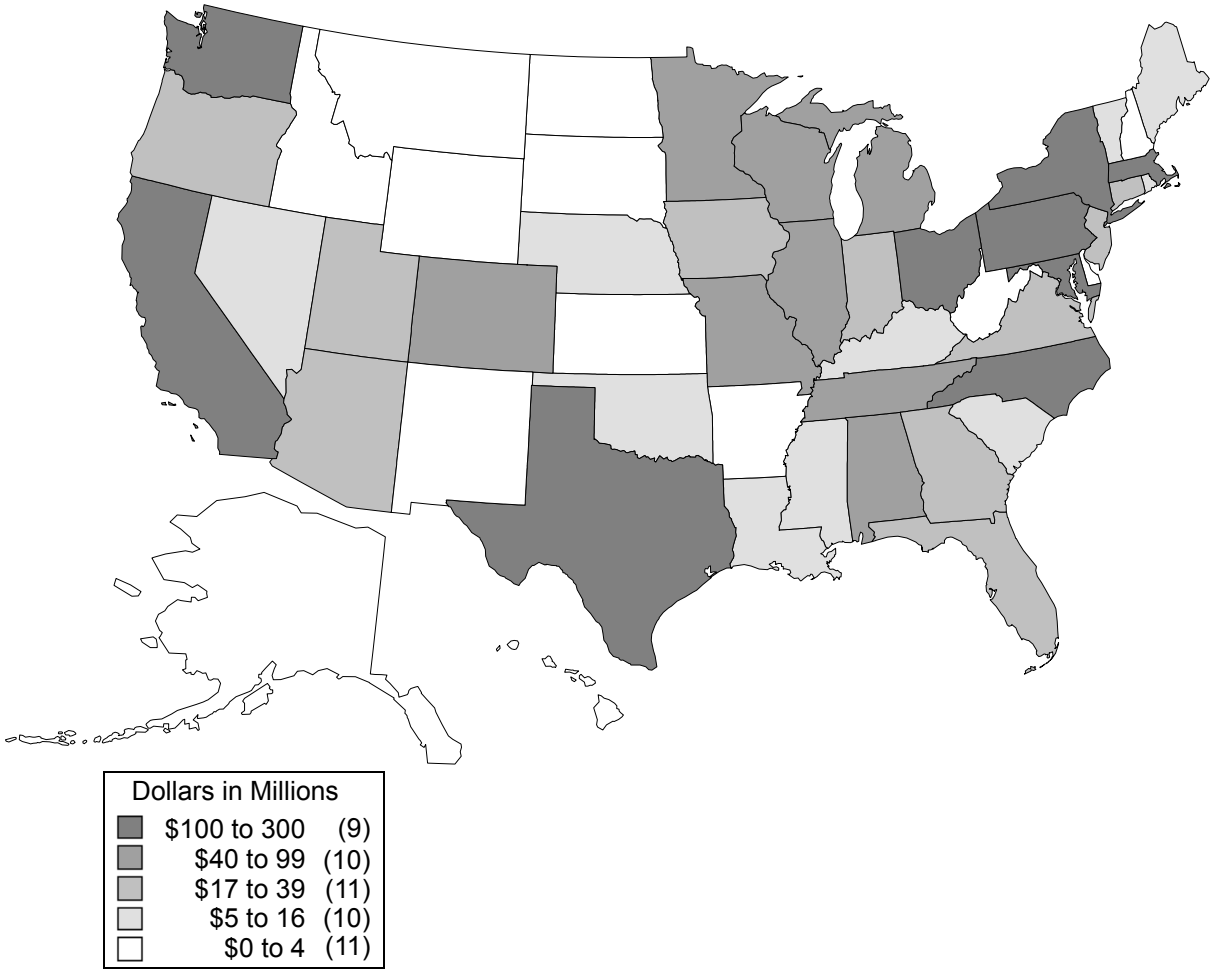
## NHLBI Research Supplements Program Obligations by Award Type: Fiscal Years 1994–2004

**Dollars (Thousands)**

| | Fiscal Year | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** |
| Minority Supplements | | | | | | | | | | | |
| Investigator | $2,894 | $3,319 | $2,552 | $2,412 | $2,185 | $2,331 | $3,262 | $3,430 | $5,046 | $3,844 | $4,256 |
| Postdoctoral | 1,882 | 2,153 | 2,899 | 3,172 | 3,032 | 3,110 | 3,053 | 3,086 | 2,554 | 2,655 | 2,713 |
| Graduate | 1,585 | 1,402 | 1,116 | 1,181 | 1,527 | 1,806 | 1,791 | 1,818 | 1,864 | 2,181 | 2,439 |
| Undergraduate | 332 | 351 | 120 | 273 | 246 | 166 | 198 | 235 | 260 | 301 | 282 |
| High School | 61 | 40 | 27 | 32 | 53 | 27 | — | 18 | 33 | 33 | 13 |
| Post-Master/Post-Baccalaureate | — | — | — | — | — | — | — | — | 65 | 309 | 597 |
| Reentry Supplements | — | — | 140 | 152 | 249 | 106 | 176 | 384 | — | — | 495 |
| Disability Supplements | 357 | 277 | 194 | 165 | 96 | 72 | 282 | 187 | 474 | 360 | 143 |
| **Total, Research Supplements Program** | **$7,111** | **$7,542** | **$7,048** | **$7,387** | **$7,388** | **$7,618** | **$8,762** | **$9,158** | **$10,296** | **$9,683** | **$10,938** |

# 14. Geographic Distribution of Awards: Fiscal Year 2004

**Geographic Distribution of Awards by State: Fiscal Year 2004**



# Geographic Distribution of Awards by State or Country: Fiscal Year 2004

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| **Alabama** | | | | | | | | |
| Auburn University at Auburn | 5 | 1,320,112 | 4 | 1,271,184 | 1 | 48,928 | — | — |
| BioCryst, Ltd. | 1 | 97,990 | 1 | 97,990 | — | — | — | — |
| CFD Research Corporation | 2 | 99,951 | 2 | 99,951 | — | — | — | — |
| Cooper Green Hospital, Birmingham | 1 | 578,079 | 1 | 578,079 | — | — | — | — |
| Gem Pharmaceuticals, Inc. | 1 | 195,590 | 1 | 195,590 | — | — | — | — |
| University of Alabama at Birmingham | 80 | 34,621,004 | 70 | 29,122,825 | 6 | 1,321,708 | 4 | 4,176,471 |
| University of South Alabama | 14 | 4,831,735 | 13 | 4,710,920 | 1 | 120,815 | — | — |
| **Total Alabama** | **104** | **41,744,461** | **92** | **36,076,539** | **8** | **1,491,451** | **4** | **4,176,471** |
| **Arizona** | | | | | | | | |
| Arete Associates | 1 | 312,445 | 1 | 312,445 | — | — | — | — |
| Arizona State University | 5 | 1,220,493 | 5 | 1,220,493 | — | — | — | — |
| Carl T. Hayden VA Medical Center | 1 | 225,000 | 1 | 225,000 | — | — | — | — |
| Intrinsic Bioprobes, Inc. | 1 | 591,033 | 1 | 591,033 | — | — | — | — |
| Mayo Clinic Scottsdale | 3 | 1,047,000 | 3 | 1,047,000 | — | — | — | — |
| St. Joseph's Hospital and Medical Center | 1 | 312,035 | 1 | 312,035 | — | — | — | — |
| University of Arizona | 34 | 14,022,219 | 29 | 12,493,916 | 4 | 808,773 | 1 | 719,530 |
| **Total Arizona** | **46** | **17,730,225** | **41** | **16,201,922** | **4** | **808,773** | **1** | **719,530** |
| **Arkansas** | | | | | | | | |
| Arkansas Children's Hospital Research Institute | 1 | 155,250 | 1 | 155,250 | — | — | — | — |
| University of Arkansas for Medical Sciences, Little Rock | 5 | 864,787 | 5 | 864,787 | — | — | — | — |
| **Total Arkansas** | **6** | **1,020,037** | **6** | **1,020,037** | **—** | **—** | **—** | **—** |
| **California** | | | | | | | | |
| Advanced Brian Monitoring, Inc. | 2 | 571,719 | 2 | 571,719 | — | — | — | — |
| Advanced Cardiovascular Systems, Inc. | 1 | 307,600 | 1 | 307,600 | — | — | — | — |
| Alexza Molecular Delivery Corporation | 3 | 546,691 | 3 | 546,691 | — | — | — | — |
| Applied Scientific Research | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| Applied Tissue and Materials, Inc. | 1 | 191,313 | 1 | 191,313 | — | — | — | — |
| Arginox Pharmaceuticals, Inc. | 2 | 321,141 | 2 | 321,141 | — | — | — | — |
| Avrion Molecular, Inc. | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| Biotime, Inc. | 1 | 149,994 | 1 | 149,994 | — | — | — | — |
| Blood Systems Research Institute | 1 | 348,827 | 1 | 348,827 | — | — | — | — |
| Burnham Institute | 8 | 2,643,928 | 7 | 2,595,000 | 1 | 48,928 | — | — |
| California Institute of Technology | 2 | 1,123,754 | 2 | 1,123,754 | — | — | — | — |
| California State Polytechnic University, Pomona | — | 154,141 | — | 154,141 | — | — | — | — |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| California State University, Long Beach | 1 | 213,750 | 1 | 213,750 | — | — | — | — |
| California State University, Northridge | — | 117,048 | — | 117,048 | — | — | — | — |
| Cedars-Sinai Medical Center | 10 | 4,301,012 | 9 | 4,257,461 | — | — | 1 | 43,551 |
| Cerus Corporation | 2 | 474,303 | 2 | 474,303 | — | — | — | — |
| Children's Hospital and Research Center at Oakland | 14 | 9,065,670 | 12 | 8,832,320 | 2 | 233,350 | — | — |
| Children's Hospital of Los Angeles | 18 | 8,409,825 | 18 | 8,409,825 | — | — | — | — |
| Children's Hospital of Orange County | 1 | 26,983 | — | — | 1 | 26,983 | — | — |
| Chimeric Technologies, Inc. | 1 | 313,180 | 1 | 313,180 | — | — | — | — |
| City of Hope/Beckman Research Institute | 3 | 2,339,335 | 3 | 2,339,335 | — | — | — | — |
| Cyntellect, Inc. | 1 | 211,767 | 1 | 211,767 | — | — | — | — |
| Cytograft Tissue Engineering, Inc. | 1 | 427,550 | 1 | 427,550 | — | — | — | — |
| Diagnostics for the Real World | 2 | 2,427,656 | 2 | 2,427,656 | — | — | — | — |
| Fibrogen, Inc. | 1 | 87,500 | 1 | 87,500 | — | — | — | — |
| Functional Insect Genomics Institute | 1 | 228,155 | 1 | 228,155 | — | — | — | — |
| Genetronics, Inc. | 1 | 102,865 | 1 | 102,865 | — | — | — | — |
| Gen-Probe, Inc. | 1 | 4,300,029 | — | — | — | — | 1 | 4,300,029 |
| Good Samaritan Hospital | 2 | 510,930 | 2 | 510,930 | — | — | — | — |
| Harbor-UCLA Research and Education Institute | 11 | 4,419,879 | 9 | 3,877,132 | — | — | 2 | 542,747 |
| House Ear Institute | 1 | 283,500 | 1 | 283,500 | — | — | — | — |
| Ibis Therapeutics, Inc. | 1 | 94,040 | 1 | 94,040 | — | — | — | — |
| Interhealth Nutraceuticals, Inc. | 1 | 149,800 | 1 | 149,800 | — | — | — | — |
| Intuitive Surgical | 1 | 93,345 | 1 | 93,345 | — | — | — | — |
| Inverseon, Inc. | 2 | 196,200 | 2 | 196,200 | — | — | — | — |
| ISCHEM Corporation | 1 | 374,972 | 1 | 374,972 | — | — | — | — |
| J. David Gladstone Institutes | 7 | 2,663,384 | 6 | 2,614,456 | 1 | 48,928 | — | — |
| Kaiser Foundation Research Institute | 8 | 7,335,577 | 4 | 3,984,810 | — | — | 4 | 3,350,767 |
| La Jolla Bioengineering Institute | 2 | 568,056 | 2 | 568,056 | — | — | — | — |
| La Jolla Institute for Molecular Medicine | 3 | 1,268,800 | 3 | 1,268,800 | — | — | — | — |
| LaunchPoint Technologies, LLC | 2 | 574,465 | 2 | 574,465 | — | — | — | — |
| Loma Linda University | 6 | 1,558,000 | 6 | 1,558,000 | — | — | — | — |
| Los Angeles Orthopaedic Foundation | 1 | 300,000 | 1 | 300,000 | — | — | — | — |
| Lpath Therapeutics, Inc. | 2 | 304,154 | 2 | 304,154 | — | — | — | — |
| Macropore Biosurgery, Inc. | 2 | 413,467 | 2 | 413,467 | — | — | — | — |
| Magnesensors, Inc. | 1 | 169,850 | 1 | 169,850 | — | — | — | — |
| Maxwell Sensors, Inc. | 1 | 100,259 | 1 | 100,259 | — | — | — | — |
| National Childhood Cancer Foundation | 1 | 966,377 | — | — | — | — | 1 | 966,377 |
| Nicopharm Pharmaceutical Solutions, Inc. | 1 | 138,940 | 1 | 138,940 | — | — | — | — |
| Northern California Institute for Research and Education | 6 | 5,758,317 | 6 | 5,758,317 | — | — | — | — |
| Oma Medical | 1 | 99,502 | 1 | 99,502 | — | — | — | — |
| Pacific Tuberculosis/Cancer Research Organization | 1 | 460,525 | 1 | 460,525 | — | — | — | — |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| Palo Alto Institute for Research and Education, Inc. | 1 | 223,200 | 1 | 223,200 | — | — | — | — |
| Palo Alto Medical Foundation | 2 | 1,210,509 | 2 | 1,210,509 | — | — | — | — |
| Polymer Technology Group, Inc. | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| ProteomTech, Inc. | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| Pulmonetic Systems, Inc. | 1 | 485,300 | 1 | 485,300 | — | — | — | — |
| Quantum Applied Science and Research | 2 | 199,916 | 2 | 199,916 | — | — | — | — |
| Rand Corporation | 2 | 851,560 | 2 | 851,560 | — | — | — | — |
| Reva Medical, Inc. | 1 | 150,000 | 1 | 150,000 | — | — | — | — |
| Sam Technology, Inc. | 1 | 335,213 | 1 | 335,213 | — | — | — | — |
| San Diego State University | 11 | 5,910,418 | 11 | 5,910,418 | — | — | — | — |
| Sangamo BioSciences, Inc. | 1 | 104,000 | 1 | 104,000 | — | — | — | — |
| Sangart, Inc. | 1 | 133,303 | 1 | 133,303 | — | — | — | — |
| Scripps Research Institute | 39 | 20,332,726 | 34 | 19,364,326 | 5 | 968,400 | — | — |
| Selective Genetics, Inc. | 1 | 1,014,190 | 1 | 1,014,190 | — | — | — | — |
| Shanbrom Technologies, LLC | 1 | 99,750 | 1 | 99,750 | — | — | — | — |
| Sidney Kimmel Cancer Center | 3 | 1,359,675 | 3 | 1,359,675 | — | — | — | — |
| Sierra Interventions, LLC | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| Sri International | 2 | 862,171 | 2 | 862,171 | — | — | — | — |
| Stanford University | 73 | 37,071,900 | 64 | 34,908,710 | 8 | 1,138,190 | 1 | 1,025,000 |
| Twenty First Century Medicine, Inc. | 1 | 590,059 | 1 | 590,059 | — | — | — | — |
| University of California, Berkeley | 7 | 1,714,019 | 6 | 1,588,237 | 1 | 125,782 | — | — |
| University of California, Davis | 33 | 10,334,784 | 29 | 9,591,707 | 2 | 414,076 | 2 | 329,001 |
| University of California, Irvine | 18 | 6,621,230 | 14 | 4,572,435 | — | — | 4 | 2,048,795 |
| University of California, Lawrence Berkeley National Laboratory | 7 | 5,512,623 | 6 | 5,209,424 | 1 | 303,199 | — | — |
| University of California, Los Angeles | 62 | 30,478,944 | 53 | 27,942,518 | 6 | 1,341,223 | 3 | 1,195,203 |
| University of California, Merced | 1 | 350,068 | 1 | 350,068 | — | — | — | — |
| University of California, Riverside | 1 | 368,452 | 1 | 368,452 | — | — | — | — |
| University of California, San Diego | 85 | 43,882,442 | 69 | 40,063,059 | 12 | 2,444,180 | 4 | 1,375,203 |
| University of California, San Francisco | 99 | 38,436,675 | 87 | 36,602,112 | 12 | 1,834,563 | — | — |
| University of California, Santa Barbara | 1 | 234,707 | 1 | 234,707 | — | — | — | — |
| University of Southern California | 19 | 6,840,466 | 19 | 6,840,466 | — | — | — | — |
| Veterans Medical Research Foundation, San Diego | 3 | 915,075 | 3 | 915,075 | — | — | — | — |
| WebSciences International | 1 | 566,150 | 1 | 566,150 | — | — | — | — |
| **Total California** | **629** | **285,897,600** | **554** | **261,793,125** | **52** | **8,927,802** | **23** | **15,176,673** |
| **Colorado** | | | | | | | | |
| Children's Hospital (Denver) | 1 | 22,500 | 1 | 22,500 | — | — | — | — |
| Colorado State University, Fort Collins | 3 | 738,533 | 2 | 695,557 | 1 | 42,976 | — | — |
| Denver Health and Hospital Authority | 2 | 1,351,625 | 2 | 1,351,625 | — | — | — | — |
| Kestrel Labs, Inc. | 1 | 468,643 | 1 | 468,643 | — | — | — | — |
| Keystone Symposia | 2 | 40,000 | 2 | 40,000 | — | — | — | — |
| Klein Buendel, Inc. | 1 | 103,446 | 1 | 103,446 | — | — | — | — |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| Myogen, Inc. | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| National Jewish Medical and Research Center | 36 | 19,318,359 | 33 | 19,137,482 | 2 | 103,832 | 1 | 77,045 |
| Rocky Mountain Biosystems, Inc. | 2 | 224,833 | 2 | 224,833 | — | — | — | — |
| Rose Biomedical Development Corporation | 2 | 528,694 | 2 | 528,694 | — | — | — | — |
| University of Colorado at Boulder | 13 | 2,907,331 | 8 | 2,395,342 | 5 | 511,989 | — | — |
| University of Colorado Health Sciences Center | 63 | 25,613,415 | 55 | 22,889,150 | 5 | 1,580,241 | 3 | 1,144,084 |
| Visible Productions, LLC | 1 | 277,346 | 1 | 277,346 | — | — | — | — |
| **Total Colorado** | **128** | **51,694,785** | **111** | **48,234,618** | **13** | **2,239,038** | **4** | **1,221,129** |
| | | | | | | | | |
| **Connecticut** | | | | | | | | |
| CAS Medical Systems, Inc. | 1 | 99,938 | 1 | 99,938 | — | — | — | — |
| John B. Pierce Laboratory, Inc. | 3 | 934,395 | 3 | 934,395 | — | — | — | — |
| L2 Diagnostics, LLC | 1 | 98,179 | 1 | 98,179 | — | — | — | — |
| Physiological Technologies | 1 | 99,510 | 1 | 99,510 | — | — | — | — |
| University of Connecticut School of Medicine and Dental Medicine | 16 | 6,973,322 | 16 | 6,973,322 | — | — | — | — |
| Wesleyan University | 1 | 284,000 | 1 | 284,000 | — | — | — | — |
| Yale University | 66 | 27,580,117 | 58 | 25,875,445 | 8 | 1,704,672 | — | — |
| **Total Connecticut** | **89** | **36,069,461** | **81** | **34,364,789** | **8** | **1,704,672** | **—** | **—** |
| | | | | | | | | — |
| **Delaware** | | | | | | | | — |
| Compact Membrane Systems, Inc. | 2 | 714,644 | 2 | 714,644 | — | — | — | — |
| Sorption Technologies, Inc. | 1 | 99,770 | 1 | 99,770 | — | — | — | — |
| University of Delaware | 4 | 1,107,000 | 4 | 1,107,000 | — | — | — | — |
| **Total Delaware** | **7** | **1,921,414** | **7** | **1,921,414** | **—** | **—** | **—** | **—** |
| | | | | | | | | |
| **District of Columbia** | | | | | | | | |
| American Institutes for Research | 2 | 2,458,278 | — | — | — | — | 2 | 2,458,278 |
| American National Red Cross | 1 | 371,326 | 1 | 371,326 | — | — | — | — |
| American Registry of Pathology, Inc. | 1 | 287,463 | 1 | 287,463 | — | — | — | — |
| Children's Research Institute | 6 | 2,279,231 | 5 | 2,196,854 | — | — | 1 | 82,377 |
| George Washington University | 11 | 3,976,976 | 10 | 3,551,976 | — | — | 1 | 425,000 |
| Georgetown University | 17 | 7,157,225 | 17 | 7,157,225 | — | — | — | — |
| Health Media Lab, Inc. | 1 | 486,819 | 1 | 486,819 | — | — | — | — |
| Healthmark Associates | 1 | 416,938 | 1 | 416,938 | — | — | — | — |
| Howard University | 6 | 2,521,245 | 3 | 1,746,927 | 1 | 130,838 | 2 | 643,480 |
| Medstar Research Institute | 1 | 924,028 | — | — | — | — | 1 | 924,028 |
| U.S. Bureau of the Census | 1 | 559,000 | — | — | — | — | 1 | 559,000 |
| U.S. Department of Agriculture | 1 | 200,000 | 1 | 200,000 | — | — | — | — |
| U.S. Department of Health and Human Services, Office of Human Development Services | 6 | 58,695,062 | — | — | — | — | 6 | 58,695,062 |
| U.S. Department of Veterans Affairs Medical Center | 1 | 120,057 | — | — | — | — | 1 | 120,057 |
| **Total District of Columbia** | **56** | **80,453,648** | **40** | **16,415,528** | **1** | **130,838** | **15** | **63,907,282** |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| **Florida** | | | | | | | | |
| Alpha-1 Foundation | 1 | 20,437 | 1 | 20,437 | — | — | — | — |
| Florida Agricultural and Mechanical University | — | 338,394 | — | 338,394 | — | — | — | — |
| Florida Atlantic University | 2 | 526,875 | 2 | 526,875 | — | — | — | — |
| Florida Institute of Technology | 1 | 243,250 | 1 | 243,250 | — | — | — | — |
| Florida International University | — | 258,260 | — | 258,260 | — | — | — | — |
| Florida State University | 3 | 1,190,668 | 3 | 1,190,668 | — | — | — | — |
| H. Lee Moffitt Cancer Center and Research Institute | 1 | 230,673 | 1 | 230,673 | — | — | — | — |
| Innovia, LLC | 1 | 413,679 | 1 | 413,679 | — | — | — | — |
| Mount Sinai Medical Center, Miami Beach | — | 1,000,000 | — | 1,000,000 | — | — | — | — |
| Nemours Children's Clinic | 1 | 520,186 | 1 | 520,186 | — | — | — | — |
| Nova Southeastern University | 2 | 360,554 | 2 | 360,554 | — | — | — | — |
| Transgenex Therapeutics | 2 | 267,916 | 2 | 267,916 | — | — | — | — |
| University of Central Florida | 2 | 600,319 | 2 | 600,319 | — | — | — | — |
| University of Florida | 42 | 14,700,995 | 38 | 14,163,151 | 3 | 262,844 | 1 | 275,000 |
| University of Miami, Coral Gables | 4 | 3,191,450 | 3 | 2,874,128 | 1 | 317,322 | — | — |
| University of Miami Medical Center | 20 | 6,969,763 | 17 | 5,983,612 | 1 | 343,605 | 2 | 642,546 |
| University of South Florida | 6 | 1,958,995 | 6 | 1,958,995 | — | — | — | — |
| Vicor Technologies, Inc. | 1 | 750,000 | 1 | 750,000 | — | — | — | — |
| **Total Florida** | **89** | **33,542,414** | **81** | **31,701,097** | **5** | **923,771** | **3** | **917,546** |
| **Georgia** | | | | | | | | |
| American Cardiovascular Research Institute | 1 | 157,242 | 1 | 157,242 | — | — | — | — |
| Bresagen, Inc. | — | 125,000 | — | 125,000 | — | — | — | — |
| Centers for Disease Control and Prevention | 1 | 725,000 | — | — | — | — | 1 | 725,000 |
| Emory University | 63 | 22,290,867 | 53 | 20,463,221 | 8 | 926,025 | 2 | 901,621 |
| Georgia Institute of Technology | 6 | 2,863,897 | 5 | 2,814,969 | 1 | 48,928 | — | — |
| Georgia State University | 3 | 720,440 | 3 | 720,440 | — | — | — | — |
| Medical College of Georgia | 38 | 15,740,531 | 35 | 15,387,036 | 3 | 353,495 | — | — |
| Mercer University, Macon | 1 | 168,946 | 1 | 168,946 | — | — | — | — |
| Morehouse School of Medicine | 12 | 4,922,368 | 11 | 4,719,953 | 1 | 202,425 | — | — |
| Transfusion and Transplantation Technology | 2 | 195,741 | 2 | 195,741 | — | — | — | — |
| University of Georgia | 4 | 652,783 | 3 | 625,800 | 1 | 26,983 | — | — |
| **Total Georgia** | **131** | **48,562,815** | **114** | **45,378,348** | **14** | **1,557,846** | **3** | **1,626,621** |
| **Hawaii** | | | | | | | | |
| Pacific Health Research Institute | 2 | 1,001,629 | 2 | 1,001,629 | — | — | — | — |
| Queen's Medical Center | 1 | 600,000 | 1 | 600,000 | — | — | — | — |
| University of Hawaii at Hilo | — | 265,082 | — | 265,082 | — | — | — | — |
| University of Hawaii at Manoa | 2 | 743,750 | 2 | 743,750 | — | — | — | — |
| **Total Hawaii** | **5** | **2,610,461** | **5** | **2,610,461** | **—** | **—** | **—** | **—** |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| **Illinois** | | | | | | | | |
| AJ Medical Engineering | 1 | 827,746 | 1 | 827,746 | — | — | — | — |
| BioTechPlex Corporation | 4 | 1,066,563 | 4 | 1,066,563 | — | — | — | — |
| Children's Memorial Hospital, Chicago | 1 | 98,010 | 1 | 98,010 | — | — | — | — |
| Cordynamics, Inc. | 1 | 97,838 | 1 | 97,838 | — | — | — | — |
| Evanston Northwestern Healthcare Research Institute | 2 | 522,202 | 2 | 522,202 | — | — | — | — |
| Hektoen Institute for Medical Research | 1 | 763,746 | 1 | 763,746 | — | — | — | — |
| Howard Brown Health Center | — | 96,213 | — | 96,213 | — | — | — | — |
| Loyola University, Chicago | 19 | 5,970,876 | 17 | 5,878,972 | 2 | 91,904 | — | — |
| Midwestern University | 1 | 200,496 | 1 | 200,496 | — | — | — | — |
| Northwestern University | 64 | 23,604,680 | 54 | 19,281,497 | 7 | 1,146,140 | 3 | 3,177,043 |
| Rosalind Franklin University of Medicine and Science | 2 | 507,000 | 2 | 507,000 | — | — | — | — |
| Rush University Medical Center | 9 | 3,908,950 | 8 | 3,216,618 | — | — | 1 | 692,332 |
| SloWave, Inc. | 1 | 98,322 | 1 | 98,322 | — | — | — | — |
| Southern Illinois University, Carbondale | 3 | 830,185 | 3 | 830,185 | — | — | — | — |
| Southern Illinois University School of Medicine | 1 | 246,750 | 1 | 246,750 | — | — | — | — |
| SSC Small Business Illinois | 1 | 389,341 | — | — | — | — | 1 | 389,341 |
| University of Chicago | 31 | 11,893,264 | 26 | 10,520,687 | 4 | 1,281,769 | 1 | 90,808 |
| University of Illinois at Chicago | 52 | 20,361,862 | 46 | 19,151,302 | 6 | 1,210,560 | — | — |
| University of Illinois, Urbana–Champaign | 4 | 1,358,232 | 4 | 1,358,232 | — | — | — | — |
| **Total Illinois** | **198** | **72,842,276** | **173** | **64,762,379** | **19** | **3,730,373** | **6** | **4,349,524** |
| **Indiana** | | | | | | | | |
| Clarian Health Partners, Inc. | 1 | 245,753 | 1 | 245,753 | — | — | — | — |
| General Biotechnology, LLC | 1 | 498,846 | 1 | 498,846 | — | — | — | — |
| Indiana University–Purdue University at Indianapolis | 50 | 18,854,144 | 48 | 18,255,348 | 2 | 598,796 | — | — |
| OptoSonics, Inc. | 1 | 111,165 | 1 | 111,165 | — | — | — | — |
| University of Notre Dame | 3 | 2,411,467 | 3 | 2,411,467 | — | — | — | — |
| **Total Indiana** | **56** | **22,121,375** | **54** | **21,522,579** | **2** | **598,796** | **—** | **—** |
| **Iowa** | | | | | | | | |
| Maharishi University of Management | 1 | 496,432 | 1 | 496,432 | — | — | — | — |
| University of Iowa | 76 | 32,503,099 | 70 | 29,847,209 | 5 | 2,255,890 | 1 | 400,000 |
| Vida Technologies | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| **Total Iowa** | **78** | **33,099,531** | **72** | **30,443,641** | **5** | **2,255,890** | **1** | **400,000** |
| **Kansas** | | | | | | | | |
| Kansas State University | 3 | 463,919 | 2 | 436,500 | 1 | 27,419 | — | — |
| University of Kansas, Lawrence | 2 | 666,460 | 2 | 666,460 | — | — | — | — |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| University of Kansas Medical Center | 7 | 1,738,799 | 6 | 1,707,780 | 1 | 31,019 | — | — |
| Wichita State University | 1 | 180,660 | 1 | 180,660 | — | — | — | — |
| **Total Kansas** | **13** | **3,049,838** | **11** | **2,991,400** | **2** | **58,438** | **—** | **—** |
| **Kentucky** | | | | | | | | |
| Regenerex, LLC | 1 | 220,500 | 1 | 220,500 | — | — | — | — |
| University of Kentucky | 31 | 8,420,489 | 29 | 8,251,912 | 2 | 168,577 | — | — |
| University of Louisville | 37 | 10,276,748 | 32 | 10,025,813 | 5 | 250,935 | — | — |
| **Total Kentucky** | **69** | **18,917,737** | **62** | **18,498,225** | **7** | **419,512** | **—** | **—** |
| **Louisiana** | | | | | | | | |
| Louisiana State University Health Sciences Center, New Orleans | 11 | 4,680,056 | 10 | 4,404,768 | — | — | 1 | 275,288 |
| Louisiana State University Health Sciences Center, Shreveport | 1 | 217,500 | 1 | 217,500 | — | — | — | — |
| Louisana State University Pennington Biomedical Research Center | 3 | 920,820 | 3 | 920,820 | — | — | — | — |
| Tulane University of Louisiana | 23 | 8,974,547 | 20 | 8,696,648 | 3 | 277,899 | — | — |
| **Total Louisiana** | **38** | **14,792,923** | **34** | **14,239,736** | **3** | **277,899** | **1** | **275,288** |
| **Maine** | | | | | | | | |
| American Red Cross Blood Services, New England | 1 | 257,915 | — | — | — | — | 1 | 257,915 |
| Bowdoin College | 1 | 187,210 | 1 | 187,210 | — | — | — | — |
| Jackson Laboratory | 11 | 6,735,091 | 10 | 6,729,471 | 1 | 5,620 | — | — |
| Maine Medical Center | 7 | 2,388,650 | 7 | 2,388,650 | — | — | — | — |
| New England Medical Center Hospitals | 1 | 365,816 | — | — | — | — | 1 | 365,816 |
| New England Research Institutes, Inc. | 1 | 837,227 | — | — | — | — | 1 | 837,227 |
| University of Maine, Orono | 1 | 472,968 | 1 | 472,968 | — | — | — | — |
| **Total Maine** | **23** | **11,244,877** | **19** | **9,778,299** | **1** | **5,620** | **3** | **1,460,958** |
| **Maryland** | | | | | | | | |
| Adlyfe, Inc. | 1 | 372,005 | 1 | 372,005 | — | — | — | — |
| Biosurface Engineering Technologies | 1 | 99,750 | 1 | 99,750 | — | — | — | — |
| Bon Secours Hospital, Baltimore | 1 | 600,000 | 1 | 600,000 | — | — | — | — |
| Cellex, Inc. | 1 | 99,670 | 1 | 99,670 | — | — | — | — |
| Clearant, Inc. | 1 | 319,487 | 1 | 319,487 | — | — | — | — |
| Clinical Trials and Surveys Corporation | 2 | 2,122,831 | — | — | — | — | 2 | 2,122,831 |
| EMMES Corporation | 2 | 837,598 | — | — | — | — | 2 | 837,598 |
| Engineering and Scientific Research Association | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| Eva Corporation | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| Federation of American Societies for Experimental Biology | 3 | 56,250 | 3 | 56,250 | — | — | — | — |
| Genex Technologies, Inc. | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| Guilford Pharmaceuticals, Inc. | 1 | 95,013 | 1 | 95,013 | — | — | — | — |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| Henry M. Jackson Foundation for the Advancement of Military Medicine | 6 | 2,134,708 | 5 | 1,846,228 | 1 | 288,480 | — | — |
| Individual Monitoring Systems, Inc. | 2 | 664,179 | 2 | 664,179 | — | — | — | — |
| Infinite Biomedical Technologies, LLC | 2 | 656,049 | 2 | 656,049 | — | — | — | — |
| Institute for Genomic Research | 1 | 1,412,828 | 1 | 1,412,828 | — | — | — | — |
| Johns Hopkins University | 193 | 81,489,323 | 168 | 75,983,817 | 18 | 3,361,400 | 7 | 2,144,106 |
| Maryland Medical Research Institute | 2 | 1,547,301 | 1 | 411,208 | — | — | 1 | 1,136,093 |
| MasiMax Resources, Inc. | 1 | 1,285,064 | — | — | — | — | 1 | 1,285,064 |
| MedStar Research Institute | 4 | 3,786,986 | 4 | 3,786,986 | — | — | — | — |
| Morgan State University | — | 60,151 | — | 60,151 | — | — | — | — |
| National Cancer Institute | 1 | 1,000,000 | — | — | — | — | 1 | 1,000,000 |
| National Center for Complementary and Alternative Medicine | 1 | 200,000 | — | — | — | — | 1 | 200,000 |
| National Center for Genome Resources | 1 | 1,032,312 | — | — | — | — | 1 | 1,032,312 |
| National Center for Health Statistics | 1 | 245,760 | — | — | — | — | 1 | 245,760 |
| National Center for Research Resources | 2 | 618,000 | — | — | — | — | 2 | 618,000 |
| National Institute of Child Health and Human Development | 3 | 7,083,373 | — | — | — | — | 3 | 7,083,373 |
| National Institute of Diabetes and Digestive and Kidney Diseases | 2 | 5,000,000 | — | — | — | — | 2 | 5,000,000 |
| National Institute of Neurological Disorders and Stroke | 1 | 1,307,100 | — | — | — | — | 1 | 1,307,100 |
| National Institutes of Health | 1 | 8,661,937 | — | — | — | — | 1 | 8,661,937 |
| Northrop Grumman Information Technology Corporation | 1 | 871,786 | — | — | — | — | 1 | 871,786 |
| Peace Technology, Inc. | 1 | 73,080 | — | — | — | — | 1 | 73,080 |
| Pulmonary Hypertension Association | 1 | 14,546 | 1 | 14,546 | — | — | — | — |
| University of Maryland, Baltimore County Campus | 1 | 285,906 | 1 | 285,906 | — | — | — | — |
| University of Maryland Baltimore Professional School | 53 | 21,309,643 | 48 | 20,402,275 | 3 | 756,777 | 2 | 150,591 |
| University of Maryland Biotechnology Institute | 2 | 742,500 | 2 | 742,500 | — | — | — | — |
| University of Maryland, College Park Campus | 2 | 1,046,932 | 2 | 1,046,932 | — | — | — | — |
| U.S. Agricultural Research Center | 2 | 850,000 | — | — | — | — | 2 | 850,000 |
| U.S. Small Business Administration | 2 | 143,000 | — | — | — | — | 2 | 143,000 |
| U.S. PHS Public Advisory Groups | 12 | 5,111,000 | 12 | 5,111,000 | — | — | — | — |
| Warren Grant Magnuson Clinical Center | 1 | 150,000 | — | — | — | — | 1 | 150,000 |
| Westat, Inc. | 2 | 4,268,062 | 1 | 864,662 | — | — | 1 | 3,403,400 |
| **Total Maryland** | **320** | **157,954,130** | **262** | **115,231,442** | **22** | **4,406,657** | **36** | **38,316,031** |
| | | | | | | | | |
| **Massachusetts** | | | | | | | | |
| ABIOMED, Inc. | 3 | 281,280 | 3 | 281,280 | — | — | — | — |
| Aeris Therapeutics, Inc. | 1 | 95,000 | 1 | 95,000 | — | — | — | — |
| Beth Israel Deaconess Medical Center | 58 | 24,473,598 | 53 | 23,128,303 | 5 | 1,345,295 | — | — |
| Biomedical Research Models, Inc. | 1 | 223,141 | 1 | 223,141 | — | — | — | — |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| BioMod Surfaces | 1 | 373,560 | 1 | 373,560 | — | — | — | — |
| BioPhysics Assay Laboratory, Inc. (BioPAL) | 1 | 356,143 | 1 | 356,143 | — | — | — | — |
| BioSurfaces | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| Boston Biomedical Research Institute | 10 | 4,281,762 | 10 | 4,281,762 | — | — | — | — |
| Boston Medical Center | 17 | 8,564,745 | 17 | 8,564,745 | — | — | — | — |
| Boston University, Charles River Campus | 6 | 1,546,999 | 5 | 1,513,055 | 1 | 33,944 | — | — |
| Boston University Medical Campus | 62 | 37,496,187 | 54 | 28,791,869 | 7 | 2,685,901 | 1 | 6,018,417 |
| Brandeis University | 1 | 105,220 | 1 | 105,220 | — | — | — | — |
| Brigham and Women's Hospital | 130 | 57,589,925 | 106 | 52,763,859 | 22 | 3,773,399 | 2 | 1,052,667 |
| Candela Laser Corporation | 1 | 79,234 | 1 | 79,234 | — | — | — | — |
| Cape Cod Research, Inc. | 1 | 102,450 | 1 | 102,450 | — | — | — | — |
| Cardiovascular Engineering, Inc. | 1 | 287,277 | 1 | 287,277 | — | — | — | — |
| CBR Institute for Biomedical Research | 8 | 12,359,559 | 8 | 12,359,559 | — | — | — | — |
| Children's Hospital Boston | 56 | 23,726,930 | 50 | 22,282,153 | 6 | 1,444,777 | — | — |
| Covalent Associates, Inc. | 1 | 389,333 | 1 | 389,333 | — | — | — | — |
| Dana-Farber Cancer Institute | 15 | 7,326,023 | 15 | 7,326,023 | — | — | — | — |
| Gene Regulation Laboratories | 1 | 359,052 | 1 | 359,052 | — | — | — | — |
| Giner, Inc. | 1 | 380,178 | 1 | 380,178 | — | — | — | — |
| GTC Biotherapeutics, Inc. | 1 | 149,265 | 1 | 149,265 | — | — | — | — |
| Gwathmey, Inc. | 3 | 1,676,564 | 3 | 1,676,564 | — | — | — | — |
| Harvard Pilgrim Health Care, Inc. | 3 | 1,808,856 | 3 | 1,808,856 | — | — | — | — |
| Harvard University | 2 | 815,422 | 2 | 815,422 | — | — | — | — |
| Harvard University Medical School | 13 | 4,697,813 | 8 | 3,722,753 | 5 | 975,060 | — | — |
| Harvard University School of Public Health | 24 | 12,379,025 | 21 | 11,817,671 | 3 | 561,354 | — | — |
| Hydra Biosciences, Inc. | 1 | 140,000 | 1 | 140,000 | — | — | — | — |
| Implant Sciences Corporation | 1 | 94,813 | 1 | 94,813 | — | — | — | — |
| Inotek Corporation | 3 | 1,285,122 | 3 | 1,285,122 | — | — | — | — |
| IQuum, Inc. | 1 | 154,086 | 1 | 154,086 | — | — | — | — |
| IVREA, Inc. | 1 | 130,875 | 1 | 130,875 | — | — | — | — |
| Joslin Diabetes Center | 2 | 1,014,170 | 2 | 1,014,170 | — | — | — | — |
| Massachusetts Eye and Ear Infirmary | 1 | 125,982 | 1 | 125,982 | — | — | — | — |
| Massachusetts General Hospital | 72 | 24,682,699 | 65 | 21,330,649 | 6 | 1,299,616 | 1 | 2,052,434 |
| Massachusetts Institute of Technology | 12 | 7,838,716 | 11 | 7,797,648 | 1 | 41,068 | — | — |
| Massachusetts Mental Health Institute | 1 | 200,550 | 1 | 200,550 | — | — | — | — |
| Molecular Insight Pharmaceuticals, Inc. | 2 | 497,238 | 2 | 497,238 | — | — | — | — |
| New England Medical Center Hospitals | 33 | 17,250,109 | 29 | 16,686,412 | 3 | 518,394 | 1 | 45,303 |
| New England Research Institutes, Inc. | 5 | 4,750,098 | 5 | 4,750,098 | — | — | — | — |
| Newton Laboratories | 1 | 99,795 | 1 | 99,795 | — | — | — | — |
| Northeastern University | 2 | 378,973 | 2 | 378,973 | — | — | — | — |
| Pharos, LLC | 1 | 263,056 | 1 | 263,056 | — | — | — | — |
| Physical Sciences, Inc. | 2 | 680,330 | 2 | 680,330 | — | — | — | — |
| Plethlogic | 1 | 149,126 | 1 | 149,126 | — | — | — | — |
| Pyramid Technical Consultants | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| Radiation Monitoring Devices, Inc. | 1 | 375,005 | 1 | 375,005 | — | — | — | — |
| Science Research Laboratory, Inc. | 1 | 555,074 | 1 | 555,074 | — | — | — | — |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| St. Elizabeth's Medical Center of Boston | 5 | 3,281,642 | 5 | 3,281,642 | — | — | — | — |
| Thermal Technologies, Inc. | 1 | 336,624 | 1 | 336,624 | — | — | — | — |
| Tufts University, Boston | 13 | 3,998,062 | 11 | 3,710,505 | 2 | 287,557 | — | — |
| University of Massachusetts Medical School, Worcester | 24 | 8,880,533 | 22 | 8,050,117 | 1 | 130,416 | 1 | 700,000 |
| Verax Biomedical, Inc. | 1 | 317,094 | 1 | 317,094 | — | — | — | — |
| V.I. Technologies, Inc. | 2 | 667,386 | 2 | 667,386 | — | — | — | — |
| Whalen Biomedical, Inc. | 1 | 100,525 | 1 | 100,525 | — | — | — | — |
| Whitehead Institute for Biomedical Research | 1 | 42,976 | — | — | 1 | 42,976 | — | — |
| **Total Massachusetts** | **616** | **280,415,200** | **547** | **257,406,622** | **63** | **13,139,757** | **6** | **9,868,821** |
| **Michigan** | | | | | | | | |
| Accumed Systems, Inc. | 1 | 683,709 | 1 | 683,709 | — | — | — | — |
| Henry Ford Health System | 11 | 5,348,534 | 11 | 5,348,534 | — | — | — | — |
| L–VAD Technology, Inc. | 1 | 668,462 | 1 | 668,462 | — | — | — | — |
| MC3, Inc. | 5 | 1,849,500 | 5 | 1,849,500 | — | — | — | — |
| Medarray, Inc. | 1 | 428,791 | 1 | 428,791 | — | — | — | — |
| Michigan State University | 12 | 3,847,620 | 11 | 3,810,420 | 1 | 37,200 | — | — |
| Molecular Innovations, Inc. | 1 | 424,685 | 1 | 424,685 | — | — | — | — |
| Oakland University | 1 | 71,000 | 1 | 71,000 | — | — | — | — |
| University of Michigan at Ann Arbor | 101 | 38,507,085 | 86 | 34,768,333 | 12 | 2,109,943 | 3 | 1,628,809 |
| Wayne State University | 14 | 3,533,760 | 14 | 3,533,760 | — | — | — | — |
| Western Michigan University | 1 | 181,875 | 1 | 181,875 | — | — | — | — |
| **Total Michigan** | **149** | **55,545,021** | **133** | **51,769,069** | **13** | **2,147,143** | **3** | **1,628,809** |
| **Minnesota** | | | | | | | | |
| Advanced Circulatory Systems, Inc. | 1 | 99,947 | 1 | 99,947 | — | — | — | — |
| Advanced Medical Electronics Corporation | 4 | 956,148 | 4 | 956,148 | — | — | — | — |
| Discovery Genomics, Inc. | 1 | 235,588 | 1 | 235,588 | — | — | — | — |
| Korosensor.com, Inc. | 1 | 303,415 | 1 | 303,415 | — | — | — | — |
| Mayo Clinic, Rochester | 64 | 22,772,976 | 55 | 20,645,275 | 6 | 815,593 | 3 | 1,312,108 |
| Minneapolis Medical Research Foundation, Inc. | 1 | 6,448,619 | — | — | — | — | 1 | 6,448,619 |
| Minnesota State University, Moorhead | 1 | 197,024 | 1 | 197,024 | — | — | — | — |
| Minnesota Veterans Research Institute | 1 | 625,310 | 1 | 625,310 | — | — | — | — |
| National Marrow Donor Program, Inc. | 1 | 535,351 | — | — | — | — | 1 | 535,351 |
| Paradigm Pharmaceuticals, LLC | 1 | 371,950 | 1 | 371,950 | — | — | — | — |
| Phygen, Inc. | 1 | 164,984 | 1 | 164,984 | — | — | — | — |
| Sunnyside Technologies | 1 | 120,800 | 1 | 120,800 | — | — | — | — |
| University of Minnesota, Twin Cities | 84 | 33,939,869 | 70 | 26,196,574 | 7 | 1,994,712 | 7 | 5,748,583 |
| Wilson Wolf Manufacturing Corporation | 1 | 695,500 | 1 | 695,500 | — | — | — | — |
| **Total Minnesota** | **163** | **67,467,481** | **138** | **50,612,515** | **13** | **2,810,305** | **12** | **14,044,661** |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| **Mississippi** | | | | | | | | |
| Jackson Hinds Comprehensive Health Center | 1 | 196,358 | 1 | 196,358 | — | — | — | — |
| Tougaloo College | 1 | 5,000 | — | — | — | — | 1 | 5,000 |
| University of Mississippi Medical Center | 17 | 6,669,305 | 12 | 6,118,164 | 4 | 118,346 | 1 | 432,795 |
| **Total Mississippi** | **19** | **6,870,663** | **13** | **6,314,522** | **4** | **118,346** | **2** | **437,795** |
| **Missouri** | | | | | | | | |
| A.T. Still University of Health Sciences | 1 | 186,600 | 1 | 186,600 | — | — | — | — |
| Alveoli Medical, LLC | 1 | 100,035 | 1 | 100,035 | — | — | — | — |
| APT Therapeutics, Inc. | 1 | 98,750 | 1 | 98,750 | — | — | — | — |
| Children's Mercy Hospital, Kansas City | 2 | 562,408 | 2 | 562,408 | — | — | — | — |
| Engineering Software Research and Development, Inc. | 1 | 251,665 | 1 | 251,665 | — | — | — | — |
| St. Louis University | 16 | 4,319,941 | 15 | 4,170,061 | — | — | 1 | 149,880 |
| University of Missouri, Columbia | 18 | 5,902,600 | 14 | 5,634,650 | 4 | 267,950 | — | — |
| University of Missouri, Kansas City | 1 | 253,490 | 1 | 253,490 | — | — | — | — |
| University of Missouri, St. Louis | 1 | 231,566 | 1 | 231,566 | — | — | — | — |
| VitalTech, Inc. | 1 | 96,990 | 1 | 96,990 | — | — | — | — |
| Washington University | 129 | 51,056,940 | 111 | 47,586,509 | 17 | 3,406,730 | 1 | 63,701 |
| **Total Missouri** | **172** | **63,060,985** | **149** | **59,172,724** | **21** | **3,674,680** | **2** | **213,581** |
| **Montana** | | | | | | | | |
| Resodyn Corporation | 1 | 155,134 | 1 | 155,134 | — | — | — | — |
| University of Montana | 4 | 1,253,602 | 4 | 1,253,602 | — | — | — | — |
| **Total Montana** | **5** | **1,408,736** | **5** | **1,408,736** | **—** | **—** | **—** | **—** |
| **Nebraska** | | | | | | | | |
| Creighton University | 3 | 578,525 | 2 | 537,792 | 1 | 40,733 | — | — |
| University of Nebraska, Lincoln | 1 | 288,000 | 1 | 288,000 | — | — | — | — |
| University of Nebraska Medical Center | 8 | 5,051,705 | 8 | 5,051,705 | — | — | — | — |
| **Total Nebraska** | **12** | **5,918,230** | **11** | **5,877,497** | **1** | **40,733** | **—** | **—** |
| **Nevada** | | | | | | | | |
| Nevada Cancer Institute | 1 | 358,997 | 1 | 358,997 | — | — | — | — |
| Sierra Biomedical Research Corporation | 2 | 753,145 | 2 | 753,145 | — | — | — | — |
| University of Nevada at Reno | 13 | 3,914,919 | 12 | 3,664,919 | — | — | 1 | 250,000 |
| **Total Nevada** | **16** | **5,027,061** | **15** | **4,777,061** | **—** | **—** | **1** | **250,000** |
| **New Hampshire** | | | | | | | | |
| Creare, Inc. | 2 | 577,687 | 2 | 577,687 | — | — | — | — |
| Dartmouth College | 22 | 6,526,562 | 21 | 6,507,209 | 1 | 19,353 | — | — |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| University of New Hampshire | 1 | 142,190 | 1 | 142,190 | — | — | — | — |
| U.S. Department of Veterans Affairs Medical Center, Albuquerque | 1 | 3,913,076 | — | — | — | — | 1 | 3,913,076 |
| Xemed, LLC | 1 | 102,965 | 1 | 102,965 | — | — | — | — |
| **Total New Hampshire** | **27** | **11,262,480** | **25** | **7,330,051** | **1** | **19,353** | **1** | **3,913,076** |
| **New Jersey** | | | | | | | | |
| Coecare.Com, LLC | 2 | 493,714 | 2 | 493,714 | — | — | — | — |
| DVX, LLC | 1 | 688,565 | 1 | 688,565 | — | — | — | — |
| Life Recovery Systems, Inc. | 1 | 601,478 | 1 | 601,478 | — | — | — | — |
| PharmaSeq, Inc. | 1 | 373,162 | 1 | 373,162 | — | — | — | — |
| Princeton University | 2 | 343,191 | 1 | 296,771 | 1 | 46,420 | — | — |
| Public Health Research Institute | 3 | 1,093,542 | 3 | 1,093,542 | — | — | — | — |
| Rutgers, The State University of New Jersey, New Brunswick | 3 | 362,222 | 2 | 362,221 | 1 | 1 | — | — |
| University of Medicine and Dentistry of New Jersey | 18 | 9,548,284 | 15 | 8,964,531 | 2 | 307,249 | 1 | 276,504 |
| University of Medicine and Dentistry of New Jersey, R.W. Johnson Medical School | 7 | 4,081,740 | 7 | 4,081,740 | — | — | — | — |
| **Total New Jersey** | **38** | **17,585,898** | **33** | **16,955,724** | **4** | **353,670** | **1** | **276,504** |
| **New Mexico** | | | | | | | | |
| Lovelace Biomedical and Environmental Research | 5 | 2,230,842 | 5 | 2,230,842 | — | — | — | — |
| Southwest Sciences, Inc. | 2 | 438,946 | 2 | 438,946 | — | — | — | — |
| TPL, Inc. | 1 | 304,952 | 1 | 304,952 | — | — | — | — |
| University of New Mexico, Albuquerque | 11 | 4,868,634 | 8 | 3,781,169 | 1 | 80,384 | 2 | 1,007,081 |
| **Total New Mexico** | **19** | **7,843,374** | **16** | **6,755,909** | **1** | **80,384** | **2** | **1,007,081** |
| **New York** | | | | | | | | |
| Albany Medical College of Union University | 7 | 2,074,387 | 5 | 1,454,553 | 2 | 619,834 | — | — |
| Angion Biomedica Corporation | 1 | 175,272 | 1 | 175,272 | — | — | — | — |
| CardioMag Imaging, Inc. | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| Cell Preservation Services, Inc. | 1 | 474,992 | 1 | 474,992 | — | — | — | — |
| City College of New York | 3 | 966,076 | 3 | 966,076 | — | — | — | — |
| Columbia University Health Sciences | 79 | 44,431,003 | 70 | 36,400,652 | 6 | 1,231,103 | 3 | 6,799,248 |
| Columbia University, New York Morningside | 8 | 3,261,085 | 6 | 2,061,484 | — | — | 2 | 1,199,601 |
| Cornell University, Ithaca | 9 | 4,246,828 | 9 | 4,246,828 | — | — | — | — |
| CUNY Graduate School and University Center | 1 | 312,500 | 1 | 312,500 | — | — | — | — |
| Foster-Miller Technologies, Inc. | 5 | 1,668,861 | 5 | 1,668,861 | — | — | — | — |
| Gene Network Sciences, Inc. | 1 | 99,960 | 1 | 99,960 | — | — | — | — |
| Graduate College of Union University | — | 80,000 | — | 80,000 | — | — | — | — |
| Hofstra University | 1 | 48,928 | — | — | 1 | 48,928 | | — |
| Jarvik Research, Inc. | 1 | 1,016,032 | — | — | — | — | 1 | 1,016,032 |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| Masonic Medical Research Laboratory, Inc. | 3 | 1,046,480 | 3 | 1,046,480 | — | — | — | — |
| Mohawk Innovative Technology, Inc. | 1 | 149,829 | 1 | 149,829 | — | — | — | — |
| Montefiore Medical Center, Bronx | 1 | 135,559 | 1 | 135,559 | — | — | — | — |
| Mount Sinai School of Medicine | 31 | 19,252,884 | 28 | 15,229,236 | 2 | 402,131 | 1 | 3,621,517 |
| Nanoprobes, Inc. | 2 | 723,301 | 2 | 723,301 | — | — | — | — |
| Narrows Institute for Biomedical Research, Inc. | 3 | 615,286 | 2 | 558,750 | 1 | 56,536 | — | — |
| New York Academy of Medicine | 1 | 478,116 | 1 | 478,116 | — | — | — | — |
| New York Blood Center | 7 | 3,185,408 | 7 | 3,185,408 | — | — | — | — |
| New York Institute of Technology, Old Westbury | 1 | 307,147 | 1 | 307,147 | — | — | — | — |
| New York Medical College | 20 | 9,741,508 | 20 | 9,741,508 | — | — | — | — |
| New York University | 1 | 221,250 | 1 | 221,250 | — | — | — | — |
| New York University School Of Medicine | 25 | 8,098,475 | 22 | 7,693,483 | 3 | 404,992 | — | — |
| North Shore–Long Island Jewish Research Institute | 5 | 1,760,028 | 5 | 1,760,028 | — | — | — | — |
| Ogilvy Public Relations Worldwide | 1 | 964,493 | — | — | — | — | 1 | 964,493 |
| Pharmacon International, Inc. | 2 | 520,741 | 2 | 520,741 | — | — | — | — |
| Photon Migration Technologies Corporation | 1 | 140,812 | 1 | 140,812 | — | — | — | — |
| Rensselaer Polytechnic Institute | 2 | 509,691 | 2 | 509,691 | — | — | — | — |
| Rockefeller University | 8 | 4,225,670 | 8 | 4,225,670 | — | — | — | — |
| Roswell Park Cancer Institute Corporation | 3 | 1,065,675 | 3 | 1,065,675 | — | — | — | — |
| Sloan-Kettering Institute for Cancer Research | 10 | 2,542,339 | 10 | 2,542,339 | — | — | — | — |
| State University of New York at Albany | 1 | 257,510 | 1 | 257,510 | — | — | — | — |
| State University of New York at Buffalo | 16 | 4,945,615 | 15 | 4,826,858 | 1 | 118,757 | — | — |
| State University of New York at Stony Brook | 19 | 5,248,008 | 18 | 4,848,008 | — | — | 1 | 400,000 |
| St. John's University | 2 | 901,438 | 2 | 901,438 | — | — | — | — |
| St. Luke's–Roosevelt Institute for Health Sciences | 7 | 2,654,619 | 7 | 2,654,619 | — | — | — | — |
| SUNY Downstate Medical Center | 7 | 1,787,013 | 6 | 1,657,864 | — | — | 1 | 129,149 |
| Syracuse University | 2 | 601,500 | 2 | 601,500 | — | — | — | — |
| Transonic Systems, Inc. | 2 | 728,403 | 2 | 728,403 | — | — | — | — |
| Trudeau Institute, Inc. | 4 | 2,990,754 | 4 | 2,990,754 | — | — | — | — |
| University of Rochester | 47 | 17,730,483 | 42 | 16,886,224 | 5 | 844,259 | — | — |
| Upstate Medical Center | 7 | 3,957,782 | 7 | 3,957,782 | — | — | — | — |
| Visiting Nurse Service of New York | 1 | 640,463 | 1 | 640,463 | — | — | — | — |
| Weill Medical College of Cornell University | 45 | 27,657,424 | 42 | 26,824,337 | 2 | 91,195 | 1 | 741,892 |
| Winthrop-University Hospital | 3 | 956,956 | 3 | 956,956 | — | — | — | — |
| Yeshiva University | 32 | 17,970,301 | 27 | 16,998,673 | 4 | 550,988 | 1 | 420,640 |
| York College | — | 297,919 | — | 297,919 | — | — | — | — |
| **Total New York** | **441** | **203,966,804** | **402** | **184,305,509** | **27** | **4,368,723** | **12** | **15,292,572** |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| **North Carolina** | | | | | | | | |
| BioMarck Pharmaceuticals | 1 | 632,540 | 1 | 632,540 | — | — | — | — |
| BreathQuant Medical Systems, Inc. | 1 | 584,164 | 1 | 584,164 | — | — | — | — |
| Carolinas Medical Center | 1 | 351,789 | 1 | 351,789 | — | — | — | — |
| Cognosci, Inc. | 1 | 214,573 | 1 | 214,573 | — | — | — | — |
| Constella Group, Inc. | 2 | 1,968,505 | — | — | — | — | 2 | 1,968,505 |
| Duke University | 121 | 59,328,343 | 105 | 55,162,253 | 12 | 1,710,158 | 4 | 2,455,932 |
| East Carolina University | 2 | 570,827 | 2 | 570,827 | — | — | — | — |
| Ercole Biotech, Inc. | 1 | 270,674 | 1 | 270,674 | — | — | — | — |
| MediWave Star Technology, Inc. | 2 | 198,180 | 2 | 198,180 | — | — | — | — |
| NDimo, Inc. | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| Nekton Research, LLC | 1 | 98,307 | 1 | 98,307 | — | — | — | — |
| North Carolina Central University | 2 | 789,305 | 2 | 789,305 | — | — | — | — |
| North Carolina State University at Raleigh | 6 | 1,875,839 | 5 | 1,680,014 | 1 | 195,825 | — | — |
| Regado Biosciences, Inc. | 1 | 98,568 | 1 | 98,568 | — | — | — | — |
| Rho Federal Systems Division, Inc. | 1 | 4,018,206 | 1 | 4,018,206 | — | — | — | — |
| Southeast TechInventures | 1 | 175,937 | 1 | 175,937 | — | — | — | — |
| University of North Carolina at Chapel Hill | 92 | 36,315,877 | 81 | 34,409,637 | 8 | 1,609,726 | 3 | 296,514 |
| University of North Carolina at Charlotte | 1 | 462,126 | 1 | 462,126 | — | — | — | — |
| University of North Carolina at Greensboro | 1 | 193,500 | 1 | 193,500 | — | — | — | — |
| U.S. PHS Office of Disease Prevention and Health Promotion | 1 | 2,000,000 | — | — | — | — | 1 | 2,000,000 |
| Vortant Technologies, LLC | 1 | 99,776 | 1 | 99,776 | — | — | — | — |
| Wake Forest University | 7 | 8,111,343 | 2 | 883,141 | — | — | 5 | 7,228,202 |
| Wake Forest University Health Sciences | 44 | 33,257,545 | 38 | 18,911,350 | 4 | 443,558 | 2 | 13,902,637 |
| Williams LifeSkills, Inc. | 1 | 272,355 | 1 | 272,355 | — | — | — | — |
| Winston-Salem State University | 1 | 116,885 | 1 | 116,885 | — | — | — | — |
| **Total North Carolina** | **294** | **152,105,164** | **252** | **120,294,107** | **25** | **3,959,267** | **17** | **27,851,790** |
| **North Dakota** | | | | | | | | |
| North Dakota State University | 3 | 564,000 | 3 | 564,000 | — | — | — | — |
| **Total North Dakota** | **3** | **564,000** | **3** | **564,000** | **—** | **—** | **—** | **—** |
| **Ohio** | | | | | | | | |
| Athersys, Inc. | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| BIOMEC, Inc. | 2 | 442,148 | 2 | 442,148 | — | — | — | — |
| Biomedical Research Associates, Inc. | 1 | 99,419 | 1 | 99,419 | — | — | — | — |
| Case Western Reserve University | 61 | 28,332,110 | 54 | 21,650,295 | 6 | 2,027,662 | 1 | 4,654,153 |
| ChantTest, Inc. | 1 | 200,633 | 1 | 200,633 | — | — | — | — |
| ChanXpress, Inc. | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| Children's Hospital Medical Center of Cincinnati | 48 | 26,041,345 | 45 | 25,706,290 | 3 | 335,055 | — | — |
| Children's Research Institute | 2 | 438,915 | 2 | 438,915 | — | — | — | — |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| Cleveland Clinic Foundation | 6 | 5,774,397 | 4 | 5,541,030 | — | — | 2 | 233,367 |
| Cleveland Clinic Lerner College of Medicine of Case Western Reserve University | 54 | 20,676,413 | 50 | 19,647,069 | 3 | 111,055 | 1 | 918,289 |
| Cleveland Medical Devices, Inc. | 3 | 451,007 | 3 | 451,007 | — | — | — | — |
| Cleveland State University | 1 | 299,555 | 1 | 299,555 | — | — | — | — |
| Curragh Chemistries, Inc. | 1 | 145,600 | 1 | 145,600 | — | — | — | — |
| Enable Medical Corporation | 1 | 387,745 | 1 | 387,745 | — | — | — | — |
| EnteraTech, Inc. | 1 | 237,155 | 1 | 237,155 | — | — | — | — |
| LAM Foundation | 1 | 21,375 | 1 | 21,375 | — | — | — | — |
| Medical College of Ohio at Toledo | 8 | 5,459,950 | 8 | 5,459,950 | — | — | — | — |
| MetroHealth Medical Center | 1 | 337,500 | 1 | 337,500 | — | — | — | — |
| NanoMimetics, Inc. | 1 | 138,071 | 1 | 138,071 | — | — | — | — |
| Ohio State University | 32 | 8,891,364 | 27 | 8,288,920 | 3 | 288,003 | 2 | 314,441 |
| Synapse Biomedical, Ltd. | 1 | 99,895 | 1 | 99,895 | — | — | — | — |
| University of Cincinnati | 47 | 17,325,907 | 42 | 15,774,165 | 3 | 733,296 | 2 | 818,446 |
| University of Dayton | 1 | 221,340 | 1 | 221,340 | — | — | — | — |
| Wright State University | 7 | 2,863,627 | 6 | 2,863,626 | 1 | 1 | — | — |
| **Total Ohio** | **283** | **119,085,471** | **256** | **108,651,703** | **19** | **3,495,072** | **8** | **6,938,696** |
| **Oklahoma** | | | | | | | | |
| Ekips Technologies, Inc. | 1 | 376,928 | 1 | 376,928 | — | — | — | — |
| Langston University | 1 | 500,000 | 1 | 500,000 | — | — | — | — |
| Oklahoma Medical Research Foundation | 6 | 3,830,971 | 6 | 3,830,971 | — | — | — | — |
| Oklahoma State University, Stillwater | 2 | 607,200 | 2 | 607,200 | — | — | — | — |
| Selexys Pharmaceuticals Corporation | 1 | 304,843 | 1 | 304,843 | — | — | — | — |
| University of Oklahoma Health Sciences Center | 11 | 4,443,595 | 11 | 4,443,595 | — | — | — | — |
| **Total Oklahoma** | **22** | **10,063,537** | **22** | **10,063,537** | **—** | **—** | **—** | **—** |
| **Oregon** | | | | | | | | |
| Dimera, LLC | 2 | 1,229,136 | 2 | 1,229,136 | — | — | — | — |
| Inovise Medical, Inc. | 1 | 325,372 | 1 | 325,372 | — | — | — | — |
| Oregon Health and Science University | 39 | 14,352,329 | 34 | 13,681,196 | 5 | 671,133 | — | — |
| Oregon Research Institute | 1 | 338,478 | 1 | 338,478 | — | — | — | — |
| Oregon State University | 1 | 250,250 | 1 | 250,250 | — | — | — | — |
| Portland State University | 1 | 355,000 | 1 | 355,000 | — | — | — | — |
| University of Oregon | 2 | 430,795 | 2 | 430,795 | — | — | — | — |
| **Total Oregon** | **47** | **17,281,360** | **42** | **16,610,227** | **5** | **671,133** | **—** | **—** |
| **Pennsylvania** | | | | | | | | |
| Allegheny-Singer Research Institute | 3 | 717,494 | 3 | 717,494 | — | — | — | — |
| APD Life Sciences, Inc. | 1 | 463,708 | 1 | 463,708 | — | — | — | — |
| CardiacAssist, Inc. | 1 | 105,074 | 1 | 105,074 | — | — | — | — |
| Carnegie Mellon University | 3 | 1,372,762 | 3 | 1,372,762 | — | — | — | — |
| CASurgica, Inc. | 1 | 99,412 | 1 | 99,412 | — | — | — | — |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| Children's Hospital of Philadelphia | 43 | 25,688,751 | 40 | 25,029,812 | 3 | 658,939 | — | — |
| Children's Hospital of Pittsburgh | 5 | 1,452,394 | 4 | 1,398,042 | 1 | 54,352 | — | — |
| Drexel University | 5 | 1,000,547 | 5 | 1,000,547 | — | — | — | — |
| Drexel University College of Medicine | 4 | 1,405,943 | 3 | 1,322,853 | 1 | 83,090 | — | — |
| Ension, Inc. | 4 | 1,366,802 | 3 | 739,872 | — | — | 1 | 626,930 |
| Fox Chase Cancer Center | 2 | 760,500 | 2 | 760,500 | — | — | — | — |
| Guthrie Foundation for Education and Research | 1 | 258,650 | 1 | 258,650 | — | — | — | — |
| InSight TeleHealth Systems, LLC | 1 | 400,524 | 1 | 400,524 | — | — | — | — |
| Institute for Cancer Research | 1 | 463,213 | 1 | 463,213 | — | — | — | — |
| Institute of Hematology and Blood Transfusion | 1 | 195,995 | — | — | — | — | 1 | 195,995 |
| Integral Molecular | 1 | 271,137 | 1 | 271,137 | — | — | — | — |
| Lankenau Medical Research Center | 1 | 400,000 | 1 | 400,000 | — | — | — | — |
| Magee-Women's Health Corporation | 2 | 325,021 | 1 | 298,038 | 1 | 26,983 | — | — |
| Medical Diagnostic Research Foundation | 1 | 303,364 | 1 | 303,364 | — | — | — | — |
| Membrane Assays, Inc. | 1 | 199,320 | 1 | 199,320 | — | — | — | — |
| Octagen Corporation | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| Pennsylvania State University, Milton S. Hershey Medical Center | 21 | 9,679,030 | 19 | 8,614,383 | 1 | 47,296 | 1 | 1,017,351 |
| Pennsylvania State University, University Park | 3 | 801,074 | 3 | 801,074 | — | — | — | — |
| Philadelphia College of Osteopathic Medicine | 1 | 218,250 | 1 | 218,250 | — | — | — | — |
| PinMed, Inc. | 1 | 99,510 | 1 | 99,510 | — | — | — | — |
| Temple University | 19 | 7,172,262 | 16 | 6,429,539 | 2 | 607,425 | 1 | 135,298 |
| Thomas Jefferson University | 21 | 6,993,423 | 20 | 6,962,410 | 1 | 31,013 | — | — |
| University of Pennsylvania | 126 | 58,516,360 | 109 | 53,331,219 | 15 | 3,644,231 | 2 | 1,540,910 |
| University of Pittsburgh at Pittsburgh | 105 | 53,808,229 | 90 | 48,479,111 | 8 | 1,306,611 | 7 | 4,022,507 |
| Vascor, Inc. | 1 | 327,131 | 1 | 327,131 | — | — | — | — |
| Villanova University | 1 | 143,077 | 1 | 143,077 | — | — | — | — |
| Wistar Institute | 4 | 1,309,564 | 4 | 1,309,564 | — | — | — | — |
| **Total Pennsylvania** | **386** | **176,418,521** | **340** | **162,419,590** | **33** | **6,459,940** | **13** | **7,538,991** |
| | | | | | | | | |
| **Rhode Island** | | | | | | | | |
| BCR Diagnostics, Inc. | 1 | 409,347 | 1 | 409,347 | — | — | — | — |
| Brown University | 10 | 4,215,512 | 9 | 4,157,511 | 1 | 58,001 | — | — |
| Gordon Research Conferences | 6 | 90,000 | 6 | 90,000 | — | — | — | — |
| Memorial Hospital of Rhode Island | 1 | 531,499 | 1 | 531,499 | — | — | — | — |
| Miriam Hospital | 12 | 3,483,153 | 10 | 3,399,109 | 2 | 84,044 | — | — |
| Pro-Change Behavior Systems, Inc. | 1 | 315,359 | 1 | 315,359 | — | — | — | — |
| QualityMetric, Inc. | 1 | 99,384 | 1 | 99,384 | — | — | — | — |
| Rhode Island Hospital, Providence | 6 | 2,168,454 | 5 | 2,125,478 | 1 | 42,976 | — | — |
| Roger Williams Hospital | 2 | 574,065 | 2 | 574,065 | — | — | — | — |
| **Total Rhode Island** | **40** | **11,886,773** | **36** | **11,701,752** | **4** | **185,021** | **—** | **—** |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| **South Carolina** | | | | | | | | |
| Clemson University | 2 | 536,250 | 2 | 536,250 | — | — | — | — |
| Medical University of South Carolina | 37 | 14,796,744 | 33 | 14,041,997 | 3 | 644,178 | 1 | 110,569 |
| Organ Recovery Systems, Inc. | 2 | 548,397 | 2 | 548,397 | — | — | — | — |
| University of South Carolina at Columbia | 12 | 4,813,397 | 12 | 4,813,397 | — | — | — | — |
| **Total South Carolina** | **53** | **20,694,788** | **49** | **19,940,041** | **3** | **644,178** | **1** | **110,569** |
| **South Dakota** | | | | | | | | |
| Missouri Breaks Research, Inc. | 2 | 497,512 | 2 | 497,512 | — | — | — | — |
| South Dakota Health Research Foundation | 2 | 527,625 | 2 | 527,625 | — | — | — | — |
| University of South Dakota | 3 | 913,250 | 3 | 913,250 | — | — | — | — |
| **Total South Dakota** | **7** | **1,938,387** | **7** | **1,938,387** | **—** | **—** | **—** | **—** |
| **Tennessee** | | | | | | | | |
| Bioinventions, LLC | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| Cumberland Pharmaceuticals, Inc. | 1 | 492,336 | 1 | 492,336 | — | — | — | — |
| East Tennessee State University | 5 | 1,155,508 | 5 | 1,155,508 | — | — | — | — |
| Meharry Medical College | 7 | 1,461,662 | 4 | 1,060,835 | 3 | 400,827 | — | — |
| St. Jude Children's Research Hospital | 8 | 7,093,545 | 6 | 5,010,443 | — | — | 2 | 2,083,102 |
| University of Memphis | 3 | 1,976,094 | 3 | 1,976,094 | — | — | — | — |
| University of Tennessee at Knoxville | 2 | 495,950 | 2 | 495,950 | — | — | — | — |
| University of Tennessee Health Sciences Center | 28 | 8,677,154 | 25 | 7,804,734 | 2 | 347,420 | 1 | 525,000 |
| Vanderbilt University | 73 | 32,868,385 | 64 | 30,123,825 | 8 | 2,158,883 | 1 | 585,677 |
| Veterans Affairs Medical Center, Memphis | 1 | 2,829,579 | — | — | — | — | 1 | 2,829,579 |
| **Total Tennessee** | **129** | **57,150,213** | **111** | **48,219,725** | **13** | **2,907,130** | **5** | **6,023,358** |
| **Texas** | | | | | | | | |
| Baylor College of Medicine | 92 | 37,671,776 | 78 | 33,183,939 | 10 | 2,266,561 | 4 | 2,221,276 |
| Baylor Research Institute | 1 | 105,050 | 1 | 105,050 | — | — | — | — |
| Cardiovascular Biosciences, Inc. | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| Cooper Institute for Aerobics Research | 4 | 1,879,395 | 4 | 1,879,395 | — | — | — | — |
| Indus Instruments | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| Lynntech, Inc. | 3 | 823,182 | 3 | 823,182 | — | — | — | — |
| Millar Instruments, Inc. | 1 | 324,397 | 1 | 324,397 | — | — | — | — |
| OWLS | 1 | 99,423 | 1 | 99,423 | — | — | — | — |
| Prairie View A&M University | — | 152,176 | — | 152,176 | — | — | — | — |
| Rice University | 3 | 777,553 | 3 | 777,553 | — | — | — | — |
| Southwest Foundation for Biomedical Research | 7 | 7,816,224 | 7 | 7,816,224 | — | — | — | — |
| Texas A&M University Health Science Center | 16 | 4,613,923 | 15 | 4,563,375 | 1 | 50,548 | — | — |
| Texas A&M University System | 3 | 540,898 | 3 | 540,898 | — | — | — | — |
| Texas Engineering Experiment Station | 1 | 639,178 | 1 | 639,178 | — | — | — | — |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| Texas Southern University | 1 | 500,000 | 1 | 500,000 | — | — | — | — |
| Texas Technology University Health Sciences Center | 3 | 619,325 | 3 | 619,325 | — | — | — | — |
| University of North Texas | 1 | 216,750 | 1 | 216,750 | — | — | — | — |
| University of North Texas Health Sciences Center | 11 | 2,968,468 | 10 | 2,832,690 | 1 | 135,778 | — | — |
| University of Texas at Austin | 4 | 696,186 | 2 | 621,750 | 2 | 74,436 | — | — |
| University of Texas at Dallas | 3 | 925,003 | 3 | 925,003 | — | — | — | — |
| University of Texas at San Antonio | 1 | 328,850 | 1 | 328,850 | — | — | — | — |
| University of Texas Health Sciences Center at Houston | 34 | 18,876,547 | 32 | 15,476,297 | — | — | 2 | 3,400,250 |
| University of Texas Health Sciences Center at San Antonio | 22 | 7,044,007 | 18 | 6,171,240 | 2 | 320,725 | 2 | 552,042 |
| University of Texas Health Sciences Center at Tyler | 11 | 2,757,454 | 11 | 2,757,454 | — | — | — | — |
| University of Texas M.D. Anderson Cancer Center | 5 | 1,621,000 | 5 | 1,621,000 | — | — | — | — |
| University of Texas Medical Branch Galveston | 14 | 3,622,637 | 13 | 3,537,004 | 1 | 85,633 | — | — |
| University of Texas–Pan American | — | 370,956 | — | 370,956 | — | — | — | — |
| University of Texas Southwestern Medical Center at Dallas | 56 | 25,550,831 | 50 | 24,027,617 | 5 | 1,347,270 | 1 | 175,944 |
| VidaCare Corporation | 1 | 146,719 | 1 | 146,719 | — | — | — | — |
| **Total Texas** | **301** | **121,887,908** | **270** | **111,257,445** | **22** | **4,280,951** | **9** | **6,349,512** |
| **Utah** | | | | | | | | |
| Axon Medical, Inc. | 1 | 99,966 | 1 | 99,966 | — | — | — | — |
| E.I. Spectra, LLC | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| LDS Hospital | 4 | 2,690,243 | 2 | 699,689 | — | — | 2 | 1,990,554 |
| Medical Physics, Inc. | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| Thrombodyne, Inc. | 1 | 461,036 | 1 | 461,036 | — | — | — | — |
| University of Utah | 45 | 17,577,438 | 43 | 17,379,401 | 2 | 198,037 | — | — |
| **Total Utah** | **53** | **21,028,683** | **49** | **18,840,092** | **2** | **198,037** | **2** | **1,990,554** |
| **Vermont** | | | | | | | | |
| Haematologic Technologies, Inc. | 1 | 99,039 | 1 | 99,039 | — | — | — | — |
| Psychological Applications, LLC | 1 | 409,515 | 1 | 409,515 | — | — | — | — |
| University of Vermont and State Agricultural College | 41 | 15,179,610 | 34 | 13,449,457 | 5 | 549,171 | 2 | 1,180,982 |
| **Total Vermont** | **43** | **15,688,164** | **36** | **13,958,011** | **5** | **549,171** | **2** | **1,180,982** |
| **Virginia** | | | | | | | | |
| Adenosine Therapeutics, LLC | 1 | 624,818 | 1 | 624,818 | — | — | — | — |
| American Psychosomatic Society | 1 | 10,000 | 1 | 10,000 | — | — | — | — |
| Eastern Virginia Medical School | 2 | 465,605 | 2 | 465,605 | — | — | — | — |
| Empirical Technologies Corporation | 2 | 566,780 | 2 | 566,780 | — | — | — | — |
| Hampton University | — | 98,069 | — | 98,069 | — | — | — | — |
| Hemodyne, Inc. | 1 | 99,487 | 1 | 99,487 | — | — | — | — |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| Hypogen, Inc. | 1 | 153,537 | 1 | 153,537 | — | — | — | — |
| NanoSonic, Inc. | 1 | 100,000 | 1 | 100,000 | — | — | — | — |
| Personal Improvement Computer Systems | 2 | 747,043 | 2 | 747,043 | — | — | — | — |
| Talisman, Ltd. | 1 | 754,040 | 1 | 754,040 | — | — | — | — |
| University of Virginia, Charlottesville | 61 | 26,212,857 | 57 | 25,261,172 | 4 | 951,685 | — | — |
| Virginia Commonwealth University | 17 | 4,952,281 | 17 | 4,952,281 | — | — | — | — |
| Virginia Polytechnic Institute and State University | 1 | 149,206 | 1 | 149,206 | — | — | — | — |
| **Total Virginia** | **91** | **34,933,723** | **87** | **33,982,038** | **4** | **951,685** | — | — |
| **Washington** | | | | | | | | |
| Asthma Inc. | 1 | 244,194 | 1 | 244,194 | — | — | — | — |
| Barlow Scientific | 2 | 727,103 | 2 | 727,103 | — | — | — | — |
| Battelle Pacific Northwest Laboratories | 2 | 2,469,956 | 2 | 2,469,956 | — | — | — | — |
| Benaroya Research Institute at Virginia Mason | 1 | 263,250 | 1 | 263,250 | — | — | — | — |
| Catch, Inc. | 1 | 338,935 | 1 | 338,935 | — | — | — | — |
| Children's Hospital and Medical Center | 3 | 1,839,237 | 3 | 1,839,237 | — | — | — | — |
| Ekos Corporation | 1 | 57,514 | 1 | 57,514 | — | — | — | — |
| Fred Hutchinson Cancer Research Center | 17 | 38,557,353 | 15 | 9,379,311 | — | — | 2 | 29,178,042 |
| Group Health Cooperative of Puget Sound | 1 | 782,817 | 1 | 782,817 | — | — | — | — |
| Group Health Cooperative of South Central Wisconsin | 1 | 1,252,939 | — | — | — | — | 1 | 1,252,939 |
| Institute for Systems Biology | 1 | 121,986 | 1 | 121,986 | — | — | — | — |
| Northwest Research Associates, Inc. | 2 | 199,715 | 2 | 199,715 | — | — | — | — |
| Pathway Medical Technologies, Inc. | 1 | 479,204 | 1 | 479,204 | — | — | — | — |
| Phantoms By Design | 2 | 541,091 | 2 | 541,091 | — | — | — | — |
| Puget Sound Blood Center | 3 | 1,013,078 | 3 | 1,013,078 | — | — | — | — |
| Seattle Institute for Cardiac Research | 1 | 4,263,755 | 1 | 4,263,755 | — | — | — | — |
| Spencer Technologies | 1 | 256,758 | 1 | 256,758 | — | — | — | — |
| Therus Corporation | 1 | 412,395 | 1 | 412,395 | — | — | — | — |
| University of Washington | 121 | 67,235,169 | 105 | 56,073,443 | 11 | 3,311,278 | 5 | 7,850,448 |
| Washington State University | 5 | 1,663,549 | 5 | 1,663,549 | — | — | — | — |
| **Total Washington** | **168** | **122,719,998** | **149** | **81,127,291** | **11** | **3,311,278** | **8** | **38,281,429** |
| **West Virginia** | | | | | | | | |
| West Virginia University | 8 | 2,092,198 | 8 | 2,092,198 | — | — | — | — |
| **Total West Virginia** | **8** | **2,092,198** | **8** | **2,092,198** | **—** | **—** | **—** | **—** |
| **Wisconsin** | | | | | | | | |
| American Society of Gene Therapy | 1 | 10,000 | 1 | 10,000 | — | — | — | — |
| Blood Center of Southeastern Wisconsin | 10 | 5,111,134 | 8 | 4,686,968 | 1 | 187,635 | 1 | 236,531 |
| Marquette University | 2 | 436,813 | 2 | 436,813 | — | — | — | — |
| Marshfield Clinic | 1 | 3,600,000 | — | — | — | — | 1 | 3,600,000 |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| Medical College of Wisconsin | 68 | 30,908,370 | 61 | 29,605,608 | 6 | 877,762 | 1 | 425,000 |
| SpectroCon, LLC | 1 | 343,284 | 1 | 343,284 | — | — | — | — |
| University of Wisconsin, Madison | 52 | 22,124,966 | 46 | 20,631,378 | 5 | 1,368,588 | 1 | 125,000 |
| VGSK, LLC | 1 | 125,000 | 1 | 125,000 | — | — | — | — |
| WiCell Research Institute | — | 134,167 | — | 134,167 | — | — | — | — |
| **Total Wisconsin** | **136** | **62,793,734** | **120** | **55,973,218** | **12** | **2,433,985** | **4** | **4,386,531** |
| **Puerto Rico** | | | | | | | | |
| Ponce School of Medicine | 1 | 123,353 | 1 | 123,353 | — | — | — | — |
| Universidad Central del Caribe | — | 172,448 | — | 172,448 | — | — | — | — |
| University of Puerto Rico, Mayaguez | — | 158,024 | — | 158,024 | — | — | — | — |
| University of Puerto Rico, Medical Sciences | 1 | 794,480 | 1 | 794,480 | — | — | — | — |
| University of Puerto Rico, Rio Piedras | 1 | 118,406 | 1 | 118,406 | — | — | — | — |
| **Total Puerto Rico** | **3** | **1,366,711** | **3** | **1,366,711** | **—** | **—** | **—** | **—** |
| **Total U.S.** | **5,829** | **2,611,341,274** | **5,146** | **2,244,871,591** | **472** | **86,337,318** | **211** | **280,132,365** |
| **Argentina** | | | | | | | | |
| National University of Cordoba | 1 | 48,928 | — | — | 1 | 48,928 | — | — |
| **Total Argentina** | **1** | **48,928** | **—** | **—** | **1** | **48,928** | **—** | **—** |
| **Australia** | | | | | | | | |
| ES Cell International Pte Ltd. | — | 74,630 | — | 74,630 | — | — | — | — |
| Howard Florey Institute | 1 | 408,881 | 1 | 408,881 | — | — | — | — |
| National Centre/HIV Epidemiology Clincal Research | 1 | 200,000 | 1 | 200,000 | — | — | — | — |
| Peter MacCallum Cancer Institute | 1 | 175,000 | 1 | 175,000 | — | — | — | — |
| Royal Melbourne Hospital | 2 | 445,000 | 2 | 445,000 | — | — | — | — |
| St. Vincent's Hospital, Melbourne | 1 | 216,000 | 1 | 216,000 | — | — | — | — |
| University of Melbourne | 2 | 254,000 | 2 | 254,000 | — | — | — | — |
| University of Sydney | 2 | 317,600 | 2 | 317,600 | — | — | — | — |
| University of Western Australia | 1 | 243,000 | 1 | 243,000 | — | — | — | — |
| Victor Chang Cardiac Research Institute | 1 | 83,323 | 1 | 83,323 | — | — | — | — |
| **Total Australia** | **12** | **2,417,434** | **12** | **2,417,434** | **—** | **—** | **—** | **—** |
| **Belgium** | | | | | | | | |
| Flanders Interuniversity Institute of Biotechnology | 1 | 175,000 | 1 | 175,000 | — | — | — | — |
| Free University of Brussels | 1 | 297,000 | 1 | 297,000 | — | — | — | — |
| **Total Belgium** | **2** | **472,000** | **2** | **472,000** | **—** | **—** | **—** | **—** |
| **Brazil** | | | | | | | | |
| Federal University of Bahia | — | 39,000 | — | 39,000 | — | — | — | — |
| **Total Brazil** | **—** | **39,000** | **—** | **39,000** | **—** | **—** | **—** | **—** |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| **Canada** | | | | | | | | |
| Clinical Research Institute of Montreal | 1 | 261,109 | 1 | 261,109 | — | — | — | — |
| Hospital for Sick Children, Toronto | 4 | 780,940 | 3 | 739,872 | 1 | 41,068 | — | — |
| London Health Sciences Center | 1 | 166,613 | — | — | — | — | 1 | 166,613 |
| McGill University | 1 | 300,000 | 1 | 300,000 | — | — | — | — |
| McMaster University | 1 | 5,169,199 | — | — | — | — | 1 | 5,169,199 |
| Ontario Cancer Institute | 1 | 200,000 | 1 | 200,000 | — | — | — | — |
| Ottawa Health Research Institute | 2 | 401,602 | 2 | 401,602 | — | — | — | — |
| St. Michael's Hospital | 1 | 90,211 | 1 | 90,211 | — | — | — | — |
| Sunnybrook and Women's College Health Sciences Center | 1 | 207,578 | 1 | 207,578 | — | — | — | — |
| UHN Toronto General Hospital | 1 | 371,418 | 1 | 371,418 | — | — | — | — |
| University Health Network | 1 | 200,000 | 1 | 200,000 | — | — | — | — |
| University of Alberta | 2 | 240,632 | 2 | 240,632 | — | — | — | — |
| University of British Columbia | 1 | — | — | — | — | — | 1 | — |
| University of Calgary | 1 | 283,725 | 1 | 283,725 | — | — | — | — |
| University of Montreal | 2 | 299,071 | 2 | 299,071 | — | — | — | — |
| University of Toronto | — | 80,000 | — | 80,000 | — | — | — | — |
| **Total Canada** | **21** | **9,052,098** | **17** | **3,675,218** | **1** | **41,068** | **3** | **5,335,812** |
| **China** | | | | | | | | |
| Chinese Center, Disease Control and Prevention | — | 24,300 | — | 24,300 | — | — | — | — |
| **Total China** | **—** | **24,300** | **—** | **24,300** | **—** | **—** | **—** | **—** |
| **Finland** | | | | | | | | |
| University of Helsinki | 1 | 270,000 | 1 | 270,000 | — | — | — | — |
| **Total Finland** | **1** | **270,000** | **1** | **270,000** | **—** | **—** | **—** | **—** |
| **India** | | | | | | | | |
| Center for DNA Fingerprinting/ Diagnostics | — | 39,000 | — | 39,000 | — | — | — | — |
| **Total India** | | **39,000** | **—** | **39,000** | **—** | **—** | **—** | **—** |
| **Israel** | | | | | | | | |
| Technion-Israel Institute of Technology | 2 | 382,408 | 1 | 372,000 | 1 | 10,408 | — | — |
| **Total Israel** | **2** | **382,408** | **1** | **372,000** | **1** | **10,408** | **—** | **—** |
| **Italy** | | | | | | | | |
| University of Parma | 1 | 369,289 | 1 | 369,289 | — | — | — | — |
| **Total Italy** | **1** | **369,289** | **1** | **369,289** | **—** | **—** | **—** | **—** |

| Institution | Totals | | Grants | | Research Training and Career Development | | Contracts | |
|---|---|---|---|---|---|---|---|---|
| | No. | Dollar | No. | Dollar | No. | Dollar | No. | Dollar |
| **Netherlands** | | | | | | | | |
| Erasmus University of Rotterdam | 1 | 216,000 | 1 | 216,000 | — | — | — | — |
| State University at Groningen | 1 | 270,000 | 1 | 270,000 | — | — | — | — |
| **Total Netherlands** | **2** | **486,000** | **2** | **486,000** | **—** | **—** | **—** | **—** |
| **Nigeria** | | | | | | | | |
| University of Ibadan | — | 10,000 | — | 10,000 | — | — | — | — |
| **Total Nigeria** | **—** | **10,000** | **—** | **10,000** | **—** | **—** | **—** | **—** |
| **Republic of Korea** | | | | | | | | |
| Mizmedi Hospital | — | 50,000 | — | 50,000 | — | — | — | — |
| **Total Republic of Korea** | **—** | **50,000** | **—** | **50,000** | **—** | **—** | **—** | **—** |
| **Russia** | | | | | | | | |
| Central Institute for Tuberculosis | 1 | 150,000 | 1 | 150,000 | — | — | — | — |
| **Total Russia** | **1** | **150,000** | **1** | **150,000** | **—** | **—** | **—** | **—** |
| **Sweden** | | | | | | | | |
| Karolinska Institute | 2 | 560,856 | 2 | 560,856 | — | — | — | — |
| Uppsala University | 1 | 162,000 | 1 | 162,000 | — | — | — | — |
| **Total Sweden** | **3** | **722,856** | **3** | **722,856** | **—** | **—** | **—** | **—** |
| **Thailand** | | | | | | | | |
| Chiang Mai University | — | 16,200 | — | 16,200 | — | — | — | — |
| **Total Thailand** | **—** | **16,200** | **—** | **16,200** | **—** | **—** | **—** | **—** |
| **United Kingdom** | | | | | | | | |
| Royal Free and University College Medical School | 1 | 216,000 | 1 | 216,000 | — | — | — | — |
| University of Bristol | 1 | 484,179 | 1 | 484,179 | — | — | — | — |
| University of Cambridge | 1 | 298,256 | 1 | 298,256 | — | — | — | — |
| University of Edinburgh | 1 | 200,000 | 1 | 200,000 | — | — | — | — |
| University of Leicester | 1 | 47,296 | — | — | 1 | 47,296 | — | — |
| University of London National Heart and Lung Institute | 1 | 339,351 | 1 | 339,351 | — | — | — | — |
| University of London University College, London | 1 | 288,106 | 1 | 288,106 | — | — | — | — |
| University of Oxford | 1 | 41,068 | — | — | 1 | 41,068 | — | — |
| University of Southampton | 1 | 265,110 | 1 | 265,110 | — | — | — | — |
| **Total United Kingdom** | **9** | **2,179,366** | **7** | **2,091,002** | **2** | **88,364** | **—** | **—** |
| **Total Other** | **55** | **16,728,879** | **47** | **11,204,299** | **5** | **188,768** | **3** | **5,335,812** |
| **Grand Total** | **5,884** | **$2,628,070,153** | **5,193** | **$2,256,075,890** | **477** | **$86,526,086** | **214** | **$285,468,177** |

# Appendixes

## Types of Research Activity

## List of Abbreviations and Acronyms

## Index

# Types of Research Activity

## Research Projects

**Research Project Grants (R01):** To support discrete and specific projects to be performed by one or several investigators in areas of the investigator's particular interests and competencies.

**Research Projects (Cooperative Agreements) (U01):** To support discrete, circumscribed projects in areas of an investigator's specific interest and competency involving substantial programmatic participation by the NHLBI during performance of the activity.

**Research Program Projects (P01):** To support broadly based, multidisciplinary, often long-term research projects that have specific major objectives or basic themes directed toward a well-defined research program goal. Usually, a relatively large, organized group of researchers conducts individual subprojects, the results of which help achieve objectives of the program project.

**Small Research Grants (R03):** To provide limited support for extended analyses of research data generated by clinical trials, population research, and demonstration and education studies.

**Academic Research Enhancement Awards (AREA) (R15):** To support small-scale research projects conducted by faculty in primarily baccalaureate degree-granting domestic institutions. Awards are for up to $75,000 for direct costs (plus applicable indirect costs) for periods not to exceed 36 months.

**Exploratory/Developmental Grants (R21):** To encourage the development of new research activities in heart, lung, and blood diseases and sleep disorders program areas.

**Resource-Related Research Projects (R24):** To support research projects that will enhance the capability of resources to serve biomedical research in areas related to cardiovascular, lung, and blood health and diseases; blood resources; and sleep disorders.

**First Independent Research Support and Transition (FIRST) Award (R29):** To provide a sufficient initial period of research support for newly independent biomedical investigators to develop their research capabilities and demonstrate the merit of their research ideas.

**Exploratory/Developmental Grant (R33):** To provide phase II support for innovative exploratory and developmental research activities initiated under the R21 mechanism.

**Method To Extend Research in Time (MERIT) Award (R37):** To provide long-term research grant support to investigators whose research competency and productivity are distinctly superior and thus are likely to continue to perform in an outstanding manner. Investigators may not apply for a MERIT award; instead, they are selected by the NHLBI on the basis of their current grant applications and their present and past grant support.

**Small Business Technology Transfer (STTR) Grants—Phase I (R41):** To support cooperative R&D projects between small business concerns and research institutions, limited in time and amount, to establish the technical merit and feasibility of ideas that have potential for commercialization. Awards are made to small business concerns only.

**Small Business Technology Transfer (STTR) Grants—Phase II (R42):** To support in-depth development of cooperative R&D projects between small business concerns and research institutions, limited in time and amount, whose feasibility has been established in Phase I and that have potential for commercialization. Awards are made to small business concerns only.

**Small Business Innovation Research (SBIR) Grants, Phase I (R43):** To support projects, limited in time and amount, to establish the technical merit and feasibility of research and development ideas that may ultimately lead to commercial products or services.

**Small Business Innovation Research (SBIR) Grants, Phase II (R44):** To support research project ideas that have been shown to be feasible in Phase I and that are likely to result in commercially marketable products or services.

## Research Centers

**Exploratory Grants (P20):** To support planning for new programs, expansion or modification of existing resources, and feasibility studies to explore various approaches to the development of interdisciplinary programs that offer potential solutions to problems of special significance to the mission of the NHLBI.

**Center Core Grants (P30):** To support shared resources and facilities for basic, clinical, behavioral, and translational research in the prevention, detection, and treatment of HIV infection and AIDS.

**Animal (Mammalian and Nonmammalian) Model and Animal and Material Resource Grant (P40):** To develop and support animal models, or animal or biological materials resources. Nonmammalian resources include nonmammalian vertebrates, invertebrates, cell systems, and nonbiological systems.

**Specialized Centers of Research (SCOR) Grants (P50):** To support both basic and clinical research related to an Institute-identified theme. The spectrum of SCOR activities comprises multidisciplinary approaches to specific disease entities or biomedical problem areas. The SCOR grants differ from research program projects in that they are in response to an announcement of programmatic needs of the Institute. Centers may be asked to perform additional studies because of urgently needed information or may serve as a regional or national resource for special purpose research.

**Comprehensive Specialized Research Center Grants (U54):** To support a large, interrelated biomedical research program focused on a disorder within the Institute's mandate; to initiate and expand community education, screening, and counseling programs; and to educate medical and allied health professionals concerning problems of diagnosis and treatment of specific diseases such as sickle cell anemia.

## Research Career Programs

**Mentored Research Scientist Development Award for Minority Faculty (K01):** To support underrepresented minority faculty members with varying levels of research experience to prepare them for research careers as independent investigators.

**Minority Institution Faculty Mentored Research Scientist Development Award (K01):** To support at minority institutions faculty members who have the interest and potential to conduct state-of-the-art research in the areas of cardiovascular, pulmonary, or hematologic disease, or in sleep disorders.

**Independent Scientist Award (K02):** To enhance the research capability of promising individuals in the formative stages of their careers of independent research in the sciences related to heart, lung, and blood diseases; blood resources; and sleep disorders.

**Research Career Development Award (RCDA) (K04):** To foster the development of young scientists with outstanding research potential for careers of independent research in the sciences related to heart, lung, and blood diseases and blood resources. New grants are no longer awarded.

**Research Career Award (RCA) (K06):** To assist institutions in supporting established investigators of high competency for the duration of their careers. New grants are no longer awarded.

**Academic Award (K07):** To support an individual with an academic appointment to introduce or improve a disease curriculum that will enhance the academic or research environment of the applicant institution as well as further the individual's own career. This award series includes the Preventive Cardiology Academic Award, the Preventive Pulmonary Academic Award, the Transfusion Medicine Academic Award, and the Systemic Pulmonary and Vascular Diseases Academic Awards, the Asthma Academic Award, the Tuberculosis Academic Award, the Sleep Academic Award, the Nutrition Academic Award, and the Cultural Competence and Health Disparities Academic Award. Currently, only the Sleep Academic Award, the Nutrition Academic Award, and the Cultural Competence and Health Disparities Academic Award programs are being supported.

**Clinical Investigator Development Award (CIDA) (K08):** To provide an opportunity for clinically trained physicians to develop research skills and gain experience in advanced research methods and experimental approaches in basic and applied sciences relevant to cardiovascular, pulmonary, and hematological diseases. This award was developed as a means to encourage clinical investigators to engage in research in specific areas designated by the Institute.

**Physician Scientist Award (PSA) (K11):** To encourage newly trained clinicians to develop independent research skills and experience in one of the fundamental sciences. New grants are no longer awarded.

**Minority School Faculty Development Award (K14):** To develop faculty investigators at minority schools and to enhance their research capabilities in areas related to heart, lung, and blood diseases; blood resources; and sleep disorders. New grants are no longer awarded.

**Research Development Award for Minority Faculty (K14):** To encourage the development of minority faculty investigators and to enhance their research capabilities in areas related to cardiovascular, lung, and blood health and disease; transfusion medicine; and sleep disorders. New grants are no longer awarded.

**Career Enhancement Award for Stem Cell Research (K18):** To enable established investigators to acquire new research capabilities in the use of human or animal embryonic, adult, or cord blood stem cells. All candidates must have a sponsor, either within their own or at another institution, who is a well-qualified stem cell expert to serve as a mentor.

**NHLBI Career Transition Award (K22):** To support the postdoctoral research training of an outstanding individual in an NHLBI intramural laboratory for up to 3 years and subsequently, to support the individual's successful transition from postdoctoral research to an extramural environment as an independent researcher.

**Mentored Patient-Oriented Research Career Development Award (K23):** To provide support for career development to investigators who have made a commitment to focus their research endeavors on patient-oriented research.

**Midcareer Investigator Award in Patient-Oriented Research (K24):** To provide support for clinicians to allow them "protected time" to devote to patient-oriented research and to act as mentors for beginning clinical investigators.

**Mentored Quantitative Research Career Development Award (K25):** To provide support to investigators with quantitative science or engineering backgrounds who have made a commitment to focus their research on basic or clinical biomedicine, bioengineering, bioimaging, or behavioral sciences.

**Clinical Research Curriculum Award (CRCA) (K30):** To stimulate inclusion of high-quality, multidisciplinary didactic training in fundamental skills, methodology, theories, and conceptualization as part of the career development of clinical investigators.

## Other Research Grants

**Scientific Evaluation (R09):** To provide funds to the chairman of an initial review group for operation of the review group.

**Cooperative Clinical Research (R10) (U10):** To support studies and evaluations of relevant clinical problems. These grants usually involve collaborative efforts among several institutions and principal investigators and are conducted under a formal protocol.

**Conference Grants (R13):** To support national and international scientific meetings, conferences, or workshops at which research is discussed.

**Research Demonstration and Education Projects (R18):** To provide support designed to develop, test, and evaluate health-related activities and to foster application of existing knowledge to the control of heart, lung, and blood diseases and sleep disorders.

**Education Projects (R25):** To provide support for the development and implementation of a program as it relates to a category in one or more of the areas of education, information, training, technical assistance, coordination, or evaluation.

**Minority Biomedical Research Support (MBRS) Grants (S06) (S14):** To strengthen the biomedical research and research training capability of minority institutions and to assist in increasing the involvement of minority faculty and students in biomedical research.

**Biomedical Research Support Grants (S07):** To strengthen, balance, and stabilize supported biomedical and behavioral research programs through flexible funds that permit institutions to respond quickly and effectively to emerging needs and opportunities; to enhance creativity and innovation, to support pilot studies, and to improve research resources.

**Continuing Education Training Grant (T15):** To assist professional schools and other public and nonprofit institutions to establish, expand, or improve programs of continuing professional education, especially for programs dealing with new scientific developments.

**Scientific Review and Evaluation (U09):** To support an initial Scientific Review Group responsible for the assessment of scientific and technical merit of grant applications.

**Conference (Cooperative Agreements) (U13):** To support international, national, or regional meetings; conferences; and workshops where substantial programmatic involvement is planned to assist the recipient.

**Resource-Related Research Projects (U24):** To support research projects contributing to improvement of the capability of resources to serve biomedical research.

**Historical Black College and University Scientist Award (UH1):** To strengthen and augment the human resources at historically black colleges and universities (HBCU) by recruiting an established research scientist into their biomedical or behavioral sciences department; to enhance the career of the recruited research scientist; and to strengthen other HBCU resources for the conduct of biomedical or behavioral research in areas related to cardiovascular, lung, and blood health and disease; transfusion medicine; and sleep disorders.

## Individual National Research Service Awards (NRSA)

**Predoctoral Individual NRSA (F31):** To provide predoctoral individuals with supervised research training in areas related to heart, lung, and blood diseases; blood resources; and sleep disorders leading toward the research degree (e.g., Ph.D.).

**Postdoctoral Individual NRSA (F32):** To provide postdoctoral research training to individuals to broaden their scientific background and extend their potential for research in areas related to heart, lung, and blood diseases and blood resources.

**NRSA for Senior Fellows (F33):** To provide experienced scientists with an opportunity to make major changes in the direction of their research careers, to broaden their scientific background, to acquire new research capabilities, to enlarge their command of an allied research field, or to take time from regular professional responsibilities for the purpose of broadening their research capabilities.

**Intramural NRSA Individual Postdoctoral Program Appointee (F35):** To offer research health scientists, research clinicians, and others the opportunity to receive full-time research training in intramural laboratories of the NHLBI and of other Institutes of the NIH.

## Institutional National Research Service Awards (NRSA)

**Institutional NRSA (T32):** To enable institutions to make awards to individuals selected by them for predoctoral and postdoctoral research training in areas related to heart, lung, and blood diseases, blood resources, and sleep disorders.

**Minority Institutional Research Training Program (T32M):** To support full-time research training for investigative careers at minority schools in areas of cardiovascular, pulmonary, and hematologic diseases and sleep disorders. Graduate students, postdoctoral students, or health professions students may be supported under this program.

**MARC Undergraduate NRSA Institutional Grants (T34):** To support institutional training grants for underrepresented minority undergraduates to obtain research training and improve their preparation for graduate training in the biomedical and behavioral sciences.

**NRSA Short-Term Research Training (T35 and T35S):** To provide individuals with research training during off-quarters or summer periods to encourage research careers or to encourage research in areas of national need. This program includes the Short-Term Training for Minority Students Program and short-term training for students in health professional schools.

**MARC Visiting Professors for Minority Institutions (T36):** To increase the number of well-trained minority scientists in biomedical disciplines and to strengthen the research and teaching capabilities of minority institutions.

## Other Support

**Research and Development Contracts (N01):** To develop or apply new knowledge or test, screen, or evaluate a product, material, device, or component for use by the scientific community.

**Small Business Innovation Research (N43):** To support projects, limited in time and amount, to establish the technical merit and feasibility of R&D ideas that may ultimately lead to a commercial product(s) or service(s).

**NIH Interagency Agreements (Y01):** To provide a source of funds to another Federal agency to acquire specific products, services, or studies.

**NIH Intra-Agency Agreements (Y02):** To provide a source of funds to another NIH component to acquire specific products, services, or studies.

**Minority Research Supplements Programs:** To provide supplemental funds to active NHLBI grants to support the research of minority high school, undergraduate, and graduate students; postdoctoral trainees; and investigators.

# List of Abbreviations and Acronyms

| | |
|---|---|
| ACCORD | Action to Control Cardiovascular Risk in Diabetes |
| ACE | angiotensin-converting enzyme |
| ACRN | Asthma Clinical Research Network |
| ACTION | A CHF Trial Investigating Outcomes of Exercise |
| AIDS | acquired immunodeficiency syndrome |
| ALLHAT | Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial |
| AMI | acute myocardial infarction |
| APPLES | Apnea Positive Pressure Long-Term Efficacy Study |
| ARDS | acute respiratory distress syndrome |
| ARDSNET | Acute Respiratory Distress Syndrome Clinical Network |
| ARIC | Atherosclerosis Risk in Communities |
| ATP III | Adult Treatment Panel III |
| BABY HUG | Pediatric Hydroxyurea Phase III Clinical Trial |
| BEA | Board of Extramural Advisors |
| BARI 2D | Bypass Angioplasty Revascularization Investigation in Type 2 Diabetics |
| CABG | coronary artery bypass graft |
| CAMP–CS /Phase 2 | Childhood Asthma Management Program–Continuation Study/Phase 2 |
| CARDIA | Coronary Artery Risk Development in Young Adults |
| CARE | Childhood Asthma Research and Education Network |
| CF | cystic fibrosis |
| CHD | coronary heart disease |
| CHF | congestive heart failure |
| CHS | Cardiovascular Health Study |
| CIHR | Canadian Institutes of Health Research |
| COBLT | Cord Blood Stem Cell Transplantation Study |
| COPD | chronic obstructive pulmonary disease |
| CORAL | Cardiovascular Outcomes in Renal Atherosclerotic Lesions |
| CSCC | Comprehensive Sickle Cell Centers |
| CVD | cardiovascular diseases |
| DBDR | Division of Blood Diseases and Resources |
| DECA | Division of Epidemiology and Clinical Applications |
| DHVD | Division of Heart and Vascular Diseases |
| DIR | Division of Intramural Research |
| 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 |
| FHS–SCAN | Family Heart Study–Subclinical Atherosclerosis Network |
| FOCUS | Functional Outcomes in Cardiovascular Patients Undergoing Surgical Hip Fracture Repair |
| FORTE | Feasibility of Retinoid Treatment in Emphysema |
| FY | fiscal year |
| GEMS | Girls Health Enrichment Multisite Studies |

| | |
|---|---|
| GOCADAN | Genetics of Coronary Artery Disease in Alaskan Natives |
| HAT | Home Automatic External Defibrillator Trial |
| HBCU | historically black colleges and universities |
| HDL | high-density lipoprotein |
| HEIRS | Hemochromatosis and Iron Overload Screen Study |
| HEW | Department of Health, Education, and Welfare (now HHS) |
| HHS | Health and Human Services (formerly HEW) |
| HIV | human immunodeficiency virus |
| ICD | International Classification of Diseases |
| JHS | Jackson Heart Study |
| JNC | Joint National Committee on the Detection, Evaluation, and Treatment of High Blood Pressure |
| LDL | low-density lipoprotein |
| MARC | Minority Access to Research Careers |
| MBRS | Minority Biomedical Research Support |
| MERIT | Method to Extend Research in Time |
| MESA | Multi-Ethnic Study of Atherosclerosis |
| MGS | Mammalian Genotyping Service |
| MI | myocardial infarction |
| MRI | magnetic resonance imaging |
| MSH | Multicenter Study of Hydroxyurea |
| NAEPP | National Asthma Education and Prevention Program |
| NCEP | National Cholesterol Education Program |
| NCHS | National Center for Health Statistics |
| NCI | National Cancer Institute |
| NCSDR | National Center on Sleep Disorders Research |
| NETT | National Emphysema Treatment Trial |
| NHAAP | National Heart Attack Alert Program |
| NHANES | National Health and Nutrition Examination Survey |
| NHBPEP | National High Blood Pressure Education Program |
| NHI | National Heart Institute |
| NHIS | National Health Interview Survey |
| NHLBAC | National Heart, Lung, and Blood Advisory Council |
| NHLBI | National Heart, Lung, and Blood Institute (formerly NHI and NHLI) |
| NHLI | National Heart and Lung Institute |
| NIA | National Institute on Aging |
| NICHD | National Institute of Child Health and Human Development |
| NIDDK | National Institute of Diabetes and Digestive and Kidney Diseases |
| NIDDM | noninsulin-dependent diabetes mellitus |
| NIH | National Institutes of Health |
| NIMH | National Institute of Mental Health |
| NLMS | National Longitudinal Mortality Study |
| NO | nitric oxide |
| NRSA | National Research Service Award |
| OAR | Office of AIDS Research |
| OD | Office of the Director |
| OEI | Obesity Education Initiative |
| OMHA | Office of Minority Health |
| OPEC | Office of Prevention, Education, and Control |
| OSA | obstructive sleep apnea |
| PA | Program Announcement |
| PAD | peripheral artery disease |
| PAHI | Pan American Hypertension Initiative |

| | |
|---|---|
| PAHO | Pan American Health Organization |
| PEACE | Prevention of Events With Angiotensin Converting Enzyme Inhibitor Therapy |
| PEGT | Programs of Excellence in Gene Therapy |
| PGA | Programs for Genomic Applications |
| PHS | Public Health Service |
| POUNDS LOST | Preventing Overweight Using Novel Dietary Strategies |
| REDS | Retrovirus Epidemiology Donor Study |
| RFA | Request for Applications |
| RFP | Request for Proposals |
| RPG | research project grant |
| SANDS | Stop Atherosclerosis in Native Diabetics Study |
| SBIR | Small Business Innovation Research |
| SCD | sickle cell disease |
| SCCOR | Specialized Centers of Clinically Oriented Research |
| SCOR | Specialized Centers of Research |
| SDB | Sleep Disordered Breathing |
| SEP | Special Emphasis Panel |
| SES | socioeconomic status |
| SIDS | sudden infant death syndrome |
| SRG | Scientific Research Group |
| STICH | Surgical Treatment for Ischemic Heart Failure |
| STOP | Stroke Prevention in Sickle Cell Anemia |
| STTR | Small Business Technology Transfer |
| TAAG | Trial of Activity for Adolescent Girls |
| TB | tuberculosis |
| WHI | Women's Health Initiative |
| WHL | World Health League |
| WLM | Weight Loss Maintenance |
| WISE | Women's Ischemia Syndrome Evaluation |
| WHO | World Health Organization |

# Index