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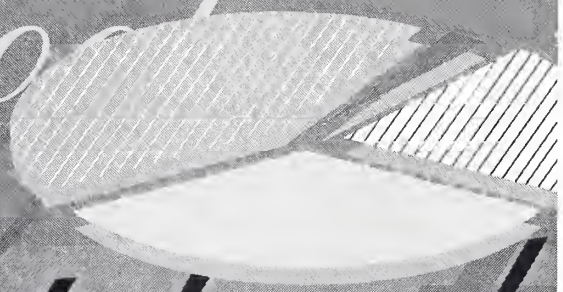


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FEBRUARY 2000
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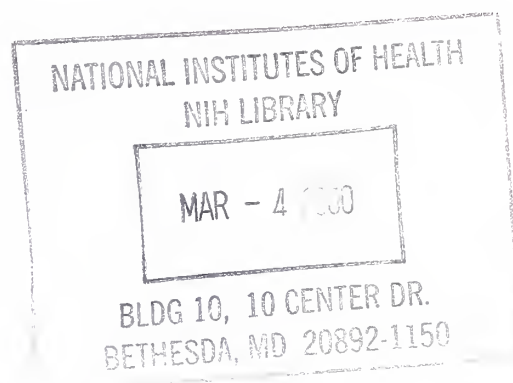


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1. Directory of Personnel*

| Office of the Director | Bldg. | Room | Phone | MSC ^{†,‡} |
|--|-------------------|-------|----------|--------------------|
| Director, Claude Lenfant, M.D. | 31 | 5A52 | 496-5166 | 2486 |
| Acting Deputy Director, John T. Watson, Ph.D. | 31 | 5A49 | 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 | 4A11 | 496-3245 | 2490 |
| Associate Director for Administrative Management, Donald P. Christoferson | 31 | 5A48 | 496-2411 | 2490 |
| Associate Director for Scientific Program Operation, Carl A. Roth, Ph.D., LL.M. | 31 | 5A03 | 496-6331 | 2482 |
| Associate Director for Prevention, Education, and Control, Gregory J. Morosco, Ph.D., M.P.H. | 31 | 4A03 | 496-5437 | 2480 |
| Associate Director for International Programs, Ruth J. Hegyeli, M.D. | 31 | 4A07 | 496-5375 | 2490 |
| Office of Special Concerns Director, Mishyelle I. Croom | 31 | 4A28 | 496-1763 | 2490 |
| Office of Administrative Management | | | | |
| Director/Executive Officer, Donald P. Christoferson | 31 | 5A48 | 496-2411 | 2490 |
| Special Assistant, Susan Kauble | 31 | 5A48 | 496-2411 | 2490 |
| Administrative Officer, Valery D. Gheen | 31 | 5A33 | 496-5931 | 2490 |
| Office of Technology Transfer and Development, Chief, Jonathan Gottlieb, Ph.D. | 31 | 1B30 | 402-5579 | 2490 |
| Management Policy and Administrative Services Branch Chief, David L. Whitmer | 31 | 5A33 | 496-5931 | 2490 |
| Freedom of Information/Privacy Act Coordinator, Suzanne Anthony | 31 | 5A33 | 496-9737 | 2490 |
| Financial Management Branch Chief, John C. Tibbs | 31 | 5A48 | 496-4653 | 2490 |
| Personnel Management Branch Chief, Barry Rubinstein | 31 | 5A28 | 496-6477 | 2484 |
| Extramural Administrative Management Branch Chief, Christinia E. Roark | RKL2 [§] | 7026 | 435-6373 | 7921 |
| Intramural Administrative Management Branch Chief, Hillel Soclof | 10 | 7N220 | 496-2157 | 1670 |
| National Center on Sleep Disorders Research | | | | |
| Director, James P. Kiley, Ph.D. | RKL2 | 10038 | 435-0199 | 7920 |
| Administrative Officer, Jan P. Montoya | RKL2 | 7026 | 435-6373 | 7921 |

* Current as of October 15, 1999. For locating personnel not listed, the general information number is 301-496-4000. 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.

| Office of the Director (cont'd.) | Bldg. | Room | Phone | MSC |
|---|-------|-------|----------|------|
| Women's Health Initiative | | | | |
| Director, Suzanne S. Hurd, Ph.D. | RKL2 | 10122 | 435-0233 | 7952 |
| Deputy Director, Jacques E. Rossouw, M.D. | RKL1* | 300 | 402-2900 | 7966 |
| Administrative Officer, Valery D. Gheen | 31 | 5A33 | 496-5931 | 2490 |
| Office of Prevention, Education, and Control | | | | |
| Director, Gregory J. Morosco, Ph.D., M.P.H. | 31 | 4A03 | 496-5437 | 2480 |
| Administrative Officer, Rebecca E. Tener | 31 | 5A33 | 496-5931 | 2490 |
| Health Communications and Information Science | | | | |
| Senior Manager, Terry C. Long | 31 | 4A03 | 496-0554 | 2480 |
| Public Health Program Development | | | | |
| Senior Manager, Robinson Fulwood, M.S.P.H. | 31 | 4A03 | 496-0554 | 2480 |
| National High Blood Pressure Education Program | | | | |
| Coordinator, Edward J. Roccella, Ph.D., M.P.H. | 31 | 4A16 | 496-1051 | 2480 |
| National Cholesterol Education Program | | | | |
| Coordinator, James I. Cleeman, M.D. | 31 | 4A16 | 496-1051 | 2480 |
| National Asthma Education and Prevention Program | | | | |
| Coordinator, Robinson Fulwood, M.S.P.H. | 31 | 4A03 | 496-0554 | 2480 |
| National Heart Attack Alert Program | | | | |
| Coordinator, Mary McDonald Hand, R.N., M.S. | 31 | 4A16 | 496-1051 | 2480 |
| National Obesity Education Initiative | | | | |
| Coordinator, Karen Donato, M.S., R.D. | 31 | 4A16 | 496-1051 | 2480 |
| Office of Science and Technology | | | | |
| Director, Carl A. Roth, Ph.D., LL.M. | 31 | 5A03 | 496-6331 | 2482 |
| Deputy Director, Barbara Liu, S.M. | 31 | 5A06 | 496-9899 | 2482 |
| Administrative Officer, Rebecca E. Tener | 31 | 5A33 | 496-5931 | 2490 |
| Office of International Programs | | | | |
| Director, Ruth Hegyeli, M.D. | 31 | 4A07 | 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 Legislative and Public Liaison | | | | |
| Coordinator, Sandra Lindsay, M.P.H. | 31 | 5A07 | 496-9899 | 2482 |
| Information Resources and Technology Program | | | | |
| Director, John J. Filigenzi | RKL2 | 8093 | 435-0119 | 7932 |
| Division of Heart and Vascular Diseases | | | | |
| Acting Director, Stephen C. Mockrin, Ph.D. | RKL2 | 9160 | 435-0466 | 7940 |
| Deputy Director, Stephen C. Mockrin, Ph.D. | RKL2 | 9170 | 435-0477 | 7940 |
| Administrative Officer, Lisa A. Freeny | RKL2 | 7026 | 435-6373 | 7921 |
| Heart Research Program | | | | |
| Director, Patrice Desvigne-Nickens, M.D. | RKL2 | 9158 | 435-0494 | 7940 |
| Senior Scientific Advisor, Frank D. Altieri, Ph.D. | RKL2 | 9166 | 435-0494 | 7940 |
| Arrhythmias Scientific Research Group | | | | |
| Leader, Peter M. Spooner, Ph.D. | RKL2 | 9192 | 435-0504 | 7940 |
| Bioengineering Scientific Research Group | | | | |
| Acting Leader, Alan Berson, Ph.D. | RKL2 | 9178 | 435-0513 | 7940 |
| Heart Function and Disease Research Group | | | | |
| Leader, John L. Fakunding, Ph.D. | RKL2 | 9200 | 435-0505 | 7940 |

*RKL1—Rockledge I Building

| Division of Heart and Vascular Diseases (cont'd.) | Bldg. | Room | Phone | MSC |
|---|--------------|-------------|--------------|------------|
| Clinical Medicine Research Group | | | | |
| Leader, George Sopko, M.D. | RKL2 | 9176 | 435-0515 | 7940 |
| Training and Special Programs Scientific Research Group | | | | |
| Leader, Michael A. Commarato, Ph.D. | RKL2 | 9204 | 435-0535 | 7940 |
| Vascular Research Program | | | | |
| Director, David M. Robinson, Ph.D. | RKL2 | 10196 | 435-0545 | 7956 |
| Senior Scientific Advisor, | | | | |
| Basil M. Rifkind, M.D. | RKL2 | 10190 | 435-0555 | 7956 |
| Atherosclerosis Scientific Research Group | | | | |
| Leader, Momtaz Wassef, Ph.D. | RKL2 | 10188 | 435-0550 | 7956 |
| Hypertension Scientific Research Group | | | | |
| Leader, Paul A. Velletri, Ph.D. | RKL2 | 10202 | 435-0560 | 7956 |
| Molecular Genetics and Medicine Scientific Research Group | | | | |
| Leader, Sonia Skarlatos, Ph.D. | RKL2 | 10186 | 435-1802 | 7956 |
| Vascular Biology and Medicine Scientific Research Group | | | | |
| Acting Leader, Stephen Goldman, Ph.D. | RKL2 | 10194 | 435-0565 | 7956 |
| Training and Special Programs Scientific Research Group | | | | |
| Leader, Beth Schucker, M.A. | RKL2 | 9206 | 435-0535 | 7940 |
| Division of Lung Diseases | | | | |
| Director, Suzanne S. Hurd, Ph.D. | RKL2 | 10122 | 435-0233 | 7952 |
| Deputy Director, Carol E. Vreim, Ph.D. | RKL2 | 10120 | 435-0233 | 7952 |
| Administrative Officer, Kathryn Lightbody | RKL2 | 7120 | 435-6373 | 7921 |
| Airway Biology and Disease Program | | | | |
| Director, James P. Kiley, Ph.D. | RKL2 | 10210 | 435-0202 | 7952 |
| Senior Scientific Advisor, | | | | |
| Susan P. Banks-Schlegel, Ph.D. | RKL2 | 10220 | 435-0202 | 7952 |
| Asthma Scientific Research Group | | | | |
| Leader, Susan P. Banks-Schlegel, Ph.D. | RKL2 | 10220 | 435-0202 | 7952 |
| Chronic Obstructive Pulmonary Disease/Environment Scientific Research Group | | | | |
| Leader, Gail G. Weinmann, M.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 | 10222 | 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, Robert A. Musson, 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 Scientific Research Group | | | | |
| Leader, Andrea Harabin, Ph.D. | RKL2 | 10012 | 435-0222 | 7952 |
| Critical Care Scientific Research Group | | | | |
| Leader, Robert A. Musson, Ph.D. | RKL2 | 10108 | 435-0222 | 7952 |
| Developmental Biology and Pediatrics Scientific Research Group | | | | |
| Leader, Mary Anne Berberich, Ph.D. | RKL2 | 10102 | 435-0222 | 7952 |

| Division of Lung Diseases (cont'd) | Bldg. | Room | Phone | MSC |
|--|-------|-------|----------|------|
| Immunology/Fibrosis Scientific Research Group | | | | |
| Leader, Robert A. Musson, Ph.D. | RKL2 | 10108 | 435-0222 | 7952 |
| Lung Cell and Vascular Biology Scientific Research Group | | | | |
| Leader, Dorothy B. Gail, Ph.D. | RKL2 | 10100 | 435-0222 | 7952 |
| Training and Special Programs Scientific Research Group | | | | |
| Co-Leader, Andrea Harabin, Ph.D. | RKL2 | 10012 | 435-0222 | 7952 |
| Co-Leader, Robert A. Musson, Ph. D. | RKL2 | 10108 | 435-0222 | 7952 |
| Division of Blood Diseases and Resources | | | | |
| Director, Barbara Alving, M.D. | RKL2 | 10160 | 435-0080 | 7950 |
| Deputy Director, Carol H. Letendre, Ph.D. | RKL2 | 10162 | 435-0080 | 7950 |
| Administrative Officer, Kathryn Lightbody | RKL2 | 7120 | 435-6373 | 7921 |
| Program Analysis Officer, Susan Pucie | RKL2 | 10166 | 435-0584 | 7950 |
| Blood Resources Program | | | | |
| Director, Henry Chang, M.D. | RKL2 | 10170 | 435-0065 | 7950 |
| Transfusion Medicine Scientific Research Group | | | | |
| Leader, George J. Nemo, Ph.D. | RKL2 | 10142 | 435-0075 | 7950 |
| Bone Marrow Transplantation Scientific Research Group | | | | |
| Leader, LeeAnn Jensen, Ph.D. | RKL2 | 10170 | 435-0065 | 7950 |
| Thrombosis and Hemostasis Scientific Research Group | | | | |
| Leader, Pankaj Ganguly, Ph.D. | RKL2 | 10176 | 435-0070 | 7950 |
| Training and Special Programs | | | | |
| Leader, Joyce I. Creamer, M.B.A. | RKL2 | 10170 | 435-0061 | 7950 |
| Blood Diseases Program | | | | |
| Director, Charles Peterson, M.D. | RKL2 | 10158 | 435-0050 | 7950 |
| Sickle Cell Disease Scientific Research Group | | | | |
| Leader, Duane Bonds, M.D. | RKL2 | 10148 | 435-0055 | 7950 |
| Cellular Hematology Scientific Research Group | | | | |
| Leader, Charles Peterson, M.D. | RKL2 | 10158 | 435-0050 | 7950 |
| Training and Special Programs | | | | |
| Bette A. Houston | RKL2 | 10154 | 435-0061 | 7950 |
| Division of Epidemiology and Clinical Applications | | | | |
| Director, Lawrence M. Friedman, M.D. | RKL2 | 8100 | 435-0422 | 7938 |
| Deputy Director, Peter Savage, M.D. | RKL2 | 8104 | 435-0422 | 7938 |
| Senior Advisor, Gerald Payne, M.D. | RKL2 | 8102 | 435-0422 | 7938 |
| Nutrition Coordinator, Nancy Ernst, Ph.D. | RKL2 | 8112 | 435-0422 | 7938 |
| Administrative Officer, Charlotte Wiltshire | RKL2 | 7118 | 435-6373 | 7921 |
| Office of Biostatistics Research | | | | |
| Director, Nancy L. Geller, Ph.D. | RKL2 | 8210 | 435-0434 | 7938 |
| Clinical Applications and Prevention Program | | | | |
| Director, Jeffrey Cutler, M.D. | RKL2 | 8130 | 435-0414 | 7936 |
| Prevention Scientific Research Group | | | | |
| Leader, Denise Simons-Morton, M.D., Ph.D. | RKL2 | 8138 | 435-0377 | 7936 |
| Clinical Trials Scientific Research Group | | | | |
| Leader, Michael Domanski, M.D. | RKL2 | 8146 | 435-0399 | 7936 |
| Behavioral Medicine Scientific Research Group | | | | |
| Leader, Peter G. Kaufmann, Ph.D. | RKL2 | 8118 | 435-0404 | 7936 |
| Epidemiology and Biometry Program | | | | |
| Director, Teri Manolio, M.D., M.H.S. | RKL2 | 8160 | 435-0707 | 7934 |
| Analytical Resources Scientific Research Group | | | | |
| Leader, Paul D. Sorlie, Ph.D. | RKL2 | 8176 | 435-0449 | 7934 |

| Division of Epidemiology and Clinical Applications (cont'd.) | Bldg. | Room | Phone | MSC |
|---|--|-------------|--------------|------------|
| Genetic Epidemiology Scientific Research Group | | | | |
| Leader, Richard Fabsitz, M.A. | RKL2 | 8152 | 435-0444 | 7934 |
| Field Studies and Clinical Epidemiology Scientific Research Group | | | | |
| Assistant Director, Diane Bild, M.D. | RKL2 | 8154 | 435-0701 | 7934 |
| Framingham Epidemiology Research Unit | | | | |
| Leader, Daniel Levy, M.D. | 5 Thurber Street Framingham, MA 01701 (508) 935-3458 | | | |
| Jackson Heart Study | | | | |
| Leader, Cecil Burchfiel, Ph.D. | 350 West Woodrow Wilson Drive Jackson, MS 39213 (601) 815-5046 | | | |
| Division of Extramural Affairs | | | | |
| Director, Robert R. Carlson | RKL2 | 7100 | 435-0260 | 7922 |
| Deputy Director, C. James Scheirer, Ph.D. | RKL2 | 7216 | 435-0266 | 7924 |
| Administrative Officer, Veronica M. Wharton | RKL2 | 7106 | 435-6373 | 7921 |
| Committee Management Officer, Kathryn M. Valeda | RKL2 | 7220 | 435-0255 | 7922 |
| Review Branch | | | | |
| Chief, C. James Scheirer, Ph.D. | RKL2 | 7216 | 435-0266 | 7924 |
| Senior Scientific Review | | | | |
| Advisor, Louis M. Ouellette, Ph.D. | RKL2 | 7200 | 435-0310 | 7924 |
| Special Assistant, Louise P. Corman, Ph.D. | RKL2 | 7180 | 435-0270 | 7924 |
| Cardiology/Pulmonary Scientific Review Group | | | | |
| Leader, Deborah P. Beebe, Ph.D. | RKL2 | 7178 | 435-0270 | 7924 |
| Blood/Vascular Scientific Review Group | | | | |
| Leader, Jeffrey H. Hurst, Ph.D. | RKL2 | 7208 | 435-0303 | 7924 |
| Clinical Studies and Training Scientific Review Group | | | | |
| Leader, Anthony M. Coelho, Jr., Ph.D. | RKL2 | 7194 | 435-0288 | 7924 |
| Contracts Operations Branch | | | | |
| Chief, Robert Best | RKL2 | 6100 | 435-0330 | 7902 |
| Heart, Lung, and Vascular Diseases Section | | | | |
| Chief, Douglas W. Frye | RKL2 | 6106 | 435-0340 | 7902 |
| Blood Diseases and Resources Section | | | | |
| Chief, Patricia E. Davis | RKL2 | 6136 | 435-0355 | 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 | | | | |
| Acting Chief, Jane Davis | RKL2 | 7174 | 435-0166 | 7926 |
| Heart and Vascular Diseases Section | | | | |
| Acting Chief, Carol Dangel | RKL2 | 7140 | 435-0177 | 7926 |
| Lung Diseases Section | | | | |
| Chief, Raymond L. Zimmerman | RKL2 | 7158 | 435-0171 | 7926 |
| Blood Diseases and Resources Section | | | | |
| Chief, Jane R. Davis | RKL2 | 7174 | 435-0166 | 7926 |
| Division of Intramural Research | | | | |
| Administrative Officer, Hillel Soclof | 10 | 7N220 | 496-2157 | 1670 |
| Clinical Research Program | | | | |
| Director, Elizabeth G. Nabel, M.D. | 10 | 8C103 | 496-1518 | 1754 |

| Division of Intramural Research (cont'd.) | Bldg. | Room | Phone | MSC |
|---|-------|-------|----------|------|
| Cardiology Branch | | | | |
| Acting Chief, Richard O. Cannon, M.D. | 10 | 7B15 | 496-5817 | 1650 |
| Cardiac Catheterization Section | | | | |
| Chief, Richard O. Cannon, M.D. | 10 | 7B15 | 496-9985 | 1650 |
| Cardiac Consultation Section | | | | |
| Chief, Eben E. Tucker, M.D. | 10 | 7B15 | 496-2742 | 1650 |
| Inherited Cardiovascular Disease Section | | | | |
| Chief, Neal D. Epstein, M.D. | 10 | 8N112 | 496-2102 | 1650 |
| Echocardiography Section | | | | |
| Chief, Julio Panza, M.D. | 10 | 7S247 | 496-2634 | 1650 |
| Hematology Branch | | | | |
| Chief, Neal S. Young, M.D. | 10 | 7C103 | 496-5093 | 1652 |
| Molecular Disease Branch | | | | |
| Chief, H. Bryan Brewer, M.D. | 10 | 7N115 | 496-5095 | 1666 |
| Cell Biology Section | | | | |
| Chief, (Vacant) | 10 | 7N114 | 496-3195 | 1666 |
| Molecular Biology Section | | | | |
| Chief, Silvia M. 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 |
| Biochemical Physiology Section | | | | |
| Chief, Vincent Manganiello, M.D., Ph.D. | 10 | 5N323 | 496-1594 | 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 Mechanism 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 | 5D17 | 496-2057 | 1590 |
| Vascular Biology Branch | | | | |
| Chief, Elizabeth G. Nabel, M.D. | 10 | 8C103 | 496-1518 | 1754 |
| Experimental Atherosclerosis Section | | | | |
| Chief, Howard S. Kruth, M.D. | 10 | 5N113 | 496-4826 | 1422 |
| Core Facilities | | | | |
| Animal Medicine and Surgery | | | | |
| Chief, Robert F. Hoyt Jr., D.V.M. | 14E | 106B | 496-9673 | 5570 |
| Flow Cytometry | | | | |
| Senior Technician, Martha Kirby | 10 | 7C212 | 402-0277 | 1652 |
| Laboratory Research Program | | | | |
| Acting Director, Barbara Bierer, M.D. | 10 | 7N214 | 496-2116 | 1754 |
| Laboratory of Biochemical Genetics | | | | |
| Chief, Marshall Nirenberg, Ph.D. | 36 | 1C06 | 496-5208 | 4036 |
| Macromolecules Section | | | | |
| Chief, Alan Peterkofsky, Ph.D. | 36 | 4C09 | 496-2408 | 4036 |
| Molecular Biology Section | | | | |
| Chief, Marshall Nirenberg, Ph.D. | 36 | 1C06 | 496-5208 | 4036 |
| Cell Differentiation Section | | | | |
| Chief, Mathew Daniels, Ph.D. | 36 | 4C01 | 496-2898 | 4036 |
| Laboratory of Biochemistry | | | | |
| Chief, P. Boon Chock, Ph.D. | 3 | 222 | 496-2073 | 0340 |

| Division of Intramural Research (cont'd.) | Bldg. | Room | Phone | MSC |
|---|-------|--------|----------|------|
| Enzymes Section | | | | |
| Chief, Earl R. Stadtman, Ph.D. | 3 | 222 | 496-4096 | 0342 |
| Intermediary Metabolism and Bioenergetics Section | | | | |
| Chief, Thressa C. Stadtman, Ph.D. | 3 | 108 | 496-3002 | 0320 |
| Metabolic Regulation Section | | | | |
| Chief, P. Boon Chock, Ph.D. | 3 | 222 | 496-2073 | 0340 |
| Protein Chemistry Section | | | | |
| Chief, R. Ann Ginsburg, Ph.D. | 3 | 208 | 496-1278 | 0340 |
| Protein Function in Disease Section | | | | |
| Chief, Rodney L. Levine, M.D., Ph.D. | 3 | 106 | 496-2310 | 0320 |
| Laboratory of Biophysical Chemistry | | | | |
| Chief, Henry M. Fales, Ph.D. | 10 | 7N318 | 496-2135 | 1676 |
| Chemical Structure Section | | | | |
| Chief, Henry M. Fales, Ph.D. | 10 | 7N318 | 496-2135 | 1676 |
| Computational Biophysics Section | | | | |
| Chief, Bernard Brooks, Ph.D. | 12A | 2041 | 496-0148 | 0580 |
| Optical Spectroscopy Section | | | | |
| Chief, Jay R. Knutson, Ph.D. | 10 | 5D40 | 496-2557 | 1412 |
| Structural Biophysics Section | | | | |
| Chief, James A. Ferretti, Ph.D. | 3 | 412 | 496-3341 | 0380 |
| Laboratory of Cardiac Energetics | | | | |
| Chief, Robert S. Balaban, Ph.D. | 10 | B1D161 | 496-3658 | 1061 |
| Laboratory of Cell Biology | | | | |
| Chief, Edward D. Korn, Ph.D. | 3 | B1-22 | 496-1616 | 0301 |
| Cellular Biochemistry and Ultrastructure Section | | | | |
| Chief, Edward D. Korn, Ph.D. | 3 | B1-22 | 496-1616 | 0301 |
| Cellular Physiology Section | | | | |
| Chief, Evan Eisenberg, M.D., Ph.D. | 3 | B1-23 | 496-2846 | 0301 |
| Membrane Enzymology Section | | | | |
| Chief, Richard W. Hendler, Ph.D. | 3 | B1-06 | 496-2610 | 0301 |
| Molecular Cell Biology Section | | | | |
| Chief, John A. Hammer III, Ph.D. | 3 | B1-18 | 496-8960 | 0301 |
| Laboratory of Cell Signalling | | | | |
| Chief, Sue Goo Rhee, Ph.D. | 3 | 120 | 496-9646 | 0340 |
| Laboratory of Kidney and Electrolyte | | | | |
| Chief, Maurice B. Burg, M.D. | 10 | 6N260 | 496-3187 | 1598 |
| Renal Cellular and Molecular Biology Section | | | | |
| Chief, Maurice B. Burg, M.D. | 10 | 6N260 | 496-3187 | 1598 |
| Renal Mechanisms Section | | | | |
| Chief, Mark A. Knepper, M.D. Ph.D. | 10 | 6N312 | 496-3064 | 1598 |
| Transport Physiology Section | | | | |
| Chief, Kenneth R. Spring, Ph.D. | 10 | 6N309 | 496-3236 | 1598 |
| Laboratory of Lymphocyte Biology | | | | |
| Chief, Barbara E. Bierer, M.D. | 10 | 5D49 | 496-6786 | 1598 |
| Laboratory of Molecular Biology | | | | |
| Chief, Toren Finkel, M.D., Ph.D. | 10 | 7B15 | 496-5201 | 1650 |
| Laboratory of Molecular Cardiology | | | | |
| Chief, Robert S. Adelstein, M.D. | 10 | 8N202 | 496-1865 | 1762 |
| Cellular and Molecular Motility Section | | | | |
| Chief, James R. Sellers, Ph.D. | 10 | 8N117 | 496-6887 | 1760 |
| Muscle Molecular Biology Section | | | | |
| Chief, Robert S. Adelstein, M.D. | 10 | 8N202 | 496-1865 | 1762 |

| Division of Intramural Research (cont'd.) | Bldg. | Room | Phone | MSC |
|---|--------------|-------------|--------------|------------|
| Laboratory of Molecular Hematology | | | | |
| Acting Chief, Brian Safer, M.D., Ph.D. | 10 | 7D18 | 496-5844 | 1654 |
| Protein Biosynthesis Section | | | | |
| Chief, Brian Safer, M.D., Ph.D. | | | | |
| Laboratory of Molecular Immunology | | | | |
| Chief, Warren J. Leonard, M.D. | 10 | 7N252 | 496-0098 | 1674 |
| Intracellular Signaling Section | | | | |
| Chief, Michael A. Beaven, Ph.D. | 10 | 8N114 | 496-6188 | 1760 |
| Lymphocyte Activation Section | | | | |
| Chief, Warren J. Leonard, M.D. | 10 | 7N252 | 496-0098 | 1674 |
| Molecular and Cellular Toxicology Section | | | | |
| Chief, Lance R. Pohl, Ph.D. | 10 | 8N115 | 496-4841 | 1760 |
| Core Facilities | | | | |
| Pathology Section | | | | |
| Chief, Victor Ferrans, M.D., Ph.D. | 10 | 2N240 | 402-0908 | 1518 |
| Confocal Microscopy Section | | | | |
| Chief, Yuhui Xu, M.D., Ph.D. | 3 | 419 | 402-2795 | 1586 |
| Transgenic Mice Section | | | | |
| Chief, Chengyu Liu, Ph.D. | 14E | 105A | 435-5034 | 5570 |

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2. Program Overview

In 1948, the National Heart Institute was established through the National Heart Act, with a mission to support research and training in the prevention, diagnosis, and treatment of cardiovascular diseases (CVD). Twenty-four years later, through section 413 of the National Heart, Blood Vessel, Lung, and Blood Act (P.L. 92-423), Congress mandated the Institute to expand and coordinate its activities in an accelerated attack against heart, blood vessel, lung, and blood diseases. The renamed National Heart, Lung, and Blood Institute (NHLBI) expanded its scientific areas of interest and intensified its efforts related to research on diseases within its purview. Over the years these areas 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. 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 scientific institutions and individuals supported by research grants and contracts. It plans and directs research to develop and evaluate interventions and devices related to prevention of heart, lung, and blood diseases and sleep disorders and to treatment and rehabilitation of affected patients. The Institute conducts research on clinical use of blood and all aspects of the management of blood resources. Through individual and institutional research training awards and career development awards, it supports research training and career 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. The Institute also coordinates with other research institutes and all Federal

health programs relevant activities in the above areas, including the related causes of stroke. It conducts educational activities, including development and dissemination of materials for health professionals and the public in the above areas, with emphasis on prevention. In addition, it 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.

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

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

The programs of the NHLBI, as shown on page 12, are implemented through five extramural units: the Division of Heart and Vascular Diseases (DHVD), the Division of Lung Diseases (DLD), the Division of Blood Diseases and Resources (DBDR), the Division of Epidemiology and Clinical Applications (DECA), and the National Center on Sleep Disorders Research (NCSDR), and one intramural unit, the Division of Intramural Research (DIR). Although the NHLBI has primary responsibility for the WHI, it is run by a consortium that includes the National Cancer Institute, the National Institute on Aging, and the National Institute of Arthritis and Musculoskeletal and Skin Diseases. The Divisions and the Center pursue their own scientific mission but cooperate in areas of common interest. The extramural Divisions and the Center use a variety of funding mechanisms, including research grants, program project grants, contracts, centers, and research training programs. Descriptions of the Division and Center programs, as well as the WHI, follow.

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

| Heart and Vascular Diseases | Lung Diseases | Blood Diseases and Resources |
|---|---|---|
| <p><i>Heart Research</i> Arrhythmias Bioengineering Ischemic Heart Disease Congenital and Infectious Diseases Heart Failure Interventional Cardiology</p> <p><i>Vascular Research</i> Molecular Genetics and Medicine Atherosclerosis Hypertension Vascular Biology and Medicine Lymphatic System</p> | <p><i>Airway Biology and Disease</i> Asthma Chronic Obstructive Pulmonary Disease and Environment Cystic Fibrosis Neurobiology and Sleep</p> <p><i>Lung Biology and Disease</i> Acquired Immunodeficiency Syndrome and Tuberculosis Critical Care and Acute Lung Injury Developmental Biology and Pediatrics Immunology and Fibrosis Lung Cell and Vascular Biology</p> | <p><i>Blood Diseases</i> Sickle Cell Disease Cellular Hematology</p> <p><i>Blood Resources</i> Transfusion Medicine Bone Marrow Transplantation Thrombosis and Hemostasis</p> |
| Epidemiology and Clinical Applications | National Center on Sleep Disorders Research | Intramural Research (cont.) |
| <p><i>Clinical Applications and Prevention</i> Prevention Clinical Trials Behavioral Medicine</p> <p><i>Epidemiology and Biometry</i> Field Studies and Clinical Epidemiology Social and Environmental Epidemiology Analytical Resources Genetic Epidemiology</p> | <p>Sleep Sleep Disorders and Related Conditions</p> <p>Women's Health Initiative</p> <p>Intramural Research Cardiology Hematology Molecular Disease Pulmonary-Critical Care Medicine Vascular Biology</p> | <p>Animal Medicine and Surgery Biochemical Genetics Biochemistry Biophysical Chemistry Cardiac Energetics Cell Biology Cell Signaling Kidney and Electrolyte Metabolism Lymphocyte Biology Molecular Biology Molecular Cardiology Molecular Hematology Molecular Immunology</p> |

Division of Heart and Vascular Diseases

An estimated 59.7 million Americans have CVD, 35 million of whom are younger than 65 years of age. Hypertension affects 50 million Americans. Approximately 12 million Americans have coronary heart disease (CHD), almost 4.6 million have congestive heart failure (CHF), 4 million have cerebrovascular disease, and 2 million have peripheral vascular diseases. About 8 million Americans with CVD are limited in activity. In 1998, about 41 percent of all deaths (949,000) were attributed to CVD, and 53 percent of them occurred in women. The economic cost

to the Nation in 2000 is projected to be \$327 billion, of which \$186 billion will be for health expenditures and \$141 billion will be for lost productivity.

The DHVD plans and directs an integrated and coordinated research program, with an emphasis on advancing knowledge of the causes of heart and vascular diseases and on their prevention, diagnosis, and treatment. The Division seeks to maintain a balance of activities across the continuum of biomedical research but places an emphasis on fundamental mechanisms. Multi-disciplinary 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's increased emphasis on heart failure research is a reflection of an aging U.S. population and increased survival from other forms of heart disease due to advances in the field of CHD. From 1982 to 1995, the number of hospitalizations attributed to CHF doubled to 872,000. In 1996, almost 44,000 deaths were primarily associated with heart failure and another 240,000 had it as a secondary cause. To address the urgent need for more research in this area, the DHVD established a program in FY 1998 to stimulate innovative multidisciplinary investigations into the cellular and molecular underpinnings of heart failure. In FY 1999, it initiated a study to evaluate whether a pulmonary artery catheterization (PAC)-directed treatment strategy is more effective than a non-PAC treatment strategy in reducing morbidity and mortality in patients with advanced CHF. Information provided by this clinical trial may provide a rational basis for safe and effective therapy for patients with severe CHF.

Coronary artery disease and congenital cardiovascular malformations and other pediatric CVD are also important areas of investigation. The recently renewed Specialized Centers of Research (SCOR) programs in adult heart disease focus on understanding the role of estrogen in ischemic heart disease, angiogenic mechanisms, and the genetics of heart failure and sudden cardiac death. The SCOR program in pediatric CVD investigates the etiology and pathophysiology of congenital and acquired CVD in children, with the goal of applying fundamental knowledge and modern technology to improve diagnosis, treatment, and prevention of these diseases.

Vascular diseases, including atherosclerosis and hypertension, are other areas of emphasis for the Division. A variety of approaches and collaborative disciplines that coordinate basic and clinical scientists with wide-ranging expertise are used to pursue research goals. For example, an ongoing SCOR program in the molecular genetics of hypertension is investigating clustering of genes associated with the disease, identification

of novel intermediate phenotypes, and fetal and neonatal origin of adult-onset hypertension. A better understanding of the disease process will allow investigators to develop improved methods of diagnosis and treatment.

In FY 1999, the DHVD began a study to investigate the cellular and molecular interrelationships of atherosclerosis and hypertension. Its aim is to identify pathways by which either one of these conditions might influence the severity of the other. Another study was initiated to examine the properties of atherosclerotic vulnerable plaque, especially those that relate to its tendency to progress to erosion or rupture leading to thromboembolic events, unstable angina, myocardial infarction (MI), and/or sudden death. A third project was established to encourage interdisciplinary research in the etiology and pathogenesis of abdominal aortic aneurysm (AAA). Collaborative studies involving basic and clinical scientists are investigating characteristics of AAA that are associated with its initiation, progression, and rupture, thereby leading to thromboembolic events and/or sudden death.

Cardiovascular complications due to substance abuse in patients with human immunodeficiency virus (HIV) infection is another area of concern for the Division. In FY 1999, two clinical studies involving HIV-infected patients were initiated—one to examine the influence of alcohol abuse on the genesis of cardiomyopathy and the other to investigate the contribution of cocaine abuse to the development of cardiovascular complications.

The DHVD continues to place a high priority on selected population groups such as women, minorities, and children. In addition to ensuring that women and minorities are appropriately represented in all clinical studies, the DHVD has implemented many programs that are specifically targeted to these groups. For example, the Division is supporting a research project to develop safe, efficient, and cost-effective diagnostic approaches for evaluating women with suspected ischemic heart disease. Another project will determine whether antioxidant treatment alone or in combination with hormone replacement therapy (HRT) will stabilize or inhibit progression and induce regression of coronary plaques. Programs targeting minority populations include exploring ethnic differences in autonomic cardiovascular control, testing whether antioxidants are useful in

preventing early atherosclerosis in blacks with carotid artery disease, studying ischemic heart disease in blacks, and investigating molecular genetics of hypertension in blacks. Research programs specifically related to children focus on innovative approaches to elucidate the etiology, pathophysiology, and diagnosis of congenital and acquired CVD in pediatric populations so that more effective methods of treatment and prevention can be developed.

Emphasis is also placed on prevention programs; the Division seeks to bring the findings of CVD research to bear on the practice of medicine in communities through demonstration and education activities. In addition, research training and career development represent a significant part of the Division's activities.

Division of Lung Diseases

Lung diseases are among the leading causes of death and disability in the United States. As an underlying cause, excluding cancer, they accounted for 251,000 deaths in 1998 and are a contributing factor to perhaps an equal number of additional deaths. More than 25 million persons have chronic bronchitis, emphysema, asthma, or other obstructive or interstitial lung diseases. In 1997, pulmonary diseases accounted for 28 percent of all hospitalizations of children younger than 15 years of age in the United States. The projected economic cost to the Nation in 2000 is about \$138 billion, of which \$92 billion will be for health expenditures and \$46 billion will be for lost productivity.

The DLD plans and directs a coordinated research program on the causes and progression of lung diseases and on their prevention, diagnosis, and treatment. Its activities focus on understanding the structure and function of the respiratory system, increasing fundamental knowledge of mechanisms associated with specific pulmonary disorders, and applying new findings to the development of treatment strategies for patients.

Asthma research is an area of high priority for the DLD. The Division supports a number of studies that apply various approaches to elucidate the etiology and pathophysiology of the disease. One project involves identifying susceptibility genes that influence development and

progression of asthma and asthma-associated phenotypes, such as bronchial hyperresponsiveness and atopy, in different racial groups, as well as providing genetic information about an individual patient's response to medication that should lead to new treatment approaches. Two programs, the SCOR on the cellular and molecular mechanisms of asthma and the origins of asthma in early life, are applying multidisciplinary approaches to understand the mechanisms associated with development, exacerbation, and persistence of the disorder. Researchers are examining the impact of environmental factors on these mechanisms. In FY 1999, the Division initiated a program to stimulate research on airway remodeling and repair in asthma, with the overall goal of elucidating the pathogenesis, regulation, and consequences of airway responses in asthma.

The Division recently renewed an adult asthma clinical research network to continue rapid assessment of new treatments and ensure that findings on optimal management of asthma are rapidly disseminated to practitioners and health care professionals. It also established a pediatric asthma clinical network to address critical clinical questions in treating infants and young children with asthma.

Working with the National Asthma Education and Prevention Program (NAEPP), the DLD developed an asthma management model that will enable continuous monitoring of scientific literature and periodic position statements for clinicians. It contains information such as the NHLBI's updated *Expert Panel Report 2: Guidelines for the Diagnosis and Management of Asthma* that reflects current advances in the understanding and treatment of asthma. This model can be accessed through the World Wide Web at <http://www.nhlbissupport.com/asthma/educenter>.

The DLD supports a diverse program in sleep research, including neurobiology of the control of breathing during sleep and sleep apnea and clinical studies of treatment for sleep apnea. Two new programs were initiated in FY 1999: obstructive sleep apnea in children and phenotypic characterization of sleep in mice.

Smoking-related diseases are a major cause of mortality and morbidity in the United States. The Division supports a range of research on

smoking-related diseases from mechanisms of pathogenesis and genetic susceptibility to clinical trials. Clinical trials topics include evaluation of smoking cessation methods, long-term impact of smoking cessation on morbidity and mortality in those with abnormal lung function, effect of inhaled corticosteroids on lung function in continuing smokers, and efficacy of lung volume reduction surgery. In FY 1999, the DLD initiated a study to test the feasibility of conducting a randomized controlled trial on the efficacy of retinoic acid, a derivative of vitamin A, in the treatment of emphysema.

The DLD is a strong supporter of acquired immunodeficiency syndrome (AIDS) research. It is participating in a recently funded NHLBI-wide initiative on the role of chemokines and chemokine receptors in the pathogenesis of HIV in the lungs, cardiovascular system, and bone marrow.

The Division continues to support an acute respiratory distress syndrome (ARDS) clinical network that is evaluating the efficacy of different therapeutic strategies such as mechanical ventilation and anti-inflammatory agents, including corticosteroids, in the treatment of patients with ARDS. Private industry is collaborating with the network on some of the therapies. Other ongoing programs focus on causes and environmental and genetic risk factors for sarcoidosis, causes of non-infectious pneumonia associated with bone marrow transplantation, cellular and molecular mechanisms of primary pulmonary hypertension, and creation of a molecular profile of bronchopulmonary dysplasia that will advance understanding of the condition and lead to the development of clinical interventions. A program to encourage research on new strategies to augment lung alveolarization was implemented in FY 1999. Research findings should ultimately lead to development of rational interventions for aberrant development of lungs, for lung injury, and for diseases such as emphysema, diffuse interstitial fibrosis, and bronchopulmonary dysplasia.

In addition, the DLD supports research training and career development programs to provide postdoctoral opportunities for beginning investigators, opportunities for patient-oriented research, prevention programs to extend important services to communities, and demonstration and education activities to transfer basic research

and clinical findings to health care professionals and patients. Funding for all the activities of the Division constitute not less than 15 percent of the funds allocated to the NHLBI, as required by legislation.

Division of Blood Diseases and Resources

Blood diseases, including both acute and chronic disorders, resulted in 265,000 deaths in 1998; 254,000 of them were due to thrombotic disorders and 11,000 were due to diseases of the red blood cells and bleeding disorders. In 2001, thrombotic disorders and other blood diseases will cost an estimated \$93 billion, of which \$53 billion will be for health expenditures and \$40 billion for lost productivity.

The nation's blood resources include nearly two dozen products; they are derived from approximately 12.6 million units of whole blood collected from approximately 8 million American donors. In 1994, an estimated 11 million units of blood were transfused to 3.4 million patients. Adverse effects following blood transfusion include development of hepatitis C—the risk being about 1:103,000 per unit of blood or blood products transfused. The risk of being infected with HIV is estimated to be 1:493,000 per unit. Universal screening of donor blood for antibodies to HIV began in 1985, and universal screening for antibodies to hepatitis C virus began in 1990. The screening tests, which have been improved over the years, have greatly reduced the risk of infection to transfusion recipients.

The DBDR has a dual role within the Institute. It develops, administers, and coordinates programs to reduce morbidity and mortality caused by blood diseases and to lead to their primary prevention. Diseases addressed include sickle cell disease (SCD), hemophilia, Cooley's anemia, and disorders of hemostasis and thrombosis. A program in stem cell and marrow transplantation has been established to determine conditions for effective transplantation. The Division also has a major responsibility to ensure the adequacy and safety of the nation's blood supply. A full range of activities, including studies of transmission of disease through transfusion, development of methods to inactivate viruses in donated blood, improvement of blood donor screening procedures, research to reduce human error in

transfusion medicine, and studies of emerging diseases that may be transmitted by blood transfusion, are used to achieve this goal.

Research on SCD remains a high priority for the Division. In FY 1999, the DBDR sponsored a workshop on the role of polymorphonuclear leukocytes in SCD pathophysiology to review the progress made in understanding the contribution of inflammatory white blood cells, especially polymorphonuclear leukocytes, to the pathophysiology of SCD and to prioritize future research directions in the area. Recent scientific findings support the concept that SCD can be viewed as a chronic inflammatory disorder, characterized by enhanced neutrophil and monocyte adhesion to endothelium that correlates with the frequency of pain crises, by oxidatively damaged and activated endothelium, and by elevated levels of known inflammatory marker proteins in circulation. An initiative to stimulate research in this area is being developed.

Therapy for SCD is also a focus of basic and clinical research. To date, hydroxyurea is the only drug approved for treatment of sickle cell anemia in adults. Although current studies show that hydroxyurea is safe in children between 5 and 15 years of age, it is not known if the therapy is also efficacious in children. Ongoing studies will provide the answer.

Finding an effective therapy for hemophilia remains a major focus for the Division. The DBDR is supporting research on gene therapy for hemophilia B, and three Phase I clinical trials to test the safety of different gene therapy approaches have recently begun.

In FY 1999, the Division issued an initiative to stimulate genetic research on thrombosis of the arterial and cerebral vasculature. The program will foster multidisciplinary research to expedite progress in understanding the pathogenesis of thrombosis in both the arterial and cerebral vasculature and to facilitate the application of new findings for better detection, prevention, and treatment. Another initiative was released to encourage the establishment of a thalassemia (Cooley's anemia) clinical research network that will allow for efficient evaluation of novel treatment methods and management strategies for individuals with thalassemia.

The Division has a major interest in stem cell transplantation research and is supporting efforts to develop preparative regimens that will permit

incompatible hematopoietic stem cell transplantation in immunized recipients with hemoglobinopathies. A program was recently initiated to focus on approaches to enable successful stem cell transplantation for hemoglobinopathies and minimize recipient morbidity and mortality.

Maintaining blood safety is an important area of research. Emerging infectious diseases pose a potential threat to the U.S. blood supply, and an infrastructure that continually monitors the safety of the blood supply and the potential transmission of newly identified infectious agents through blood transfusion is vitally important. The NHLBI-supported Retrovirus Epidemiology Donor Study provides such an infrastructure and has contributed to studies in this area. In FY 1999, the Division issued an initiative to foster interest in the development of assay methods for the detection of Creutzfeldt-Jakob disease in blood and tissue.

To meet its overall responsibilities, the Division maintains an integrated and coordinated program of grants, contracts, training and career development awards, and academic awards. SCORs in thrombosis, transfusion medicine, and hematopoietic stem cell biology and Comprehensive Centers in sickle cell disease are currently supported.

Division of Epidemiology and Clinical Applications

The DECA has primary responsibility for epidemiologic studies, clinical trials, and prevention studies in heart and vascular, lung, and blood diseases and for basic and applied research in behavioral medicine. The Division identifies research opportunities; stimulates and conducts research on causes, prevention, diagnosis, and treatment of disease; and assesses the need for technologic development in acquisition and application of research findings in these areas. It evaluates and uses basic and clinical research findings in defined populations (such as occupational groups, school children, health professionals, and minorities) and community settings, with an emphasis on studies of primary and secondary prevention in nonhospitalized patients or populations.

Genetic epidemiology is an important component of the research program. The Division has expanded several ongoing longitudinal studies to include genetic studies in an effort to improve

understanding of the interaction between genetics and the environment. One study conducted in both high-risk and random families is testing candidate genes to find new genes linked to CVD. Genetic and environmental factors associated with CVD and CVD risk factors in American Indians is the subject of another study. A new program with similar objectives involving blacks was initiated in Jackson, Mississippi. It consists of a single-site epidemiologic study like those previously established in Framingham, MA, and Honolulu, HI. The prevalence and genetic and environmental determinants of iron overload and hereditary hemochromatosis are the focus of another new program. It will investigate the feasibility and potential benefits and risks of primary care-based screening and intervention.

Development of techniques to detect and evaluate subclinical CVD is also an important area of investigation. An observational study to determine characteristics related to progression of subclinical to clinical disease was recently initiated. Scientists will compare new measures of subclinical disease with established measures. Ultimately, the goal is to develop noninvasive, population-based methods that can be used in screening and intervention studies for identifying asymptomatic persons at greatest risk for clinical events.

Intervention research is essential to providing up-to-date effective treatment, control, and prevention strategies for CVD. A study was recently initiated to evaluate two multicomponent lifestyle interventions to control blood pressure. In FY 1999, the Division established a program to develop and test interventions involving diet and physical activity to prevent obesity in high-risk preadolescent black girls.

Clinical trials are a useful approach to test the efficacy of various drug therapies. Currently, one is under way to determine whether the combined incidence of nonfatal MI and fatal CHD differs between hypertensives receiving diuretics and those receiving alternative antihypertensive pharmacologic treatment. In this trial, a subset of hypercholesterolemic patients is being examined to determine whether reducing serum cholesterol levels with a lipid-lowering drug decreases the incidence of mortality from all causes. Other issues under investigation are the effect on mortality of two strategies of antiarrhythmic drug

therapy in patients with atrial fibrillation, the effect on mortality of an angiotensin-converting enzyme inhibitor in patients with good ventricular function following an MI, and the effectiveness of intravenous magnesium therapy in reducing mortality in patients undergoing initial evaluation for suspected acute MI.

Behavioral studies are an important component of clinical trials and have been included in several intervention projects. One study being supported by the Division is investigating the effects of psychosocial support on morbidity and mortality in patients recently hospitalized with acute MI, and another is testing the effectiveness of various behavioral interventions to increase physical activity among sedentary patients.

National Center on Sleep Disorders Research

An estimated 70 million Americans suffer from a sleep problem; among them, nearly 60 percent have a chronic disorder. About 10 percent of the U.S. adult population has frequent or chronic insomnia, approximately 18 million Americans have sleep apnea, and an estimated 250,000 people have narcolepsy. Additionally, approximately 100,000 accidents and 1,500 traffic fatalities a year are sleep related. More than 50 percent of Americans older than age 65 have sleep difficulties. As the aged population grows, sleep problems will affect an even larger proportion of the U.S. population. Each year, sleep disorders, sleep deprivation, and sleepiness add as much as \$15.9 billion to the national health care bill.

The NCSDR plans, directs, and supports a program of basic, clinical, and applied research; health education; research training; and prevention-related research in sleep, chronobiology, and sleep disorders. It maintains surveillance over 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 NCSDR supports research on the neurobiology of sleep, sleep apnea, and the cardiovascular effects of sleep-related breathing disorders. In FY 1999, a program on phenotypic characterization of sleep in mice was initiated to determine the genetic underpinnings of sleep and wakefulness, elucidate the physiological role of sleep, and

develop new directions for treatment of sleep disorders.

Sleep apnea is the second most common sleep disorder after insomnia and has been implicated as a potential risk factor for the development of hypertension, ischemic heart disease, and cerebral infarction. To investigate the cardiovascular consequences of sleep apnea, the NCSDR began the Sleep Heart Health Study (SHHS) in 1994, which is based on established epidemiologic studies. The SHHS has the largest data set on sleep disordered breathing and includes information on individuals representing the full spectrum of racial and minority groups in the United States, over a wide age range. During the second examination phase, initiated in FY 1999, investigators are gathering outcome data on vital status and cause of death, incident (or recurrent) cardiovascular and cerebrovascular disease, blood pressure, daytime sleepiness, and interval history of automobile crashes.

About 25 percent of American children aged 1 to 5 years have a sleep disturbance, yet little is known about the specific risks associated with sleep apnea in children. To increase knowledge in this research area, the NCSDR initiated a new program in FY 1999 to assess the relationship of sleep apnea to development, behavior, and school performance and to study airway abnormalities responsible for obstructive sleep apnea in children. Characterization of risk factors and their relationship to pathogenesis of the disorder may lead to the development of optimal strategies for early diagnosis and treatment.

Multidisciplinary research training programs in sleep biology and sleep disorders are being supported to ensure that highly trained scientists are available to address important gaps in the current biomedical and biological understanding of sleep, including those outlined in the NIH Director's Sleep Disorders Research Plan. Among them is the Sleep Academic Award program to enhance the awareness of medical students, physicians, and other health care professionals about sleep and sleep disorder diagnosis.

The NCSDR collaborates on a number of NIH and government-wide activities. An example is a partnership with the Department of Transportation to develop science-based education and information on drowsy driving. In FY 1999, the program produced *The NHTSA & NCSDR Pro-*

gram to Combat Drowsy Driving: A Report to Congress on Collaboration Between the National Highway Traffic Safety Administration and the National Center on Sleep Disorders Research. In another productive partnership, the Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health and the NIH developed an initiative, Implementation of the National Occupational Research Agenda, to generate knowledge that can be used in preventing occupational diseases and injuries, especially the effects of sleep deprivation and sleep disorders on work-related health and safety risks.

The NCSDR continues to work closely with the NHLBI Office of Prevention, Education, and Control (OPEC) on the sleep education program. Several new public and professional education materials were developed and disseminated. The mass media campaign on sleep apnea continued. Two sleep-related articles for primary care physicians were published in the journal *American Family Physician*; "Recognizing Problem Sleepiness in Your Patients" appeared in February 1999, and "Insomnia: Assessment and Management in Primary Care" appeared in June 1999. The latter document was also printed and distributed in cooperation with the American Academy of Sleep Medicine. Another collaborative effort included convening a working group in FY 1999 to review the literature related to restless legs syndrome and to develop a publication targeted to primary care physicians. Reaching youth with messages about sleep and sleep disorders is yet another major education priority. Beginning in FY 1999, a project was initiated with the NIH Office of Science Education to develop a supplemental curriculum for high school students on the biology of sleep and its relationship to health. Planning has begun for a major education program to be launched in FY 2000 to reach children ages 7 to 14 with sleep-related messages. A new NCSDR Web site has been developed to provide improved access to sleep-related information for researchers, health professionals, patients, and the general public. An early FY 2000 launching of the Web site is planned.

Women's Health Initiative

On October 1, 1997, the WHI was transferred to the NHLBI. It was originally established by the NIH in 1991 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, consisting of more than 161,000 women aged 50 to 79, will seek to answer questions on benefits and risks of HRT and changes in dietary patterns and calcium/vitamin D supplements in disease prevention. Specifically, the HRT part of the clinical trial will study the effects of HRT on heart disease, osteoporosis-related bone fractures, and breast and endometrial cancer. The trial will enable scientists to assess both the benefits and risks of the therapy. The dietary modification part will examine the effect of a lowfat, high fruit, vegetable, and grain diet on heart disease, breast cancer, and colorectal cancer in postmenopausal women. The calcium/vitamin D part will test whether these supplements reduce the risk of colorectal cancer and the frequency of hip and other bone fractures in postmenopausal women.

Women who were ineligible or unwilling to participate in the clinical trial were encouraged to enroll in a concurrent long-term observational study to delineate new risk factors and biological markers for diseases, allow comparison with the clinical trial cohort findings, evaluate temporal relationship between risk factors and disease outcomes, and improve estimates of known predictors of disease by sociodemographic factors. The medical history and health habits of approximately 100,000 women will be tracked. Recruitment for the observational study was completed in December 1998, and participants will be followed for 8 to 12 years.

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

The community prevention study component will focus on community-based strategies to enhance adoption of healthful behaviors, with a

particular emphasis on women of diverse races, ethnic groups, and socioeconomic strata. The goal of this effort is to develop carefully evaluated model programs that can be implemented in a wide range of communities throughout the United States. Areas of interest include reduction of CVD among black women; peer support among black women; environmental factors and physical activity in women; osteoporosis prevention, education, and outreach; diabetes care in minority women; methods to enhance physical activity in women; and women's attitudes regarding surgical menopause and HRT.

Division of Intramural Research

The NHLBI DIR conducts clinical research on the normal and pathophysiologic functioning of cardiac, pulmonary, blood, and vascular systems and basic research on normal and abnormal cellular behavior at the molecular level. In FY 1999, the Division's organizational structure was revised; a clinical research program and a laboratory research program were established. A vascular biology branch, two laboratories (lymphocyte biology and molecular biology), and five core centers were also formed. The Molecular Hematology Branch was retitled the Laboratory of Molecular Hematology, and two branches, Clinical Hematology and Hypertension-Endocrine, were abolished.

Research foci of the 18 laboratories and branches and 5 core facilities range from structural organic chemistry to cardiology. Major areas of interest include mechanisms of gene regulation, gene transfer, and gene therapy; molecular basis of lipoprotein dysfunctions and atherogenic process; molecular basis of vascular diseases; molecular basis of diseases of alveolar structures of the lung and design of new therapeutic modalities; cellular and molecular events underlying ischemic heart disease and myocardial hypertrophy; biochemical events associated with aging and certain pathologic processes; molecular, structural, and developmental aspects of muscle and nonmuscle contractile systems; biochemistry and physiology of calcium channels; molecular and cellular processes for conversion of metabolic energy into useful work; molecular basis of transmembrane signaling and signal transduction pathways; pathophysiology of renal

function at cellular and molecular levels; biochemistry of trace nutrients; enzyme kinetics, metabolic regulation, and protein chemistry; and cellular and molecular basis of toxicities induced by drugs and other foreign compounds.

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

Office of Prevention, Education, and Control

The NHLBI OPEC coordinates translation and dissemination of research findings and scientific consensus to health professionals, patients, and the public so that information can be adapted for and integrated into health care practice and individual health behavior. To accomplish its mission, the Office established health education programs and initiatives that address high blood pressure, high blood cholesterol, asthma, early warning signs of heart attack, obesity, and sleep disorders. The four largest programs have coordinating committees that consist of national medical, public health, and voluntary organizations and other federal agencies. The coordinating committees help to plan, implement, and evaluate program efforts in professional, patient, and public education and spread the messages of the programs to a wide range of audiences.

The National High Blood Pressure Education Program (NHBPEP) was initiated in 1972 to reduce death and disability related to high blood pressure. The Program, a cooperative effort among the NHLBI, 44 professional and voluntary health agencies, and state health departments, is a model for national health education programs that has been and continues to be adopted by other national and international groups.

Since its inception, the number of hypertensives aware of their condition has increased fourfold, and four times as many hypertensives are treating and controlling their disease. Data from the National Health and Nutrition Examination Surveys (NHANES) indicate that over the past four decades, mean systolic blood pressure

has declined by 10 mm Hg and age-adjusted mortality rates from heart disease and stroke have fallen by 50 and 60 percent, respectively.

The Program continues its mission of translating research results to improve medical care outcomes and the public's health. Quick reference cards describing action steps needed to control hypertension were distributed to practicing clinicians by direct mail and via the NHLBI Web site in FY 1999. The *Sixth Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure* is the basis of an implementation plan for the southeast United States to address the special hypertension prevention and management needs of that region.

Other NHBPEP activities in FY 1999 include updating guidelines on issues related to hypertension and pregnancy and updating a statement on high blood pressure and the need to reduce salt consumption based on a NHLBI-sponsored workshop. A summary of the workshop proceedings was submitted to *Hypertension* for publication; an updated statement will be issued and provided to the U.S. Dietary Guidelines Committee.

The NHBPEP Coordinating Committee reviewed and approved the hypertension component to a set of performance measures, Health Plan Employer Data and Information Set (HEDIS), established by the National Committee for Quality Assurance. The measure will indicate the degree to which managed care organization (MCO) programs address control of hypertension and will allow consumers to compare the effectiveness of various MCO plans to control high blood pressure.

In FY 1999, the High Blood Pressure Month Kit, that stresses the need for Americans to work with their doctors to lower their blood pressure to less than 140/90 mm Hg, was distributed to community groups and made available on the NHLBI Web site. The materials focus primarily on minorities, women, older Americans, and low-literacy audiences; patient education materials are also provided in Spanish.

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 death from CHD. As shown by

results from the 1995 Cholesterol Awareness Survey of physicians and the public, the NCEP has made significant progress toward its goal of reducing the prevalence of high blood cholesterol. From 1983 to 1995, the percentage of the public who ever had their cholesterol checked rose from 35 to 75 percent, showing that 70 to 80 million more Americans were aware of their cholesterol level in 1995 than in 1983. Moreover, in 1995, physicians reported initiating diet and drug treatment at much lower cholesterol levels than in 1983, levels close to NCEP recommendations, and major elements of the NCEP guidelines for detection and treatment have become established practice.

The NCEP uses a dual strategy for educating the American people on the importance of blood cholesterol reduction. One strategy focuses on individuals whose high blood cholesterol places them at increased risk for CHD and emphasizes the need for detection and treatment. The other strategy focuses on the general public and encourages heart-healthy eating patterns to lower average cholesterol levels. Various approaches are used to educate the public about the importance of eating a diet low in saturated fat, engaging in physical activity, maintaining weight control, and having regular cholesterol level checkups.

The latest NHANES III data demonstrate that these two educational strategies have had a substantial effect on measured blood cholesterol levels of U.S. adults. Since 1978, the public's intake of saturated fat, total fat, and cholesterol decreased significantly, resulting in impressive declines in average blood cholesterol levels and in the prevalence of high blood cholesterol in the U.S. population. Cholesterol levels in adolescents have also declined.

As part of National Cholesterol Education Month in September 1999, the NCEP launched an updated and expanded version of its interactive Web site, "Live Healthier, Live Longer," that provides information about cholesterol lowering for individuals who want to prevent heart disease, as well as for those who have heart disease. The Web site, accessible from the NHLBI home page, also allows users to obtain information that is personally relevant to their cholesterol levels and degree of heart disease risk.

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

Dissemination and implementation of national guidelines on diagnosis and management of asthma is a major program priority. Past efforts focused on strategies to establish partnerships with national organizations to develop educational materials and programs, and to use national partner networks to disseminate materials and implement programs. The NAEPP has adopted a new approach that emphasizes creation of partnerships with local asthma coalitions to stimulate grass roots programs. To this end, in November 1998, the NAEPP convened a workshop, "Strengthening Asthma Coalitions: Thinking Globally, Acting Locally," at which coalition representatives presented their priorities for ways the NAEPP could support their efforts. Highest priority was assigned to locating and stimulating funding sources, facilitating networking, organizing additional coalition meetings, and standardizing data collection and analysis to allow comparison of data across communities. In response, the NAEPP provided support to develop a framework for asthma surveillance and, with other national organizations, organized additional coalition meetings in 1999. Most recently, with the objective of implementing projects in high-risk communities, the NAEPP issued a Request for Proposals (RFP) inviting coalitions to develop innovative, replicable grass-roots programs, particularly in communities that are disproportionately affected by asthma.

In FY 1999, the NHLBI launched the Asthma Management Model System, a unique computerized management information tool (accessible from the NHLBI home page) for clinicians, researchers, public health planners, and individuals concerned about asthma. The system has three main components: "research mode" that links to and integrates a variety of searchable

databases and other resources; "education mode" that provides immediate access to clinical practice guidelines and professional and patient education materials, including medical education opportunities and slides for presentations; and "communication mode" that allows users to e-mail the Webmaster, register for updates, and connect with online discussion groups.

The National Heart Attack Alert Program (NHAAP) was initiated in June 1991 to reduce morbidity and mortality from acute MI, including out-of-hospital cardiac arrest, through education of health professionals (e.g., physicians, nurses, and emergency medical services personnel), patients, and the public about the importance of rapid identification and treatment of individuals with heart attack symptoms and signs. To date, the Program has developed recommendations for emergency department management of individuals presenting with characteristic symptoms of acute MI. It has also prepared background papers on 911 emergency telephone systems, issued staffing and equipment requirements for emergency medical services systems, recommended emergency medical dispatching processes and procedures, and identified factors associated with patient/bystander delay in seeking care for acute MI manifestations. In addition, the NHAAP has developed recommendations on current and new tests/technologies for detecting acute MI (including unstable angina) for health care providers in emergency departments. The NHAAP also has published recommendations for providers about reducing prehospital delay in patients at high risk for an acute MI and for community planners about ensuring access to timely and appropriate care for individuals with acute coronary syndromes.

Areas identified for increased program activity include evidence-based evaluation of diagnostic technologies, strategies, and protocols to identify patients with acute cardiac ischemia; health care systems and community planning that includes managed care issues; new information technologies; education outreach to health care providers and their high-risk patients; and a new focus on informing the general public about early recognition of and appropriate response to individuals with symptoms of acute coronary syndrome (heart attack as well as unstable angina).

The NHLBI Obesity Education Initiative (OEI) was started in January 1991 to inform the public and health professionals of 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 expert panel report, *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: Evidence Report*, was released in June 1998 by the OEI, in collaboration with the National Institute of Diabetes and Digestive and Kidney Diseases. A number of activities were undertaken to bring the guidelines to the attention of a variety of health professional groups. The full report was published as a supplement to the *Journal of Obesity Research* (September 1998) and was provided to 100,000 primary care physicians. The executive summary was published in the *Archives of Internal Medicine* (September 1998), the *Journal of the American Dietetic Association* (October 1998), and the *American Journal of Clinical Nutrition* (October 1998). The guidelines were presented at professional meetings and regional conferences on CVD, and they are being discussed at six Centers for Obesity Research and Education as part of an educational program to train primary care physicians to help patients lose weight.

A variety of products have been developed to help translate key recommendations from the guidelines into clinical practice. They include *The Practical Guide to the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults*, an abbreviated version of the guidelines that provides primary care practitioners with the basic tools they need to assess and manage overweight and obese patients; a Web-based PowerPoint slide show that can be used to tailor presentations to meet the needs of individual audiences, including patients; and an "electronic textbook" that allows easy Web access to most of the clinical guidelines evidence report and includes interactive features, such as the treatment algorithm, a menu planner, and a body mass index calculator.

Public education efforts include development of a Web site, "Achieve Your Healthy Weight," (accessible from the NHLBI home page) that helps users determine whether they are at increased risk for obesity-associated diseases and provides tips on ways to reduce calories and

increase physical activity. The popular television program "Good Morning America" translated information from the guidelines into a series of educational segments about losing weight.

The NHLBI, in collaboration with the National Recreation and Park Association and two state universities, developed and implemented a program, "Hearts N' Parks Y2K," at 12 sites in North Carolina to promote adoption of heart-healthy behaviors by children and their families. The goal is to create model community-based programs to increase the number of children and adults (including the elderly) who engage in heart-healthy behaviors and to demonstrate the impact that community parks and recreation departments can have on motivating behavior change. Lessons learned from the individual sites will be compiled into a resource community guidebook that will be available to others who wish to organize similar programs throughout the country.

The NHLBI Ad Hoc Committee on Minority Populations was established in 1975 to facilitate communication between minority communities and the NHBPEP. Its role has since expanded as the Institute developed new education and prevention programs. The current Committee is composed of 17 multiethnic, multidisciplinary health professionals from diverse cultural backgrounds with broad-based expertise in a variety of areas. Representing blacks, Hispanics, American Indians, and Asian and Pacific Islander Americans, it provides direct input on NHLBI minority initiatives.

The OPEC and the Office of Research on Minority Health (ORMH), NIH, are currently collaborating on several projects associated with improving cardiovascular health in minority populations. One such project is the "National Physicians' Network (NPN)," a national strategy designed to mobilize, train, and equip physicians and other health care practitioners to promote cardiovascular health in the black community through prevention and education programs. The NPN Speakers' Kit is used by more than 40 percent of NPN members to make presentations in a variety of settings. The NPN is also working with four historically black medical schools to help them include the Speakers' Kit in their curricula. To maintain the Network, a Web-based continuing education and training program

for health professionals will be created. A second project, the Latino Community CVD Prevention and Outreach Initiative "*Salud para su Corazón*" (Health for Your Heart), is a tested and comprehensive community outreach program to raise awareness and knowledge of CVD and promote heart-healthy behaviors among Hispanics. It uses messages and materials that are culturally and language appropriate and that can be disseminated through numerous channels, including mass media and community outreach by lay health educators (*promotores de salud*). Plans are in progress to disseminate the heart-health model to other Latino communities. A third project, "Building Healthy Hearts for American Indians and Alaska Natives Communities," is a pilot project to increase knowledge and promote heart health among these populations in three communities: the Laguna Pueblo in New Mexico, the Ponca tribe in Oklahoma, and Native Alaskans served by the Bristol Bay Health Corporation, a nonprofit Native Alaska health provider. Culturally appropriate tools are being developed. A fourth project is focusing on the cardiovascular health needs of Asian and Pacific Islander Americans. The NHLBI, in partnership with the Asian and Pacific Islander American Health Forum in San Francisco and the Moloka'i General Hospital in Hawaii, conducted two workshops in 1999 to assess CVD risk factors, identify partners for dissemination, and discuss developing outreach activities for Asian and Pacific Islander Americans. The workshops brought together new partners who can provide important information for developing an action plan to address CVD needs and disparities in this population.

International Activities

The Institute has a long-standing history of working with other nations to reduce mortality and morbidity from heart, lung, and blood diseases. It maintains a number of important international government-to-government agreements with more than 20 countries including Russia, China, Japan, Germany, Italy, Poland, Czechoslovakia, Kyrgyzstan, Georgia, Egypt, Pakistan, Korea, Australia, Vietnam, and South Africa. In addition, a number of NHLBI grantees are collaborating with scientists in Uganda, Uruguay, Mexico, Hungary, Romania, Ukraine, Bulgaria, India,

and Turkey under the Fogarty International Research Collaborative Awards Program. Activities in which the Institute participates jointly with other countries include exchanges of scientists and data, research projects, comparisons of epidemiologic data, working group meetings, and publications in areas of high national and scientific priority. Rapid international progress in science and technology and expanding networks of electronic communications combine to create a framework for continuing growth in international collaborations. Highlights of these activities are presented in the Institute's annual reports on international activities.

The NHLBI contributes to worldwide plans for prevention and control of cardiovascular, pulmonary, and blood diseases in both developed and developing countries. For example, the NHLBI Director and staff members serve as consultants to the World Health Organization (WHO), the Pan American Health Organization (PAHO), the World Hypertension League, and the Global Initiative on Asthma. The Institute also serves as a WHO Collaborating Center for Cardiovascular Research and Training for the Americas and provides information and data for use throughout the world.

Evidence-based guidelines, the basis for the Institute's prevention programs, have a major impact on international health policies. The NHLBI guidelines on hypertension, cholesterol, and asthma have been translated into many

languages so that they can be adapted for use in other countries. The Institute's international collaboration in hypertension control is serving as a model for infrastructure building and cost-effective health care approaches for CVD and other emerging chronic diseases. NHLBI collaborative programs with China, Germany, Poland, and Egypt provide evidence that cardiovascular and pulmonary prevention programs, similar to those successfully implemented in the United States, can be adapted to other countries.

As a result of the 1998 Conference on the Pandemic of Cardiovascular Disease sponsored by the PAHO, the WHO, the NHLBI, and the Fogarty International Center, the Institute is developing the Pan American Hypertension Initiative that will focus on prevention and control of hypertension in North, Central, and South America and the Caribbean. The initiative will be directed at an estimated 140 million hypertensives in the region and will emphasize the importance of prevention and control of this condition in order to avoid its sequelae of heart attacks, stroke, heart failure, kidney failure, and premature deaths.

Aplastic anemia is another area that received international attention in FY 1999. A working group of American scientists went to Hanoi and Ho Chi Minh City to conduct training seminars, assess the progress of joint research, and develop plans for continued collaboration with the Blood Transfusion and Hematology Institutes.



3. Important Events

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

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

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

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

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

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

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

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

December 1, 1952. Dr. James Watt is appointed Director of 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 the Congress with approval from President Lyndon B. Johnson.

November 22-24, 1964. The Second National Conference on Cardiovascular Diseases, cosponsored by the American Heart Association, the NHI, and the Heart Disease Control Program of the PHS, is held to evaluate progress since the 1950 Conference and to assess needs and goals

for continued and accelerated growth against heart and blood vessel diseases.

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

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

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

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

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

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

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

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

October 26, 1968. The NHI receives the National Hemophilia Foundation's Research and Scientific Achievement Award for its "medical leadership. . . , tremendous stimulation and

support of research activities directly related to the study and treatment of hemophilia."

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

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

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

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

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

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

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

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

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

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

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

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

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

April 5, 1974. The Assistant Secretary for Health, HEW, authorizes release of the Report to the President by the President's Advisory Panel

on Heart Disease. The report of the 20-member panel, chaired by Dr. John S. Millis, includes a survey of the problem of heart and blood vessel disorders and panel recommendations to reduce illness and death from them.

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

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

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

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

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

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

November 1979. The results of the Hypertension Detection and Follow-up Program (HDFP), a major clinical trial started in 1971, provide

evidence that tens of thousands of lives are being saved through treatment of mild hypertension and that perhaps thousands more could be saved annually if all people with mild hypertension were under treatment.

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

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

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

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

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

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

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

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

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

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

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

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

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

November 1985. The NHLBI inaugurates the National Cholesterol Education Program (NCEP) to increase awareness among health professionals

and the public that elevated blood cholesterol is a cause of CHD and that reducing elevated blood cholesterol levels will contribute to the reduction of CHD.

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

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

December 17, 1986. The citizens of Framingham, MA, are presented a tribute by the Assistant Secretary for Health, Health and Human Services (HHS), for their participation in the Framingham Heart Study over the past 40 years.

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

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

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

September 1988. Acquired immunodeficiency syndrome 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, National Cancer Institute, insert a normal gene into a patient's cells to compensate for a defective gene that left the patient's cells unable to produce an enzyme essential to the functioning of the body's immune system.

January 1991. The NHLBI Obesity Education Initiative 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 age 60 years significantly reduces stroke and MI.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

May 21, 1996. The NHLBI announces results from the Framingham Heart Study that conclude earlier and more aggressive treatment of hypertension is vital to preventing congestive heart failure. Lifestyle changes, such as weight loss, a healthy eating plan, and physical activity, are crucial for reducing blood lipids in those treated for Stage I hypertension.

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

November 13, 1996. The NHLBI releases findings from two studies, Dietary Approaches to Stop Hypertension (DASH) Trial and Trial of Nonpharmacologic Intervention in the Elderly (TONE). The DASH Trial demonstrates that a diet low in fat and high in vegetables, fruits, fiber, and low-fat dairy products significantly and quickly lowers blood pressure. The TONE Trial 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, that the risk factors high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, and cigarette smoking affect the progression of atherosclerosis equally in women and men regardless of race.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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, asthma, chronic obstructive pulmonary disease (COPD), and blood-clotting disorders: embolisms and thromboses. The most serious atherosclerotic diseases are coronary heart disease (CHD), as manifested by heart attack and angina pectoris, and cerebrovascular disease, as manifested by stroke.

In 1998 cardiovascular, lung, and blood diseases accounted for 1,199,000 deaths and 51 percent of all deaths in the United States (p. 35). The projected economic cost in 2000 for these diseases is expected to be \$476 billion, 25 percent of the total economic costs of illness, injuries, and death (p. 50). Of all diseases, heart disease is the leading cause of death, cerebrovascular disease is third (behind cancer), and COPD ranks fourth (p. 38). Cardiovascular and lung diseases account for three of the five leading causes of death (p. 38) and four of the five leading causes of infant death (p. 44). Hypertension, heart disease, asthma, and chronic bronchitis are especially prevalent and account for substantial morbidity in Americans of all ages (p. 46). Increases in prevalence have been greatest for asthma and congestive heart failure CHF.

The purpose of the biomedical research conducted by the NHLBI is to contribute to the prevention and treatment of cardiovascular, lung, and blood diseases. National disease statistics show that by mid-century, morbidity and mortality from these diseases had reached record high levels. Since then, however, substantial improvements have been achieved, especially over the past 30 years, as shown by the significant decline in mortality rates. Because many of these diseases begin early in life, their early detection and control can reduce the risk of disability and 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.

A new standard, the projected population for the year 2000, has been used to determine the death rates for the age-adjusted charts found on pages 39, 40, 41, and 43. The corresponding

charts that were age-adjusted to the old standard—the 1940 standard—can be found in the Appendixes. For the international charts, the European Standard Population was used to age-adjust the death rates.

Cardiovascular Diseases

- CVD caused 949,000 deaths in 1998, 41 percent of all deaths (p. 35).
- Heart disease is the leading cause of death; the main form, CHD, caused 460,000 deaths in 1998 (pp. 36, 38).
- The annual number of deaths from CVD increased substantially between 1900 and 1970 (p. 37). This trend ended even though the population continues to increase and age.
- Total CVD mortality from all ages combined, measured by the crude death rate, changed from an increasing to a decreasing trend with a peak in 1963. By 1995, the rate achieved was similar to the rate in 1936 (p. 37).
- Cerebrovascular disease, the third leading cause of death, accounted for 158,000 deaths in 1998 (pp. 36, 38).
- Heart disease is second only to all cancers combined in years of potential life lost (p. 38).
- Among minority groups, heart disease ranks first and stroke ranks fifth or higher as the leading causes of death (p. 38).
- The steep decline in age-adjusted death rate for CVD means a substantial reduction in annual risk of death for an individual of any age. The smaller reduction in crude death rate reflects the impact of an aging population that is growing over time, so that the overall national mortality burden of CVD remains at a high level compared with other causes of death (pp. 37, 39).
- The rapid increase in deaths due to CHF between 1968 and 1997 is a major exception to the mortality decline in CVD (p. 39).
- Between 1985 and 1997, heart disease and stroke declined for men and women in almost all race/ethnic groups. Exceptions involved death rate for stroke, where the rate did not change in American Indian women and increased in Asian men (p. 40).

- Because of the rapid decline in mortality from CHD since the peak in 1963, there were 684,000 fewer deaths from CHD in 1998 than would have occurred if there had been no decline (p. 41).
- Substantial improvements have been made in the treatment of CVD. Since 1975, case-fatality rates from hospitalized AMI, stroke, cardiac dysrhythmia, and CHF patients declined appreciably (p. 41).
- The decline in CHD mortality began earlier in the United States than in most countries, and in the 1970s and 1980s outpaced that in most countries (only selected countries are shown) (p. 42).
- Between 1988 and 1998, the percent decline in death rates for CHD was greatest among white males and least among black females (p. 43).
- In 1997, an estimated 59.7 million persons in the United States had some form of CVD; 50 million had hypertension and about 12 million had CHD (p. 46).
- Since the 1960s there has been a substantial reduction in the prevalence of hypertension, smoking, and cholesterol, but not overweight (p. 47).
- A 1988–94 national survey showed many more people with hypertension (systolic BP \geq 160 mm Hg or diastolic BP \geq 95 mm Hg or on antihypertensive medication) were aware of their condition and had it treated and controlled compared with individuals with hypertension in previous years (p. 48).
- A 1991–94 national survey showed only 27 percent 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. 48).
- Hospitalization rates for CHF increased between 1971 and 1997 (p. 49).
- The estimate of economic cost of CVD is expected to be \$327 billion in 2000:
 - \$186 billion in direct health expenditures
 - \$28 billion in indirect cost of morbidity
 - \$113 billion in indirect cost of mortality (p. 50)

Lung Diseases

- Lung diseases, excluding lung cancer, caused an estimated 251,000 deaths in 1998 (p. 35).
- COPD caused 109,000 deaths in 1998 and is the fourth leading cause of death (pp. 36, 38).
- Between 1988 and 1998, death rates for COPD and asthma increased substantially in

women; mortality for COPD and asthma declined in men, but only negligibly for COPD (p. 43).

- Between 1979 and 1998, infant death rates for the various lung diseases declined substantially (p. 43).
- The four leading causes of infant mortality are lung diseases or have a lung disease component (p. 44). Between 1989 and 1998, changes in mortality for the causes were:
 - Congenital anomalies (-24%)
 - Disorders of short gestation (+22%)
 - Sudden infant death syndrome (-54%)
 - Respiratory distress syndrome (-59%)
- Lung diseases accounted for 41 percent of all deaths under 1 year of age in 1998 (p. 44).
- Trends in COPD mortality in the United States are increasing rapidly in women and are flat for men. A selection of countries shows that the death rate for women in the United States is increasing significantly compared with the rates in several other countries (p. 45).
- Asthma is a common chronic condition, particularly in children. Prevalence and mortality continue to increase (pp. 46, 47, 49).
- Asthma and emphysema are leading chronic conditions causing limitation of activity (not shown). Asthma is the fourth leading chronic condition causing bed disability days.

Blood Diseases

- An estimated 265,000 deaths, 11 percent of all deaths, were attributed to blood diseases in 1998. These include the following:
 - 255,000 due to blood-clotting disorders
 - 8,000 to diseases of the red blood cell
 - 2,000 to bleeding disorders (pp. 35, 36)
- A large proportion of deaths from acute MI and cerebrovascular disease involve blood-clotting problems (p. 36). Mortality trends are downward (p. 35).
- In 2000, blood-clotting disorders are expected to cost the Nation's economy \$82 billion, and other blood diseases will cost \$11 billion (p. 50).
- The mean age at death for persons with sickle cell anemia increased from about 28 years in 1979 to 34.4 years in 1997 (not shown).
- Each year, an estimated 13 million units of blood are collected from about 8 million donors and transfused to 3 to 4 million patients (not shown).

Deaths From All Causes and Deaths From Cardiovascular, Lung, and Blood Diseases, U.S., 1978 and 1998

| Cause of Death | 1978 | | 1998 | |
|--|------------------|------------------|------------------|------------------|
| | Number of Deaths | Percent of Total | Number of Deaths | Percent of Total |
| All Causes | 1,928,000 | 100 | 2,338,000 | 100 |
| All Cardiovascular, Lung, and Blood Diseases | 1,126,000 | 58 | 1,199,000 | 51 |
| Cardiovascular Diseases (CVD) | 989,000 | 51 | 949,000 | 41 |
| Blood | 371,000* | 19 | 265,000‡ | 11 |
| Lung | 143,000† | 7 | 251,000† | 11 |
| All Other Causes | 802,000 | 42 | 1,139,000 | 49 |

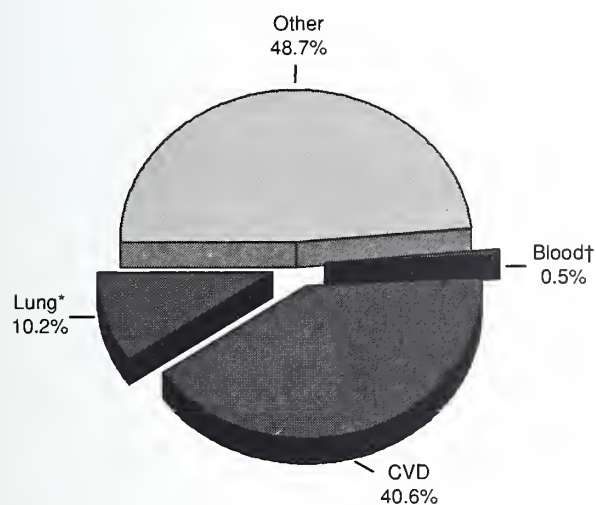
* Includes 365,000 CVD deaths involving blood clotting.

† Includes 12,000 CVD deaths due to pulmonary heart disease in 1978 and 12,000 in 1998.

‡ Includes 255,000 CVD deaths involving blood-clotting disease.

Source: Vital statistics of the U.S., National Center for Health Statistics (NCHS). Figures for 1998 are estimated by the NHLBI.

Deaths by Major Causes, U.S., 1998



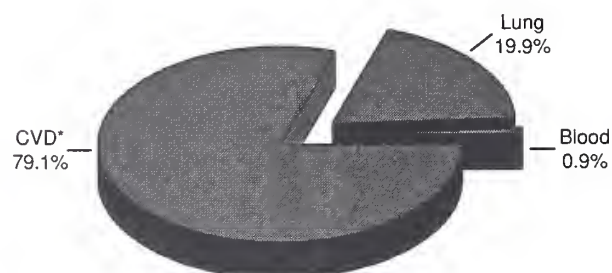
■ Total Cardiovascular, Lung, and Blood Diseases 51.3%

* Excludes deaths from pulmonary heart disease.

† Excludes deaths from blood-clotting disorders and pulmonary embolism (10.9%).

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

Deaths From Cardiovascular, Lung, and Blood Disease, U.S., 1998



* CVD involving blood clotting (21.2%).

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

Deaths From Specific Cardiovascular, Lung, and Blood Diseases, U.S., 1998

| Cause of Death | Deaths (Thousands) | | |
|--|--------------------|------------|------------|
| | Cardiovascular | Lung | Blood |
| Acute Myocardial Infarction (AMI) | 204 | — | 139* |
| Other Coronary Heart Disease (CHD) | 256 | — | — |
| Cerebrovascular Diseases (Stroke) | 158 | — | 104* |
| Other Atherosclerosis | 43 | — | 3* |
| Pulmonary Embolism | 9 | 9* | 9* |
| Other Cardiovascular Diseases | 279 | 3* | — |
| Diseases of the Red Blood Cell | — | — | 8 |
| Bleeding Disorders | — | — | 2 |
| Chronic Obstructive Pulmonary Disease (COPD) | — | 109 | — |
| Asthma | — | 5 | — |
| Other Airway Diseases | — | 1 | — |
| Pneumonia and Influenza | — | 95 | — |
| Neonatal Pulmonary Disorders | — | 12 | — |
| Interstitial and Inhalation Lung Diseases | — | 10 | — |
| Other Lung Diseases | — | 7 | — |
| Total† | 949 | 251 | 265 |

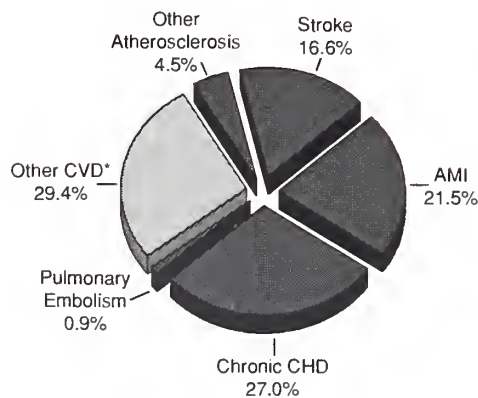
* Deaths from clotting or pulmonary disorders also included as cardiovascular deaths.

† Numbers may not add to total due to rounding.

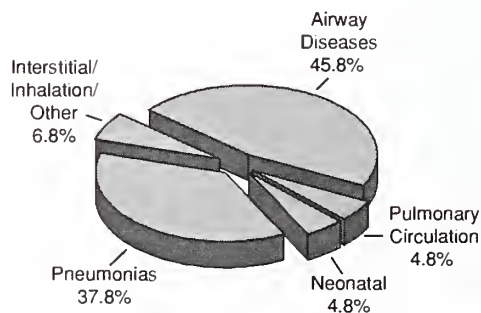
Note: Total, excluding overlap, is 1,199,000.

Source: Vital statistics of the U.S., NCHS. Figures shown are estimated by the NHLBI.

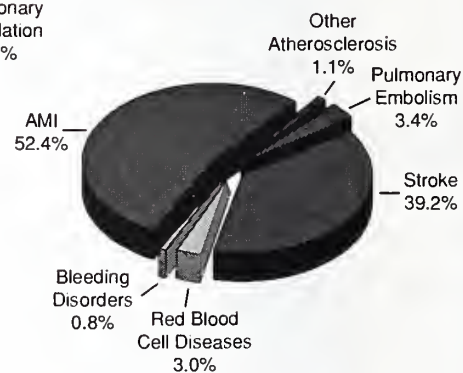
Deaths From Cardiovascular Diseases, U.S., 1998



Deaths From Lung Diseases, U.S., 1998



Deaths From Blood Diseases, U.S., 1998



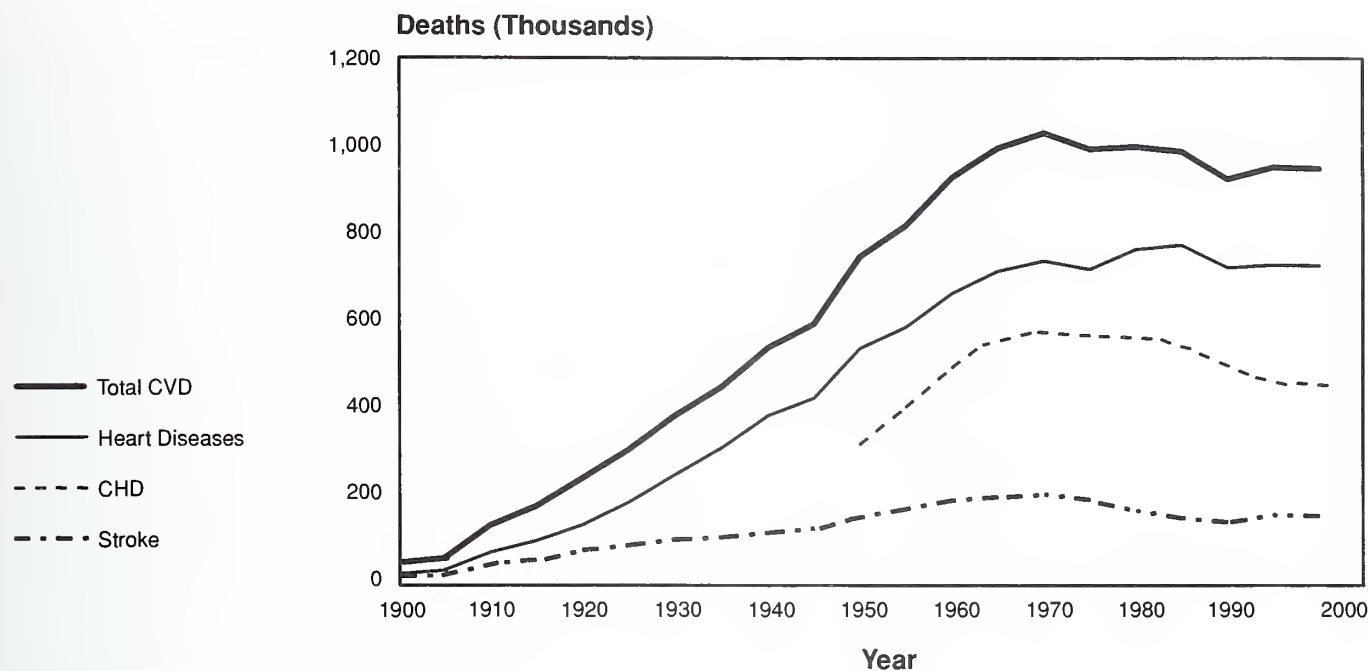
■ Atherosclerosis-Related Diseases 70.6%

■ Blood-Clotting Disorders 95.8%

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

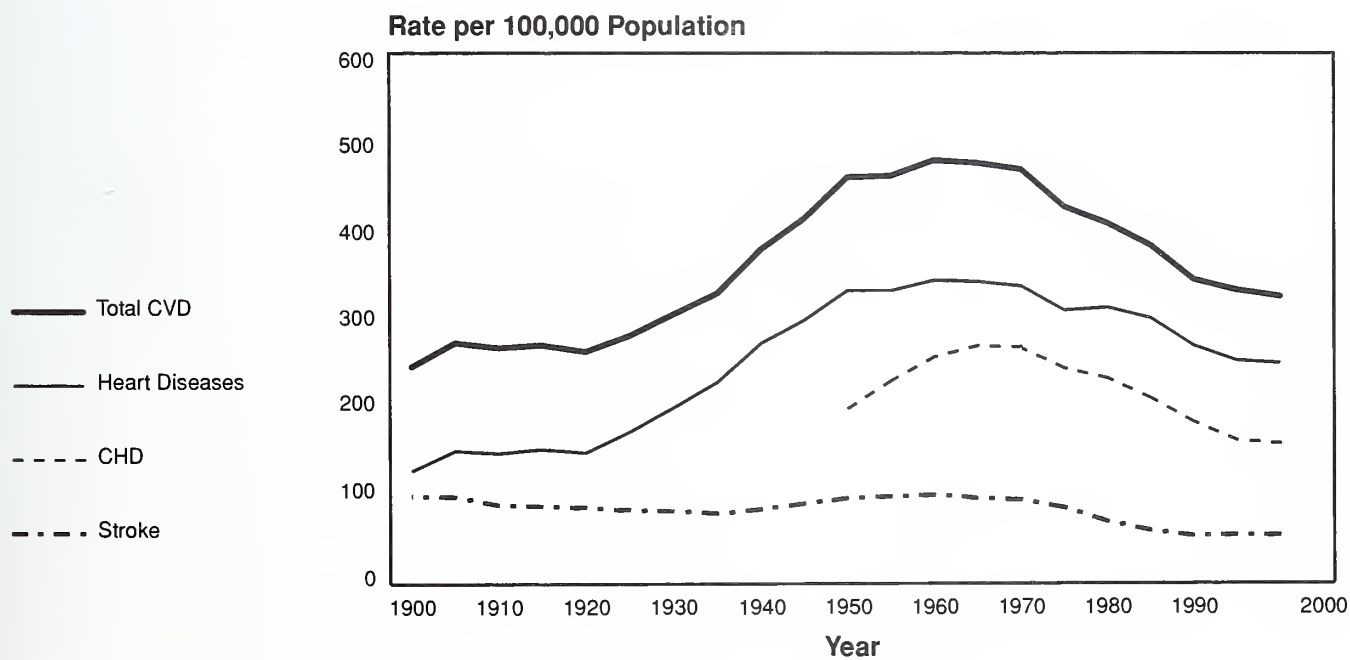
Source: Vital statistics of the U.S., NCHS. Figures shown are estimated by the NHLBI.

Deaths From Cardiovascular Diseases, U.S., 1900-98



Source: Vital statistics of the U.S., NCHS.

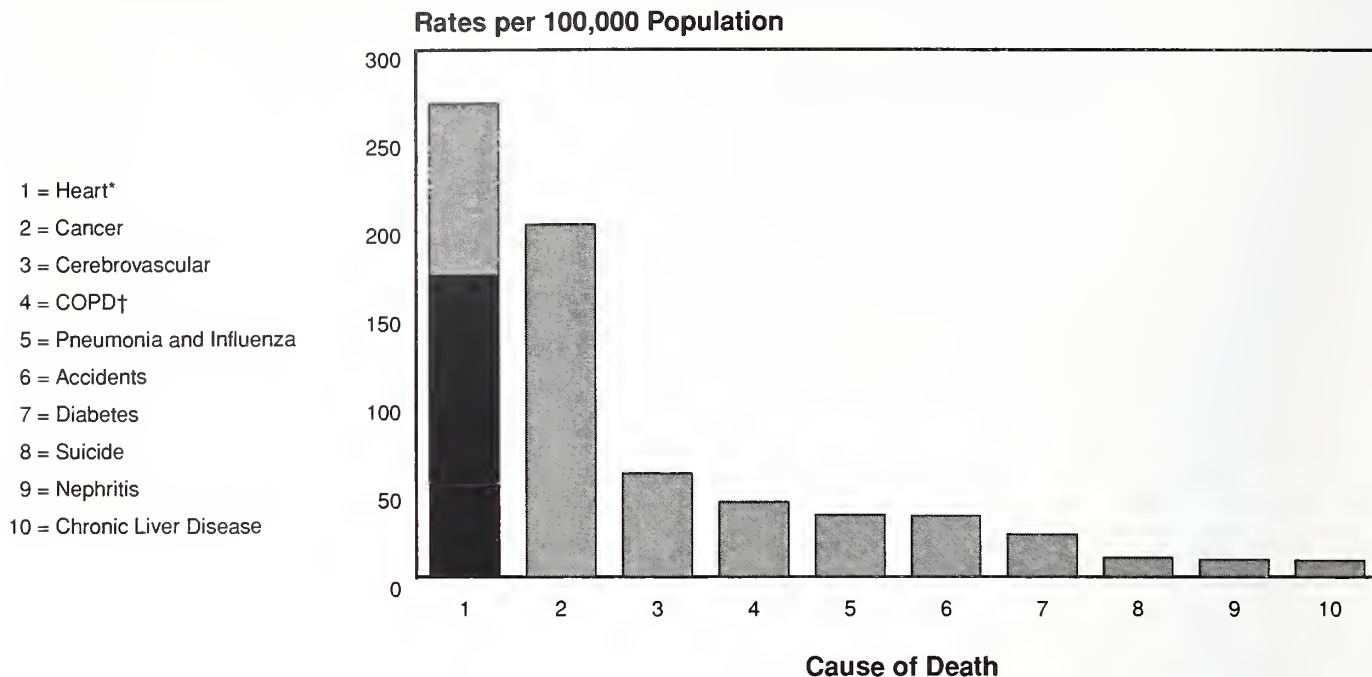
Death Rates* for Cardiovascular Diseases, U.S., 1900-98



* Not age-adjusted.

Source: Vital statistics of the U.S., NCHS.

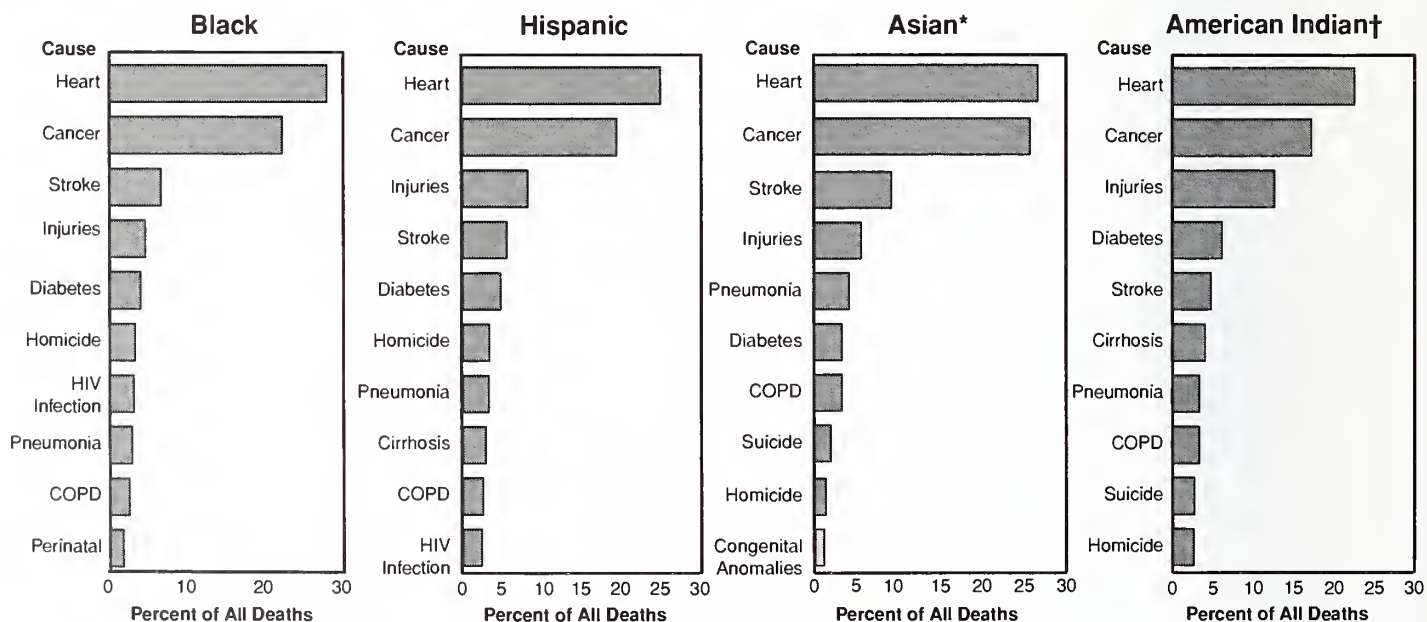
Ten Leading Causes of Death: Death Rates, U.S., 1998



| Years of potential life lost (millions)‡ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | 3.2 | 4.2 | 0.6 | 0.4 | 0.3 | 2.5 | 0.4 | 0.6 | 0.1 | 0.4 |

* Includes 170.3 deaths per 100,000 population from CHD.
 † COPD and allied conditions (including asthma).
 ‡ Based on the average remaining years of life up to age 75 years.
 Source: Vital statistics of the U.S., NCHS (preliminary).

Ten Leading Causes of Death Among Minority Groups, U.S., 1997



* Includes deaths among individuals of Asian extraction and Asian-Pacific Islanders.
 † Includes deaths among Aleuts and Eskimos.
 Source: Vital statistics of the U.S., NCHS.

Death Rates for Cardiovascular and Noncardiovascular Diseases, U.S., 1978 and 1998

| Cause of Death | Rate* | | Rate Change | Percent Change |
|----------------------------|-------|-------|-------------|----------------|
| | 1978 | 1998† | | |
| All Causes | 1,044 | 876 | -168 | -16 |
| Cardiovascular Diseases | 559 | 355 | -204 | -36 |
| Coronary Heart Disease | 318 | 173 | -145 | -46 |
| Stroke | 104 | 60 | -44 | -42 |
| Other | 137 | 122 | -15 | -11 |
| Noncardiovascular Diseases | 485 | 521 | 37 | 8 |

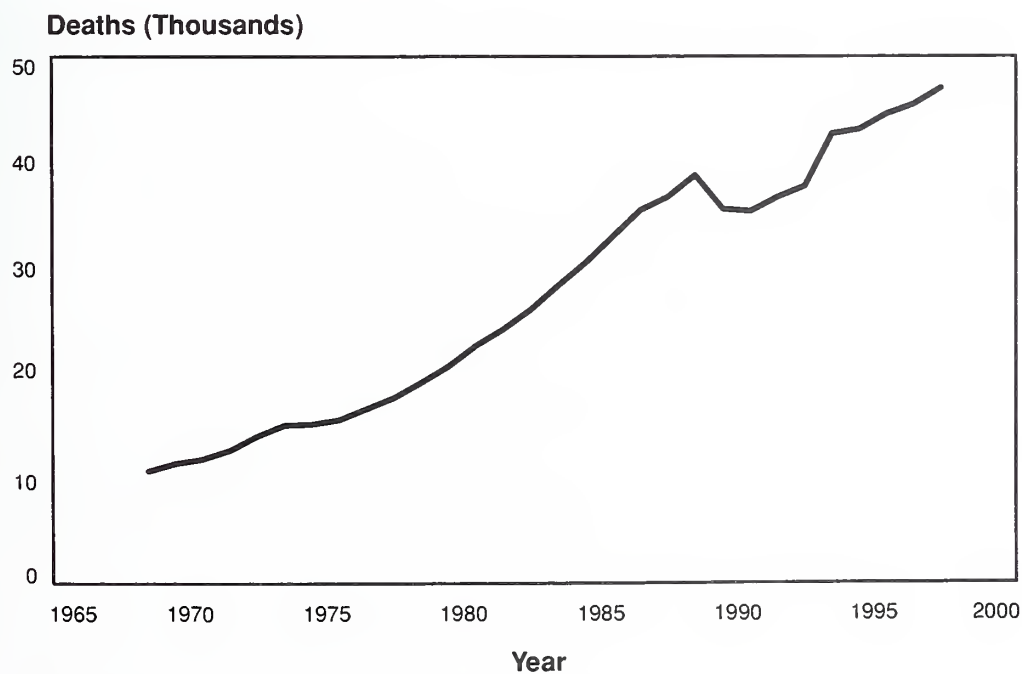
* Rate per 100,000 population age-adjusted to the 2000 standard.

† Data for 1998 are preliminary or estimated by the NHLBI.

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

Source: Vital statistics of the U.S., NCHS.

Deaths From Congestive Heart Failure, U.S., 1968-97



The sharp drop occurring in 1989 is attributed to the revision of the death certificate.

Source: Vital statistics of the U.S., NCHS.

Death Rates* for Heart Disease by Gender, Race, and Ethnicity, Ages 45+ Years, U.S., 1985-97

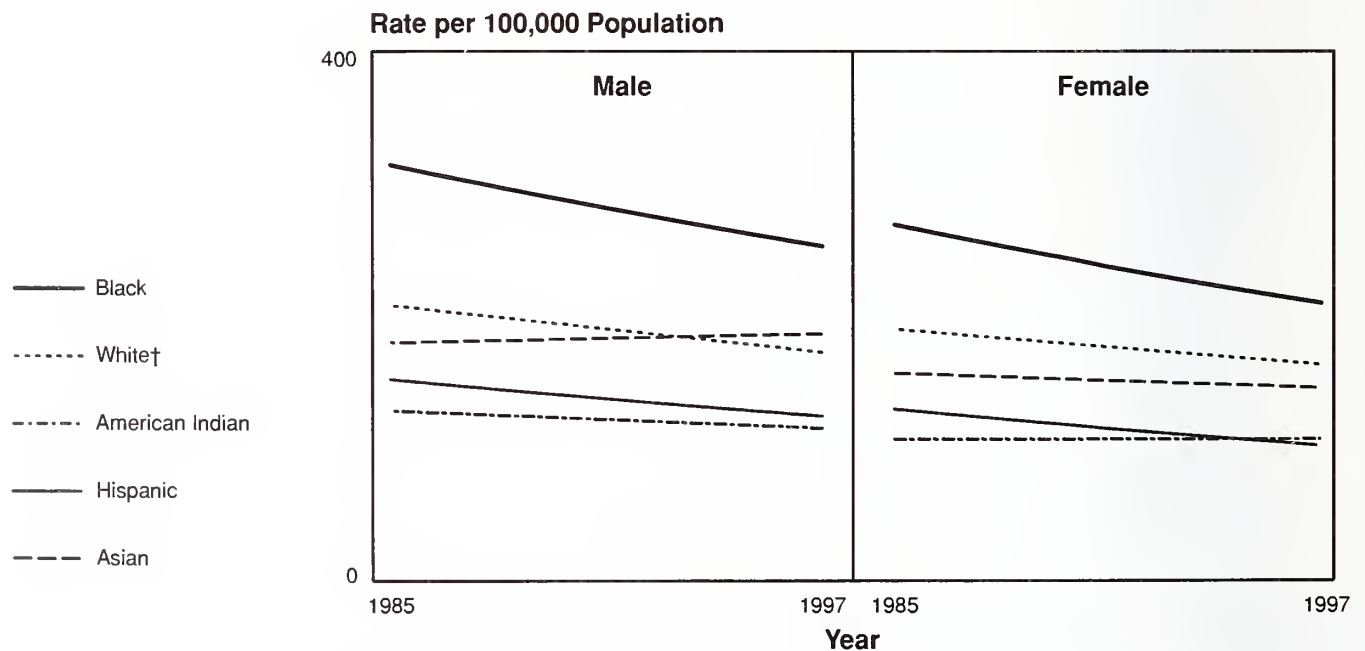


* Age-adjusted to the 2000 U.S. population.

† Non-Hispanic

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

Death Rates* for Stroke by Gender, Race, and Ethnicity, Ages 45+ Years, U.S., 1985-97



* Age-adjusted to the 2000 U.S. population.

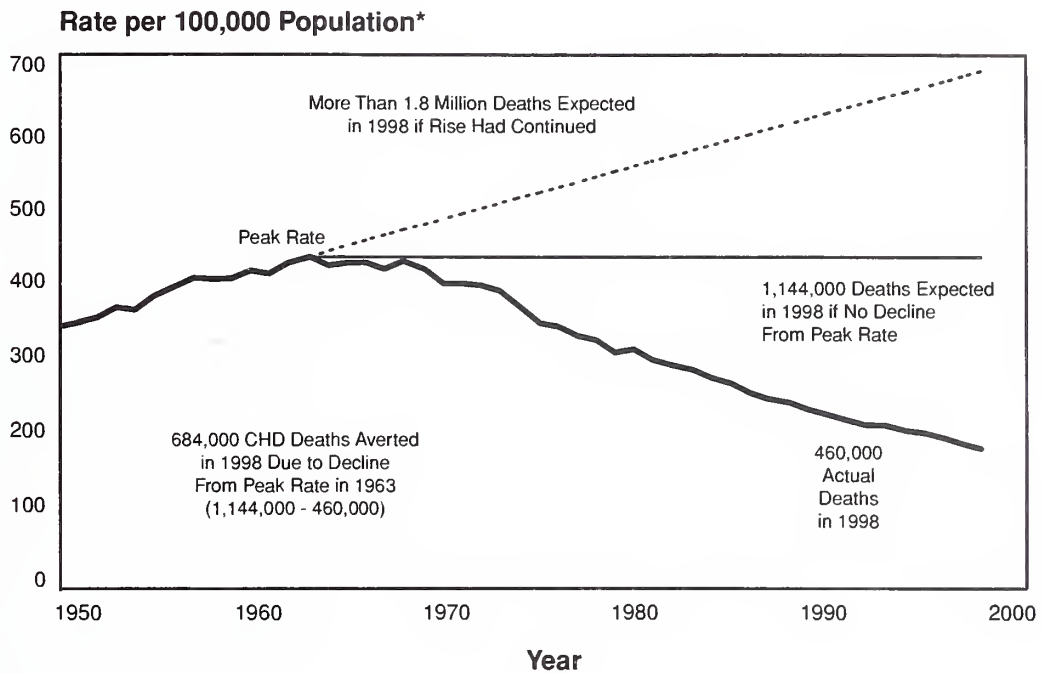
† Non-Hispanic

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

Source: Vital statistics of the U.S., NCHS.

Death Rates for Coronary Heart Disease, U.S., 1950-98

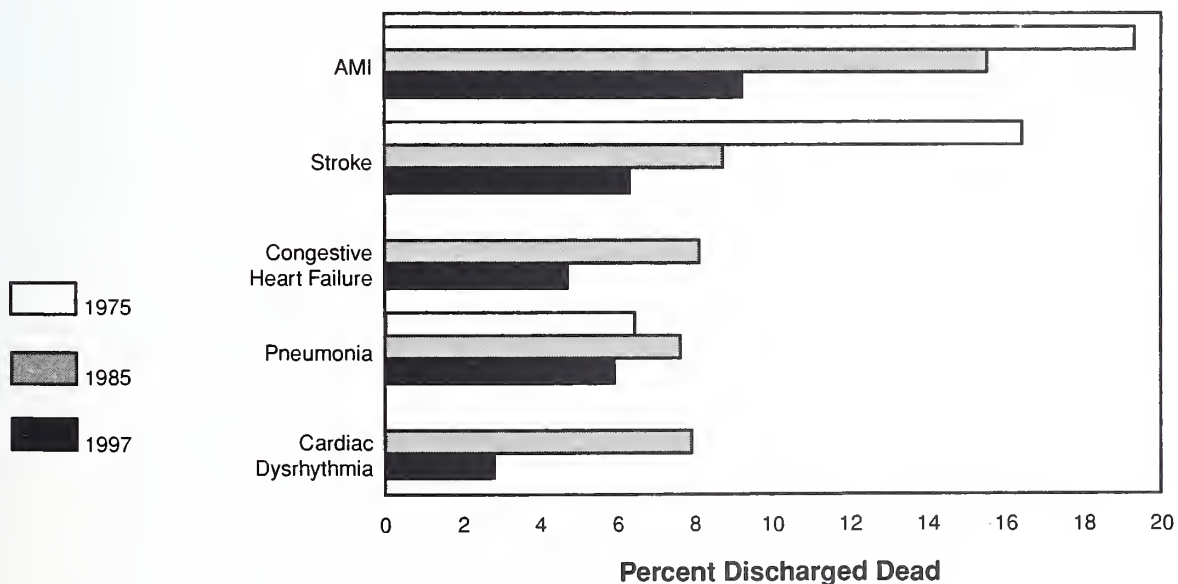
Actual Rate and Expected Rates if Rise Had Continued or Reached a Plateau



* Age adjusted to 2000 U.S. population. (Comparability ratio applied to 1968-78 rates.)

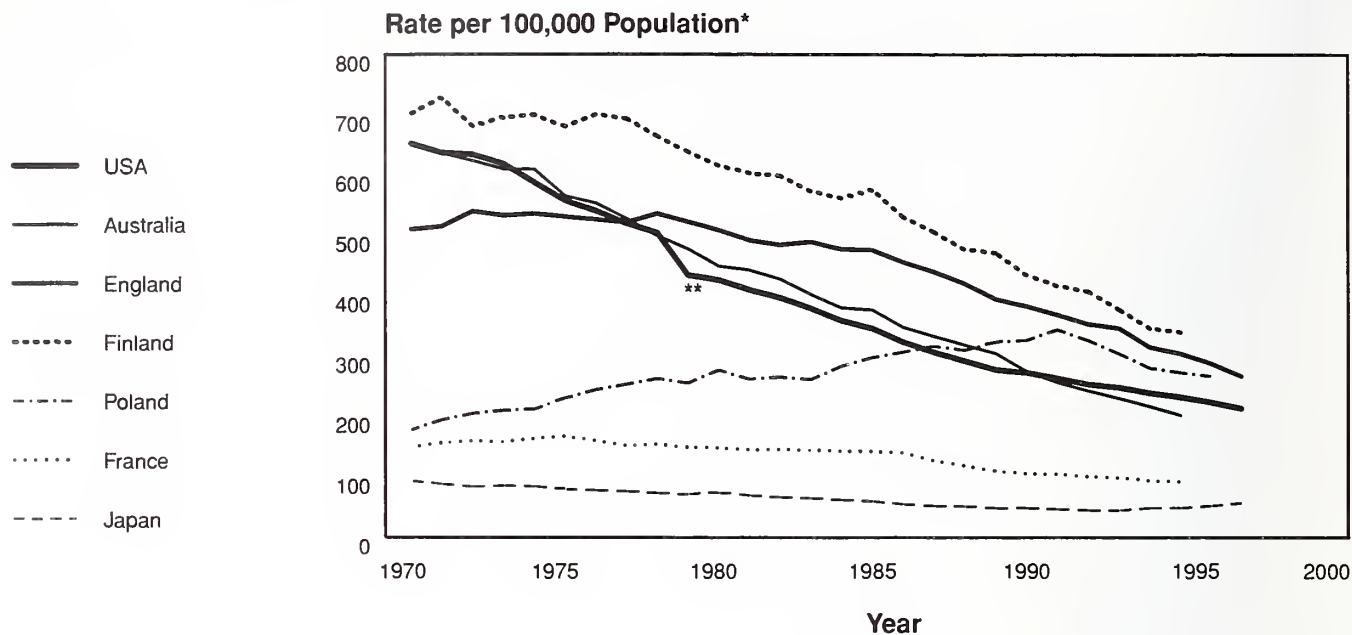
Source: Vital statistics of the U.S., NCHS. Data for 1998 are preliminary.

Common Cardiovascular and Lung Diseases With High Percentage Discharged Dead From Hospitals, U.S., 1975, 1985, and 1997



Source: National Hospital Discharge Survey, NCHS.

Death Rates for Coronary Heart Disease in Men Ages 35-74 Years, Selected Countries, 1970-97

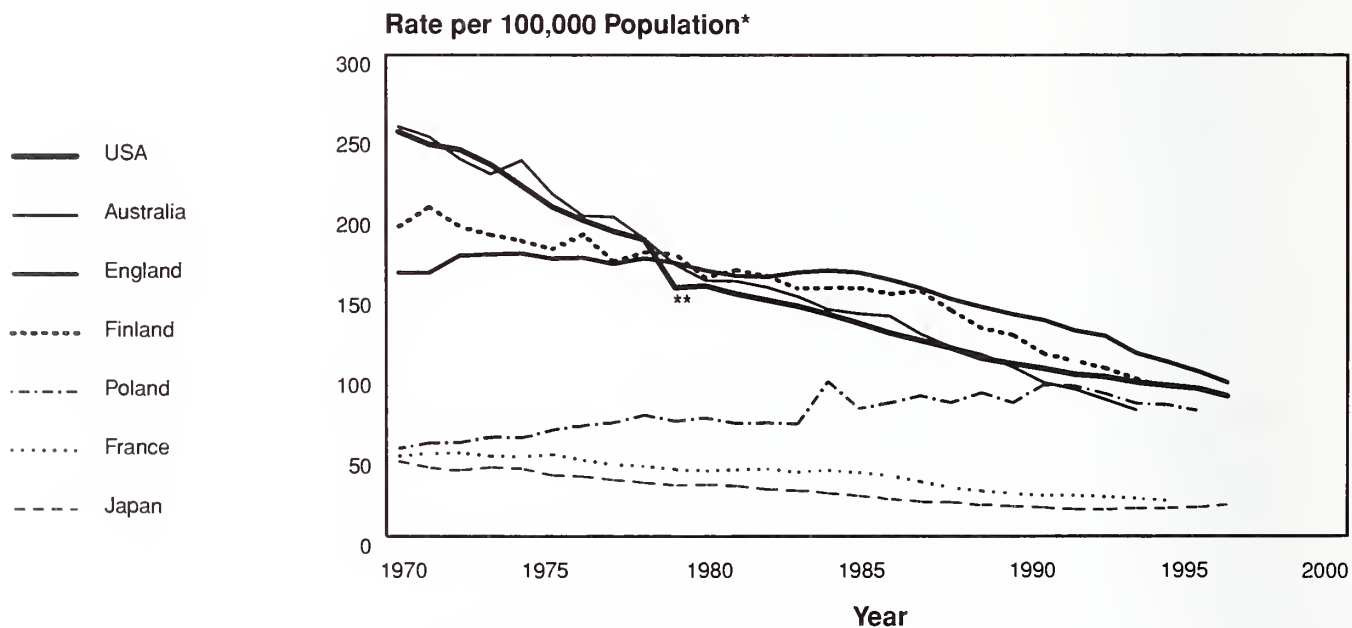


* Age-adjusted to the European Standard Population.

** The sudden decline is due to revision in the International Classification of Diseases in 1979.

Source: World Health Statistics Annual, WHO.

Death Rates for Coronary Heart Disease in Women Ages 35-74 Years, Selected Countries, 1970-97

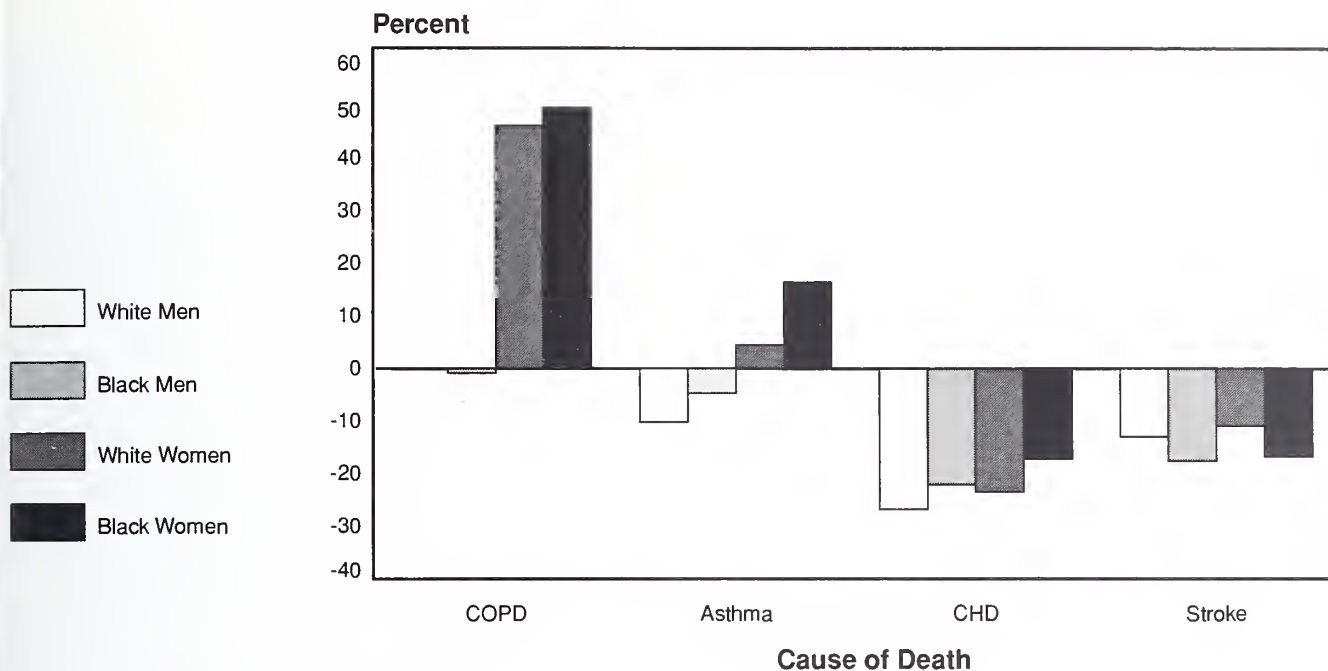


* Age-adjusted to the European Standard Population.

** The sudden decline is due to revision in the International Classification of Diseases in 1979.

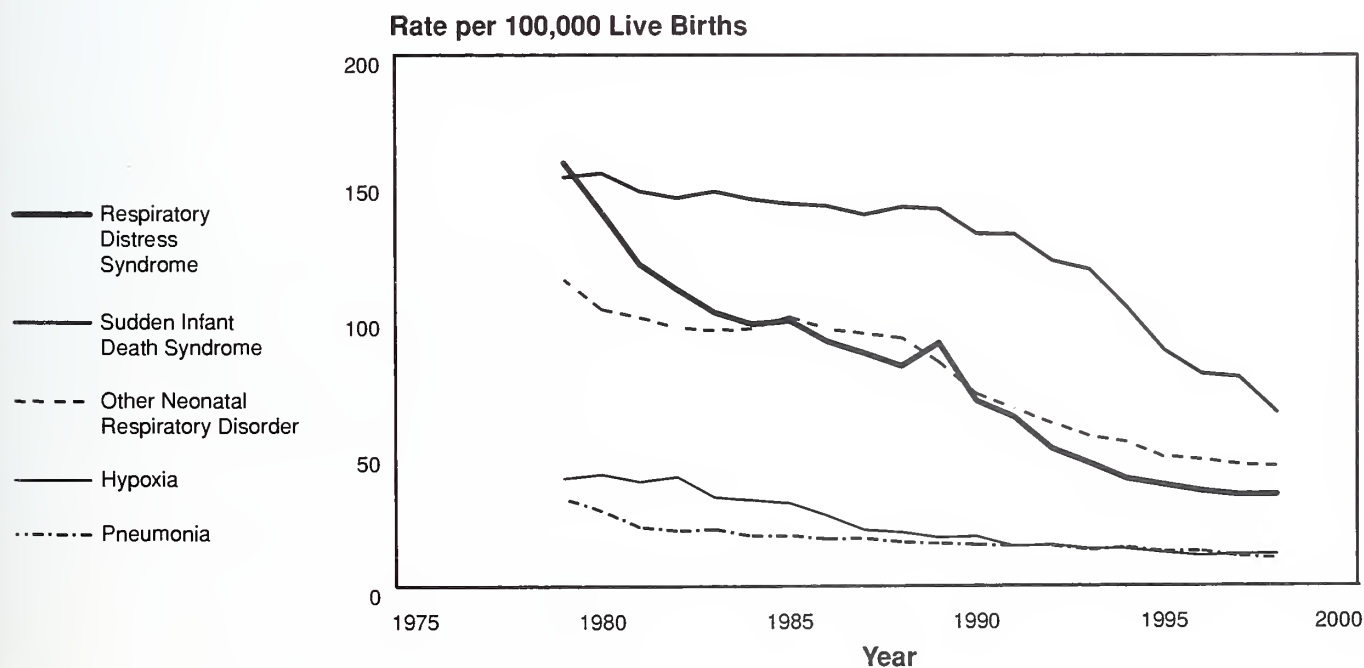
Source: World Health Statistics Annual, WHO.

Change in Death Rates* for Selected Causes by Race and Gender, U.S., 1988-98



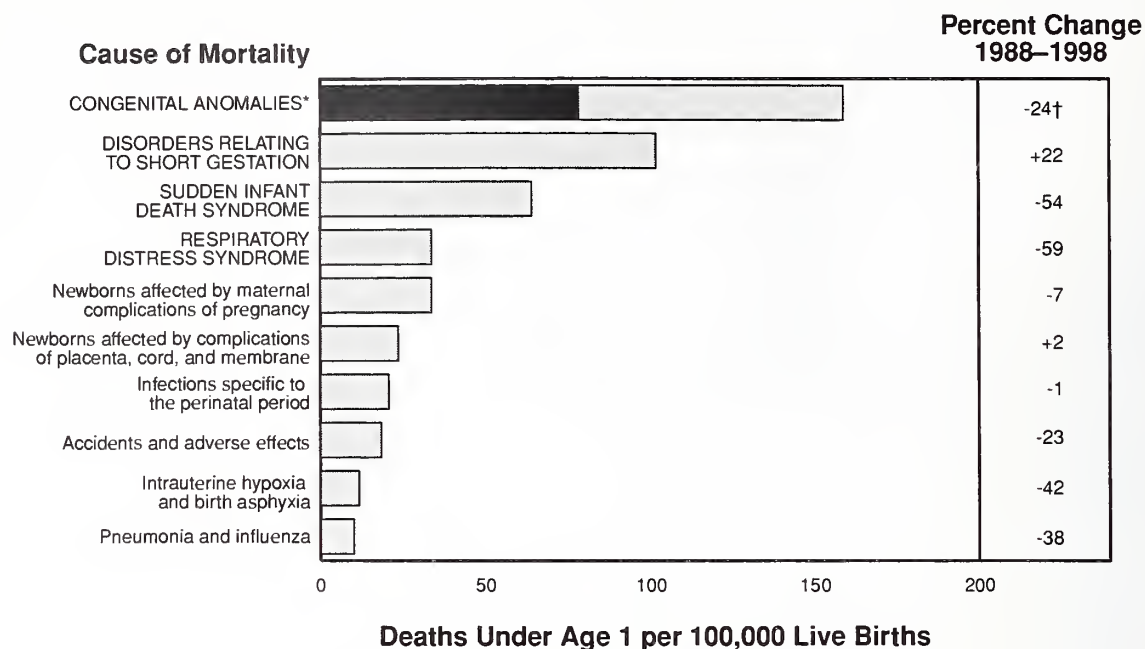
* Age-adjusted to the 2000 U.S. population.
Source: Vital statistics of the U.S., NCHS.

Death Rates for Lung Diseases in Infants, U.S., 1979-98



Source: Vital statistics of U.S., NCHS.

Ten Leading Causes of Infant Mortality, U.S., 1998



* In 1998, congenital CVD and congenital anomalies of the respiratory system represented 49 percent of all infant deaths due to congenital anomalies.

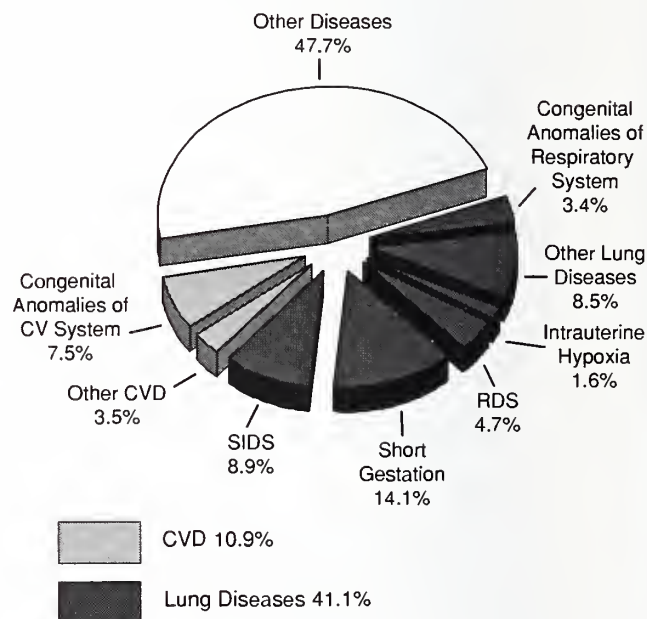
† Between 1988 and 1998, congenital CVD declined 33 percent; congenital anomalies of the respiratory system declined 14 percent; other congenital anomalies declined 24 percent.

Note: Capitalization indicates diseases addressed in Institute programs.

Source: From 1988 final and 1998 preliminary vital statistics of the U.S., NCHS.

Deaths Under Age 1 Year Due to Cardiovascular and Lung Diseases, U.S., 1998

| Cause of Death | Deaths Under Age 1 |
|-------------------------------------|--------------------|
| All Causes | 28,488 |
| Cardiovascular Diseases | 3,115 |
| Congenital Anomalies | 2,129* |
| Other | 986* |
| Lung Diseases | 11,703 |
| Sudden Infant Death Syndrome (SIDS) | 2,529* |
| Respiratory Distress Syndrome (RDS) | 1,328* |
| Short Gestation | 4,011* |
| Intrauterine Hypoxia | 459 |
| Congenital Anomalies | 962* |
| Other Lung Diseases | 2,414† |
| Other Diseases | 13,670 |



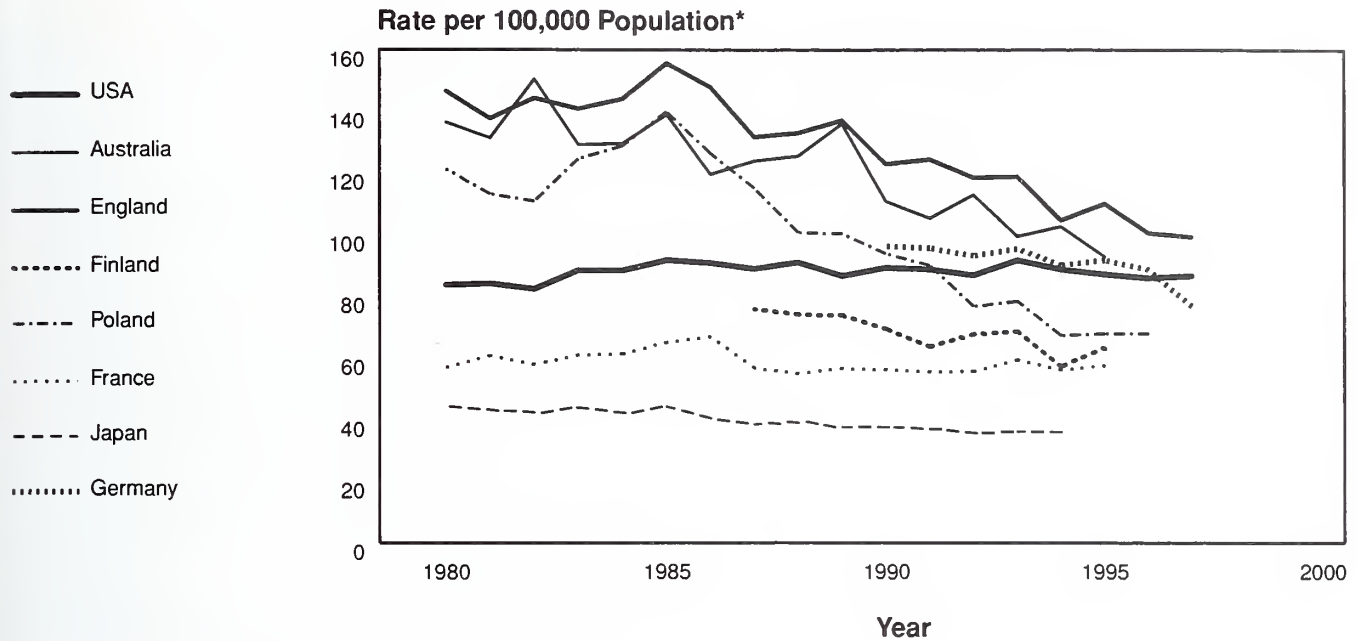
* NHLBI programs address these diseases.

† NHLBI programs address diseases that caused about one half of these deaths.

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

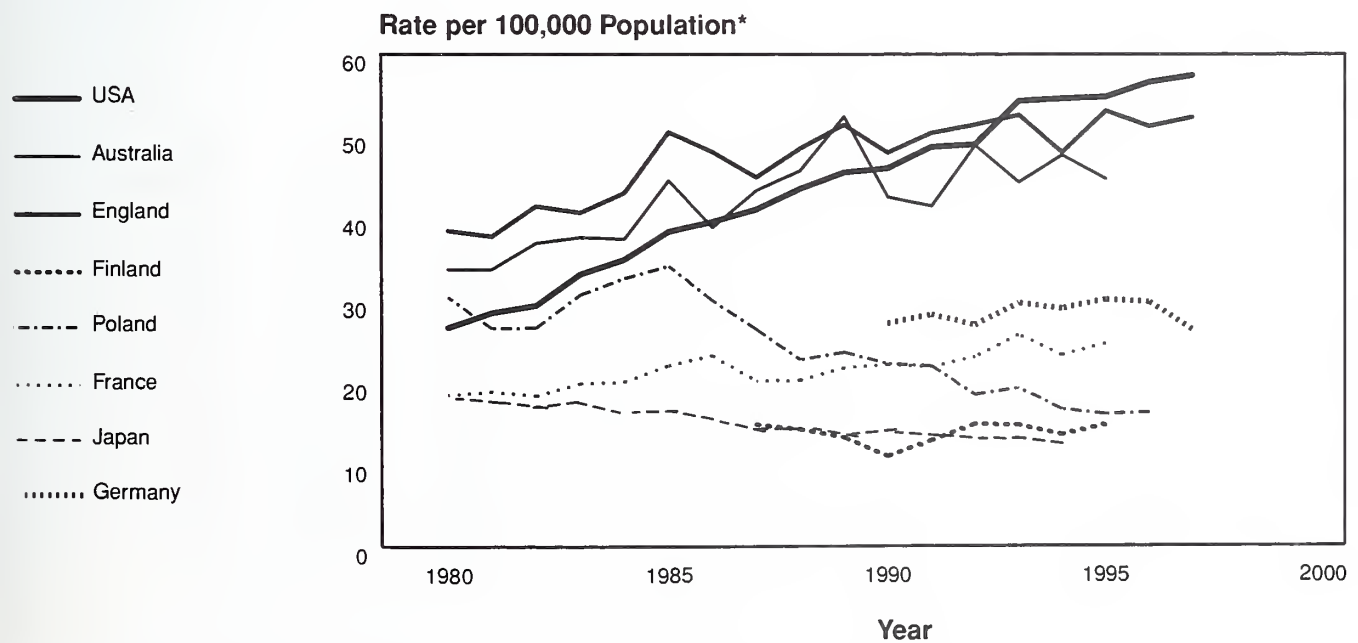
Source: Estimated by the NHLBI from final 1997 and preliminary 1998 vital statistics of the U.S., NCHS.

Death Rates for Chronic Obstructive Pulmonary Disease in Men Ages 35+ Years, Selected Countries, 1980-97



* 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, 1980-97



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

Prevalence of Common Cardiovascular, Lung, and Blood Diseases, U.S., 1997

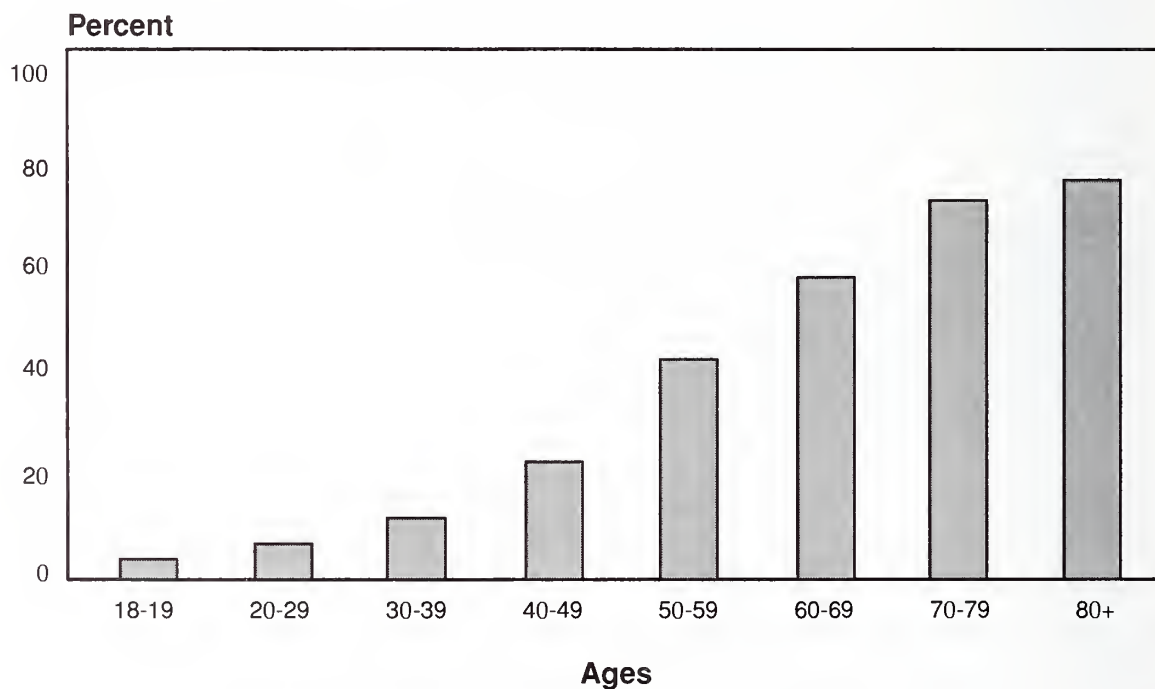
| Disease | Number |
|-------------------------------|------------|
| Total Cardiovascular Diseases | 59,700,000 |
| Hypertension* | 50,000,000 |
| Coronary Heart Disease | 12,200,000 |
| Arrhythmias | 3,900,000 |
| Congestive Heart Failure | 4,600,000 |
| Rheumatic Heart Disease | 1,800,000 |
| Cerebrovascular Diseases | 4,400,000 |
| Hardening of Arteries | 1,600,000 |
| Congenital Heart Disease | 1,000,000 |
| Asthma | 14,600,000 |
| Chronic Bronchitis | 14,200,000 |
| Emphysema | 1,800,000 |
| Anemias (all forms) | 3,500,000 |

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

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

Sources: Extrapolated to United States from National Health and Nutrition Examination Survey (NHANES), 1988-94, and National Health Interview Survey (NHIS), 1996.

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

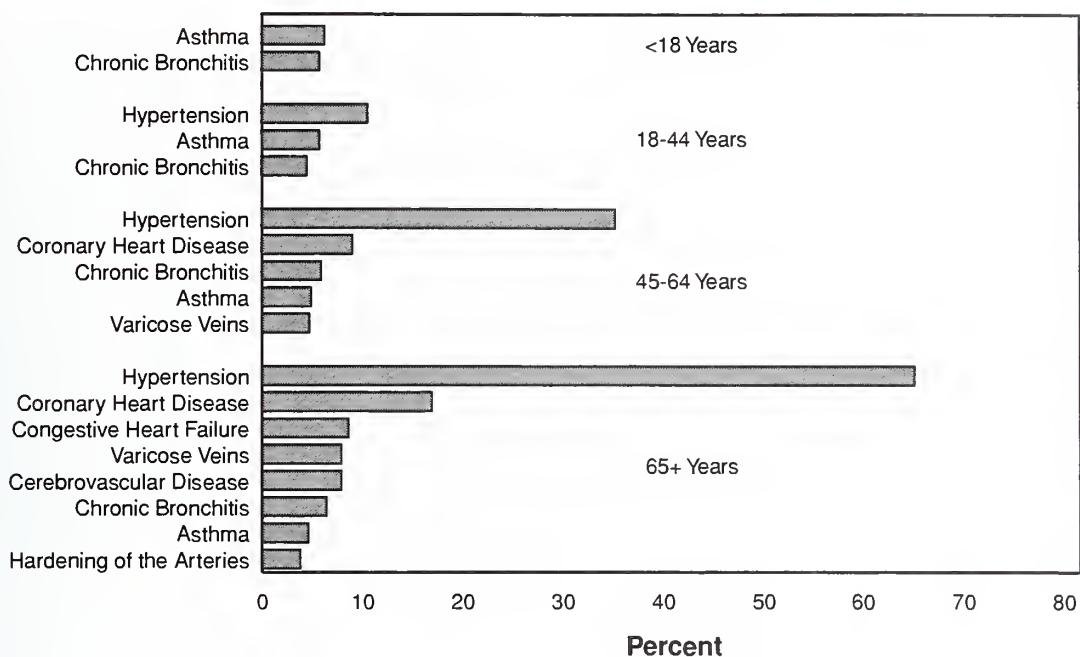


* Hypertension, coronary heart disease, cerebrovascular disease, congestive heart failure, rheumatic heart disease, or congenital cardiovascular disease.

Hypertension = 140/90+ or on medication.

Source: NHANES, 1988-94.

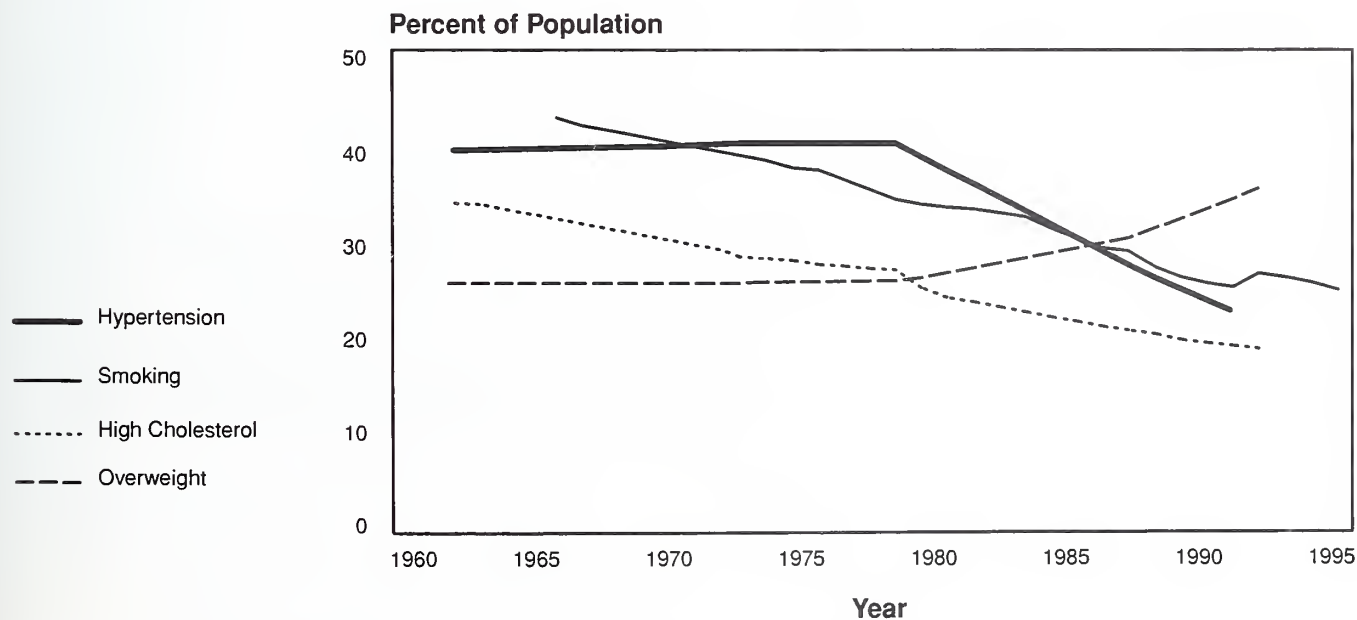
Prevalence of Common Cardiovascular and Lung Diseases by Age, U.S., 1996



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

Source: NHIS and NHANES, NCHS.

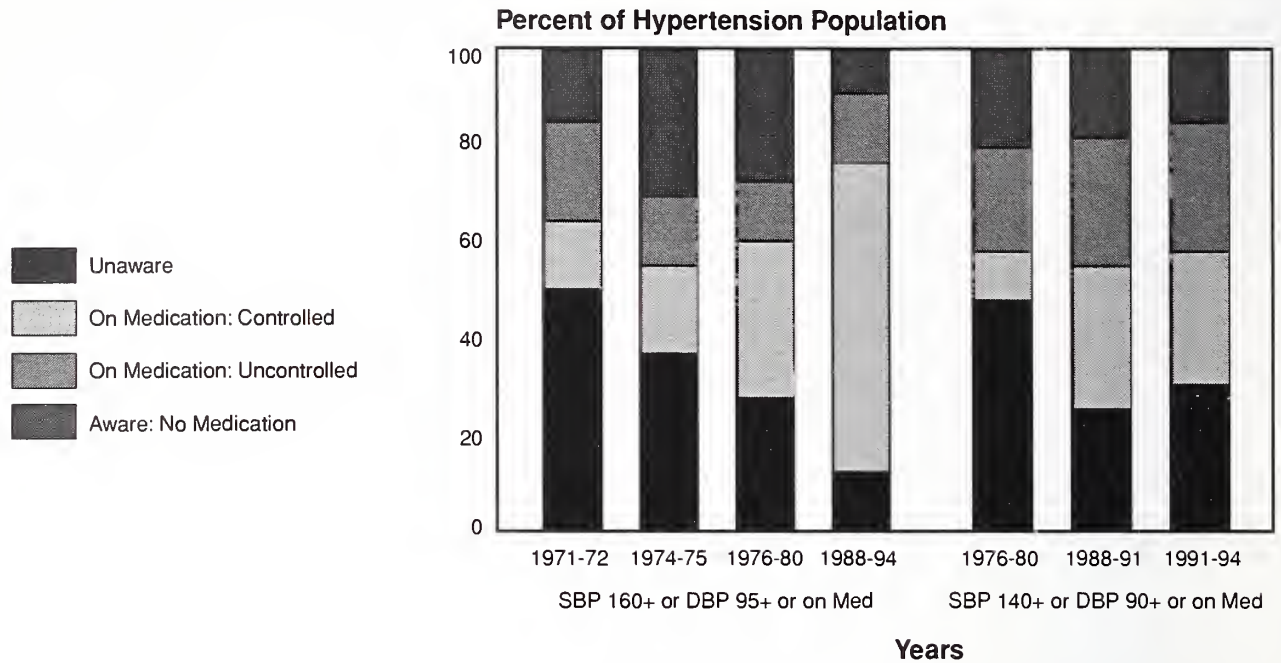
Prevalence of Cardiovascular Disease Risk Factors, U.S., 1960-95



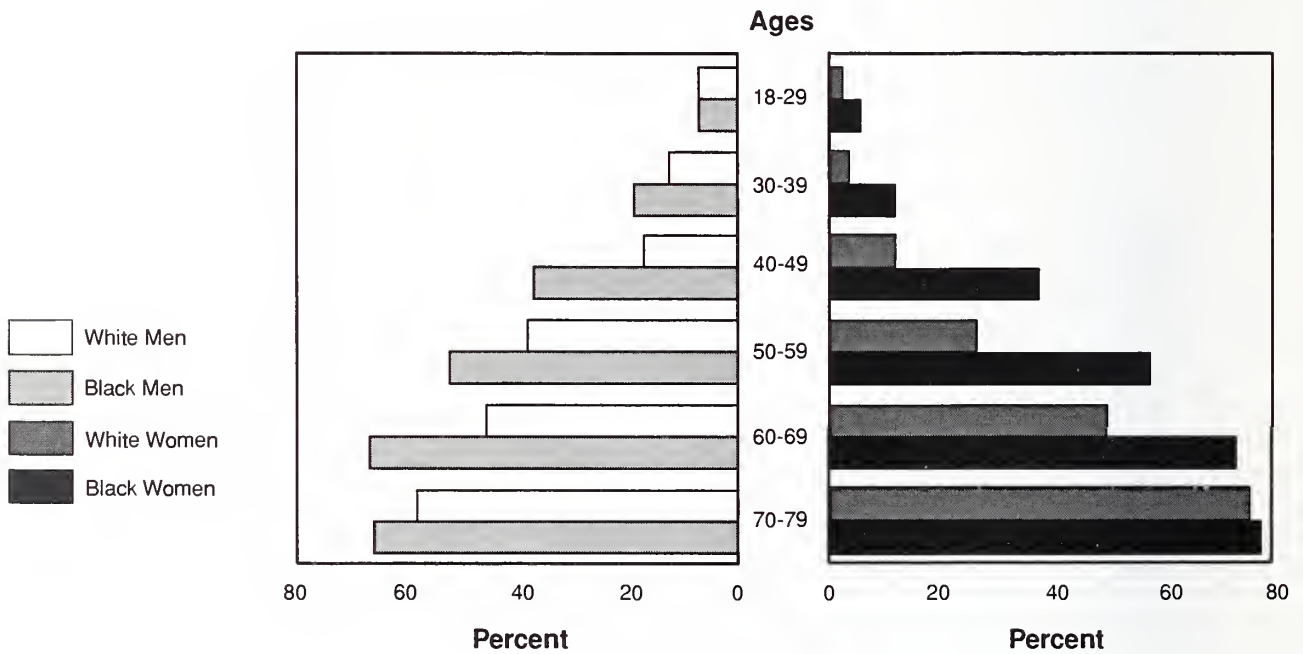
Hypertension is blood pressure 140/90+ mm Hg or on medication. Total serum cholesterol is 240+ mg/dl. Overweight is BMI 27.8+ kg/m² for men and 27.3+ for women.

Source: NHIS for smoking and NHANES for the other risk factors.

Hypertensive Population Aware, Treated, and Controlled, U.S., 1971-72 to 1988-94

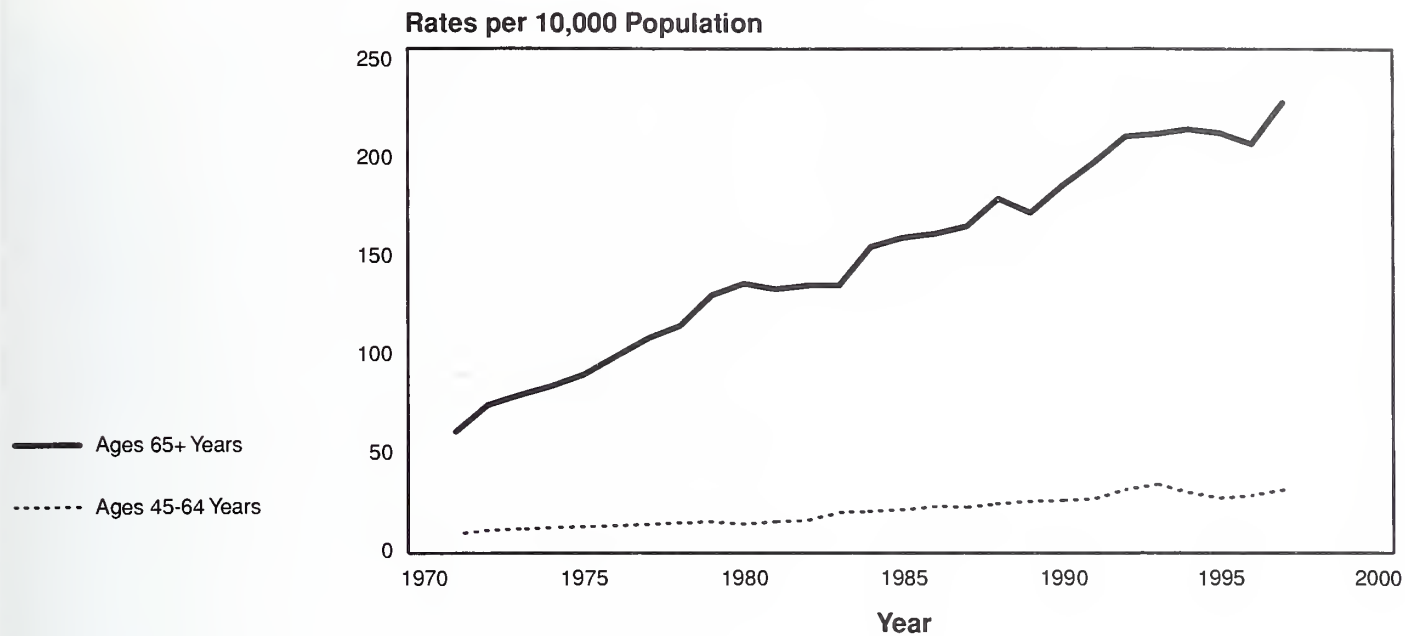


Adult Population With Hypertension* by Age, Gender, and Race, U.S., 1991-94



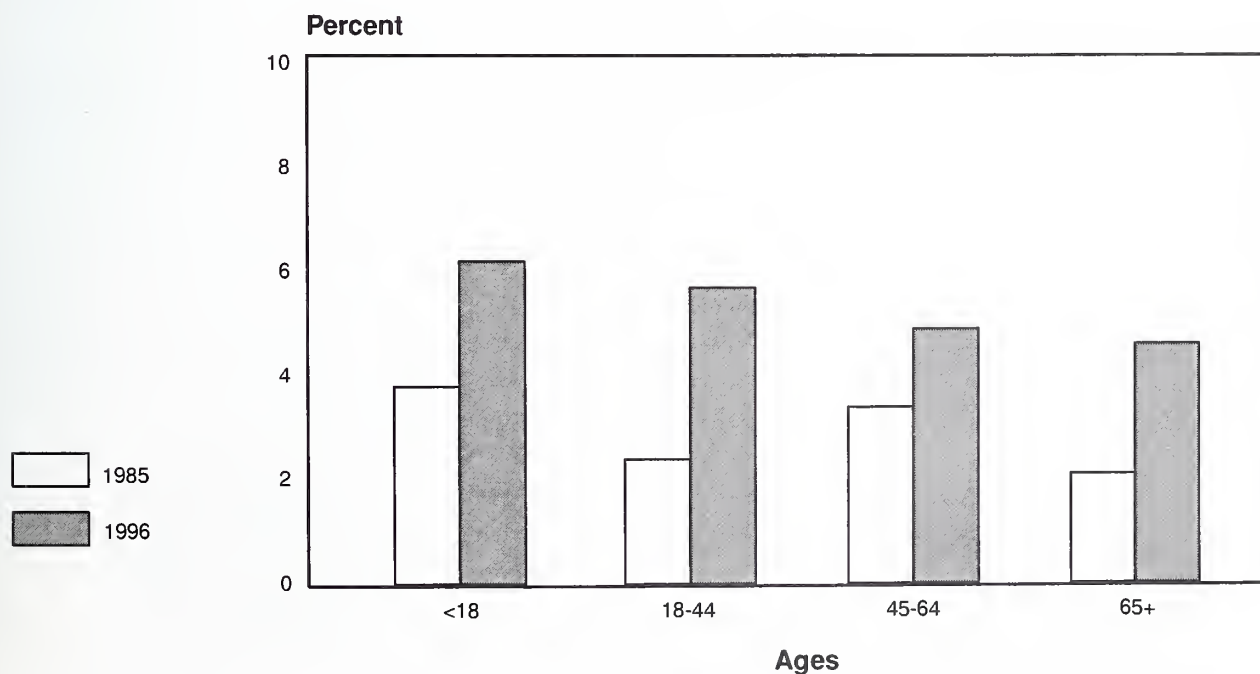
* Systolic blood pressure 140+ or diastolic blood pressure 90+ or taking antihypertensive medication.
 Source: NHANES, NCHS, personal communication.

Hospitalization Rates for Congestive Heart Failure, Ages 45-64 Years and 65+ Years, U.S., 1971-97



Source: National Hospital Discharge Survey, NCHS.

Prevalence of Asthma by Age, U.S., 1985 and 1996



Source: NHIS, NCHS.

Direct and Indirect Economic Costs of Illness by Major Diagnosis, U.S., 2000

| | Amount (Dollars in Billions) | | | | Percent Distribution | | | |
|---|------------------------------|----------------|-----------------|------------------|----------------------|----------------|---------------|---------------|
| | Direct Costs* | Indirect Costs | | | Direct Costs | Indirect Costs | | |
| | | Morbidity† | Mortality‡ | Total | | Morbidity | Mortality | Total |
| Cardiovascular Disease (Including Blood Clotting)~ | \$185.8 (43.6) | 27.6 (6.4) | 113.2 (31.5) | 326.6 (81.5) | 14.8 (3.5) | 15.8 (3.7) | 24.8 (6.9) | 17.3 (4.3) |
| Lung Diseases†† | 91.6 | 22.8 | 23.5 | 137.9 | 7.3 | 13.0 | 5.1 | 7.3 |
| Blood Diseases | 8.8 | 0.6 | 1.8 | 11.2 | 0.7 | 0.3 | 0.4 | 0.6 |
| Subtotal | 286.2 | 51.0 | 138.5 | 475.7 | 22.8 | 29.1 | 30.3 | 25.2 |
| Diseases of the Digestive System | 130.7 | 8.9 | 18.8 | 158.4 | 10.4 | 5.1 | 4.1 | 8.4 |
| Neoplasms | 60.0 | 15.0 | 105.2 | 180.2 | 4.8 | 8.6 | 23.0 | 9.6 |
| Mental Disorders | 98.3 | 23.1 | 6.4 | 127.8 | 7.8 | 13.2 | 1.4 | 6.8 |
| Diseases of the Nervous System | 68.3 | 6.8 | 7.6 | 82.7 | 5.4 | 3.9 | 1.7 | 4.4 |
| Diseases of the Musculoskeletal System | 65.7 | 17.8 | 1.7 | 85.2 | 5.2 | 10.2 | 0.4 | 4.5 |
| Diseases of the Genitourinary System | 52.2 | 4.5 | 4.5 | 61.2 | 4.2 | 2.6 | 1.0 | 3.2 |
| Endocrine, Nutritional, and Metabolic Diseases | 46.3 | 5.7 | 14.5 | 66.5 | 3.7 | 3.3 | 3.2 | 3.5 |
| Infectious and Parasitic Diseases | 33.8 | 10.7 | 47.5 | 92.0 | 2.7 | 6.1 | 10.4 | 4.9 |
| Diseases of the Skin | 51.3 | 1.4 | 0.4 | 53.1 | 4.1 | 0.8 | 0.1 | 2.8 |
| Other Respiratory Diseases | 53.4 | 7.0 | 1.8 | 62.2 | 4.2 | 4.0 | 0.4 | 3.3 |
| Other and Unallocable | 308.1 | 23.1 | 110.4 | 441.6 | 24.6 | 13.2 | 24.1 | 23.4 |
| Total | \$1,254.3 | \$175.0 | \$457.3 | \$1,886.6 | 100% | 100% | 100% | 100% |

* Direct costs of CVD are extrapolated to 2000 from costs estimated by NCHS. Direct costs are personal health care expenditures for hospital and nursing home care, drugs, home care, and physician and other professional services. Totals for these types of costs are estimated by HCFA. Allocation by diagnosis is based on statistics from the National Hospital Discharge Survey, the National Ambulatory Medical Care Survey, the National Home and Hospice Survey, and the National Nursing Home Survey of the NCHS.

† Morbidity costs were estimated for 2000 by multiplying 1999 NCHS estimates by a 4 percent inflation factor.

‡ The mortality cost for each disease group was estimated for 2000 by first multiplying the number of deaths in 1995 in each age- and sex-specific group by the 1997 present value of lifetime earnings; second, summing these estimates; and third, multiplying by a 1997-2000 inflation factor based on change in mean earnings.

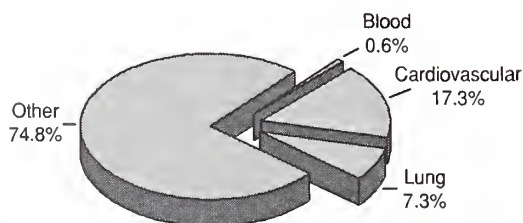
~ Based on NHLBI definition of blood-clotting diseases based primarily on proportions of morbidity and mortality statistics for acute MI, cerebrovascular diseases, and diseases of arteries.

†† Does not include lung cancer, leukemias, or pulmonary heart disease.

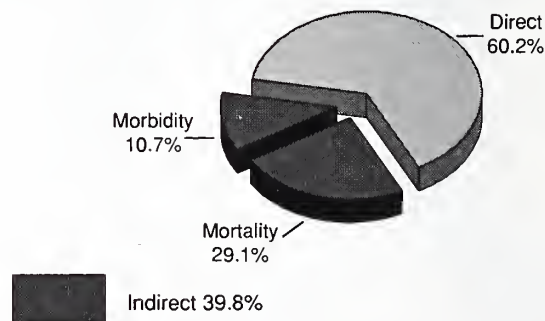
Note: Numbers may not add to totals due to rounding.

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

Total Economic Costs, U.S., 2000



Economic Costs: Cardiovascular, Lung, and Blood Diseases, U.S., 2000





5. Institute-Initiated Programs Starting in FY 1999

Approximately three-quarters of the research supported by the NHLBI is initiated by individual investigators; the remainder is initiated by the Institute. This chapter describes the rationale for Institute-initiated programs and the objectives of the Institute-initiated programs that began in FY 1999.

It is incumbent upon the Institute to respond appropriately to evolving national needs, Congressional mandates, and advances in scientific knowledge. Each NHLBI initiative represents the outcome of numerous and extensive discussions and thorough reviews by representatives of the scientific community and by Institute advisory committees and special emphasis panels. The advisory committees and special emphasis panels, together with professional societies and NHLBI staff, continually review the progress of research within the NHLBI program areas, assess newly acquired knowledge, and identify research topics that offer the best opportunities or 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 evolve as Requests for Applications (RFAs) for grants or for cooperative agreements, or Requests for Proposals (RFPs) for contracts. A smaller number of initiatives take the form of Program Announcements (PAs). Applications and proposals submitted in response to RFAs and RFPs compete among themselves for specific "set-aside" funds. Applications submitted in response to PAs compete with other investigator-initiated applications for funding.

RFA, RFP, and PA concepts prepared by the Institute are presented to the National Heart, Lung, and Blood Advisory Council (NHLBAC) for review, comments, 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 workloads, and the

proposed mechanism. These considerations guide the Director's subsequent decision to approve an initiative for release. Released initiatives 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 (formerly, the NIH Division of Research Grants).

Descriptions of Institute-initiated programs that began in FY 1999 are presented below according to NHLBI scientific program. Trans-NIH initiatives that include NHLBI participation are also included.

HEART AND VASCULAR DISEASES PROGRAM

Initiatives Being Renewed

Cardiovascular Health Study (CHS): Morbidity and Mortality Follow-up

The purpose of this RFP is to provide follow-up to a longitudinal study of risk factors for development and progression of clinical CVD in adults older than 65 years of age. Particular emphasis is on measures of subclinical disease—disease detected noninvasively before signs and symptoms appear—as predictors of subsequent overt events. Morbidity and mortality will be tracked through 2005.

Coronary Artery Risk Development in Young Adults (CARDIA) Study Extension

The purpose of this RFP is to extend an ongoing 10-year NHLBI epidemiologic study of the evolution of cardiovascular risk factors before middle age in a biracial cohort recruited at ages 18 to 30 years. The study is designed to investigate contributors to change in CVD risk factors during the critical years of transition from adolescence through young adulthood to middle age. Detection and quantification of calcium in

coronary arteries via electron-beam computed tomography will be added to the Year 14 measure of subclinical coronary atherosclerosis.

Specialized Centers of Research (SCOR) in Pediatric Cardiovascular Disease

The objective of this SCOR is to foster interdisciplinary studies of the etiology, pathophysiology, and diagnosis of congenital and acquired CVD in children so that more effective methods of treatment and prevention can be developed.

New Initiatives

Abdominal Aortic Aneurysms: Pathogenesis

The objective of this RFA is to determine the etiology, pathophysiology, and clinical progression (or stabilization and/or regression) of abdominal aortic aneurysm. Research will focus on disease initiation and progression and on rupture that leads to thromboembolic events and sudden death.

Cardiovascular Complications From Cocaine Abuse in HIV Infection

The purpose of this RFA is to investigate the pathology and pathophysiology of cardiovascular complications associated with cocaine abuse in HIV patients. Research findings will enable scientists to establish a rational basis for developing prevention, diagnosis, and treatment strategies.

Cellular and Genetic Interrelationships of Atherosclerosis of Hypertension

The goal of this RFA is to develop new animal and cellular models of the interrelationship of atherosclerosis and hypertension. Scientists will focus on cellular and molecular mechanisms leading to concurrent development of high blood pressure and atherosclerosis and identify pathways by which either one of these conditions may influence the severity of the other.

Decreasing Weight Gain in African American Preadolescent Girls

The purpose of this RFA is to develop and test interventions that involve decreasing excessive weight gain during the high-risk transitional period from prepuberty to puberty to prevent obesity in African American girls. Phase I studies include development of new interventions and a 12-week pilot test to determine their feasibility, acceptability, and potential impact. During Phase 2, a 2-year controlled trial will be conducted to evaluate the efficacy of the interventions.

Early Access to Defibrillation as Treatment for Out-of-Hospital Cardiac Arrest

The purpose of this RFP is to evaluate whether survival of persons with out-of-hospital cardiac arrest can be significantly improved in a community by making automated external defibrillators (devices capable of automatically detecting and treating ventricular fibrillation) available to individuals (foremen, guards, police, and airline stewards) who are likely to react to a medical emergency.

Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness (ESCAPE)

The purpose of this RFP is to determine whether a pulmonary artery catheterization (PAC)-directed treatment strategy is more effective than a non-PAC treatment strategy in reducing morbidity and mortality in patients with advanced CHF.

The study is designed to determine whether therapy specifically tailored to the individual, using hemodynamic monitoring, results in a better clinical outcome than current standard therapy without invasive monitoring.

Genesis of Cardiomyopathy With HIV Infection and Alcohol Abuse

The objective of this RFP is to elucidate the mechanisms responsible for additive or synergistic effects of alcohol abuse and HIV infection in the development of cardiomyopathy. The ultimate goal is to provide a rational basis for prevention, optimal diagnosis, and treatment of cardiovascular complications in patients with HIV infection and alcohol abuse.

Hemochromatosis: Genetic Prevalence and Penetrance

The purpose of this RFP is to initiate an epidemiologic study of the prevalence and genetic determinants of hereditary hemochromatosis (chronic iron overload toxicity) in a multiethnic population. Results will be used to determine the feasibility and public health benefits of presymptomatic screening and intervention for this condition.

Multi-Ethnic Study of Atherosclerosis (MESA)

The purpose of this RFP is to conduct a 10-year observational study of subclinical CVD in a diverse population. Investigators will determine the characteristic associated with progression of

subclinical to clinical CVD, identify factors related to newer measures of subclinical disease, examine relationships between new and established measures, and develop population-based methods suitable for application in future screening and intervention studies to identify asymptomatic persons at highest risk of clinical events.

Prevention of Cardiovascular Disease in Diabetes Mellitus

The purpose of this RFP is to prevent major cardiovascular events in diabetic patients. The study will examine the relative effectiveness of three diabetic treatment strategies. In addition, it will compare the current recommended treatment for blood pressure and lipids control with a more aggressive approach to treating these risk factors in non-diabetic patients.

Study of Coronary Revascularization and Therapeutics Evaluations (SOCRATES)

The objective of this RFP is to assess benefits and risks associated with early revascularization compared with medical anti-ischemic strategies in patients with stable CHD and ischemia who are receiving intensive drug and lifestyle risk factor modifications according to current guidelines. Information obtained from the study will provide a rational basis for safe and effective therapy for patients with stable CHD and will provide insights into the role of ischemia in the long-term clinical outcome of CHD patients.

LUNG DISEASES PROGRAM

Initiatives Being Renewed

SCOR in Acute Lung Injury

The purpose of this RFA is to foster multidisciplinary basic and clinical research to enable basic science findings to be rapidly applied to clinical problems associated with acute lung injury (ALI) and acute respiratory distress syndrome (ARDS). The ultimate goal is to provide a rational basis for prevention, optimal diagnosis, and treatment of ALI and ARDS.

Sleep Heart Health Study: Data Coordinating Center

The purpose of this RFA is to establish a Data Coordinating Center for the Sleep Heart Health Study, a multicenter, epidemiologic investigation

to assess sleep apnea as an independent or contributing risk factor for development of cardiovascular and cerebrovascular disease. The data center will support protocol development, sample size calculations, common questionnaires, complete data analysis, data management, standardization of procedures, quality control, development of analytical models, and overall study coordination.

New Initiatives

Airway Remodeling and Repair in Asthma

The purpose of this RFA is to understand at the cellular, subcellular, and molecular levels, the role airway injury and its abnormal repair have in airway remodeling and its consequences in the pathogenesis of asthma.

Development of Animal Models of HIV-Related Lung Disease

The goal of this RFA is to develop animal models of HIV-related lung disease that will enable scientists to study basic pathogenetic mechanisms involved in lung disorders and will ultimately be useful in evaluation of new treatment strategies.

Obstructive Sleep Apnea in Children

The objectives of this RFA are to define abnormalities in airway structure and function responsible for obstructive sleep apnea (OSA) in children 3 to 12 years of age and to identify physiologic and clinical measures associated with increased morbidity. Research findings will provide new strategies for diagnosis and treatment of OSA in children.

Pediatric Asthma Clinical Research Network

The purpose of this RFA is to establish a network of interactive pediatric asthma clinical research groups to evaluate new and existing therapeutic approaches for children with asthma and to disseminate scientific findings to health care professionals, patients, and the public.

Phenotypic Characterization of Sleep in Mice

The goal of this RFA is to develop molecular, cellular, and systems approaches to investigate sleep phenotypes in mice. Well-characterized mice models are needed to elucidate the molecular underpinnings of sleep and circadian rhythms, the physiologic role of sleep, and potential treatment strategies for sleep disorders.

Retinoic Acid Treatment in Emphysema

The purpose of this RFP is to determine the feasibility of conducting a clinical trial on the efficacy of retinoic acid, a derivative of vitamin A, in the treatment of emphysema. Secondary objectives are to identify optimal patient populations, drugs, dosing schedules, and outcome measures.

Strategies to Augment Alveolization

The objectives of this RFA are to elucidate molecular and cellular processes that are involved in the formation and functional differentiation of lung alveoli and to determine whether similar principles apply to induction of alveolar regeneration. Research findings should lead to new strategies for interventions in aberrant development of lungs, lung injury, and diseases such as emphysema, diffused interstitial fibrosis, and bronchopulmonary dysplasia.

BLOOD DISEASES AND RESOURCES PROGRAM

New Initiatives

Creutzfeldt-Jakob Disease (CJD) Assay Methods Development

The goal of this RFA is to develop assay methods for detecting CJD and other transmissible spongiform encephalopathies that can be used to screen donated blood and organs or tissues.

Developmental Processes in Differential Expression of Globin Genes

The purpose of this PA is to investigate developmental processes involved in differential expression of globin genes. Mutations in this gene cluster lead to common inherited diseases such as sickle cell anemia and thalassemia. Elucidation of molecular mechanisms responsible for developmental and tissue-specific control of the globin gene cluster could lead to new therapeutic approaches to treat hemoglobinopathies.

Stem Cell Transplantation to Establish Allochimerism

The objective of this RFA is to develop improved and novel preparative regimens that will enable successful incompatible hematopoietic stem cell transplantation in immunized patients with hemoglobinopathies such as SCD and Cooley's anemia.

TRANS-NHLBI

Initiatives Being Renewed

Mammalian Genotyping Service

This service will provide genotyping support service to studies that are concerned with identifying genetic determinants responsible for CVD.

Mentored Research Scientist Development Award for Minority Faculty (K01)

The purpose of this RFA is to encourage the enhancement of research skills in cardiovascular, pulmonary, and hematologic diseases; sleep disorders; and transfusion medicine by minority faculty members and to increase the number of minority individuals involved in research.

Minority Institution Faculty Mentored Research Scientist Development Award (K01)

The purpose of this RFA is to enhance the research skills of faculty members with doctoral degrees in biomedical or behavioral science at minority institutions in areas relevant to the NHLBI. Ultimately, the goal is to develop highly trained minority scientists who will pursue research careers as independent investigators

Minority Institutional Research Training Program (T32M)

The purpose of this RFA is to provide full-time research training for investigative careers at minority schools in areas of cardiovascular, pulmonary, and hematologic diseases and sleep disorders. The minority institution must identify and collaborate with a research center (medical school or comparable institution) that has strong, well-established, and relevant research and research training programs. A mentor from the research center will assist the advisor at the minority institution in the trainee's development and research plan.

Short-Term Training for Minority Students (T35)

The purpose of this RFA is to encourage institutions to provide opportunities for minority undergraduate and graduate students to become exposed to biomedical research in areas relevant to cardiovascular, pulmonary, and hematologic diseases, and sleep disorders through a short-term research experience of 2 to 3 consecutive months.

New Initiatives

HIV in the Lungs, Heart, and Blood: Role of Chemokines and Their Receptors

The objective of this RFA is to investigate the role of chemokines (chemicals that stimulate cells) and chemokine receptors in the pathogenesis of HIV in the lungs and in the cardiovascular and hematopoietic systems. Ultimately, the goal is to determine whether chemokines or their derivatives can effectively block infection of tissue cells and transfer of virus and whether new antiviral agents based on these molecular interactions block cell infection.

Vascular and Hematopoietic Development and Disease

The goal of this PA is to elucidate the origins of blood and vessel formation and the fundamental processes of commitment and diversification during development. Investigators will apply innovative approaches to identify and characterize precursor cells, define regulatory mechanisms that determine and maintain diverse phenotypes, and explain how these developmental mechanisms might be involved in pathologic conditions of the mature animal. The ultimate goal is to provide the foundation for new therapies to treat cardiovascular, lung, and blood diseases based on morphogenetic principles.

TRANS-NIH

Initiative Being Renewed

Research on the Hematologic Abnormalities in AIDS

The purpose of this PA is to stimulate research on the cellular basis of hematologic abnormalities that are common in AIDS patients and have a significant impact on their course of treatment. Emphasis is on understanding the mechanism that may be involved in HIV-induced hematopoietic suppression.

New Initiatives

Bioengineering Research Grants and Partnerships

The purpose of this PA is to foster bioengineering studies among interdisciplinary groups (bioengineers, scientists, and clinicians) to advance health or health-related research within the mission of the NIH. Bioengineering integrates physical, chemical, mathematical, and engineering principles to develop innovative biologics, materials, processes, implants, devices, and informatics for prevention, diagnosis, and treatment of disease, for patient rehabilitation, and for improving health.

Centers for Mind/Body Interactions and Health

The purpose of this RFA is to encourage behavioral, psychological, social, and biomedical research on the interrelationships among cognition, emotion, biological processes, and physical health. The NHLBI is interested in research on the role of stress in coronary heart disease and hypertension, the experience of pain due to a disease or condition, causes or precipitants of asthma, and sleep disorders.

Novel Approaches to Enhance Stem Cell Research

The purpose of this PA is to encourage research that enhances the use of stem cells as a model biological system. Studies of interest include isolating, characterizing, and identifying totipotent and multipotent stem cells from animal models, as well as generating reagents and techniques to characterize and separate stem cells from other cell types.

Zebrafish as an Animal Model for Development and Disease Research

The purpose of this PA is to stimulate research on the zebrafish as an animal model for the study of development and disease. Focus is directed to the use of the zebrafish to identify genes, and elucidate molecular and genetic mechanisms, responsible for normal and defective development and for disease in humans.





6. Institute Public Advisory Committees

National Heart, Lung, and Blood Advisory Council

Structure

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

Executive Secretary: Robert R. Carlsen, Director, Division of Extramural Affairs, National Heart, Lung, and Blood Institute

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 National Heart, Lung, and Blood Advisory Council reviews applications for research grants, cooperative agreements, and training grants in heart, blood vessel, lung, and blood diseases, and in blood resources, and recommends to the Director, NIH, scientific projects that merit support.

In its advisory role, the Council advises the Secretary, HHS, the Assistant Secretary for Health, HHS, and the Directors, NIH and NHLBI, on matters relating to the 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*

Claude Lenfant, M.D.
(Chair)

National Heart, Lung, and Blood Institute

Francois M. Abboud, M.D. (1999)
University of Iowa Hospital and Clinics

Donald Bartlett, Jr., M.D. (1999)
Dartmouth Medical School

William W. Busse, M.D. (2000)
University of Wisconsin Medical School

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

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

Valentin Fuster, M.D., Ph.D. (2000)
Mount Sinai Medical Center

Cage S. Johnson, M.D. (2001)
University of Southern California

Shiriki K. Kumanyika, Ph.D., M.P.H. (2000)
University of Pennsylvania School of Medicine

Carolyn C. Lopez, M.D. (2001)
Cook County Hospital

William J. Martin II, M.D. (2001)
Indiana University Medical Center

Alan Meisel, LL.B. (1999)
University of Pittsburgh School of Law

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

Carmen Ramos-Bonoan, M.D. (1999)
New York City Department of Health

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

Judith A. Simpson (2000)
United Patients Association of Pulmonary
Hypertension

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

Paul K. Whelton, M.D. (2001)
Tulane University School of Public Health and
Tropical Medicine

Carolyn F. Whitsett, M.D. (2000)
Crawford Long Hospital of Emory University

Ex Officio Members

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

Donna Shalala, Ph.D.
Department of Health and Human Services

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

Harold Varmus, M.D.
National Institutes of Health

* Current as of October 1999. The current roster, containing full addresses for the NHLBI Advisory Council and Committees, can be obtained from the NHLBI's home page on the World Wide Web at <http://www.nhlbi.nih.gov/nhlbi/meetings/index.htm>.

Program Advisory and Review Committees

Sickle Cell Disease Advisory Committee

Chair: Kenneth R. Bridges, M.D.
Harvard Medical School

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

The Sickle Cell Disease Advisory Committee advises the Secretary, HHS; the Assistant Secretary for Health, HHS; and the Directors of the NIH, NHLBI, and Division of Blood Diseases and Resources, NHLBI, on the Sickle Cell Disease Program and on suggested priorities within that program. The Committee also makes recommendations concerning planning, execution, and evaluation of all aspects of the program.

Membership*

Joseph DeSimone, Ph.D. (2000)
Veterans Administration West Side Medical Center

Peter Lane, M.D. (2003)
University of Colorado Health Sciences Center

Vipul Mankad, M.D. (2000)
University of Kentucky

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

Sonya I. Ross (2001)
Maryland Department of Health and Mental Hygiene

Jeanne A. Smith, M.D., M.P.H. (2002)
Columbia University-Harlem Hospital

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

Paul S. Swerdlow, M.D. (2002)
Wayne State University

Tim M. Townes, Ph.D. (2002)
University of Alabama at Birmingham

Ex Officio Members

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

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

Martin Steinberg, M.D.
Jackson Veterans Administration Medical Center

Harold E. Varmus, M.D.
National Institutes of Health

Major Scott A. Wegner
Walter Reed Army Institute of Research

Sleep Disorders Research Advisory Board

Chair: David P. White, M.D.
Brigham and Women's Hospital

Executive Secretary: James P. Kiley, Ph.D., Director, National Center on Sleep Disorders Research, NHLBI, National Institutes of Health, Bethesda, Maryland 20892, (301) 435-0199

The Sleep Disorders Research Advisory Board advises the Directors of the NIH, NHLBI, and National Center on Sleep Disorders Research on matters related to scientific activities carried out by and through the Center and policies respecting such activities, including identification of research priorities for coordination of sleep and sleep disorders research by the NIH and other Federal, professional, and voluntary organizations. The Board advises the Director of the Center on areas and approaches that should be addressed by the Center's targeted programs, including identification of basic, clinical, and health education topics of importance to national health fields.

Membership*

Carol Bell-Anderson (2002)
Patient Advocate—Narcolepsy
Edina, Minnesota

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

James Everett, M.D. (2002)
Morehouse School of Medicine

Carol A. Landis, D.N.Sc., R.N. (2002)
University of Washington

Morris L. Lyons (2000)
Consultant
West Lafayette, Indiana

* Current as of October 1999.

Sandra B. McGinnis (2003)
Patient Advocate—Sleep
Ponte Vedra Beach, Florida

Emmanuel Mignot, M.D., Ph.D. (2002)
Stanford University School of Medicine

Richard P. Millman, M.D. (2001)
Rhode Island Hospital

Michael M. Rosbash, Ph.D. (2001)
Brandeis University

Fred W. Turek, Ph.D. (2000)
Northwestern University

Carol U. Walker (2000)
Restless Legs Syndrome Foundation

Ex Officio Members

Colonel Gregory Belenky
Walter Reed Army Institute of Research

F. J. Brinley Jr., Ph.D., M.D.
NINDS, National Institutes of Health

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

James P. Kiley, Ph.D.
NHLBI, National Institutes of Health

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

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

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

David Satcher, M.D., Ph.D.
Department of Health and Human Services

Harold E. Varmus, M.D.
National Institutes of Health

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

Clinical Trials Review Committee

Chair: Alan D. Guerci, M.D.
St. Francis Hospital

Scientific Review Administrator: Joyce A.
Hunter, Ph.D., Health Science Administrator,
Division of Extramural Affairs, NHLBI, National
Institutes of Health, Bethesda, Maryland 20892,
(301) 435-0287

The Clinical Trials Review Committee provides initial technical merit review for the 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*

Lennette J. Benjamin, M.D. (2002)
Montefiore Medical Center

Bernard R. Chaitman, M.D. (2002)
St. Louis University Health Sciences Center

Vernon M. Chinchilli, Ph.D. (2003)
Pennsylvania State University

Moses S.S. Chow, Pharm.D. (2000)
Hartford Hospital

Patricia J. Elmer, Ph.D. (2000)
Kaiser Permanente

Stephanie J. Green, Ph.D. (2002)
University of Washington

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

Kenneth A. Jamerson, M.D. (2000)
University of Michigan Medical Center

Naomi L. Luban, M.D. (2001)
Children's National Medical Center

Polly E. Parsons, M.D. (2000)
University of Colorado Health Sciences Center

Carl J. Pepine, M.D. (2003)
University of Florida

Edward L. Peterson, Ph.D. (2002)
Henry Ford Hospital

Cynthia S. Rand, Ph.D. (2003)
Johns Hopkins Asthma and Allergy Center

Susan Redline, M.D., M.P.H. (2001)
Rainbow Babies and Children's Hospital

Heart, Lung, and Blood Program Project Review Committee

Chair: Vernon S. Bishop, M.D.
University of Texas Health Sciences Center

* Current as of October 1999.

Scientific Review Administrator: Jeffery H. Hurst, Ph.D., Health Scientist Administrator, Division of Extramural Affairs, NHLBI, National Institutes of Health, Bethesda, Maryland 20892, (301) 435-0303

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

Membership*

Jerome A. Dempsey, Ph.D. (2001)
University of Wisconsin-Madison

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

Claire M. Doerschuk, M.D. (2002)
Harvard University

David P. Hajjar, Ph.D. (2002)
Cornell University Medical College

Judith S. Hochman, M.D. (2000)
Columbia University

Maureane R. Hoffman, M.D., Ph.D. (2001)
Duke University Medical Center

Gary L. Larsen, M.D. (2001)
National Jewish Center for Immunology
and Respiratory Medicine

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

Eduardo Marban, M.D., Ph.D. (2000)
Johns Hopkins University School of Medicine

Thomas R. Martin, M.D. (2003)
University of Washington

Russell M. Medford, M.D., Ph.D. (2001)
Emory University School of Medicine

Gary K. Owens, Ph.D. (2003)
University of Virginia School of Medicine

Dean Sheppard, M.D. (2002)
University of California, San Francisco

Leslie E. Silberstein, M.D. (2001)
University of Pennsylvania

Mary Sorci-Thomas, Ph.D. (2000)
Wake Forest University

Pearl T.C.Y. Toy, M.D. (2002)
University of California, San Francisco

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

National Heart, Lung, and Blood Institute Special Emphasis Panel

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

Board of Scientific Counselors

Chair: Lorraine J. Gudas, Ph.D.
Cornell University Medical College

Executive Secretary: Edward D. Korn, Ph.D.,
Director, Division of Intramural Research,
NHLBI, National Institutes of Health, Bethesda,
Maryland 20892, (301) 496-2116

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

Membership*

John A. Glomset, M.D. (2000)
University of Washington

Heidi E. Hamm, Ph.D. (2002)
Northwestern University School of Medicine

Christina C. Leslie, Ph.D. (2002)
National Jewish Medical and Research Center

Peter Libby, M.D. (2001)
Harvard Medical School

Florante A. Quiocho, Ph.D. (2002)
Baylor College of Medicine

Alan R. Tall, M.D. (2000)
Columbia University

* Current as of October 1999.





7. Fiscal Year 1999 Budget Overview

NHLBI Obligations by Budget Mechanism: Fiscal Year 1999

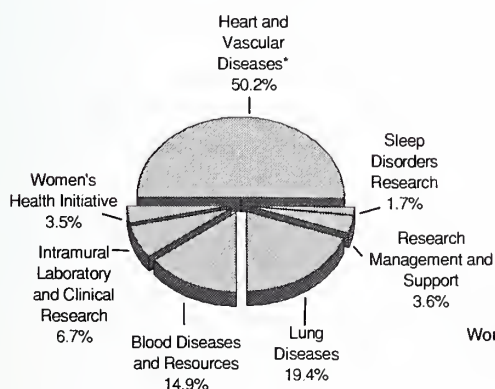
| Budget Mechanism | Obligated Dollars FY 1999* (Dollars in Thousands) | Percent of Total NHLBI FY 1999 Budget |
|---|---|--|
| Research Project Grants† | \$1,142,473 | 63.9% |
| Specialized Centers of Research (SCORs) | 100,994 | 5.6 |
| Sickle Cell Centers | 17,350 | 1.0 |
| Center for AIDS Research | 1,545 | 0.1 |
| Other Research Grants | 84,219 | 4.7 |
| Research Careers Programs | (47,670) | (2.6) |
| Training Programs | 60,794 | 3.4 |
| Research and Development Contracts | 197,238 | 11.0 |
| Intramural Laboratory and Clinical Research | 119,492 | 6.7 |
| Research Management and Support‡ | 63,903 | 3.6 |
| Research Facilities Construction Grants | 0 | 0.0 |
| Total, NHLBI | \$1,788,008 | 100.0% |

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

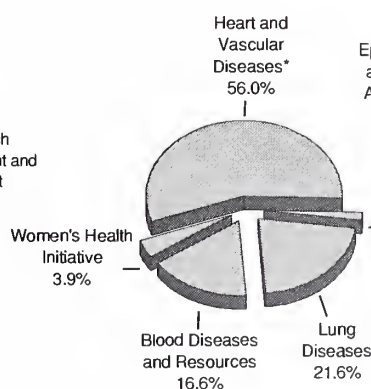
† Includes \$41,519 for Small Business Innovation Research (SBIR) Grants.

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

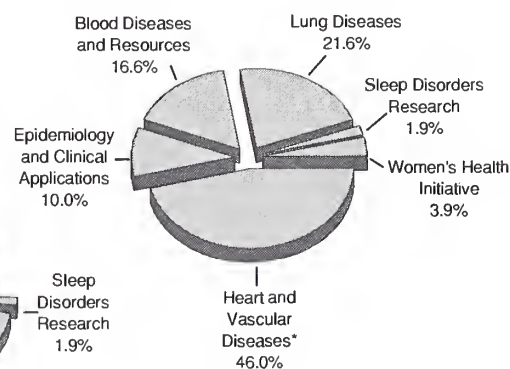
**NHLBI Total Obligations
by Budget Category**



**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 1999

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

NHLBI Obligations by Program: Fiscal Year 1999

| Program | Obligated Dollars FY 1999 (Dollars in Thousands) | Percent of NHLBI Extramural FY 1999 Budget |
|--------------------------------------|--|--|
| Heart and Vascular Diseases* | \$898,031 | 56.0% |
| Lung Diseases | 346,244 | 21.6 |
| Blood Diseases and Resources | 266,088 | 16.6 |
| Sleep Disorders Research | 31,150 | 1.9 |
| Women's Health Initiative | 63,100 | 3.9 |
| Total, Extramural Obligations | \$1,604,613 | 100.0% |

* Includes Heart and Vascular Diseases, as well as Epidemiology and Clinical Applications.

NHLBI Heart and Vascular Diseases Program* Obligations by Budget Mechanism: Fiscal Year 1999

| Budget Mechanism | Obligated Dollars (Dollars in Thousands) | Percent of Program Budget |
|---|---|------------------------------|
| Research Project Grants | \$578,225 | 78.3% |
| Specialized Centers of Research (SCORs) | 46,328 | 6.3 |
| Other Research Grants | 31,733 | 4.3 |
| Research Career Programs | (18,359) | (2.5) |
| Training Programs | 33,059 | 4.5 |
| Research and Development Contracts | 48,958 | 6.6 |
| Total, Heart and Vascular Diseases | \$738,303 | 100.0% |

* Includes Heart and Vascular Diseases only.

NHLBI Epidemiology and Clinical Applications Obligations by Budget Mechanism: Fiscal Year 1999

| Budget Mechanism | Obligated Dollars (Dollars in Thousands) | Percent of Epidemiology and Clinical Applications Budget |
|--|---|---|
| Research Project Grants | \$101,788 | 63.7% |
| Specialized Centers of Research (SCORs) | 0 | 0.0 |
| Other Research Grants | 10,580 | 6.6 |
| Research Career Programs | (4,491) | (2.8) |
| Training Programs | 3,047 | 1.9 |
| Research and Development Contracts | 44,311 | 27.7 |
| Total, Epidemiology and Clinical Applications | \$159,726 | 100.0% |

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

NHLBI Lung Diseases Program Obligations by Budget Mechanism: Fiscal Year 1999

| Budget Mechanism | Obligated Dollars (Dollars in Thousands) | Percent of Program Budget |
|---|---|------------------------------|
| Research Project Grants | \$239,801 | 69.3% |
| Specialized Centers of Research (SCORs) | 37,487 | 10.8 |
| Other Research Grants | 28,937 | 8.4 |
| Research Career Programs | (15,124) | (4.4) |
| Training Programs | 14,587 | 4.2 |
| Research and Development Contracts | 25,432 | 7.3 |
| Total, Lung Diseases | \$346,244 | 100.0% |

NHLBI Blood Diseases and Resources Program Obligations by Budget Mechanism: Fiscal Year 1999

| Budget Mechanism | Obligated Dollars (Dollars in Thousands) | Percent of Program Budget |
|--|---|------------------------------|
| Research Project Grants | \$199,282 | 74.9% |
| Specialized Centers of Research (SCORs) | 12,900 | 4.8 |
| Sickle Cell Centers | 17,350 | 6.5 |
| Center for AIDS Research | 1,545 | 0.6 |
| Other Research Grants | 10,754 | 4.0 |
| Research Career Programs | (7,497) | (2.6) |
| Training Programs | 8,822 | 3.3 |
| Research and Development Contracts | 15,436 | 5.8 |
| Total, Blood Diseases and Resources | \$266,089 | 100.0% |

NHLBI National Center on Sleep Disorders Research Obligations by Budget Mechanism: Fiscal Year 1999

| Budget Mechanism | Obligated Dollars (Dollars in Thousands) | Percent of Program Budget |
|---|---|------------------------------|
| Research Project Grants | \$23,377 | 75.0% |
| Specialized Centers of Research (SCORs) | 4,279 | 13.7 |
| Other Research Grants | 2,215 | 7.1 |
| Research Career Programs | (2,201) | (7.1) |
| Training Programs | 1,279 | 4.1 |
| Research and Development Contracts | 0 | 0.0 |
| Total, National Center on Sleep Disorders Research | \$31,150 | 100.0% |

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

NHLBI Women's Health Initiative Obligations by Budget Mechanism: Fiscal Year 1999

| Budget Mechanism | Obligated Dollars (Dollars in Thousands) | Percent of Program Budget |
|---|---|------------------------------|
| Research Project Grants | \$0 | 0.0% |
| Specialized Centers of Research (SCORs) | 0 | 0.0 |
| Other Research Grants | 0 | 0.0 |
| Research Career Programs | (0) | (0.0) |
| Training Programs | 0 | 0.0 |
| Research and Development Contracts | 63,100 | 100.0 |
| Total, Women's Health Initiative | \$63,100 | 100.0% |

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



8. Long-Term Trends

Budget History of the NHLBI: Fiscal Years 1950-99

(Dollars in Thousands)

| Fiscal Year | Budget Estimate to Congress | House Allowance | Senate Allowance | Appropriation | Obligations | Cumulative Fiscal Year Obligations |
|-----------------|-----------------------------|-----------------|------------------------|------------------------|------------------------|------------------------------------|
| 1950 | \$ 34,630 | \$ 11,575 | \$ 29,117 | \$ 16,075 | \$ 15,768 | \$ 15,768 |
| 1951 | 8,800 | 8,800 | 9,400 | 9,400 | 8,497 | 24,265 |
| 1952 | 10,237 | 10,074 | 10,156 | 10,083 | 9,850 | 34,115 |
| 1953 | 9,779 | 9,623 | 12,000 | 12,000 | 11,398 | 45,513 |
| 1954 | 11,040 | 12,000 | 15,418 | 15,168 | 14,952 | 60,465 |
| 1955 | 14,570 | 16,168 | 17,168 | 16,668 | 16,595 | 77,060 |
| 1956 | 17,454 | 17,398 | 23,976 | 18,808 | 18,838 | 95,898 |
| 1957 | 22,106 | 25,106 | 33,396 | 33,396 | 32,392 | 128,290 |
| 1958 | 33,436 | 33,436 | 38,784 | 35,936 | 35,973 | 164,263 |
| 1959 | 34,820 | 36,212 | 49,529 | 45,613 | 45,468 | 209,731 |
| 1960 | 45,594 | 52,744 | 89,500 | 62,237 | 61,565 | 271,296 |
| 1961 | 63,162 | 71,762 | 125,166 | 86,900 | 86,239 | 357,535 |
| 1962 | 97,073 | 105,723 | 160,000 | 132,912 | 110,849 | 468,384 |
| 1963 | 126,898 | 143,398 | 149,498 | 147,398 | 120,597 | 588,981 |
| 1964 | 130,108 | 129,325 | 130,545 | 132,404 | 117,551 | 706,532 |
| 1965 | 125,640 | 124,521 | 125,171 | 124,824 | 124,412 | 830,944 |
| 1966 | 141,412 | 146,212 | 143,462 | 141,462 | 141,171 | 972,115 |
| 1967 | 148,407 | 154,770 | 164,770 | 164,770 | 164,342 | 1,136,457 |
| 1968 | 167,954 | 167,954 | 177,954 | 167,954 | 162,134 | 1,298,591 |
| 1969 | 169,735 | 164,120 | 172,120 | 166,928 | 161,834 | 1,460,425 |
| 1970 | 160,513 | 160,513 | 182,000 | 171,257 | 160,433 | 1,620,858 |
| 1971 | 171,747 | 178,479 | 203,479 | 194,901 | 194,826 | 1,815,684 |
| 1972 | 195,492 | 211,624 | 252,590 | 232,627 | 232,577 | 2,048,261 |
| 1973 | 255,280 | 300,000 | 350,000 | 300,000 | 255,722 | 2,303,983 |
| 1974 | 265,000 | 281,415 | 320,000 | 302,915 | 327,270 | 2,631,253 |
| 1975 | 309,299 | 321,196 | 330,000 | 327,996 | 327,953 | 2,959,206 |
| 1976 | 324,934 | 329,079 | 379,059 | 370,096 | 368,648 | 3,327,854 |
| TQ ¹ | 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 | 1,214,792 | 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 ² | 1,355,866 | 1,351,422 ³ | 20,821,930 |
| 1997 | 1,320,555 ⁴ | 1,438,265 | 1,344,742 ⁴ | 1,432,529 ⁵ | 1,431,821 | 22,253,751 |
| 1998 | 1,467,189 | 1,513,004 | 1,531,898 | 1,531,061 ⁶ | 1,526,276 | 23,780,027 |
| 1999 | 1,709,328 ⁷ | 1,720,344 | 1,793,697 | 1,793,697 ⁸ | 1,788,008 | 25,568,035 |

¹ TQ=Transition Quarter, July 1-September 30, 1976.

² Senate Allowance reflects the Institute share of the government-wide rescission and the HHS rescission.

³ 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 one percent transfer authority.

⁴ Excludes funds for AIDS research activities consolidated in the NIH Office of AIDS Research (OAR).

⁵ Excludes enacted administrative reduction.

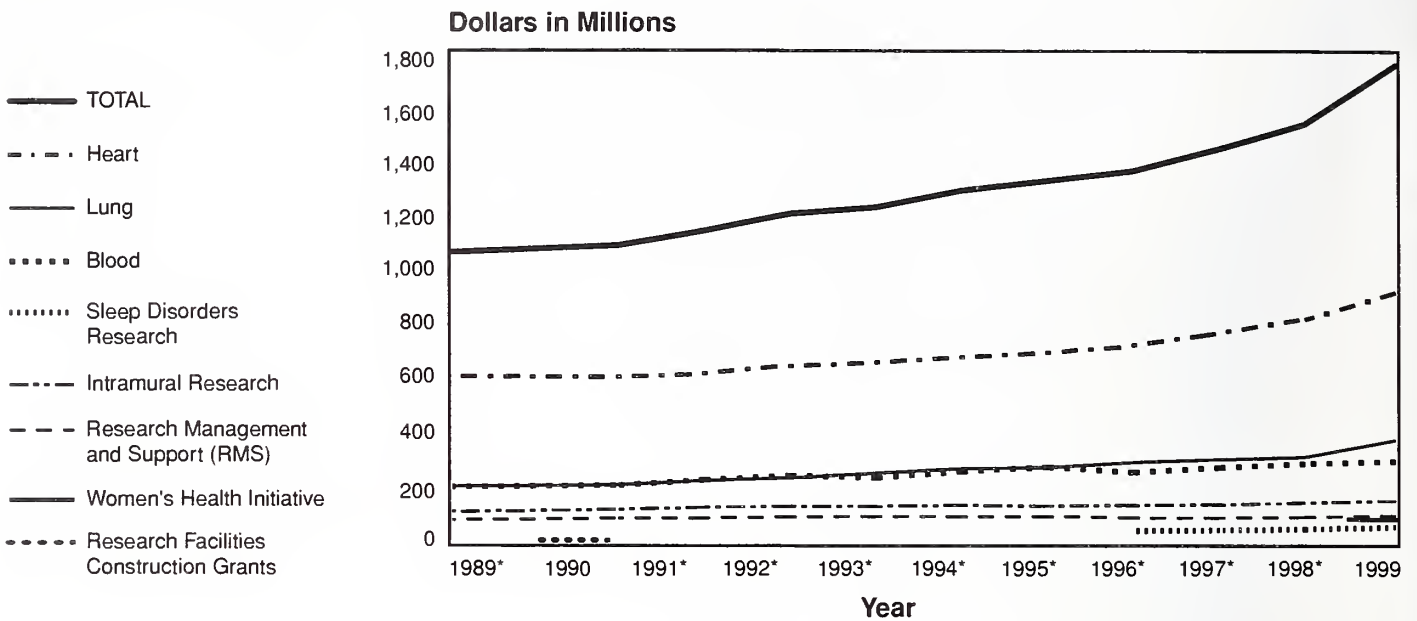
⁶ Excludes \$321,000 Director Transfer; \$2,856,000 Secretary Transfer; and \$1,600,000 Director Rescission.

⁷ Includes \$5,161,000 Bioterrorism reduction.

⁸ Excludes \$3,840,000 Director Transfer; \$571,000 Secretary Transfer; and \$1,188,000 Director Rescission.

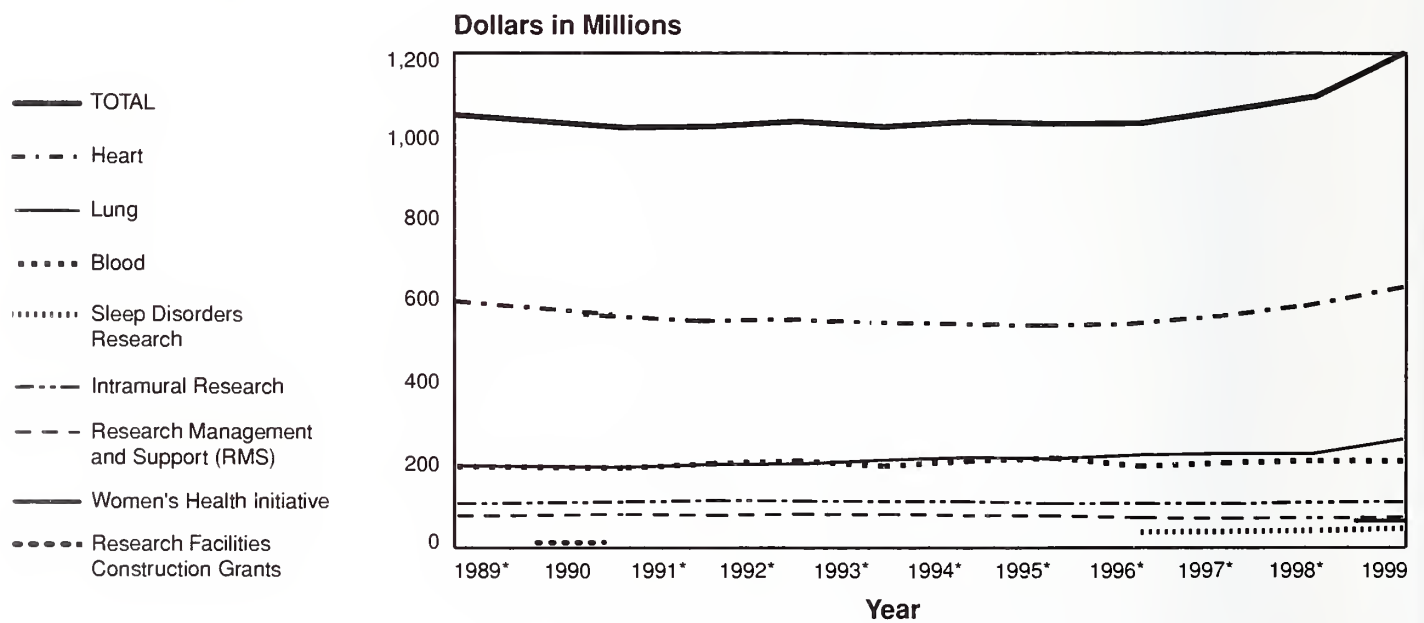
NHLBI Total Obligations by Budget Category: Fiscal Years 1989-99

Current Dollars



NHLBI Total Obligations by Budget Category: Fiscal Years 1989-99

Constant 1989 Dollars



* No funds were available for Research Facilities Construction Grants, FY 1989 and FY 1991-99.

NHLBI Total Obligations by Budget Category: Fiscal Years 1989-99

Current Dollars (Millions)

| | Fiscal Year | | | | | | | | | | |
|--|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Heart | \$581.7 | \$579.6 | \$589.6 | \$619.5 | \$632.0 | \$651.7 | \$668.9 | \$692.8 | \$737.9 | \$795.6 | \$898.0 |
| Lung | 171.4 | 177.0 | 193.8 | 203.4 | 221.6 | 238.7 | 243.0 | 261.9 | 273.4 | 281.7 | 346.2 |
| Blood | 169.3 | 175.2 | 195.9 | 211.9 | 203.5 | 227.4 | 244.6 | 224.3 | 242.7 | 257.5 | 266.1 |
| Sleep Disorders Research | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 15.9 | 18.7 | 22.3 | 31.2 |
| Women's Health Initiative | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 63.1 |
| Intramural Research | 77.0 | 85.5 | 93.7 | 97.1 | 98.2 | 101.7 | 98.9 | 101.8 | 104.4 | 111.6 | 119.5 |
| Research Management and Support (RMS) | 46.1 | 52.7 | 52.9 | 58.2 | 59.4 | 58.4 | 59.5 | 54.8 | 54.6 | 57.6 | 63.9 |
| Research Facilities Construction Grants | 0.0 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total | \$1,045.5 | \$1,070.7 | \$1,125.9 | \$1,190.1 | \$1,214.7 | \$1,277.9 | \$1,314.9 | \$1,351.4 | \$1,431.8 | \$1,526.3 | \$1,788.0 |

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

Constant 1989 Dollars (Millions)

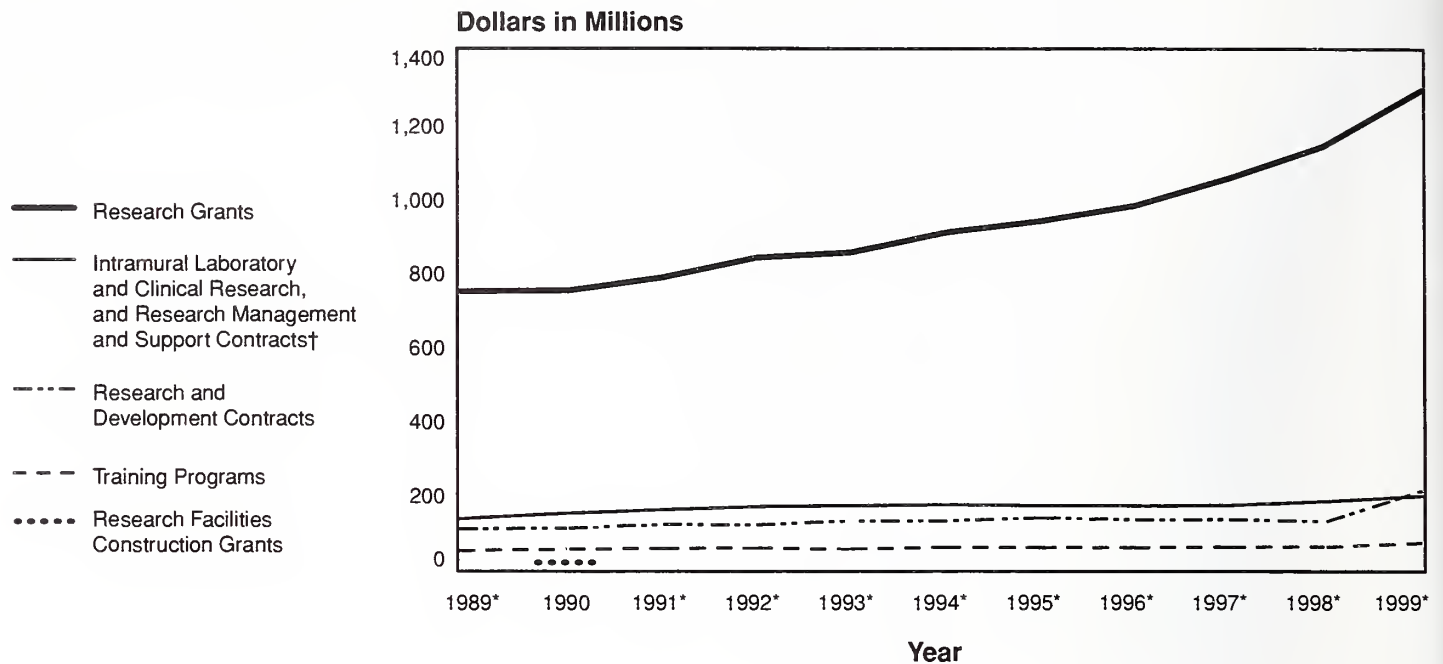
| | Fiscal Year | | | | | | | | | | |
|--|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999* |
| Heart | \$581.7 | \$549.5 | \$533.0 | \$536.5 | \$529.0 | \$525.3 | \$521.1 | \$525.8 | \$545.3 | \$568.9 | \$616.9 |
| Lung | 171.4 | 167.8 | 175.2 | 176.1 | 185.5 | 192.4 | 189.3 | 198.8 | 202.0 | 201.4 | 237.8 |
| Blood | 169.3 | 166.1 | 177.1 | 183.5 | 170.3 | 183.3 | 190.5 | 170.2 | 179.4 | 184.1 | 182.8 |
| Sleep Disorders Research | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 12.1 | 13.8 | 15.9 | 21.4 |
| Women's Health Initiative | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 43.4 |
| Intramural Research | 77.0 | 81.1 | 84.7 | 84.1 | 82.2 | 82.0 | 77.0 | 77.3 | 77.2 | 79.8 | 82.1 |
| Research Management and Support (RMS) | 46.1 | 50.0 | 47.8 | 50.4 | 49.7 | 47.1 | 46.4 | 41.6 | 40.4 | 41.2 | 43.9 |
| Research Facilities Construction Grants | 0.0 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total | \$1,045.5 | \$1,015.0 | \$1,017.8 | \$1,030.6 | \$1,016.7 | \$1,030.0 | \$1,024.3 | \$1,025.8 | \$1,058.0 | \$1,091.3 | \$1,228.4 |

*2.8% Inflation Factor used to calculate FY 1999.

This table is based on the Biomedical Research & Development Price Index (February 1999).

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

NHLBI Total Obligations by Budget Mechanism: Fiscal Years 1989-99



* No funds were available for Research Facilities Construction Grants, FY 1989 and FY 1991-99.

NHLBI Total Obligations by Budget Mechanism: Fiscal Years 1989-99

(Dollars in Millions)

| Budget Mechanism | Fiscal Year | | | | | | | | | | |
|---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Research Grants* | \$785.7 | \$788.9 | \$824.9 | \$880.4 | \$895.3 | \$951.2 | \$982.6 | \$1,025.4 | \$1,100.9 | \$1,189.8 | \$1,346.6 |
| Research and Development (R&D) Contracts | 96.7 | 98.4 | 108.7 | 107.7 | 117.5 | 118.3 | 125.9 | 120.9 | 121.9 | 116.7 | 197.2 |
| Training Programs | 39.9 | 44.4 | 45.8 | 46.7 | 44.3 | 48.3 | 48.0 | 48.5 | 49.8 | 50.6 | 60.8 |
| Intramural Laboratory and Clinical Research (DIR), and Research Management and Support (RMS)† | 123.2 | 138.3 | 146.5 | 155.3 | 157.6 | 160.1 | 158.4 | 156.6 | 159.1 | 169.2 | 183.4 |
| Research Facilities Construction Grants | 0.0 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total, NHLBI | \$1,045.5 | \$1,070.7 | \$1,125.9 | \$1,190.1 | \$1,214.7 | \$1,277.9 | \$1,314.9 | \$1,351.4 | \$1,431.8 | \$1,526.3 | \$1,788.0 |

* Includes Research Career Programs.

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

NHLBI Employment: Fiscal Years 1989-99

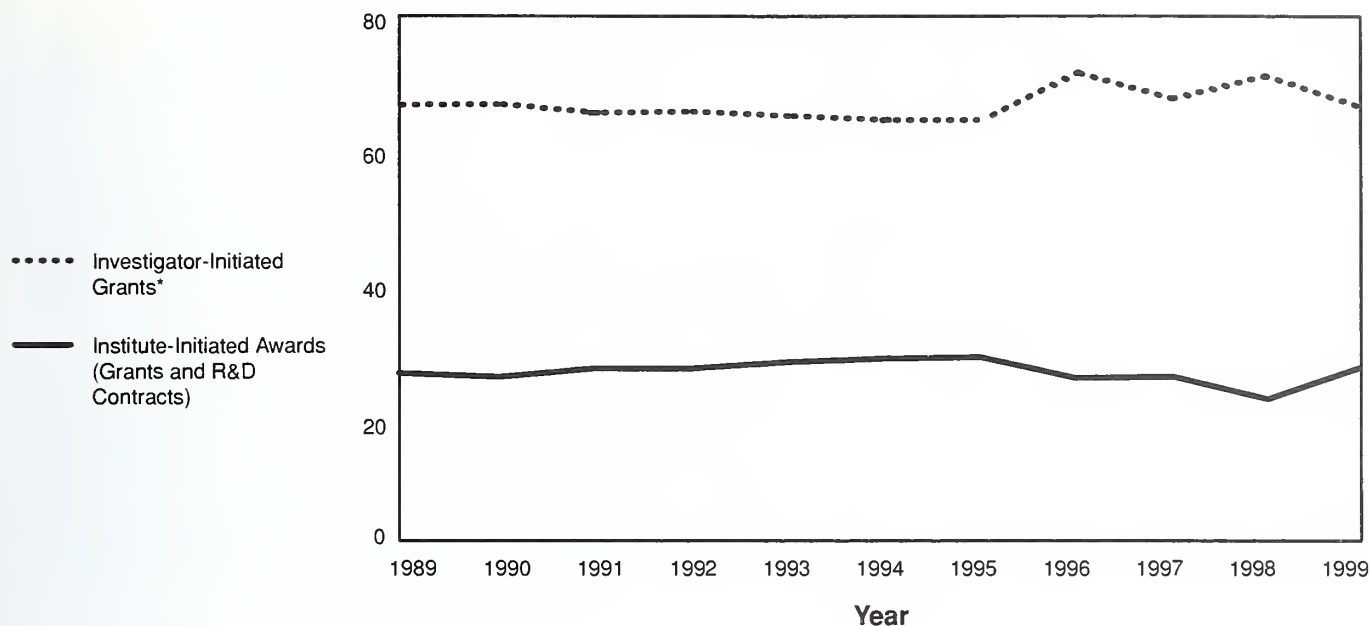
| Staff | Fiscal Year | | | | | | | | | | |
|-------|-------------|-------|------|------|------|------|------|------|------|------|------|
| | 1989* | 1990* | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| FTEs | 842 | 845 | 891 | 931 | 911 | 854 | 822 | 834 | 829 | 840 | 847 |

* Excludes Developmental Programs (SIS, Co-op) which were ceiling exempt, FY 1987-90.

† Full-time equivalents.

NHLBI Institute-Initiated and Investigator-Initiated Awards: Fiscal Years 1989-99

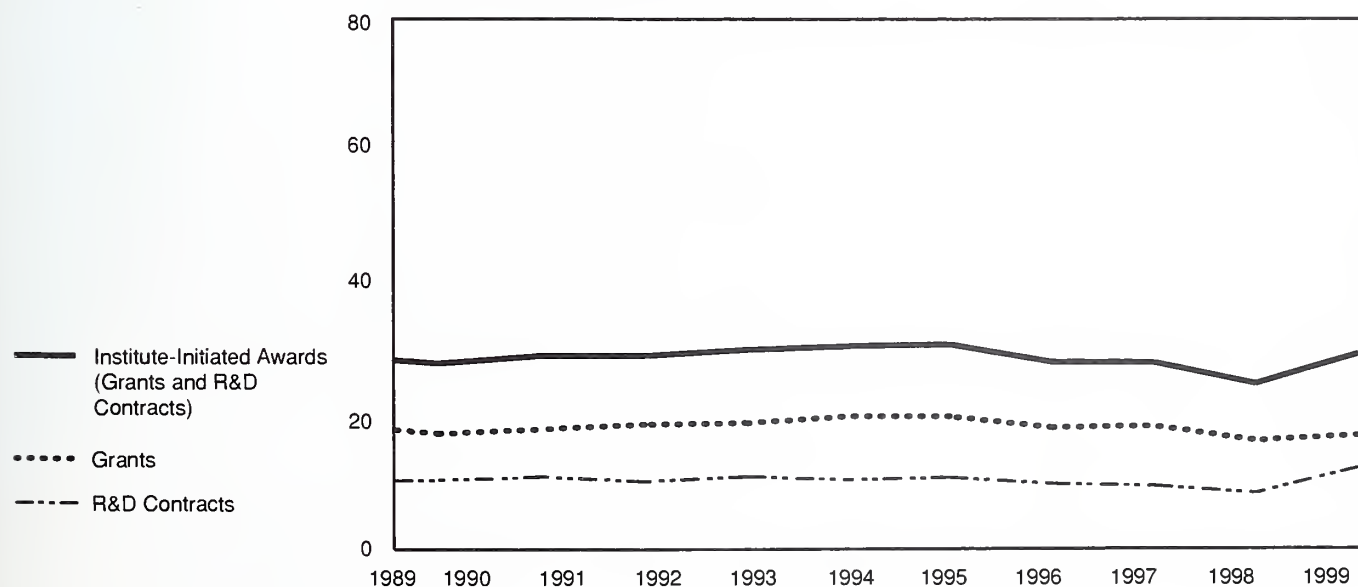
Percent of Extramural Funds



* Includes Research Career Programs.

NHLBI Grants and Research and Development Contracts as Subsets of Institute-Initiated Awards: Fiscal Years 1989-99

Percent of Extramural Funds



NHLBI Extramural Programs: Fiscal Years 1989-99

Dollars

| Budget Mechanism | (Dollars in Millions) | | | | | | | | | | |
|-----------------------------------|-----------------------|----------------|----------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Investigator-Initiated Awards | | | | | | | | | | | |
| Investigator-Initiated Grants* | \$592.5 | \$598.1 | \$616.3 | \$654.8 | \$663.2 | \$669.7 | \$725.0 | \$815.5 | \$835.3 | \$930.5 | \$1,023.6 |
| Research Career Programs K04, K06 | 20.3 | 21.5 | 22.8 | 23.0 | 23.1 | 25.1 | 25.7 | 28.9 | 28.9 | 36.1 | 46.3 |
| Subtotal | 612.8 | 619.6 | 639.1 | 677.8 | 686.3 | 694.8 | 750.7 | 844.4 | 864.2 | 966.6 | 1,069.9 |
| Institute-Initiated Awards | | | | | | | | | | | |
| Grants (RFAs) | 173.0 | 169.4 | 185.8 | 202.6 | 209.0 | 226.4 | 231.9 | 216.8 | 236.8 | \$223.2 | 276.7 |
| (Centers) | (87.9) | (88.4) | (92.2) | (96.5) | (96.6) | (101.5) | (107) | (87.5) | (87.7) | (114.4) | (119.9) |
| R&D Contracts (RFPs) | 96.7 | 98.4 | 108.7 | 107.7 | 117.5 | 118.3 | 125.9 | 116.7 | 121.9 | 116.7 | 197.2 |
| Subtotal | 269.7 | 267.8 | 294.5 | 310.3 | 326.5 | 344.7 | 357.8 | 333.5 | 358.7 | 339.9 | 473.9 |
| Training | 39.9 | 44.4 | 45.8 | 46.7 | 44.3 | 48.2 | 48.0 | 48.5 | 49.8 | 50.6 | 60.8 |
| Total, Extramural | \$922.4 | \$931.8 | \$979.4 | \$1,034.8 | \$1,057.1 | \$1,087.7 | \$1,156.5 | \$1,226.4 | \$1,272.7 | \$1,357.1 | \$1,604.6 |

NHLBI Extramural Programs: Fiscal Years 1989-99

Percent

| Budget Mechanism | (As Percent of Total Extramural Funds) | | | | | | | | | | |
|-----------------------------------|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Investigator-Initiated Awards | | | | | | | | | | | |
| Investigator-Initiated Grants* | 64.2 | 64.0 | 62.9 | 63.2 | 62.7 | 62.6 | 62.7 | 69.2 | 65.6 | 68.5 | 63.8 |
| Research Career Programs K04, K06 | 2.3 | 2.6 | 2.3 | 2.3 | 2.2 | 2.3 | 2.2 | 2.5 | 2.3 | 2.6 | 2.9 |
| Subtotal | 66.5 | 66.6 | 65.2 | 65.5 | 64.9 | 64.9 | 64.9 | 71.7 | 67.9 | 71.2 | 66.7 |
| Institute-Initiated Awards | | | | | | | | | | | |
| Grants (RFAs) | 18.7 | 18.1 | 19.0 | 19.6 | 19.8 | 20.2 | 20.1 | 18.4 | 18.6 | 16.4 | 17.2 |
| (Centers) | (9.5) | (9.5) | (9.4) | (9.3) | (9.1) | (9.1) | (9.2) | (7.4) | (6.9) | (8.4) | (7.5) |
| R&D Contracts (RFPs) | 10.5 | 10.6 | 11.1 | 10.4 | 11.1 | 10.6 | 10.9 | 9.9 | 9.6 | 8.5 | 12.3 |
| Subtotal | 29.2 | 28.6 | 30.1 | 30.0 | 30.9 | 30.8 | 31.0 | 28.3 | 28.2 | 25.0 | 29.5 |
| Training | 4.3 | 4.8 | 4.7 | 4.5 | 4.2 | 4.3 | 4.1 | 4.1 | 3.9 | 3.7 | 3.8 |
| Total, Extramural | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

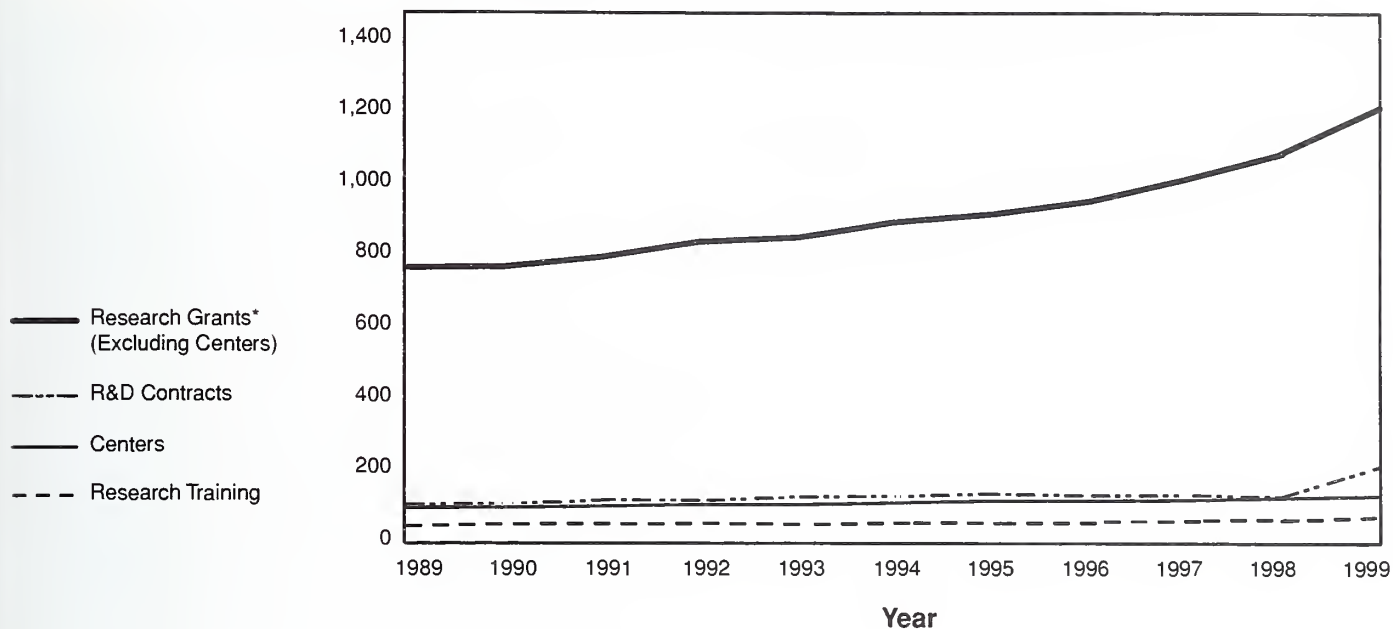
* Includes all R18s.

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

NHLBI Extramural Research Funding Mechanism: Fiscal Years 1989-99

Dollars

Dollars in Millions



NHLBI Extramural Research Funding Mechanism: Fiscal Years 1989-99

Dollars

(Dollars in Millions)

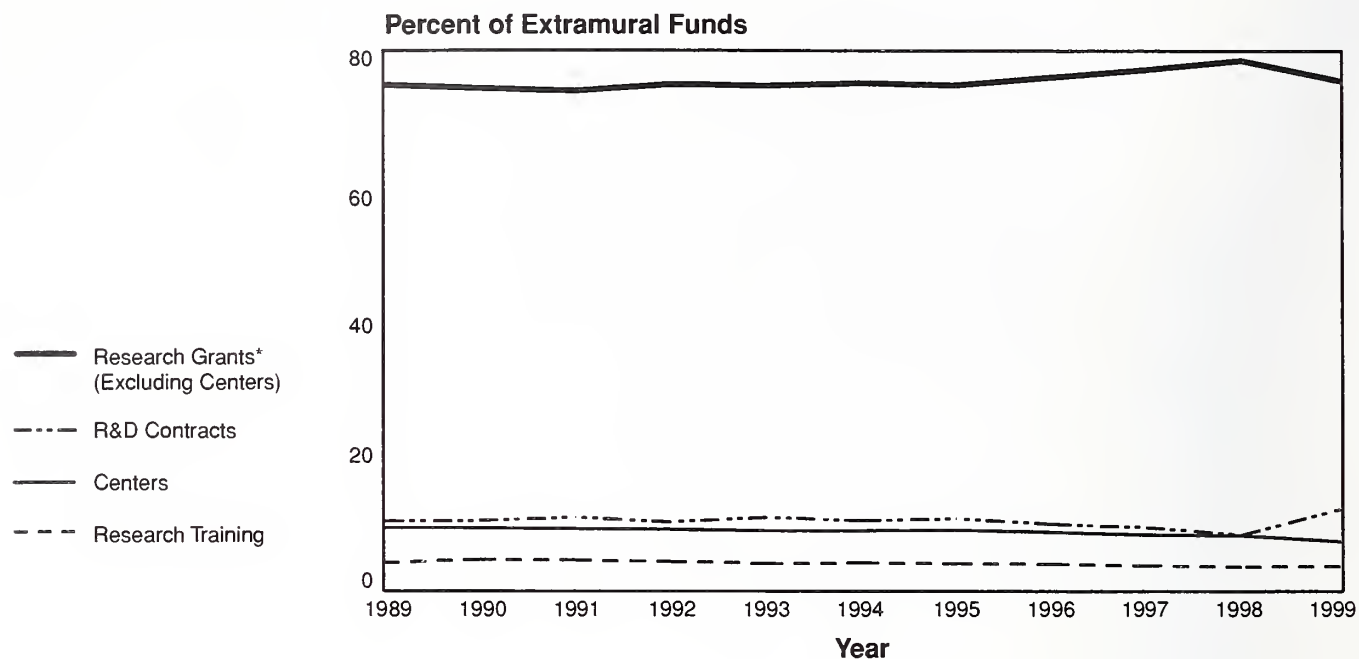
| Budget Mechanism | Fiscal Year | | | | | | | | | | |
|--------------------------------------|----------------|----------------|----------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Research Grants* (Excluding Centers) | \$697.9 | \$700.6 | \$732.7 | \$783.9 | \$798.7 | \$849.7 | \$875.7 | \$918.7 | \$992.3 | \$1,075.4 | \$1,226.7 |
| Centers | 87.9 | 88.4 | 92.2 | 96.5 | 96.6 | 101.5 | 107.0 | 106.7 | 108.7 | 114.4 | 119.9 |
| R&D Contracts | 96.7 | 98.4 | 108.7 | 107.7 | 117.5 | 118.3 | 125.9 | 120.9 | 121.9 | 116.7 | 197.2 |
| Research Training | 39.9 | 44.4 | 45.8 | 46.7 | 44.3 | 48.2 | 48.0 | 48.5 | 49.8 | 50.6 | 60.8 |
| Total, Extramural | \$922.4 | \$931.8 | \$979.4 | \$1,034.8 | \$1,057.1 | \$1,117.7 | \$1,156.6 | \$1,194.8 | \$1,272.8 | \$1,357.1 | \$1,604.6 |

* Includes Research Career Programs.

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

NHLBI Extramural Research Funding Mechanism: Fiscal Years 1989-99

Percent



NHLBI Extramural Research Funding Mechanism: Fiscal Years 1989-99

Percent

| Budget Mechanism | (Percent) | | | | | | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | Fiscal Year | | | | | | | | | | |
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Research Grants* (Excluding Centers) | 75.7 | 75.2 | 74.8 | 75.8 | 75.6 | 76.0 | 75.7 | 76.9 | 78.0 | 79.4 | 76.4 |
| Centers | 9.5 | 9.5 | 9.4 | 9.3 | 9.1 | 9.1 | 9.2 | 8.9 | 8.5 | 8.4 | 7.5 |
| R&D Contracts | 10.5 | 10.6 | 11.1 | 10.4 | 11.1 | 10.6 | 10.9 | 10.1 | 9.6 | 8.5 | 12.3 |
| Research Training | 4.3 | 4.8 | 4.7 | 4.5 | 4.2 | 4.3 | 4.1 | 4.1 | 3.9 | 3.7 | 3.8 |
| Total, Extramural | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

* Includes Research Career Programs.

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



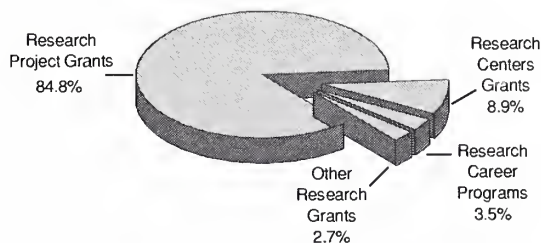
9. Research Grants

NHLBI Research Grants by Activity: Fiscal Year 1999

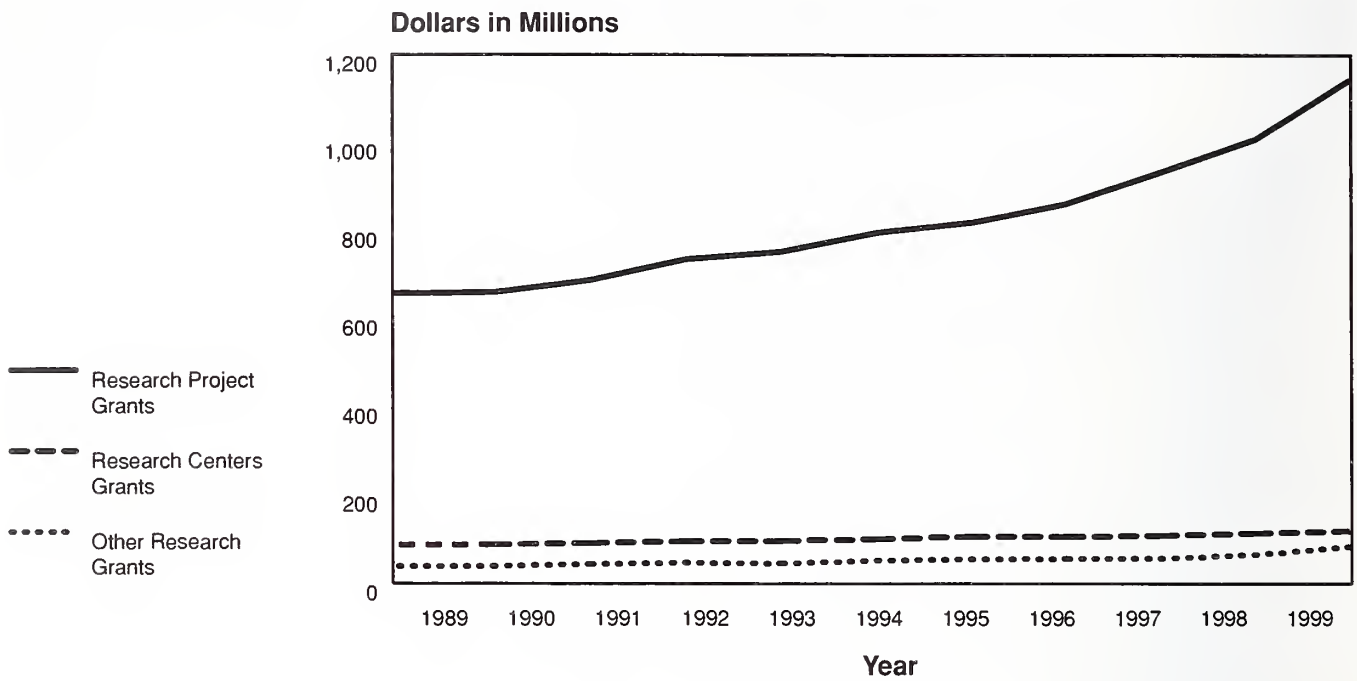
| | Number of Grants | Total Cost (Dollars in Thousands) | Percent of Total NHLBI Research Grant Dollars |
|--|------------------|-----------------------------------|---|
| Research Project Grants (RPGs) | | | |
| Regular Research Grants (R01) | 2,770 | \$780,121 | 57.93% |
| Small Research Grants (R03) | 13 | 850 | 0.06 |
| Program Project Grants (P01) | 142 | 218,753 | 16.25 |
| Cooperative Agreements (U01) | 90 | 45,858 | 3.41 |
| Area Grants (R15) | — | — | 0.00 |
| Explorative Developmental Grant (R21) | 8 | 871 | 0.06 |
| Transition Award (R29) | 225 | 23,744 | 1.76 |
| Method to Extend Research in Time (R37) | 94 | 30,757 | 2.28 |
| Subtotal | 3,342 | 1,100,954 | 81.76 |
| Small Business Technology Transfer (STTR Phase I) (R41) | 14 | 1,483 | 0.11 |
| Small Business Technology Transfer (STTR Phase II) (R42) | 4 | 1,132 | 0.08 |
| Small Business Innovation Research (SBIR Phase I) (R43) | 102 | 10,504 | 0.78 |
| Small Business Innovation Research (SBIR Phase II) (R44) | 76 | 28,400 | 2.11 |
| Subtotal, Small Business | 196 | 41,519 | 3.08 |
| Subtotal, Research Project Grants | 3,538 | 1,142,473 | 84.84 |
| Research Center Grants | | | |
| Specialized Centers of Research (SCOR) (P50) | 70 | 100,994 | 7.50 |
| Sickle Cell Centers (P60) | 10 | 17,350 | 1.29 |
| Center for AIDs Research (P30) | 0 | 1,545 | 0.11 |
| Subtotal, Research Centers Grants | 80 | 119,889 | 8.90 |
| Research Career Programs | | | |
| Mentored Research Development Award for Minority Faculty (K01) | 30 | 3,644 | 0.27 |
| Minority Institutional Faculty Mentored Research Scientist Award (K01) | 0 | 0 | 0.00 |
| Research Scientist Development Award (K02) | 18 | 1,548 | 0.11 |
| Research Career Development Award (K04) | 6 | 568 | 0.04 |
| Research Career Award (K06) | 2 | 70 | 0.01 |
| Systemic Pulmonary and Vascular Diseases Academic Award (K07) | 3 | 532 | 0.04 |
| Asthma Academic Award (K07) | 3 | 248 | 0.02 |
| Nutrition Academic Award (K07) | 10 | 1,480 | 0.11 |
| Tuberculosis Academic Award (K07) | 13 | 1,052 | 0.08 |
| Sleep Academic Award (K07) | 20 | 1,736 | 0.13 |
| Clinical Investigator Scientist Award (K08) | 262 | 29,741 | 2.21 |
| Minority School Faculty Development Award (K14) | 22 | 2,538 | 0.19 |
| Research Development Award for Minority Faculty (K14) | 0 | 0 | 0.00 |
| Mentored Patient-Oriented Research Career Development Award (K23) | 13 | 1,687 | 0.13 |
| Midcareer Investigator Award in Patient-Oriented Research (K24) | 11 | 1,054 | 0.08 |
| Clinical Research Curriculum Award (K30) | 9 | 1,772 | 0.13 |
| Subtotal, Research Career Programs | 422 | 47,670 | 3.54 |
| Other Research Grants | | | |
| Cooperative Clinical Research (U10, R10) | 43 | 20,080 | 1.49 |
| Minority Biomedical Research Support (S06, S14) | — | 3,423 | 0.25 |
| Other (R09, R13, R18, R24, R25, T15, U09, U24, UH1) | 37 | 13,046 | 0.97 |
| Subtotal, Other Research Grants | 80 | 36,549 | 2.71 |
| Total, NHLBI Research Grants | 4,120 | \$1,346,581 | 100.00% |

For descriptions of grants, see page 164.

NHLBI Total Research Grants by Category



NHLBI Research Project Grant,* Research Centers Grant, and Other Research Grant Obligations: Fiscal Years 1989-99



NHLBI Research Project Grant,* Research Centers Grant, and Other Research Grant Obligations: Fiscal Years 1989-99

(Dollars in Thousands)

| | 1989 | 1990 | 1991 | 1992 | 1993 | Fiscal Year 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
|-------------------------|------------------|------------------|------------------|------------------|------------------|---------------------|------------------|--------------------|--------------------|--------------------|--------------------|
| Research Project Grants | \$658,388 | \$660,722 | \$688,330 | \$736,232 | \$752,978 | \$797,092† | \$819,674‡ | \$862,027‡§ | \$935,322‡ | \$1,009,152‡ | \$1,142,473‡ |
| Research Centers Grants | 87,870 | 88,382 | 92,174 | 96,510 | 96,628 | 101,535 | 106,980 | 106,688 | 108,665 | 114,397 | 119,889 |
| Other Research Grants† | 39,524 | 39,841 | 44,387 | 47,656 | 45,654 | 52,576 | 55,974 | 56,692 | 56,993 | 66,234 | 84,219 |
| Total | \$785,782 | \$788,945 | \$824,891 | \$880,398 | \$895,260 | \$951,203 | \$982,628 | \$1,025,407 | \$1,100,980 | \$1,189,783 | \$1,346,581 |

* Includes P01s.

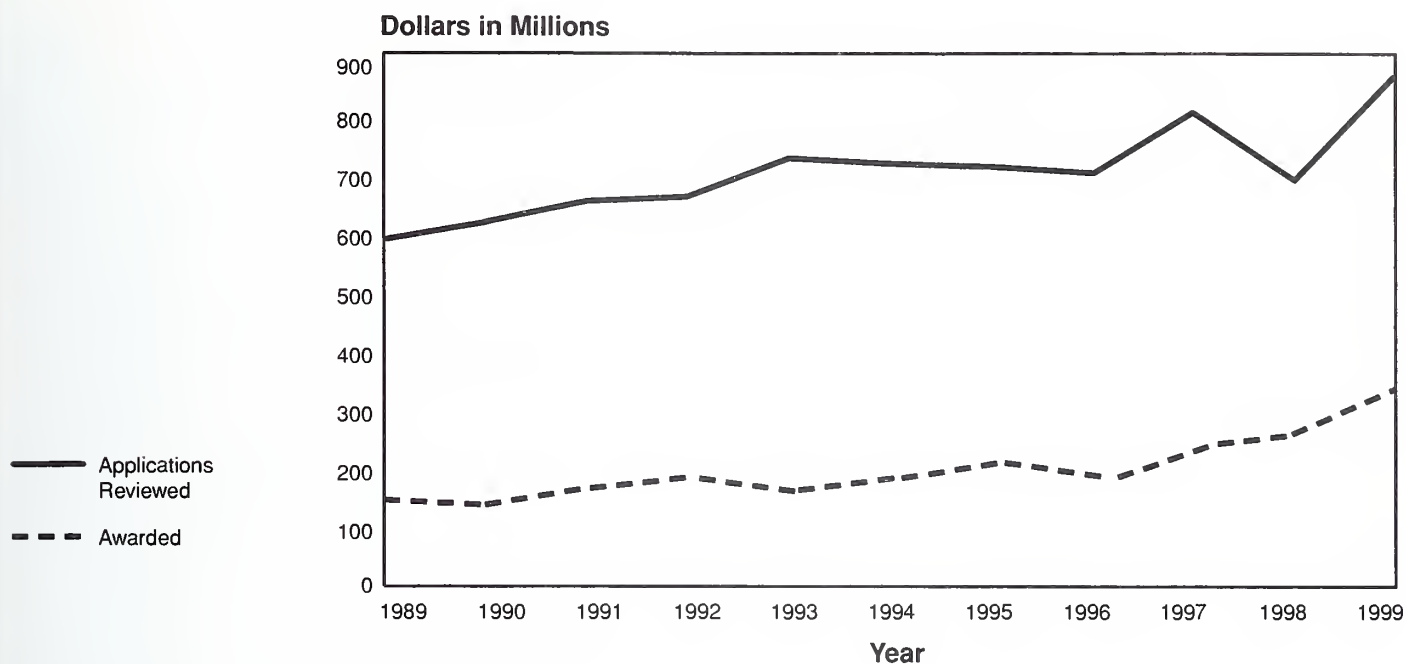
† Includes Research Career Programs; excludes General Research Support Grants.

‡ Includes R03, R41, R42, R43, and R44s.

§ Includes Program Evaluation Assessment of \$4,435,000.

NHLBI Competing Research Project Grant Applications*: Fiscal Years 1989-99

Total Cost Dollars Reviewed and Awarded



NHLBI Competing Research Project Grant Applications*: Fiscal Years 1989-99

Total Cost Dollars Reviewed and Awarded

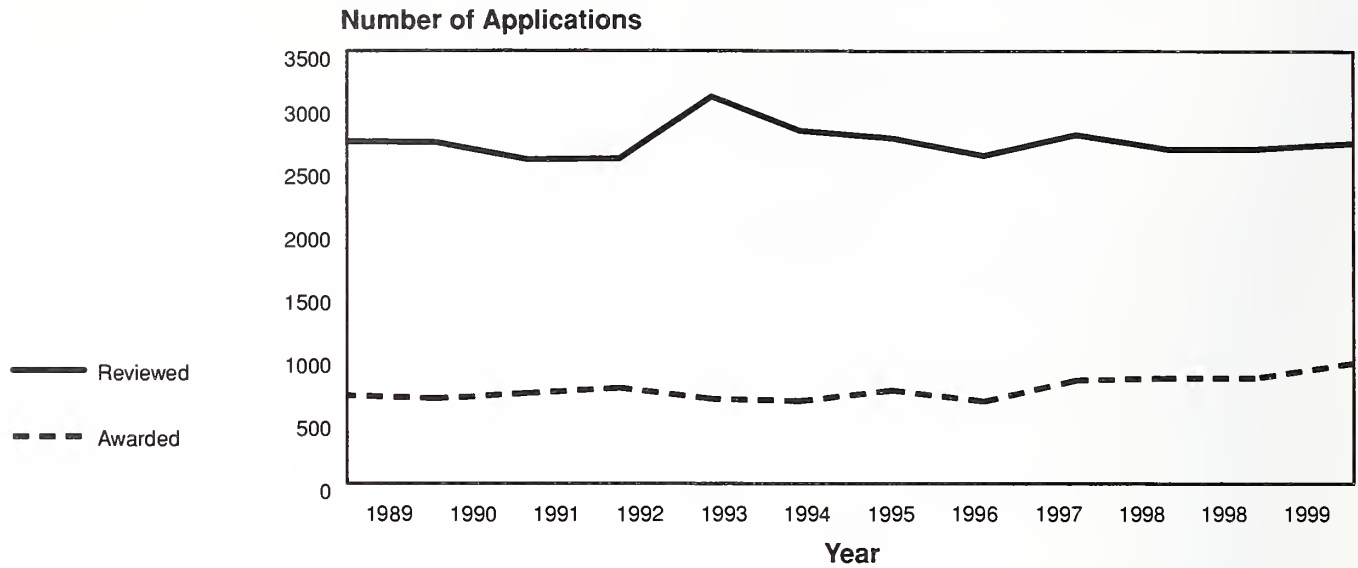
(Dollars in Millions)

| | Fiscal Year | | | | | | | | | | |
|-----------------------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Applications Reviewed | 585.8 | 614.9 | 650.8 | 658.4 | 724.3 | 715.0 | 710.3 | 699.2 | 802.1 | 687.1 | 867.1 |
| Awarded | 143.1 | 134.8 | 162.8 | 181.3 | 158.0 | 180.4 | 207.5 | 182.1 | 240.1 | 252.4 | 330.4 |

* Includes R01, R23, R29, R37, R43, R44, P01, and U01 grants; includes R03 grants beginning in FY 1994; excludes R41, R43, and R44 beginning in FY 1994.

NHLBI Competing Research Project Grant Applications*: Fiscal Years 1989-99

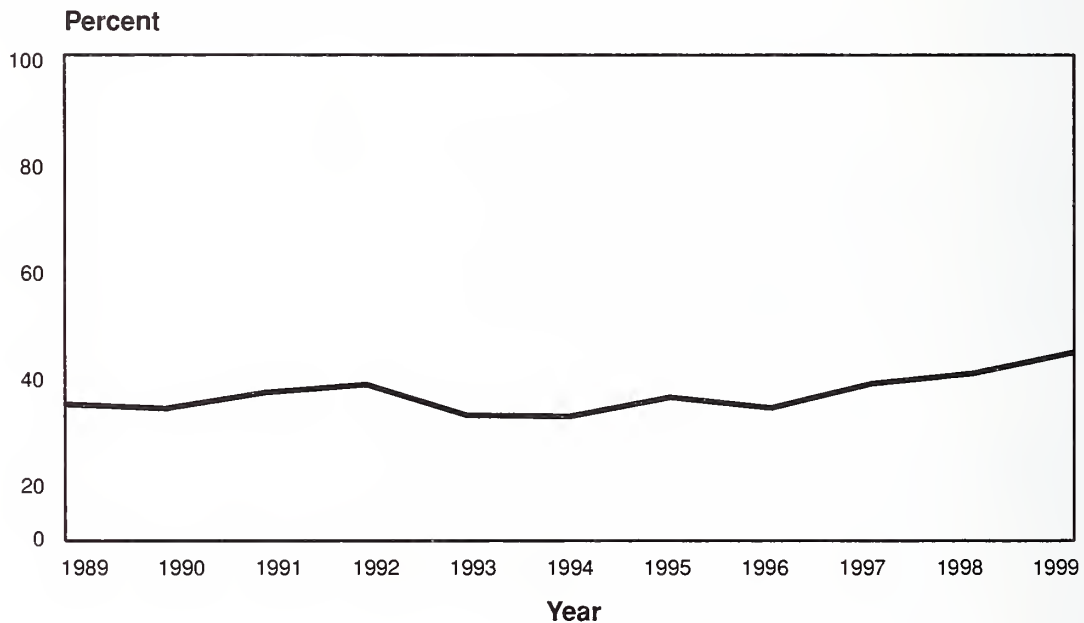
Number Reviewed and Awarded



(Number of Applications)

| | Fiscal Year | | | | | | | | | | |
|-----------------------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Applications Reviewed | 2,716 | 2,707 | 2,571 | 2,580 | 3,072 | 2,801 | 2,744 | 2,605 | 2,771 | 2,657 | 2,704 |
| Awarded | 698 | 675 | 717 | 759 | 673 | 655 | 740 | 652 | 821 | 837 | 959 |

Percent of Reviewed Applications Funded (Success Rate)

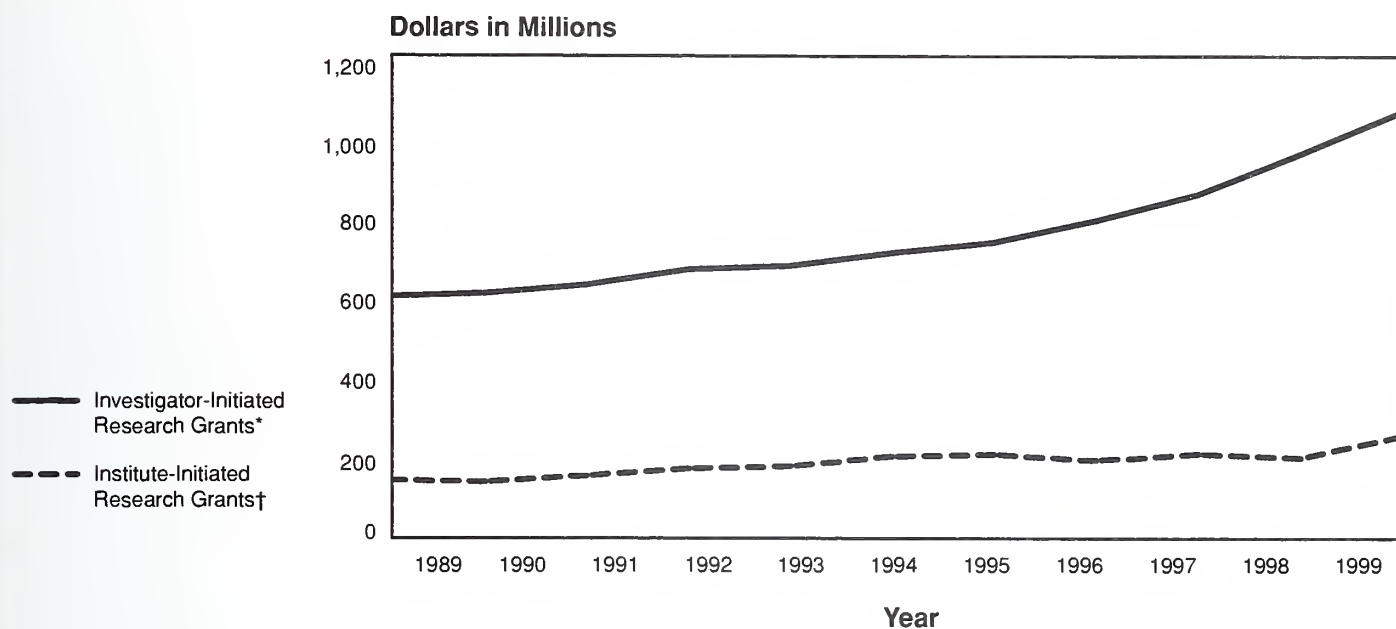


(Percent)

| | Fiscal Year | | | | | | | | | | |
|---------------|-------------|------|------|------|------|------|------|------|------|------|------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Success Rates | 25.9 | 24.4 | 26.6 | 28.8 | 21.1 | 23.4 | 27.0 | 25.0 | 29.6 | 31.5 | 35.5 |

* Includes R01, R23, R29, R37, R43, R44, P01, and U01 grants; includes R03 grants beginning in FY 1994; excludes R41, R43, and R44 beginning in FY 1994.

NHLBI Investigator-Initiated and Institute-Initiated Research Grant Obligations: Fiscal Years 1989-99



NHLBI Investigator-Initiated and Institute-Initiated Research Grant Obligations: Fiscal Years 1989-99

| | (Dollars in Millions) | | | | | | | | | | |
|-------------------------|-----------------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------------|------------------|------------------|------------------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Investigator-Initiated* | \$618.1 | \$625.0 | \$645.8 | \$683.9 | \$692.8 | \$724.8 | \$750.7 | \$804.1 | \$867.9 | \$966.6 | \$1,069.9 |
| Institute-Initiated† | 167.7 | 164.0 | 179.1 | 196.5 | 202.5 | 226.4 | 231.9 | 216.8 | 233.0 | 223.2 | 276.7 |
| Total | \$785.8 | \$789.0 | \$824.9 | \$880.4 | \$895.3 | \$951.2 | \$982.6 | \$1,020.9‡ | \$1,100.9 | \$1,189.8 | \$1,346.6 |

* Includes R01, R23, R29, R37, R43, R44, P01, and U01 grants; includes R03 grants beginning in FY 1994; includes Research Career Programs and R55 beginning in FY 1995.

† Including 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 1989-99

(Dollars in Millions)

| Fiscal Year | Competing | | | Total | Noncompeting | Total Noncompeting and Competing |
|-------------|---------------|-------------------|-----------------------|---------|--------------|----------------------------------|
| | New Competing | Renewal Competing | Competing Supplements | | | |
| 1989 | \$77.5 | \$70.5 | \$1.7 | \$149.7 | \$508.7 | \$658.4 |
| 1990 | 68.4 | 72.6 | 1.5 | 142.5 | 518.2 | 660.7 |
| 1991 | 84.0 | 86.0 | 1.6 | 171.6 | 516.7 | 688.3 |
| 1992 | 88.5 | 101.2 | 0.5 | 190.2 | 546.0 | 736.2 |
| 1993 | 89.9 | 79.1 | 0.6 | 169.6 | 583.4 | 753.0 |
| 1994 | 99.7 | 79.6 | 1.1 | 180.4 | 599.9 | 780.3 |
| 1995 | 111.1 | 94.5 | 1.9 | 207.5 | 588.4 | 795.9 |
| 1996 | 90.5 | 90.4 | 1.2 | 182.1 | 649.9 | 832.0‡ |
| 1997 | 135.8 | 104.0 | .3 | 240.1 | 662.4 | 902.5 |
| 1998 | 147.5 | 103.9 | 1.0 | 252.4 | 721.3 | 973.7 |
| 1999 | 202.0 | 127.2 | 1.2 | 330.4 | 770.6 | 1,101.0 |

Facility and Administrative (F&A)[†] Rates of NHLBI Research Project Grants*: Fiscal Years 1989-99

(Dollars in Thousands)

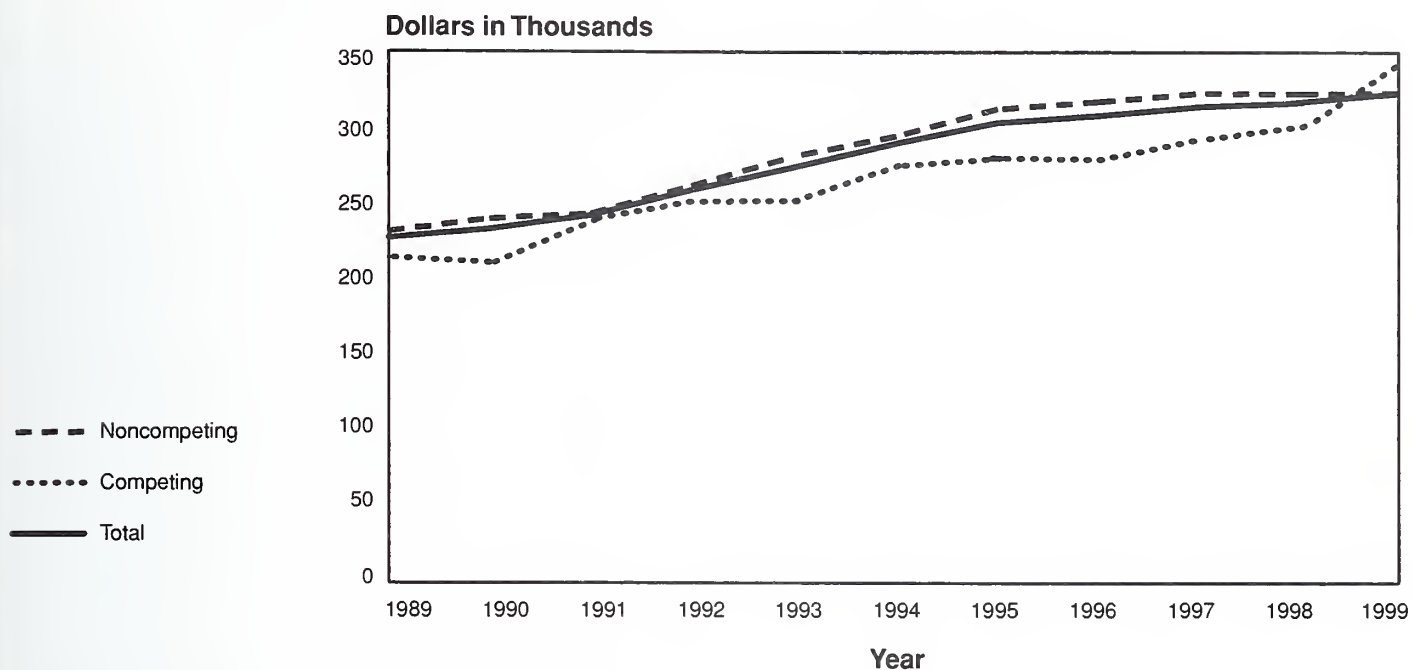
| Fiscal Year | Direct Cost | F&A Cost [†] | F&A Cost as a Percent of Direct Cost | Total Cost |
|-------------|-------------|-----------------------|--------------------------------------|------------|
| 1989 | \$452,557 | \$205,831 | 45.5 | \$658,388 |
| 1990 | 450,497 | 210,225 | 46.7 | 660,722 |
| 1991 | 470,623 | 217,707 | 46.3 | 688,330 |
| 1992 | 503,076 | 233,156 | 46.3 | 736,232 |
| 1993 | 516,022 | 236,956 | 45.9 | 752,978 |
| 1994 | 534,374 | 245,965 | 46.0 | 780,339 |
| 1995 | 543,502 | 252,423 | 46.4 | 795,925 |
| 1996 | 564,219 | 267,785 | 47.5 | 832,004‡ |
| 1997 | 611,576 | 290,915 | 47.6 | 902,491 |
| 1998 | 660,009 | 313,765 | 47.5 | 973,774 |
| 1999 | 764,198 | 336,756 | 44.1 | 1,100,954 |

* Includes R01, R23, R29, R37, R43, R44, P01, and U01 grants; includes R03 grants beginning in FY 1994; excludes R41, R43, and R44 beginning in FY 1994.

† Previously called Indirect Cost.

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

NHLBI Research Project Grants*: Average Cost, Fiscal Years 1989-99



NHLBI Research Project Grants*: Average Cost, Fiscal Years 1989-99

(Dollars in Thousands)

| | Fiscal Year | | | | | | | | | | |
|--------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--------------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Noncompeting | \$231.5 | \$239.9 | \$243.2 | \$261.7 | \$281.0 | \$294.8 | \$312.8 | \$317.5 | \$323.0 | \$322.6 | \$323.4 |
| Competing | 214.5 | 211.1 | 239.3 | 251.4 | 252.0 | 275.5 | 280.4 | 279.3 | 292.5 | 301.6 | 344.5 |
| Total | \$227.4 | \$233.1 | \$242.2 | \$259.0 | \$273.9 | \$290.1 | \$303.7 | \$308.3 | \$314.2 | \$316.9 | 322.9 |

* Includes R01, R23, R29, R37, R43, R44, P01, and U01 grants; includes R03 grants beginning in FY 1944; excludes R41, R43, and R44 beginning in FY 1994.

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 1999 | Total FY 1999 Obligations | Total Obligations to Date |
|--|---------------------------------------|------------------------------|------------------------------|
| Heart and Vascular Diseases | | | |
| Azithromycin and Coronary Events Study (ACES) | \$ 847,117 | \$2,663,325 | \$3,510,442 |
| Bypass Angioplasty Revascularization Investigation (BARI) Data Coordinating Center | 46,114,706 | 1,609,304 | 47,724,010 |
| Child and Adolescent Trial for Cardiovascular Health (CATCH) III Tracking Study Coordinating Center | 35,753,696 | 210,411 | 35,964,107 |
| Decreasing Weight Gain During Adolescence in Black Preadolescent Girls | — | 2,282,118 | 2,282,118 |
| Depression and Mortality Following Myocardial Infarction | 1,155,434 | 354,713 | 1,510,147 |
| Dietary Patterns, Sodium Intake, and Blood Pressure (DASH2) | 5,926,156 | 3,645,974 | 9,572,130 |
| Dynamic Evaluation of Percutaneous Coronary Intervention | 1,234,227 | 644,822 | 1,879,049 |
| Early Natural History of Arteriosclerosis | 2,289,437 | 1,131,794 | 3,421,231 |
| Ecologically Guided Bioprospecting In Panama | — | 50,000 | 50,000 |
| Estrogen Replacement and Atherosclerosis (ERA) Trial | 5,229,355 | 1,017,000 | 6,246,355 |
| Family Blood Pressure Program | 30,176,420 | 7,161,597 | 37,338,017 |
| Family Heart Study (FHS)—Molecular Genetics and Genetic Epidemiology | 5,484,396 | 1,613,879 | 7,098,275 |
| Glucose Tolerance and Risk for CVD in the Elderly | 766,453 | 395,719 | 1,162,172 |
| Insulin Resistance and Atherosclerosis Study (IRAS) | 15,740,006 | 1,500,000 | 17,240,006 |
| Mode Selection Trial in Sinus Node Dysfunction (MOST) | 7,815,151 | 2,878,540 | 10,693,691 |
| NHLBI Growth and Health Study | 16,947,946 | — | 16,947,946 |
| Obesity Prevention in American Indians (PATHWAYS) | 17,148,982 | 4,196,235 | 21,345,217 |
| PREMIER: Lifestyle Interventions for Blood Pressure Control | 2,234,393 | 3,424,279 | 5,658,672 |
| Randomized Evaluation of Mechanical Assistance for the Treatment of Chronic Heart Failure (REMATCH) | 3,055,994 | 1,333,338 | 4,389,332 |
| Strong Heart Study—CVD in American Indians | 19,979,824 | 1,969,046 | 21,948,870 |
| Sudden Cardiac Death in Heart Failure (SCD-HeFT) | 3,238,084 | 1,708,953 | 4,947,037 |
| Women's Estrogen/Progestin Lipid-Lowering Hormone Atherosclerosis Regression Trial (WELL-HART) | 3,772,081 | 1,131,434 | 4,903,515 |
| Subtotal, Heart and Vascular Diseases | 224,909,858 | 40,922,481 | 265,832,339 |
| Lung Diseases | | | |
| Asthma Clinical Research Network (ACRN) | 24,689,325 | 5,399,251 | 30,088,576 |
| Collaborative Studies on the Genetics of Asthma (CSGA) | 22,321,962 | 3,439,242 | 25,761,204 |
| Lung Health Study—Long-Term Follow-up | 1,996,675 | 1,986,190 | 3,982,865 |
| Lymphangiomyomatosis Registry | 799,724 | 420,329 | 1,220,053 |
| Pediatric Asthma Clinical Research Network | — | 4,175,379 | 4,175,379 |
| Programs in Bronchopulmonary Dysplasia | — | 4,165,127 | 4,165,127 |
| Sarcoidosis Genetic Linkage Consortium | — | 1,653,707 | 1,653,707 |
| Scleroderma Lung Study | — | 1,039,399 | 1,039,399 |
| Subtotal, Lung Diseases | 49,807,686 | 22,278,624 | 72,086,310 |
| Blood Diseases and Resources | | | |
| Subtotal, Blood Diseases and Resources | — | — | — |
| National Center for Sleep Disorders Research | | | |
| Sleep Heart Health Study | — | 2,736,191 | 2,736,191 |
| Subtotal, National Center for Sleep Disorders Research | — | 2,736,191 | 2,736,191 |
| Total, NHLBI Clinical Trials, Cooperative Agreements | \$274,717,544 | \$65,937,296 | \$340,654,840 |

Heart and Vascular Diseases Program

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

The purpose of this study is to determine whether treatment with the antibiotic, azithromycin, for one year will reduce the rate of non-fatal myocardial infarction and coronary heart disease deaths over three-and-a-half years in patients with documented coronary artery disease and serologic evidence of past infection with *Chlamydia pneumoniae*.

Obligations

Funding History:

Fiscal Year 1999—\$2,663,325

Fiscal Year 1998—\$847,117

Total Funding to Date—\$3,510,442

Current Active Organization and Grant Number

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

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

See Chapter 11. Clinical Trials.

Child and Adolescent Trial for Cardiovascular Health (CATCH) III Tracking Study Coordinating Center, Initiated in Fiscal Year 1987

See Chapter 11. Clinical Trials.

Decreasing Weight Gain During Adolescence in Black Preadolescent Girls, Initiated in Fiscal Year 1999

See Chapter 11. Clinical Trials.

Depression and Mortality Following Myocardial Infarction, Initiated in Fiscal Year 1997

The purpose of this study is to examine altered autonomic tone in depressed acute MI patients as a risk factor for mortality. Primary analysis will determine whether heart rate variability accounts for the significantly higher mortality expected in depressed compared to nondepressed groups, and whether this effect is largely concentrated in patients with ventricular arrhythmias and left ventricular dysfunction. Clinical features of depression that may be associated with high mortality risk and with altered autonomic tone such as symptom severity, comorbid anxiety, or hostility will also be identified.

Obligations

Funding History:

Fiscal Year 1999—\$354,713

Fiscal Year 1997-98—\$1,155,434

Total Funding to Date—\$1,510,147

Current Active Organization and Grant Number

1. Washington University
St. Louis, Missouri —HL-58946

Dietary Patterns, Sodium Intake, and Blood Pressure (DASH 2), Initiated in Fiscal Year 1997

The purpose of this study is to compare the effects of three levels of dietary sodium and two patterns of diet (a reference diet and an intervention diet high in fruits and vegetable and low in fat) on blood pressure in mildly hypertensive patients. DASH 2 builds on and extends the results of the original NHLBI-initiated DASH study. Comparisons will be made to determine whether salt has a different effect on blood pressure in blacks than in whites.

Obligations

Funding History:

Fiscal Year 1999—\$3,645,974

Fiscal Year 1997-98—\$5,926,156

Total Funding to Date—\$9,572,130

Current Active Organizations and Grant Numbers

1. Duke University
Durham, North Carolina —HL- 57114
2. The Johns Hopkins University
Baltimore, Maryland —HL-57139
3. Kaiser Foundation Research Institute
Oakland, California —HL-57156

4. Brigham and Women's Hospital
Boston, Massachusetts —HL-57173
5. Pennington Biomedical Research Center
Baton Rouge, Louisiana —HL-57190

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 1999—\$644,822
Fiscal Year 1997-98—\$1,234,227
Total Funding to Date—\$1,879,049

Current Active Organization and Grant Number

1. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-33292

Early Natural History of Arteriosclerosis, Initiated in Fiscal Year 1972

The objectives of this long-term program are to study the impact of genetic factors on the evolution of CVD risk factors in childhood to subsequent subclinical changes (cardiovascular structural and functional characteristics) to ultimately clinical mortality in adulthood and to determine the association of risk factor phenotypes to anatomic changes in the cardiovascular system as seen by necropsy. A large percentage of the participants are black.

Obligations

Funding History:

Fiscal Year 1999—\$1,131,794
Fiscal Year 1997-98*—\$2,289,437
Total Funding to Date—\$3,421,231

Current Active Organization and Grant Number

1. Tulane University of Louisiana
New Orleans, Louisiana —HL-38844

Ecologically Guided Bioprospecting in Panama, Initiated in Fiscal Year 1999

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

Obligations

Funding History:

Fiscal Year 1999—\$50,000
Total Funding to Date—\$50,000

Current Active Organization and Grant Number

1. Smithsonian Institution
Washington, D.C. —TW-01021

Estrogen Replacement and Atherosclerosis (ERA) Trial, Initiated in Fiscal Year 1994

The purpose of this study is to determine whether estrogen replacement therapy, with or without low-dose progesterone, slows progression or induces regression of coronary atherosclerosis in postmenopausal women.

Obligations

Funding History:

Fiscal Year 1999—\$1,017,000
Fiscal Years 1994-98—\$5,229,355
Total Funding to Date—\$6,246,355

Current Active Organization and Grant Number

1. Wake Forest University
Winston-Salem, North Carolina —HL-49488

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 1999—\$7,161,597
Fiscal Years 1995-98—\$30,176,420
Total Funding to Date—\$37,338,017

*Became a U01 in 1997.

Current Active Organizations and Grant Numbers

1. University of Michigan at Ann Arbor
Ann Arbor, Michigan —HL-54457
2. University of Mississippi Medical Center
Jackson, Mississippi —HL-54463
3. Mayo Foundation
Rochester, Minnesota —HL-54464
4. Case Western Reserve University
Cleveland, Ohio —HL-54466
5. University of Utah
Salt Lake City, Utah —HL-54471
6. University of Minnesota
Twin Cities
Minneapolis, Minnesota —HL-54472
7. Washington University
St. Louis, Missouri —HL-54473
8. University of Texas Health Science Center
Houston, Texas —HL-54481
9. Loyola University Medical Center
Maywood, Illinois —HL-54485
10. University of Alabama at Birmingham
Birmingham, Alabama —HL-54495
11. University of Minnesota
Twin Cities
Minneapolis, Minnesota —HL-54496
12. Boston University
Boston, Massachusetts —HL-54497
13. University of Texas Health Science Center
Houston, Texas —HL-54504
14. Medical College of Wisconsin
Milwaukee, Wisconsin —HL-54508
15. University of North Carolina
Chapel Hill
North Carolina —HL-54509
16. University of Michigan at Ann Arbor
Ann Arbor, Michigan —HL-54512
17. University of Utah
Salt Lake City, Utah —HL-54515
18. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-54526

Family Heart Study (FHS)—Molecular Genetics and Genetic Epidemiology, Initiated in Fiscal Year 1992

The objectives of this study are to identify and characterize genes associated with CHD and atherosclerosis and to examine familial and environmental factors of CHD in order to determine how they interact in the development of clinical outcomes.

Obligations

Funding History:

Fiscal Year 1999—\$1,613,879
Fiscal Years 1992-98—\$5,484,396
Total Funding to Date—\$7,098,275

Current Active Organizations and Grant Numbers

1. University of North Carolina
Chapel Hill, North Carolina —HL-56563
2. University of Minnesota
Minneapolis, Minnesota —HL-56564
3. Boston University Medical Center
Boston, Massachusetts —HL-56565
4. University of Utah
Salt Lake City, Utah —HL-56566
5. Washington University
St. Louis, Missouri —HL-56567
6. University of Minnesota
Minneapolis, Minnesota —HL-56568
7. University of Utah
Salt Lake City, Utah —HL-56569

Glucose Tolerance and Risk for Cardiovascular Disease in the Elderly, Initiated in Fiscal Year 1997

The goal of this project is to increase understanding of the longitudinal relationship of cardiovascular risk factors, including diabetes, impaired glucose tolerance, and insulin resistance, to other risk factors, and to stroke and CHD in a cohort of Japanese-American men who have participated in the Honolulu Heart Program for the past 30+ years.

Obligations

Funding History:

Fiscal Year 1999—\$395,719
Fiscal Year 1998—\$766,453
Total Funding to Date—\$1,162,172

Current Active Organization and Grant Number

1. Kuakini Medical Center
Honolulu, Hawaii —HL-56274

Insulin Resistance and Atherosclerosis Study (IRAS), Initiated in Fiscal Year 1991

The objective of this study is to investigate the relationship of insulin and insulin resistance to CVD and CVD risk factors over a range of glucose tolerance in patients with diabetes and in individuals without the disease. The tri-ethnic patient population consists of blacks, whites, and Hispanics.

Obligations

Funding History:

Fiscal Year 1999—\$1,500,000
Fiscal Years 1991-98—\$15,740,006
Total Funding to Date—\$17,240,000

Current Active Organizations and Grant Numbers

1. Wake Forest University
School of Medicine
Winston-Salem, North Carolina —HL-47887
2. Kaiser Permanente
Oakland, California —HL-47889
3. University of Southern California
Los Angeles, California —HL-47890
4. University of Colorado, Health
Sciences Center
Denver, Colorado —HL-47892
5. University of California
Los Angeles, California —HL-47902
6. University of Texas, Health
Sciences Center
San Antonio, Texas —HL-55208

Mode Selection Trial in Sinus Node Dysfunction (MOST), Initiated in Fiscal Year 1995

The purpose of this study is to determine whether dual chamber rate modulated pacing in patients with sick sinus syndrome improves event-free survival, leads to superior quality of life and functional status, and is more cost-effective than single chamber rate modulated pacing.

Obligations

Funding History:

Fiscal Year 1999—\$2,878,540
Fiscal Years 1995-98—\$7,815,151
Funding to Date—\$10,693,691

Current Active Organizations and Grant Numbers

1. Mount Sinai Medical Center
Miami Beach, Florida —HL-49804
2. Duke University
Durham, North Carolina —HL-53973
3. University of California
San Francisco, California —HL-55981

NHLBI Growth and Health Study, Initiated in Fiscal Year 1992

The purpose of this study is to examine factors involved in development of obesity and associated CVD risk factors over a 10-year period in a cohort of black and white girls recruited at 9 to 10 years of age. Results will be used to develop effective intervention programs for obesity prevention.

Obligations

Funding History:

Fiscal Year 1999—\$0
Fiscal Years 1992-98—\$16,947,946
Total Funding to Date—\$16,947,946

Current Active Organizations and Grant Numbers

1. Children's Hospital Medical Center
Cincinnati, Ohio —HL-48941
2. Westat, Inc.
Rockville, Maryland —HL-48942
3. Maryland Medical Research Institute
Baltimore, Maryland —HL-48943
4. University of California
Berkeley, California —HL-48944

Obesity Prevention in American Indians (PATHWAYS), Initiated in Fiscal Year 1993

See Chapter 11. Clinical Trials.

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

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

Obligations

Funding History:

Fiscal Year 1999—\$3,424,279
Fiscal Year 1998—\$2,234,393
Funding to Date—\$5,658,672

Current Active Organizations and Grant Numbers

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

Randomized Evaluation of Mechanical Assistance for the Treatment of Chronic Heart Failure (REMATCH), Initiated in Fiscal Year 1997

The objective of this study is to compare the effectiveness of a left ventricular assist device to medical therapy in reducing mortality among patients with heart failure who are not candidates for cardiac transplantation. Rigorous assessment of quality of life and cost-effectiveness of medical versus device therapy are also being conducted.

Obligations

Funding History:

Fiscal Year 1999—\$1,333,338

Fiscal Year 1997-98—\$3,055,994

Total Funding to Date—\$4,389,332

Current Active Organization and Grant Number

1. Columbia University Health Sciences
New York, New York —HL-53986

Strong Heart Study, Initiated in Fiscal Year 1988

The objective of this study is to survey CVD morbidity and mortality rates among three geographically diverse groups of American Indians and to estimate the levels of CVD risk factors. In Phase III, the feasibility of genetic and family studies is being explored.

Obligations

Funding History:

Fiscal Year 1999—\$1,979,046

Fiscal Years 1988-98—\$19,979,824

Funding to Date—\$21,948,870

Current Active Organizations and Grant Numbers

1. Medlantic Research Institute
Washington, D.C. —HL-41642
2. U.S. PHS Aberdeen Area
Indian Health Service
Rapid City, South Dakota —HL-41652
3. University of Oklahoma, Health
Sciences Center
Oklahoma City, Oklahoma —HL-41654

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

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

Obligations

Funding History:

Fiscal Year 1999—\$1,708,953

Fiscal Year 1997-98—\$3,238,084

Total Funding to Date—\$4,947,037

Current Active Organizations and Grant Numbers

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

Women's Estrogen/Progestin Lipid-Lowering Hormone Atherosclerosis Regression Trial (WELL-HART), Initiated in Fiscal Year 1995

The purpose of this study is to determine the effects of HRT on progression or regression of CHD in postmenopausal women by quantitative angiography.

Obligations

Funding History:

Fiscal Year 1999—\$1,131,434

Fiscal Years 1995-98—\$3,772,081

Total Funding to Date—\$4,903,515

Current Active Organization and Grant Number

1. University of Southern California
Los Angeles, California —HL-49298

Lung Diseases

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

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

Obligations

Funding History:

Fiscal Year 1999—\$5,399,251
Fiscal Years 1993-98—\$24,689,325
Total Funding to Date—\$30,088,576

Current Active Organizations and Grant Numbers

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

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

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

Obligations

Funding History:

Fiscal Year 1999—\$3,439,242
Fiscal Years 1992-98—\$22,321,962
Total Funding to Date—\$25,761,204

Current Active Organizations and Grant Numbers

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

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

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

Obligations

Funding History:

Fiscal Year 1999—\$1,986,190
Fiscal Year 1998—\$1,996,675
Total Funding to Date—\$3,982,865

Current Active Organizations and Grant Numbers

1. The Johns Hopkins University
Baltimore, Maryland —HL-59274
2. University of Minnesota, Twin Cities
Minneapolis, Minnesota —HL-59275
3. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-59276
4. Case Western Reserve University
Cleveland, Ohio —HL-50277
5. University of Utah
Salt Lake City, Utah —HL-59290
6. University of Alabama at Birmingham
Birmingham, Alabama —HL-59291
7. University of Manitoba
Winnipeg, Canada —HL-59292
8. University of California
Los Angeles, California —HL-59293
9. Mayo Foundation
Rochester, Minnesota —HL-59294
10. Oregon Health Sciences University
Portland, Oregon —HL-59320
11. Case Western Reserve University
Detroit, Michigan —HL-59739

Lymphangioleiomyomatosis (LAM) Registry, Initiated in Fiscal Year 1997

The purpose of this study is to establish a registry of individuals with LAM. The cohort of identified individuals will be used to characterize the clinical features of LAM and provide information on the natural course of the disease. Investigators will examine the clinical features of LAM patients who undergo lung transplantation and assess its efficacy.

Obligations

Funding History:

Fiscal Year 1999—\$420,329
Fiscal Year 1997-98—\$799,724
Funding to Date—\$1,220,053

Current Active Organization and Grant Number

1. Cleveland Clinic Foundation
Cleveland, Ohio —HL-58440

Pediatric Asthma Clinical Research Network, Initiated in Fiscal Year 1999

See Chapter 11. Clinical Trials.

Programs in Bronchopulmonary Dysplasia, Initiated in Fiscal Year 1999

The objectives of this cooperative program are to develop a multi-institutional research effort to address the mechanisms of postnatal lung pathobiology that lead to chronic lung disease and to provide a unique resource center of prematurely delivered baboon with induced bronchopulmonary dysplasia for study to investigators within the program.

Obligations

Funding History:

Fiscal Year 1999—\$4,165,127
Funding to Date—\$4,165,127

Current Active Organizations and Grant Numbers

1. Southwest Foundation for Biomedical Research
San Antonio, Texas —HL-52636
2. Brigham and Women's Hospital
Boston, Massachusetts —HL-52638
3. University of Texas, South West Medical Center
Dallas, Texas —HL-52647
4. University of California
San Francisco, California —HL-56061
5. National Jewish Medical and Research Center
Denver, Colorado —HL-56263
6. Barnes Jewish Hospital
St. Louis, Missouri —HL-63387
7. National Jewish Medical and Research Center
Denver, Colorado —HL-63397
8. University of Texas, South West Medical Center
Dallas, Texas —HL-63399
9. University of Rochester
Rochester, New York —HL-63400
10. Children's Hospital
Boston, Massachusetts —HL-63403

Sarcoidosis Genetic Linkage Consortium, Initiated in Fiscal Year 1999

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

Obligations

Funding History:

Fiscal Year 1999—\$1,653,707
Funding to Date—\$1,653,707

Current Active Organization and Grant Number

1. Case Western Reserve University
Detroit, Michigan —HL-60263

Scleroderma Lung Study, Initiated in Fiscal Year 1999

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

Obligations

Funding History:

Fiscal Year 1999—\$1,039,399
Funding to Date—\$1,039,399

Current Active Organizations and Grant Numbers

1. University of Medicine and Dentistry New Jersey
Piscataway, New Jersey —HL-60550
2. University of California
Los Angeles, California —HL-60587
3. The Johns Hopkins University
Baltimore, Maryland —HL-60597
4. University of California
Los Angeles, California —HL-60606
5. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-60607
6. Boston University
Boston, Massachusetts —HL-60682
7. University of Alabama
Birmingham, Alabama —HL-60748
8. Medical University of South Carolina
Charleston, South Carolina —HL-60750
9. National Jewish Medical and Research Center
Denver, Colorado —HL-60792
10. Georgetown University
Washington, D.C. —HL-60794
11. Virginia Mason Research Center
Seattle, Washington —HL-60823

- 12. Wayne State University
Detroit, Michigan —HL-60839
- 13. University of Illinois
Chicago, Illinois —HL-60895

National Center on Sleep Disorders Research

Sleep Heart Health Study, Initiated in Fiscal Year 1999

The purpose of this multicenter observational study is to determine the prevalence of and 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 1999—\$2,736,191

Total Funding to Date—\$2,736,191

Current Active Organizations and Grant Numbers

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

NHLBI Research Centers (P50 and P60) Programs

Specialized Centers of Research (P50) Program

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

NHLBI Specialized Centers of Research (P50)

| Areas of Concentration | Period of Operation | Obligations (Dollars in Thousands) | | |
|--|---------------------|------------------------------------|------------------|------------------|
| | | Prior to FY 1998* | FY 1999 | Total to Date* |
| Heart and Vascular Diseases Program | | | | |
| Gene Transfer Principles for Heart, Lung, and Blood Diseases | 1997- | \$10,382 | \$5,340 | \$15,722 |
| Ischemic Heart Disease in Blacks | 1995- | 9,635 | 2,708 | 12,343 |
| Ischemic Heart Disease, Sudden Cardiac Death, Heart Failure | 1995- | 54,288 | 15,079 | 69,367 |
| Molecular Genetics of Hypertension | 1996- | 25,650 | 9,261 | 34,911 |
| Molecular Medicine and Atherosclerosis | 1997- | 13,312 | 7,236 | 20,548 |
| Pediatric Cardiovascular Disease | 1993- | 16,444 | 6,704 | 23,148 |
| Subtotal, Heart and Vascular Diseases Program | | 129,711 | 46,328 | 176,039 |
| Lung Diseases Program | | | | |
| Acute Lung Injury | 1994- | 37,174 | 9,077 | 46,251 |
| Airway Biology and Pathogenesis of Cystic Fibrosis | 1988- | 30,239 | 5,224 | 35,463 |
| Cellular and Molecular Mechanisms of Asthma | 1996- | 24,900 | 10,753 | 35,653 |
| Pathobiology of Fibrotic Lung Disease | 1997- | 9,129 | 4,845 | 13,974 |
| Pathobiology of Lung Development | 1996- | 17,278 | 7,589 | 24,867 |
| Subtotal, Lung Diseases Program | | 118,720 | 37,488 | 156,208 |
| Blood Diseases and Resources Program | | | | |
| Hematopoietic Stem Cell Biology | 1995- | 14,722 | 3,705 | 18,427 |
| Hemostatic and Thrombotic Disorders | 1971- | 131,662 | 4,457 | 136,119 |
| Transfusion Biology and Medicine | 1985- | 40,031 | 4,737 | 44,768 |
| Subtotal, Blood Diseases and Resources Program | | 186,415 | 12,899 | 199,314 |
| National Center for Sleep Disorders Research | | | | |
| Neurobiology of Sleep and Sleep Apnea | 1988- | 4,267 | 4,279 | 8,546 |
| Subtotal, National Center for Sleep Disorders Research | | 4,267 | 4,279 | 8,546 |
| Total, Specialized Centers of Research (P50) | | \$439,113 | \$100,994 | \$540,107 |

Specialized Centers of Research (P50) Program

Heart and Vascular Diseases Program

Gene Transfer Principles for Heart, Lung, and Blood Diseases

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

Obligations

Fiscal Year 1999—\$5,340,000

Current Active Organizations and Grant Numbers

1. Cornell University Medical College
New York, New York —HL-59312
2. Baylor College of Medicine
Houston, Texas —HL-59314
3. Brigham and Women's Hospital
Boston, Massachusetts —HL-59316
4. University of Florida
Gainesville, Florida —HL-59412

Ischemic Heart Disease in Blacks

The purpose of this SCOR is to promote an interdisciplinary study of issues surrounding the expression of heart disease in blacks.

Obligations

Fiscal Year 1999—\$2,707,705

Current Active Organizations and Grant Numbers

1. University of Texas Southwest
Medical Center
Dallas, Texas —HL-55988
2. Boston University
Boston, Massachusetts —HL-55993

Ischemic Heart Disease, Sudden Cardiac Death, Heart Failure

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

Obligations

Fiscal Year 1999—\$15,079,476

Current Active Organizations and Grant Numbers

1. The Johns Hopkins University
Baltimore, Maryland —HL-52307
2. The Johns Hopkins University
Baltimore, Maryland —HL-52315
3. University of Cincinnati
Cincinnati, Ohio —HL-52318
4. University of California
Los Angeles, California —HL-52319
5. Brigham and Women's Hospital
Boston, Massachusetts —HL-52320
6. Indiana University-Purdue
University Indianapolis
Indianapolis, Indiana —HL-52323
7. University of Utah
Salt Lake City, Utah —HL-52338
8. University of California
San Diego, California —HL-53773
9. Baylor College of Medicine
Houston, Texas —HL-54313
10. Duke University
Durham, North Carolina —HL-54314

Molecular Genetics of Hypertension

The goals of this SCOR are to study the molecular genetics of hypertension, to provide understanding of the etiology and pathogenesis of hypertension, and to apply new knowledge for the improved diagnosis and management of the disease. Some of the subprojects have a large minority patient population.

Obligations

Fiscal Year 1999—\$9,260,711

Current Active Organizations and Grant Numbers

- | | |
|---|-----------|
| 1. Medical College of Wisconsin Milwaukee, Wisconsin | —HL-54998 |
| 2. Brigham and Women's Hospital Boston, Massachusetts | —HL-55000 |
| 3. Boston University Medical Center Boston, Massachusetts | —HL-55001 |
| 4. University of Southern California Los Angeles, California | —HL-55005 |
| 5. University of Iowa Hospitals Iowa City, Iowa | —HL-55006 |
| 6. Yale University School of Medicine New Haven, Connecticut | —HL-55007 |

Molecular Medicine and Atherosclerosis

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

Obligations

Fiscal Year 1999—\$7,236,270

Current Active Organizations and Grant Numbers

- | | |
|--|-----------|
| 1. Columbia University New York, New York | —HL-56984 |
| 2. Brigham and Women's Hospital Boston, Massachusetts | —HL-56985 |
| 3. Cornell University Medical College New York, New York | —HL-56987 |
| 4. University of California San Diego, California | —HL-56989 |
| 5. Beth Israel Deaconess Medical Center Boston, Massachusetts | —HL-56993 |

Pediatric Cardiovascular Diseases

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

Obligations

Fiscal Year 1999—\$6,704,168

Current Active Organizations and Grant Numbers

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

Lung Diseases Program

Acute Lung Injury

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

Obligations

Fiscal Year 1999—\$9,076,504

Current Active Organizations and Grant Numbers

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

Airway Biology and Pathogenesis of Cystic Fibrosis

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

Obligations

Fiscal Year 1999—\$5,223,902

Current Active Organizations and Grant Numbers

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

Cellular and Molecular Mechanisms of Asthma

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

Obligations

Fiscal Year 1999—\$10,753,099

Current Active Organizations and Grant Numbers

1. Brigham and Women's Hospital
Boston, Massachusetts —HL-56383
2. University of Chicago
Chicago, Illinois —HL-56399
3. Washington University
St. Louis, Missouri —HL-56419
4. University of California
San Francisco, California —HL-56385
5. University of New Mexico
Albuquerque, New Mexico —HL-56384
6. Yale University
New Haven, Connecticut —HL-56389
7. University of Wisconsin
Madison, Wisconsin —HL-56396

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 1999—\$4,844,476

Current Active Organizations and Grant Numbers

1. Boston University
Boston, Massachusetts —HL-56386
2. University of Michigan
Ann Arbor, Michigan —HL-56402
3. National Jewish Center for
Immunology and Respiratory Diseases
Denver, Colorado —HL-56556

Pathobiology of Lung Development

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

Obligations

Fiscal Year 1999—\$7,589,244

Current Active Organizations and Grant Numbers

1. Children's Hospital Medical Center
Cincinnati, Ohio —HL-56387
2. University of North Carolina
Chapel Hill, North Carolina —HL-56395
3. Children's Hospital of Boston
Boston, Massachusetts —HL-56398
4. Children's Hospital of Philadelphia
Philadelphia, Pennsylvania —HL-56401
5. University of Colorado Health
Science Center
Denver, Colorado —HL-57144

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 1999—\$3,705,000

Current Active Organizations and Grant Numbers

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

Hemostatic and Thrombotic Disorders

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

Obligations

Fiscal Year 1999—\$4,457,336

Current Active Organizations and Grant Numbers

1. Mt. Sinai School of Medicine
New York, New York —HL-54469
2. University of Pennsylvania
Philadelphia, Pennsylvania —HL-54500
3. University of Oklahoma
Oklahoma City, Oklahoma —HL-54502

Transfusion Biology and Medicine

This SCOR has been established to foster new approaches for improving the availability, efficacy, safety, and quality of blood and blood products for therapeutic uses. One of the centers has a large minority population.

Obligations

Fiscal Year 1999—\$4,737,296

Current Active Organizations and Grant Numbers

1. New York Blood Center
New York, New York —HL-54459
2. University of California, San Francisco
San Francisco, California —HL-54476
3. University of Pennsylvania
Philadelphia, Pennsylvania —HL-54516

National Center for Sleep Disorders Research

Neurobiology of Sleep and Sleep Apnea

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

Obligations

Fiscal Year 1998—\$4,279,149

Current Active Organizations and Grant Numbers

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

Comprehensive Sickle Cell Centers (P60) Program

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

Obligations

Fiscal Year 1999—\$17,350,000

Current Active Organizations and Grant Numbers

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

Center for AIDS Research (P30) Program

The NHLBI, along with five other NIH Institutes, contributes to the support of six Centers for AIDS Research (CFAR) that were established to provide a multidisciplinary environment that promotes basic, clinical, behavioral, and translational research activities in the prevention, detection, and treatment of HIV infection and AIDS. Almost half of the patient population comes from minority groups.

Obligations

Fiscal Year 1999—\$1,545,000

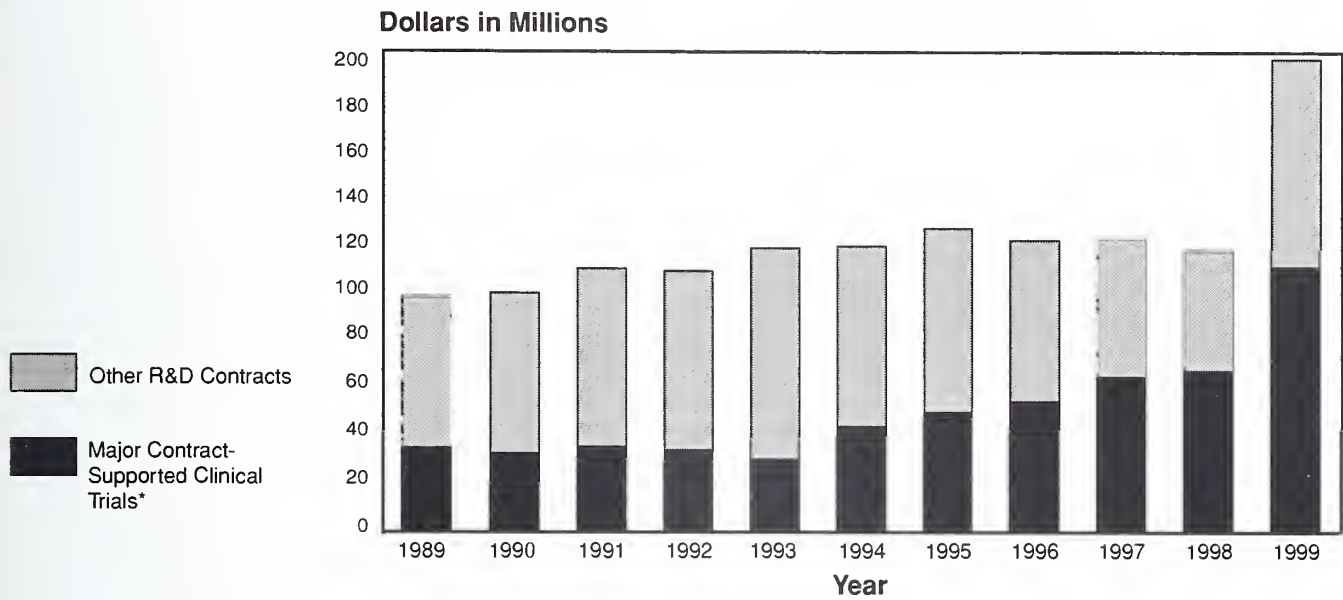
Current Active Organizations and Grant Numbers

| | | | |
|--|-----------|--|-----------|
| 1. University of Washington Seattle, Washington | —AI-27757 | 6. Miriam Hospital Providence, Rhode Island | —AI-42853 |
| 2. University of Alabama Birmingham, Alabama | —AI-27767 | 7. Northwestern University Chicago, Illinois | —CA-79458 |
| 3. University of California Los Angeles, California | —AI-28697 | 8. Emory University Atlanta, Georgia | —DA-12121 |
| 4. University of California San Diego, California | —AI-36214 | 9. University of California San Francisco, California | —MH-59037 |
| 5. Case Western Reserve University Cleveland, Ohio | —AI-36219 | | |



10. Research and Development Contracts

NHLBI Research and Development Contract Obligations*: Fiscal Years 1989-99



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

NHLBI Total Research and Development Contract Obligations: Fiscal Years 1989-99

(Dollars in Thousands)

| | Fiscal Year | | | | | | | | | | |
|---------------------------|-----------------|-----------------|------------------|------------------|------------------|------------------|------------------|-------------------|-------------------|-------------------|-------------------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Heart | \$63,944 | \$62,177 | \$61,070 | \$57,714 | \$66,717 | \$67,173 | \$70,178 | \$80,373 | \$84,820 | \$77,886 | \$93,270 |
| Lung | 9,169 | 10,338 | 16,910 | 16,977 | 18,552 | 21,957 | 15,414 | 21,032 | 18,183 | 13,123 | 25,432 |
| Blood | 23,607 | 25,862 | 30,725 | 32,980 | 32,280 | 29,122 | 40,324 | 19,522 | 18,934 | 25,695 | 15,436 |
| Women's Health Initiative | — | — | — | — | — | — | — | — | — | — | 63,100 |
| Total | \$96,720 | \$98,377 | \$108,705 | \$107,671 | \$117,549 | \$118,252 | \$125,916 | \$120,927* | \$121,937† | \$116,704‡ | \$197,238§ |

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

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

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

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

Major NHLBI Research and Development Contracts by Program*: Fiscal Year 1999

| | Total Obligations Prior to FY 1999 | Total FY 1999 Obligations | Total Obligations to Date |
|--|---------------------------------------|------------------------------|------------------------------|
| Heart and Vascular Diseases | | | |
| Atherosclerosis Risk in Communities (ARIC) | \$102,107,181 | \$40,312 | \$102,147,493 |
| Cardiovascular Health Study (CHS) | 58,495,194 | 6,309,999 | 64,805,193 |
| Circulatory Assist/Artificial Heart Program | 86,861,292 | 3,598,676 | 90,459,968 |
| Coronary Artery Risk Development in Young Adults (CARDIA) | 44,965,174 | 6,020,405 | 50,985,579 |
| Framingham Study | 27,261,172 | 6,773,587 | 34,034,759 |
| Innovative Ventricular Assist System (IVAS) | 22,530,059 | 4,235,957 | 26,766,016 |
| Jackson Heart Study (JHS) | 295,000 | 1,123,000 | 1,418,000 |
| Mammalian Genotyping Service (MGS) | 5,207,750 | 6,412,000 | 11,619,750 |
| Multi-Ethnic Study of Atherosclerosis (MESA) | 0 | 2,715,887 | 2,715,887 |
| Lung Diseases | | | |
| A Case-Controlled Etiologic Study of Sarcoidosis (ACCESS) | 8,494,284 | 1,217,744 | 9,712,028 |
| Interventions to Improve Asthma Management and Prevention at School | 5,451,325 | 1,243,453 | 6,694,778 |
| Pediatric Pulmonary and Cardiac Complications of HIV Infection (P2C2) | 39,714,927 | 0 | 39,714,927 |
| Blood Diseases and Resources | | | |
| Refinement of New Assays for Direct Detection of Viral Nucleic Acids in Donated Organs | 12,558,357 | 1,656,055 | 14,214,412 |
| Retrovirus Epidemiology Donor Study (REDS) | 43,407,061 | 8,413,818 | 51,820,879 |

* Excludes clinical trials included in Chapter 11.

Heart and Vascular Diseases Program

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

The ARIC 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 cerebrovascular disease 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 ethnic mix of their community whereas the fourth is exclusively black.

Obligations

Funding History:

Fiscal Year 1999—\$40,312
Fiscal Years 1985-98—\$102,107,181
Total Funding to Date—\$102,147,493

Current Active Organizations and Contract Numbers

1. University of North Carolina
Chapel Hill, North Carolina —HC-55015
2. Baylor College of Medicine
Houston, Texas —HC-55016
3. University of North Carolina
Chapel Hill, North Carolina —HC-55018
4. University of Minnesota
Minneapolis, Minnesota —HC-55019
5. The Johns Hopkins University
Baltimore, Maryland —HC-55020
6. Mississippi Medical Center
Jackson, Mississippi —HC-55021
7. University of Texas
Health Science Center
Houston, Texas —HC-55022

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

The CHS is a population-based, longitudinal study of risk factors for the development and progression of CHD and stroke in elderly adults. Specific objectives for this phase of the project include identifying risk association with clinical disease by accumulation of events, determining whether presence or progression of

* Formerly called "Coronary Heart Disease and Stroke in the Elderly Program."

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 1999—\$6,309,999

Fiscal Years 1988-98—\$58,495,194

Total Funding to Date—\$64,805,193

Current Active Organizations and Contract Numbers

1. University of Washington
Seattle, Washington —HC-85079
2. Bowman Gray School of Medicine
Wake Forest University
Winston-Salem, North Carolina —HC-85080
3. The Johns Hopkins University
Baltimore, Maryland —HC-85081
4. University of California
Davis, California —HC-85083
5. University of Vermont
Burlington, Vermont —HC-85086
6. The Johns Hopkins University
Baltimore, Maryland —HC-15103
7. Geisinger Medical Center
Danville, Pennsylvania —HC-45133
8. Georgetown University
Washington, D.C. —HC-35129
9. University of Wisconsin
Madison, Wisconsin —HC-75150
10. University of Pittsburgh
Pittsburgh, Pennsylvania —HC-85082

Circulatory Assist/Artificial Heart Program

This program focuses on electrical-mechanical, fully implantable circulatory support systems: ventricular assist devices and the total artificial heart. The basic research underlying this program is supported by research grants. Device development and clinical testing of devices are supported by contract.

Obligations

Funding History:

Fiscal Year 1999—\$3,598,676

Fiscal Years 1984-98—\$86,861,292

Total Funding to Date—\$90,459,968

Current Active Organizations and Contract Numbers

Biventricular Assist and Replacement Devices, Initiated in Fiscal Year 1988:

1. Cleveland Clinic Foundation
Cleveland, Ohio —HV-38128
2. Pennsylvania State University
Hershey, Pennsylvania —HV-38130

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

The major objective of this study is to describe and identify factors associated with the development of cardiovascular risk factors and early atherosclerosis in a cohort of black and white young adults. The fifth (Year 10) examination was completed in 1996, and a Year 15 examination, which will include a measure of subclinical atherosclerosis, is planned for 2000.

Obligations

Funding History:

Fiscal Year 1999—\$6,020,405

Fiscal Years 1984-98—\$44,965,174

Total Funding to Date—\$50,985,579

Current Active Organizations and Contract Numbers

1. University of California at Irvine
Irvine, California —HC-45134
2. University of Alabama at Birmingham
Birmingham, Alabama —HC-48047
3. University of Minnesota
Minneapolis, Minnesota —HC-48048
4. Northwestern University
Chicago, Illinois —HC-48049
5. Kaiser Permanente Division of Research
Oakland, California —HC-48050
6. University of Alabama at Birmingham
Birmingham, Alabama —HC-95095

Framingham Study

The Framingham Study is a longitudinal investigation of constitutional, environmental, and genetic factors influencing the development of CVD in men and women free of those conditions at the outset. In addition to the cohort of 5,209 men and women originally enrolled in the study, a second sample of nearly equal size consisting of offspring (and their spouses) was established in the 1970s. The offspring cohort permits the examination of numerous hypotheses about the familial clustering of CVD and CVD risk factors.

Obligations

Funding History:

Fiscal Year 1999—\$6,773,587

Fiscal Years 1983-98—\$27,261,173

Total Funding to Date—\$34,034,760

Current Active Organization and Contract Number

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

Innovative Ventricular Assist System (IVAS), Initiated in Fiscal Year 1995

The major objective of this research is to encourage the development of totally implantable ventricular assist systems that are designed to achieve at least a 5-year life-time with 90 percent reliability.

Obligations

Funding History:

Fiscal Year 1999—\$4,235,957

Fiscal Years 1995-98—\$22,530,059

Total Funding to Date—\$26,766,016

Current Active Organizations and Contract Numbers

1. Abiomed, Inc.
Danvers, Massachusetts —HV-58154
2. Nimbus, Inc.
Rancho Cordova, California —HV-58155
3. Pennsylvania State University
University Park, Pennsylvania —HV-58156
4. Transcoil, Inc.
Trooper, Pennsylvania —HV-58157
5. Whalen Biomedical, Inc.
Cambridge, Massachusetts —HV-58158
6. Cleveland Clinic Foundation
Cleveland, Ohio —HV-58159

Jackson Heart Study (JHS), Initiated in Fiscal Year 1998

A single-site epidemiologic study of CVD in blacks, similar to those previously established in Framingham, MA, and Honolulu, HI, with primary goals of (1) identifying risk factors for development and progression of CVD; (2) enhancing recruitment, cohort retention, and scientific productivity of the existing Jackson site of the ARIC study; (3) 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 1999—\$1,123,000*

Fiscal Year 1998—\$295,000*

Total Funding to Date—\$1,418,000

Current Active Organization and Contract Number

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 NHLBI Mammalian Genotyping Service provides genotyping to meritorious projects involving humans, mice, and rats in all disease areas. This service 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 4 million genotypes per year.

Obligations

Funding History:

Fiscal Year 1999—\$6,412,000

Fiscal Years 1994-98—\$5,207,750

Total Funding to Date—\$11,619,750

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 object of this investigation is to examine the characteristics of subclinical CVD (detected noninvasively before clinical signs and symptoms appear) that predict progression to clinically overt CVD in a diverse population consisting of approximately 40 percent whites, 30 percent blacks, 20 percent Hispanics, and 10 percent Asians. Risk factors that predict subclinical disease, as well as its progression to clinically overt CVD, will also be studied.

*Additional funding is provided by the NIH Office of Research on Minority Health (ORMH).

Obligations

Funding History:

Fiscal Year 1999—\$2,715,887

Total Funding to Date—\$2,715,887

Current Active Organizations and Contract Numbers

| | |
|--|-----------|
| 1. University of Washington Seattle, Washington | —HC-95159 |
| 2. University of California Los Angeles, California | —HC-95160 |
| 3. Columbia University New York, New York | —HC-95161 |
| 4. The Johns Hopkins University Baltimore, Maryland | —HC-95162 |
| 5. University of Minnesota Minneapolis, Minnesota | —HC-95163 |
| 6. Northwestern University Chicago, Illinois | —HC-95164 |
| 7. Wake Forest University Winston-Salem, North Carolina | —HC-95165 |
| 8. University of Vermont Colchester, Vermont | —HC-95166 |
| 9. New England Medical Center Boston, Massachusetts | —HC-95167 |
| 10. The Johns Hopkins University Baltimore, Maryland | —HC-95168 |
| 11. UCLA Medical Center Research and Education Institute Los Angeles, California | —HC-95169 |

Lung Diseases Program

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

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

Obligations

Funding History:

Fiscal Year 1999—\$1,217,744

Fiscal Years 1995-98—\$8,494,284

Total Funding to Date—\$9,712,028

Current Active Organizations and Contract Numbers

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

Interventions to Improve Asthma Management and Prevention at School, Initiated in Fiscal Year 1995

This is a program to develop and evaluate innovative interventions to ensure optimal asthma management and prevention at school. The objectives are to identify cost-effective measures to improve recognition and appropriate referral of children with uncontrolled asthma; reduce children's exposure to known allergens and irritants; increase participation of students with asthma in all school activities; improve support to students for following their asthma management plans; and improve communication between the school and home. The project emphasizes the development of model programs for country wide use, with particular attention on rural minorities and inner-city populations.

Obligations

Funding History:

Fiscal Year 1999—\$1,243,453

Fiscal Years 1995-98—\$5,451,325

Total Funding to Date—\$6,694,778

Current Active Organizations and Contract Numbers

1. University of Alabama
Birmingham, Alabama —HR-56077
2. University of Michigan at Ann Arbor
Ann Arbor, Michigan —HR-56078
3. University of Texas Health Science
Center at Houston
Houston, Texas —HR-56079

Pediatric Pulmonary and Cardiac Complications of HIV Infection (P2C2), Initiated in Fiscal Year 1989

This multicenter natural history study, in a primarily minority population, is designed to identify and follow the course of lung and cardiovascular diseases that occur in pediatric patients with all stages of vertically transmitted HIV infection.

Obligations

Funding History:

Fiscal Year 1999—\$0

Fiscal Years 1989-98—\$39,714,927

Total Funding to Date—\$39,714,927

Current Active Organizations and Contract Numbers

1. Cleveland Clinic Foundation
Cleveland, Ohio —HR-96037
2. University of California, Los Angeles
Los Angeles, California —HR-96038
3. Baylor College of Medicine
Houston, Texas —HR-96040
4. Children's Hospital Corporation
Boston, Massachusetts —HR-96041
5. Mt. Sinai School of Medicine
New York, New York —HR-96042
6. Presbyterian Hospital
New York, New York —HR-96043

Blood Diseases and Resources Program

Refinement of New Assays for Direct Detection of Viral Nucleic Acids in Donated Blood, Initiated in Fiscal Year 1996

This program will refine, for use in clinical laboratories, one or more nucleic acid-based techniques for the direct detection of blood-borne viruses (HIV and hepatitis C are the highest priority) in donors of blood for transfusion. The purpose of the new technique is to reduce the antibody-negative window between infectivity and detection to the shortest possible time.

Obligations

Funding History:

Fiscal Year 1998—\$1,656,055

Fiscal Years 1996-98—\$12,558,357

Total Funding to Date—\$14,214,412

Current Active Organization and Contract Number

1. Gen-Probe, Inc.
San Diego, California —HB-67130

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

This program was established to determine the prevalence of retrovirus-positivity in blood donors, a majority of whom are minority. Researchers are evaluating the demographic, risk factor, and behavioral characteristics of blood donors with high risks who continue to donate. A blood specimen repository is also being established as a mechanism for evaluating new tests for known viruses and as a sentinel for as-yet-unrecognized viruses.

Obligations

Funding History:

Fiscal Year 1999—\$8,413,818

Fiscal Years 1989-98—\$43,407,061

Total Funding to Date—\$51,820,879

Current Active Organizations and Contract Numbers

1. University of California, San Francisco
San Francisco, California —HB-47114
2. Oklahoma Blood Institute
Oklahoma City, Oklahoma —HB-97078
3. American Red Cross, Greater
Chesapeake and Potomac Region
Baltimore, Maryland —HB-97079
4. American Red Cross
Southern California
Los Angeles, California —HB-97080
5. American Red Cross
Southeastern Michigan Region
Detroit, Michigan —HB-97081
6. Westat
Rockville, Maryland —HB-97082



11. Clinical Trials

A clinical trial is defined as a scientific research study undertaken with human subjects to evaluate prospectively the diagnostic, prophylactic, or therapeutic effect of a drug, device, regimen, or procedure used or intended ultimately for use in

the practice of medicine or the prevention of disease. A clinical trial is planned and conducted prospectively and includes a concurrent control group or other appropriate comparison group.

NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 1989-99

Research Grants and Cooperative Agreements (Dollars in Thousands)

| | Fiscal Year | | | | | | | | | | |
|--|-------------|---------|---------|-------|-------|-------|-------|-------|-------|------|------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Heart and Vascular Diseases | | | | | | | | | | | |
| Program on Surgical Control of Hyperlipidemias (POSCH) | \$2,394 | \$1,902 | \$1,584 | \$— | \$485 | \$500 | \$538 | \$566 | \$294 | \$— | \$— |
| Exercise Training and Plasma Lipoproteins in Man | 621 | — | — | — | — | — | — | — | — | — | — |
| Physicians' Health Study | 655 | 645 | 555 | — | — | — | — | — | — | — | — |
| Stanford Coronary Risk Intervention Program (SCRIP) | 1,485 | 1,410 | 354 | 382 | — | — | — | — | — | — | — |
| Continuation of Trial of Antihypertensive Intervention Management (COTAIM) | 1,914 | 1,780 | 614 | — | — | — | — | — | — | — | — |
| Polyunsaturates and KCL to Control Mild Hypertension | 266 | 272 | 328 | — | — | — | — | — | — | — | — |
| Boston Area Anticoagulation Trial for Atrial Fibrillation | 495 | 479 | 370 | — | — | — | — | — | — | — | — |
| Electrophysiologic Study vs. Electrocardiographic Monitoring (ESVEM) | 959 | 794 | 904 | 740 | — | — | — | — | — | — | — |
| Prevention of Coronary Aneurysm in Kawasaki Syndrome | 822 | — | — | — | — | — | — | — | — | — | — |
| Sodium-Potassium Blood Pressure Trial in Children | 563 | 206 | 205 | — | — | — | — | — | — | — | — |
| Treatment of Mild Hypertension Study (TOMHS) | — | 1,931 | 962 | — | — | — | — | — | — | — | — |
| Optimal Exercise Regimens for Persons at Increased Risk | 520 | — | — | — | — | — | — | — | — | — | — |
| Myocarditis Treatment Trial | 1,591 | — | 247 | — | — | — | — | — | — | — | — |
| Diuretics, Hypertension, and Arrhythmias Clinical Trial | 41 | 127 | — | — | — | — | — | — | — | — | — |
| Recurrent Carotid Stenosis | 186 | 120 | — | — | — | — | — | — | — | — | — |
| Coronary Artery Surgery Study Follow-up | — | — | 644 | 670 | — | — | — | — | — | — | — |
| Training Levels Comparison Trial | 395 | 339 | 245 | — | — | — | — | — | — | — | — |
| Controlled Trial to Reverse Coronary Atherosclerosis | 438 | 459 | 180 | — | — | — | — | — | — | — | — |
| Cardiac Arrest in Seattle: Conventional vs. Amiodarone Drug Evaluation (CASCADE) | 627 | 664 | 668 | — | — | — | — | — | — | — | — |
| Emory Angioplasty Versus Surgery Trial (EAST) | 1,430 | 1,877 | 1,951 | — | 277 | 288 | 296 | 296 | — | — | — |
| Asymptomatic Carotid Artery Plaque Study (ACAPS) | 1,170 | 843 | 901 | 1,255 | — | — | 66 | 70 | — | — | — |
| Myocardial Infarction Triage and Intervention Project (MITI) | 643 | 624 | 539 | — | — | — | — | — | — | — | — |
| Infant Heart Surgery: Central Nervous System Sequelae of Circulatory Arrest | 588 | 623 | 720 | 770 | 756 | 516 | 598 | 699 | 685 | 582 | 584 |
| Lifestyle Heart Trial | 515 | 530 | 604 | 524 | — | — | — | — | — | — | — |
| Thrombolysis in Myocardial Ischemia (T3) | 4,029 | 1,957 | 4,011 | 636 | — | — | — | — | — | — | — |
| Do Fish Oils Prevent Restenosis Postcoronary Angioplasty?* | 1,069 | 1,352 | 1,452 | 750 | — | — | — | — | — | — | — |

NHLBI Investigator-Initiated Clinical Trials: Fiscal Year 1989-99 (continued)

Research Grants and Cooperative Agreements (Dollars in Thousands)

| | Fiscal Year | | | | | | | | | | |
|---|-------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Heart and Vascular Diseases (continued) | | | | | | | | | | | |
| Prevention of Early Readmission in Elderly Congestive Heart Failure Patients | — | 90 | 106 | 108 | 112 | 77 | — | — | — | — | — |
| MRFIT Follow-up and Analysis | — | 350 | 358 | 387 | 402 | 418 | — | — | — | — | — |
| Multicenter Unsustained Tachycardia Trial (MUSTT)* | — | — | 2,029 | 2,072 | 2,092 | 2,095 | 1,958 | 504 | — | — | — |
| Trial of Vitamin E and Aspirin in Nurses | — | — | 2,990 | 1,170 | 1,393 | 1,488 | 1,426 | 1,434 | 1,473 | 1,536 | 1,530 |
| Diet and Exercise for Elevated Risk (DEER) | — | — | 717 | 775 | 805 | 703 | — | — | — | — | — |
| Cardiovascular Risk Factors and Menopause | — | — | — | 539 | 610 | 601 | 451 | 478 | 494 | 528 | 186 |
| Sodium Sensitivity in African Americans | — | — | — | 686 | 492 | 97 | 249 | — | — | — | — |
| Montreal Heart Attack Readjustment Trial (M-HART) | — | — | — | 271 | 298 | 340 | — | — | — | — | — |
| Stress Reduction in Elderly Blacks With Hypertension | — | — | — | 296 | 321 | 338 | 321 | — | — | — | — |
| Trial of Nonpharmacologic Intervention in the Elderly (TONE) | — | — | — | 749 | 1,038 | 796 | 729 | — | — | — | — |
| CABG Patch Trial* | — | — | — | — | 3,362 | 3,117 | 1,344 | 988 | 1,171 | — | — |
| Women's Antioxidant and Cardiovascular Study (WACS) | — | — | — | — | 586 | 612 | 620 | 643 | 501 | 525 | 540 |
| Oral Calcium in Pregnant Women With Hypertension | — | — | — | — | 280 | 290 | 306 | 320 | 332 | — | — |
| Stress Reduction and Hypertensive Heart Disease in Blacks | — | — | — | — | — | 219 | 330 | 403 | 407 | 40 | 326 |
| 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 | — |
| HDL-Atherosclerosis Treatment Study | — | — | — | — | — | 484 | 480 | 427 | 445 | 340 | — |
| 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 |
| Mode Selection Trial in Sinus Node Dysfunction (MOST)* | — | — | — | — | — | — | 2,163 | 1,857 | 2,096 | 1,700 | 2,879 |
| 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* | — | — | — | — | — | — | — | 476 | 244 | 305 | — |
| Soy Estrogen Alternative Study (SEA) | — | — | — | — | — | — | — | 219 | 217 | 221 | — |
| REMATCH Trial* | — | — | — | — | — | — | — | — | 1,258 | 1,798 | 1,333 |
| Dietary Patterns, Sodium Intake, and Blood Pressure (DASH 2)*† | — | — | — | — | — | — | — | — | 2,233 | 3,693 | 3,646 |
| Sudden Cardiac Death in Heart Failure Trial (SCD-HeFT)* | — | — | — | — | — | — | — | — | 1,571 | 1,667 | 1,709 |
| CVD Risk and Health in Postmenopausal Phytoestrogen Users | — | — | — | — | — | — | — | — | 631 | 662 | 574 |
| Treatment of Hypertension with Two Exercise Intensities | — | — | — | — | — | — | — | — | 359 | 474 | 473 |

* Paid by U01/U10

NHLBI Investigator-Initiated Clinical Trials: Fiscal Years 1989-99 (continued)

Research Grants and Cooperative Agreements (Dollars in Thousands)

| | Fiscal Year | | | | | | | | | | |
|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|---------------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Heart and Vascular Diseases (continued) | | | | | | | | | | | |
| Prevention of Recurrent Venous Thromboembolism (PREVENT) | — | — | — | — | — | — | — | — | — | 1,242 | 894 |
| PREMIER: Lifestyle Interventions for Blood Pressure Control* | — | — | — | — | — | — | — | — | — | 2,234 | 2,698 |
| Azithromycin and Coronary Events Study (ACES) * | — | — | — | — | — | — | — | — | — | 847 | 2,663 |
| Antiarrhythmic Effects of N-3 Fatty Acids | — | — | — | — | — | — | — | — | — | — | 514 |
| Fatty Acid Antiarrhythmia Trial (FAAT) | — | — | — | — | — | — | — | — | — | — | 519 |
| Open Artery Trial | — | — | — | — | — | — | — | — | — | — | 1,628 |
| Subtotal, Heart and Vascular Diseases | 23,416 | 19,374 | 24,238 | 12,780 | 13,309 | 16,098 | 15,987 | 13,673 | 19,239 | 23,265 | 25,120 |
| Lung Diseases | | | | | | | | | | | |
| Human Surfactant Treatment of Respiratory Distress Syndrome | 270 | — | — | — | — | — | — | — | — | — | — |
| Trial of Inspiratory Muscle Rest and Exercise in Chronic Obstructive Lung Disease | 34 | — | — | — | — | — | — | — | — | — | — |
| Extracorporeal Carbon Dioxide Removal for Adult Respiratory Distress Syndrome | 237 | — | — | — | — | — | — | — | — | — | — |
| Emphysema: Physiologic Effects of Nutritional Support | — | 215 | 224 | 230 | 246 | 155 | — | — | — | — | — |
| Cardiopulmonary Effects of Ibuprofen in Human Sepsis* | — | 799 | 725 | 792 | 886 | 683 | — | — | — | — | — |
| Inhaled Beclomethasone to Prevent Chronic Lung Disease* | — | — | — | — | 583 | 690 | 738 | 551 | 436 | — | — |
| Lung Health Study II*† | — | — | — | — | 594 | 3,307 | 4,434 | 3,183 | 3,508 | 980 | — |
| Lung Health Study-Long-term Follow-up* | — | — | — | — | — | — | — | — | — | 1,997 | 1,986 |
| Asthma Clinical Research Network* | — | — | — | — | — | — | — | — | — | 5,849 | 5,399 |
| Fetal Tracheal Occlusion for Severe Diaphragmatic Hernia | — | — | — | — | — | — | — | — | — | — | 419 |
| Scleroderma Lung Study | — | — | — | — | — | — | — | — | — | — | 1,040 |
| Subtotal, Lung Diseases | 541 | 1,014 | 949 | 1,022 | 2,309 | 4,835 | 5,172 | 3,734 | 3,944 | 8,826 | 8,844 |
| Blood Diseases and Resources | | | | | | | | | | | |
| Erythropoietin for Anemia Due to Zidovudine in Human Immunodeficiency Virus Infection | 251 | 229 | — | — | — | — | — | — | — | — | — |
| Multicenter Study of Hydroxyurea in Patients With Sickle Cell Anemia - Phase II* | — | — | 1,999 | 3,139 | 3,221 | 3,271 | 1,238 | — | — | — | — |
| Chelation Therapy of Iron Overload With Pyridoxal Isonicotinoyl Hydrazone (PIH) | 202 | 203 | 211 | 220 | 218 | — | — | — | — | — | — |
| Trial To Reduce Alloimmunization to Platelets (TRAP) - Extension† | — | — | — | — | — | 2,510 | 1,246 | 263 | — | — | — |
| Stroke Prevention in Sickle Cell Anemia (STOP)* | — | — | — | — | — | 2,751 | 3,257 | 2,435 | 2,584 | 2,036 | — |
| Pediatric Hydroxyurea in Sickle Cell Anemia (PED HUG) | — | — | — | — | — | 146 | 250 | 260 | 270 | — | — |
| Subtotal, Blood Diseases and Resources | 453 | 432 | 2,210 | 3,359 | 3,439 | 8,678 | 5,991 | 2,958 | 2,854 | 2,036 | — |
| Total, NHLBI | \$24,410 | \$20,820 | \$27,397 | \$17,161 | \$19,057 | \$29,611 | \$27,150 | \$20,365 | \$26,037 | \$34,127 | 33,964 |

* Paid by U01/U10.

† Previously an Institute-Initiated Clinical Trial.

NHLBI Investigator-Initiated Clinical Trials, Fiscal Year 1999: Summary by Program

| | Total Obligations Prior to FY 1999 | Total FY 1999 Obligations | Total Obligations to Date |
|---|---------------------------------------|------------------------------|------------------------------|
| Heart and Vascular Diseases | | | |
| Antiarrhythmic Effects of N-3 Fatty Acids | \$ 0 | \$ 514,003 | \$ 514,003 |
| Azithromycin and Coronary Events Study (ACES) | 847,117 | 2,663,325 | 3,510,442 |
| Cardiovascular Risk Factors and the Menopause | 3,700,262 | 186,229 | 3,886,491 |
| CVD Risk and Health in Postmenopausal Phytoestrogen Users | 1,292,665 | 573,984 | 1,866,649 |
| Dietary Patterns, Sodium Intake and Blood Pressure (DASH 2) * | 5,926,156 | 3,645,974 | 9,572,130 |
| Enalapril After Anthracycline Cardiotoxicity | 3,454,153 | 0 | 3,454,153 |
| Estrogen and Graft Atherosclerosis Research Trial * | 1,025,774 | 0 | 1,025,774 |
| Estrogen Replacement and Atherosclerosis (ERA) Trial * | 5,229,355 | 1,017,000 | 6,246,355 |
| Fatty Acid Antiarrhythmia Trial (FAAT) | 0 | 519,377 | 519,377 |
| HDL-Atherosclerosis Treatment Study | 2,176,197 | 0 | 2,176,197 |
| Infant Heart Surgery: Central Nervous System Sequelae of Circulatory Arrest | 6,536,115 | 583,927 | 7,120,042 |
| Mode Selection Trial in Sinus Node Dysfunction (MOST) * | 7,815,151 | 2,878,540 | 10,693,691 |
| Open Artery Trial | 0 | 1,627,533 | 1,627,533 |
| Oral Calcium in Pregnant Women with Hypertension | 1,527,781 | 0 | 1,527,781 |
| Postmenopausal Hormone Therapy in Unstable Angina | 1,045,368 | 276,292 | 1,321,660 |
| PREMIER: Lifestyle Interventions for Blood Pressure Control | 2,234,393 | 2,697,471 | 4,931,864 |
| Prevention of Recurrent Venous Thromboembolism (PREVENT) | 1,241,607 | 894,040 | 2,135,647 |
| REMATCH Trial * | 3,055,994 | 1,333,338 | 4,389,332 |
| Shock Trial: Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock? | 4,798,763 | 0 | 4,798,763 |
| Stress Reduction and Hypertensive Heart Disease in Blacks | 1,399,184 | 326,249 | 1,725,433 |
| Sudden Cardiac Death in Heart Failure Trial (SCD-HeFT) * | 3,238,084 | 1,708,953 | 4,947,037 |
| Treatment of Hypertension With Two Exercise Intensities | 832,543 | 472,827 | 1,305,370 |
| Trial of Vitamin E and Aspirin in Women | 12,910,446 | 1,529,729 | 14,440,175 |
| Women's Antioxidant and Cardiovascular Study (WACS) | 3,486,405 | 540,137 | 4,026,542 |
| Women's Estrogen/Progestin Lipid-Lowering Hormone Atherosclerosis Regression Trial (WELL-HART) * | 3,771,881 | 1,131,434 | 4,903,315 |
| Subtotal, Heart and Vascular Diseases | 77,545,394 | 25,120,362 | 102,665,756 |
| Lung Diseases | | | |
| Asthma Clinical Research Network ** | 5,849,329 | 5,399,251 | 11,248,580 |
| Fetal Tracheal Occlusion for Severe Diaphragmatic Hernia | 0 | 418,850 | 418,850 |
| Lung Health Study II ** | 16,007,755 | 0 | 16,007,755 |
| Lung Health Study - Long Term Follow-up ** | 1,996,675 | 1,986,190 | 3,982,865 |
| Scleroderma Lung Study* | 0 | 1,039,399 | 1,039,399 |
| Subtotal, Lung Diseases | 23,853,759 | 8,843,690 | 32,697,449 |
| Blood Diseases and Resources | | | |
| Stroke Prevention in Sickle Cell Anemia (STOP)* | 13,062,252 | 0 | 13,062,252 |
| Subtotal, Blood Diseases and Resources | 13,062,252 | 0 | 13,062,252 |
| Total, NHLBI | \$114,461,405 | \$33,964,052 | \$148,425,457 |

*Indicates paid by U01/U10.

+Previously an Institute-Initiated Clinical Trial.

Institute-Initiated Clinical Trials: Fiscal Years 1989-99

Contracts

(Dollars in Thousands)

| | Fiscal Year | | | | | | | | | | |
|--|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Heart and Vascular Diseases | | | | | | | | | | | |
| Lipid Research Clinics | \$1,117 | \$485 | \$967 | \$574 | \$11 | \$622 | \$583 | \$660 | \$650 | \$685 | — |
| Systolic Hypertension in the Elderly Program (SHEP) | 3,820 | 2,887 | 1,295 | 404 | 369 | — | — | — | — | — | — |
| Studies of Left Ventricular Dysfunction (SOLVD) | 6,634 | 4,855 | 2,325 | 902 | — | — | — | — | — | — | — |
| Cardiac Arrhythmia Suppression Trial (CAST) | 8,968 | 9,988 | 4,872 | 2,193 | — | 29 | — | — | — | — | — |
| Postcoronary Artery Bypass Graft (CABG) Study* | 4,050 | 2,832 | 3,628 | 5,195 | 213 | — | — | — | — | — | — |
| Prevention and Treatment of Hypertension Study (PATHS) | 195 | 399 | 787 | 564 | 585 | — | — | — | — | — | — |
| Effects of Digitalis on Survival in Patients With Congestive Heart Failure | — | 604 | 2,619 | 3,272 | 3,464 | 270 | 2,235 | — | — | — | — |
| Asymptomatic Cardiac Ischemia Pilot Study (ACIP) | — | — | 2,862 | 2,720 | 630 | 210 | 7 | — | — | — | — |
| Psychophysiological Investigations of Myocardial Ischemia (PIMI) | — | — | 335 | 1,400 | 1,400 | 433 | 165 | — | — | — | — |
| Arterial Disease Multifactorial Intervention Trial (ADMIT) | — | — | — | 663 | 2,062 | 2,341 | 395 | — | — | — | — |
| Raynaud's Treatment Study | — | — | — | 339 | 1,131 | 2,532 | 1,664 | 221 | 19 | — | — |
| Antiarrhythmic Versus Implantable Defibrillator (AVID) | — | — | — | 250 | 1,203 | 1,068 | 5,348 | 2,475 | — | 871 | 548 |
| Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT) | — | — | — | — | 2,760 | 10,914 | 3,412 | 9,676 | 15,943 | 17,119 | — |
| Activity Counseling Trial (ACT) | — | — | — | — | — | 1,260 | 5,000 | — | 2,167 | 2,439 | — |
| Postmenopausal Estrogen/Progestin Interventions (PEPI) | — | — | — | — | — | 600 | 1,305 | — | 3 | 170 | — |
| Enhancing Recovery in Coronary Heart Disease Patients (ENRICHED) | — | — | — | — | — | — | 1,871 | 6,993 | 6,837 | 5,904 | 3,303 |
| Atrial Fibrillation Follow-up: Investigation in Rhythm Management (AFFIRM) | — | — | — | — | — | — | 883 | 2,510 | 6,330 | — | 3,785 |
| 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 |
| Women's Ischemia Syndrome Evaluation (WISE) | — | — | — | — | — | — | — | 1,577 | 133 | 2,932 | 856 |
| Prevention of Events With Angiotensin Converting Enzyme Inhibitor Therapy (PEACE) | — | — | — | — | — | — | — | 3,632 | 2,838 | 2,836 | 2,850 |
| Magnesium in Coronaries (MAGIC) | — | — | — | — | — | — | — | — | — | 1,169 | 2,009 |
| Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness (ESCAPE) | — | — | — | — | — | — | — | — | — | — | 1,750 |
| Prevention of Cardiovascular Disease in Diabetes Mellitus (PCDD) | — | — | — | — | — | — | — | — | — | — | 4,130 |
| Public Access Defibrillation (PAD) Community Trial | — | — | — | — | — | — | — | — | — | — | 2,923 |
| Subtotal, Heart and Vascular Diseases | 24,784 | 22,050 | 19,690 | 18,476 | 13,828 | 20,279 | 25,368 | 29,910 | 40,111 | 38,490 | 26,032 |
| Lung Diseases | | | | | | | | | | | |
| Lung Health Study I | 5,349 | 5,875 | 7,016 | 10,496 | — | 3,398 | 650 | 350 | — | — | — |
| Childhood Asthma Management Program (CAMP) | — | — | 1,289 | — | 11,361 | 9,745 | 5,096 | 7,977 | 5,695 | — | 6,551 |
| Acute Respiratory Distress Syndrome Clinical Network (ARDSNET) | — | — | — | — | — | 1,800 | 4,170 | 4,337 | 4,510 | 4,880 | 6,837 |
| National Emphysema Treatment Trial (NETT) | — | — | — | — | — | — | — | — | 2,710 | 3,367 | 7,545 |
| Retinoid Treatment in Emphysema: Feasibility Studies | — | — | — | — | — | — | — | — | — | — | 884 |
| Subtotal, Lung Diseases | 5,349 | 5,875 | 8,305 | 10,496 | 11,361 | 14,943 | 9,916 | 12,664 | 12,915 | 8,247 | 21,817 |

Institute-Initiated Clinical Trials: Fiscal Years 1989-99 (continued)

Contracts

(Dollars in Thousands)

| | Fiscal Year | | | | | | | | | | |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Blood Diseases and Resources | | | | | | | | | | | |
| Clinical Course of Sickle Cell Disease | 2,361 | 2,118 | 1,609 | 2,161 | 1,756 | 2,390 | 4,375 | 376 | 205 | 2,144 | 350 |
| Penicillin Prophylaxis in Sickle Cell Disease (PROPS II) | | 686 | 860 | 1,013 | 1,058 | 1,095 | 226 | — | — | — | — |
| Anti-HIV Immunoglobulin (HIVIG) in Prevention of Maternal-Fetal HIV Transmission | — | — | 3,016 | — | — | 3,016 | 1,819 | 706 | — | — | — |
| T-Cell Depletion in Unrelated Donor Marrow | — | — | — | — | — | 1,310 | 1,917 | 1,461 | 639 | 2,228 | 690 |
| Viral Activation Transfusion Study (VATS) | — | — | — | — | — | — | 5,000 | 5,647 | 2,353 | 1,668 | — |
| Cord Blood Stem Cell Transplantation Study | — | — | — | — | — | — | — | 1,419 | 6,573 | 12,530 | 1,456 |
| Multicenter Study of Hydroxyurea in Sickle Cell Anemia Adult Follow-up (MSH) | — | — | — | — | — | — | — | 703 | 472 | 475 | — |
| Subtotal, Blood Diseases and Resources | 3,047 | 2,978 | 5,638 | 3,219 | 2,851 | 6,942 | 13,111 | 10,312 | 10,242 | 19,045 | 2,496 |
| Women's Health Initiative (WHI) | — | — | — | — | — | — | — | — | — | — | 59,100 |
| Total, NHLBI, Contracts | \$33,180 | \$30,903 | \$33,633 | \$32,191 | \$28,040 | \$42,164 | \$48,395 | \$52,886 | \$63,268 | \$65,782 | \$109,445 |

* Gift Fund (unappropriated) used—\$322,000 - FY 89; \$447,000 - FY 90; \$4,662,000 - FY 94; \$1,320,000 - FY95; and \$917,720 - FY 96.

Institute-Initiated Clinical Trials: Fiscal Years 1989-99

Cooperative Agreements

(Dollars in Thousands)

| | Fiscal Year | | | | | | | | | | |
|--|-------------|---------|---------|---------|---------|---------|---------|--------|--------|-------|-------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Heart and Vascular Diseases | | | | | | | | | | | |
| Trials of Hypertension Prevention (TOHP) | \$4,774 | \$5,760 | \$6,846 | \$5,435 | \$5,111 | \$4,385 | \$1,240 | \$649 | \$— | \$— | \$— |
| Dietary Intervention Study in Children (DISC) | 3,023 | 4,616 | 2,154 | 2,018 | 1,686 | 1,615 | 1,625 | 1,625 | 746 | — | — |
| Bypass Angioplasty Revascularization Investigation (BARI) | 5,539 | 6,216 | 6,309 | 3,952 | 3,978 | 3,965 | 3,882 | 2,757 | 2,894 | 1,360 | 1,609 |
| Postmenopausal Estrogen/Progestin Interventions (PEPI) | 1,336 | 2,158 | 2,801 | 2,554 | 1,516 | 1,109 | 584 | 331 | — | — | — |
| Child and Adolescent Trial for Cardiovascular Health (CATCH) | 1,977 | 1,012 | 5,920 | 5,501 | 6,077 | 2,586 | 2,342 | 2,682 | 3,956 | 572 | 210 |
| Cholesterol Reduction in Seniors Program (CRISP) | — | 150 | 1,496 | 850 | — | — | — | — | — | — | — |
| Dietary Effects on Lipoproteins and Thrombogenic Activity (DELTA) | — | — | — | 1,950 | 3,213 | 3,121 | 2,485 | 132 | 290 | — | — |
| Obesity Prevention in American Indians (PATHWAYS) | — | — | — | — | 1,689 | 1,814 | 2,150 | 3,432 | 4,119 | 3,945 | 4,196 |
| Dietary Approaches to Stop Hypertension (DASH) | — | — | — | — | 1,650 | 2,350 | 2,513 | 899 | — | — | — |
| Rapid Early Action for Coronary Treatment (REACT) | — | — | — | — | — | 2,609 | 5,091 | 4,992 | 2,866 | 496 | — |
| Decreasing Weight Gain During Adolescence in Black Preadolescent Girls | — | — | — | — | — | — | — | — | — | — | 2,282 |
| Subtotal, Heart and Vascular Diseases | 16,649 | 19,912 | 25,526 | 22,260 | 24,920 | 23,554 | 21,912 | 17,499 | 14,871 | 6,373 | 8,297 |
| Lung Diseases | | | | | | | | | | | |
| Asthma Clinical Research Network | — | — | — | — | 2,500 | 3,694 | 3,640 | 4,526 | 4,479 | — | — |
| Asthma and Pregnancy Studies | — | — | — | — | — | 1,000 | 991 | 1,000 | 913 | — | — |
| Pediatric Asthma Clinical Research Network | — | — | — | — | — | — | — | — | — | — | 4,175 |
| Subtotal, Lung Diseases | — | — | — | — | 2,500 | 4,694 | 4,631 | 5,526 | 5,392 | 5,849 | 4,175 |

Institute-Initiated Clinical Trials: Fiscal Years 1989-99 (continued)

Cooperative Agreements

(Dollars in Thousands)

| | Fiscal Year | | | | | | | | | | |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Blood Diseases and Resources | | | | | | | | | | | |
| Hydroxyurea in Patients With Sickle Cell Anemia, Phase I | 509 | 44 | — | — | — | — | — | — | — | — | — |
| Trial To Reduce Alloimmunization to Platelets (TRAP) | 747 | 2,034 | 2,111 | 3,483 | 1,422 | — | — | — | — | — | — |
| Subtotal, Blood Diseases and Resources | 1,256 | 2,078 | 2,111 | 3,483 | 1,422 | — | — | — | — | — | — |
| Total, NHLBI, Cooperative Agreements | \$17,905 | \$21,990 | \$27,637 | \$25,743 | \$28,842 | \$28,248 | \$26,543 | \$23,025 | \$20,263 | \$6,373 | \$12,472 |
| Total, NHLBI-Initiated Clinical Trials | \$51,085 | \$52,893 | \$61,270 | \$57,934 | \$56,882 | \$70,412 | \$74,938 | \$75,911 | \$83,531 | \$72,155 | \$121,917 |

Institute-Initiated Clinical Trials, Fiscal Year 1999: Summary by Program

Contracts

| | Total Obligations Prior to FY 1999 | Total FY 1999 Obligations | Total Obligations to Date |
|--|---------------------------------------|------------------------------|------------------------------|
| Heart and Vascular Diseases | | | |
| Activity Counseling Trial (ACT) | \$ 10,865,847 | \$ — | \$ 10,865,847 |
| Antiarrhythmic Versus Implantable Defibrillator (AVID) | 11,215,000 | 547,624 | 11,762,624 |
| Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT) | 59,824,355 | — | 59,824,355 |
| Atrial Fibrillation Follow-up: Investigation in Rhythm Management (AFFIRM) | 9,723,215 | 3,785,258 | 13,508,473 |
| Enhancing Recovery in Coronary Heart Disease Patients (ENRICH) | 21,604,861 | 3,303,626 | 24,908,487 |
| Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness (ESCAPE) | — | 1,749,624 | 1,749,624 |
| Magnesium in Coronaries (MAGIC) | 1,169,145 | 2,008,821 | 3,177,966 |
| Prevention of Cardiovascular Disease in Diabetes Mellitus (PCDD) | — | 4,130,324 | 4,130,324 |
| Prevention of Events with Angiotensin Converting Enzyme Inhibitor Therapy (PEACE) | 9,304,830 | 2,850,253 | 12,155,083 |
| Public Access Defibrillation (PAD) Community Trial | — | 2,923,418 | 2,923,418 |
| Raynaud's Treatment Study | 5,905,609 | — | 5,905,609 |
| Women's Angiographic Vitamin and Estrogen Trial (WAVE) | 5,538,899 | 3,877,675 | 9,416,574 |
| Women's Ischemia Syndrome Evaluation (WISE) | 4,641,931 | 856,054 | 5,497,985 |
| Subtotal, Heart and Vascular Diseases | 128,927,845 | 26,032,677 | 154,960,522 |
| Lung Diseases | | | |
| Acute Respiratory Distress Syndrome Clinical Network (ARDSNET) | 19,697,000 | 6,837,000 | 26,534,000 |
| Childhood Asthma Management Program (CAMP) | 41,162,800 | 6,551,000 | 47,713,800 |
| National Emphysema Treatment Trial (NETT) | 6,077,000 | 7,545,000 | 13,622,000 |
| Retinoid Treatment in Emphysema: Feasibility Studies | — | 884,000 | 884,000 |
| Subtotal, Lung Diseases | 66,936,800 | 21,817,000 | 88,753,800 |
| Blood Diseases and Resources | | | |
| Clinical Course of Sickle Cell Disease (CSSCD) | 58,117,176 | 350,462 | 58,467,638 |
| Cord Blood Stem Cell Transplantation Study | 20,521,661 | 1,456,000 | 21,977,661 |
| Multicenter Study of Hydroxyurea in Sickle Cell Anemia Adult Follow-Up (MSH) | 1,650,307 | — | 1,650,307 |
| T-Cell Depletion in Unrelated Donor Marrow | 7,555,733 | 690,000 | 8,245,733 |
| Viral Activation Transfusion Study (VATS) | 14,668,555 | — | 14,668,555 |
| Subtotal, Blood Diseases and Resources | 102,513,432 | 2,496,462 | 105,009,894 |
| Women's Health Initiative (WHI) | 364,755,000 | 59,100,000 | 423,855,000 |
| Total, NHLBI, Clinical Trial, Contracts | \$673,998,924 | \$109,446,139 | \$783,445,063 |

Institute-Initiated Clinical Trials, Fiscal Year 1999: Summary by Program (continued)

Cooperative Agreements

| | Total Obligations Prior to FY 1999* | Total FY 1999 Obligations | Total Obligations to Date |
|--|--|------------------------------|------------------------------|
| Heart and Vascular Diseases | | | |
| Bypass Angiography Revascularization Investigation (BARI) | \$46,114,706 | \$1,609,304 | \$47,724,010 |
| Child and Adolescent Trial for Cardiovascular Health (CATCH) | 35,753,696 | 210,411 | 35,964,107 |
| Decreasing Weight Gain During Adolescence in Black Preadolescent Girls | — | 2,282,118 | 2,282,118 |
| Obesity Prevention in American Indians (PATHWAYS) | 17,148,982 | 4,196,235 | 21,345,217 |
| Subtotal, Heart and Vascular Diseases | 99,017,384 | 8,298,068 | 107,315,452 |
| Lung Diseases | | | |
| Asthma and Pregnancy Studies | 3,903,553 | — | 3,903,553 |
| Pediatric Asthma Clinical Research Network | — | 4,175,379 | 4,175,379 |
| Subtotal, Lung Diseases | 3,903,553 | 4,175,379 | 8,078,932 |
| Blood Diseases and Resources | | | |
| Subtotal, Blood Diseases and Resources | — | — | — |
| Total, NHLBI-Initiated Clinical Trials, Cooperative Agreements | \$102,920,937 | \$12,473,447 | \$115,394,384 |
| Total, NHLBI-Initiated Clinical Trials | \$776,919,861 | \$121,919,586 | \$898,839,447 |

Heart and Vascular Diseases Program

Activity Counseling Trial (ACT), Initiated in Fiscal Year 1994

This trial is testing the effectiveness of various behavioral interventions delivered in health care settings to increase physical activity among sedentary patients. The effects of a staff-assistance intervention, a staff-counseling intervention, and a control group receiving only physician advice on physical activity and cardiorespiratory fitness are compared.

Obligations

Funding History:

Fiscal Year 1999—\$0

Fiscal Years 1994-98—\$10,865,847

Total Funding to Date—\$10,865,847

Current Active Organizations and Contract Numbers

- Cooper Institute for Aerobics Research
Dallas, Texas —HC-45135
- Leland Stanford Junior University
Stanford, California —HC-45136

- University of Tennessee
Memphis, Tennessee —HC-45137
- Wake Forest University
Winston Salem, North Carolina —HC-45138

Antiarrhythmic Versus Implantable Defibrillator (AVID), Initiated in Fiscal Year 1992

This randomized clinical trial determined whether use of an implantable cardiac defibrillator (ICD) reduced total mortality, compared with conventional pharmacologic therapy, in patients who had been resuscitated from sudden cardiac death or were otherwise at very high risk of mortality from arrhythmic causes. The trial was stopped early in April 1997 because of the finding that after one year, patients in the ICD group experienced a nearly 38 percent reduction in deaths.

Obligations

Funding History:

Fiscal Year 1999—\$547,624

Fiscal Years 1992-98—\$11,215,000

Total Funding to Date—\$11,762,624

Current Active Organization and Contract Number

1. University of Washington
Seattle, Washington —HC-25117

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 (angiotensin converting enzyme [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.

Obligations

Funding History:

- Fiscal Year 1999—\$0*
Fiscal Years 1993-98—\$59,824,355
Total Funding to Date—\$59,824,355

Current Active Organization and Contract Number

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

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

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

Obligations

Funding History:

- Fiscal Year 1999—\$3,785,258
Fiscal Years 1995-98—\$9,723,215
Total Funding to Date—\$13,508,473

Current Active Organization and Contract Number

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

* Funded through Gift Fund in FY 1999—\$2,270,000.

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

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

Obligations

Funding History:

- Fiscal Year 1999—\$1,609,304
Fiscal Years 1987-98—\$46,114,706
Total Funding to Date—\$47,724,010

Current Active Organization and Grant Number

Clinical Units

1. University of Pittsburgh
Pittsburgh, Pennsylvania —HL-38610

Child and Adolescent Trial for Cardiovascular Health (CATCH), Initiated in Fiscal Year 1987

This trial, which includes a large minority population, examined the effectiveness of school and home interventions for reducing CVD risk. Intervention components included a school food service program, a physical education program, a classroom curriculum, and a home curriculum. The CATCH III Tracking Study examined the onset, development, and intercorrelation of CVD risk factors from early to middle adolescence. It had an adequate sample size to permit comparisons to be made between blacks, whites, and Hispanics.

Obligations

Funding History:

- Fiscal Year 1999—\$210,411
Fiscal Years 1987-98—\$35,753,696
Total Funding to Date—\$35,964,107

Current Active Organization and Grant Number

1. New England Research Institutes, Inc.
Watertown, Massachusetts —HL-47098

Decreasing Weight Gain During Adolescence in Black Preadolescent Girls, Initiated in Fiscal Year 1999

The objective of this project is to develop and test interventions to prevent obesity by decreasing weight gain during the high-risk transitional period from pre-puberty to puberty in African American girls who are at high risk for developing obesity.

Obligations

Funding History:

Fiscal Year 1999—\$2,282,118
Total Funding to Date—\$2,282,118

Current Active Organizations and Grant Numbers

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

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

The objective of this multicenter, randomized clinical trial is to test the efficacy of interventions that provide social support and ameliorate depression in post-MI patients. CHD death and reinfarction are primary end points. Secondary outcomes include health-related quality of life and adherence to medical and lifestyle change regimens. A high percentage of minorities have been recruited for the study.

Obligations

Funding History:

Fiscal Year 1999—\$3,303,626
Fiscal Years 1995-98—\$21,604,861
Total Funding to Date—\$24,908,487

Current Active Organizations and Contract Numbers

1. University of North Carolina
Chapel Hill, North Carolina —HC-55140
2. University of Miami
Coral Gables, Florida —HC-55143
3. Rush-Presbyterian-St. Lukes
Medical Center
Chicago, Illinois —HC-55144

4. Stanford University
Palo Alto, California —HC-55145
5. Washington University
St. Louis, Missouri —HC-55146
6. University of Washington
Seattle, Washington —HC-55147
7. Yale University
New Haven, Connecticut —HC-55148

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

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

Obligations

Funding History:

Fiscal Year 1999—\$1,749,624
Total Funding to Date—\$1,749,624

Current Active Organization and Grant Number

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

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

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

Obligations

Funding History:

Fiscal Year 1999—\$2,008,821
Fiscal Year 1998—\$1,169,145
Total Funding to Date—\$3,177,966

Current Active Organization and Contract Number

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

Obesity Prevention in Young American Indians (PATHWAYS), Initiated in Fiscal Year 1993

This full-scale trial assesses the effectiveness of a school-based intervention in primary prevention of obesity among American Indian elementary school children.

Obligations

Funding History:

Fiscal Year 1999—\$4,196,235

Fiscal Years 1993-98—\$17,148,982

Total Funding to Date—\$21,345,217

Current Active Organizations and Grant Numbers

1. University of New Mexico
Albuquerque, New Mexico —HL-50867
2. The Johns Hopkins University
Baltimore, Maryland —HL-50869
3. University of Minnesota
Minneapolis, Minnesota —HL-50885
4. Gila River Indian Community
Sacaton, Arizona —HL-50905
5. Coordinating Center:
University of North Carolina
Chapel Hill, North Carolina —HL-50907

Prevention of Cardiovascular Disease in Diabetes Mellitus (PCDD), Initiated in Fiscal Year 1999

The purpose of this study is evaluate three diabetic treatment strategies (intensive glycemic control, intensive lipid and blood pressure control, and insulin resistance-lowering therapy) to prevent major cardiovascular events in patients with Type 2 diabetes mellitus. Outcome measures include CVD mortality and major morbidity (MI and stroke).

Obligations

Funding History:

Fiscal Year 1999—\$4,130,324

Total Funding to Date—\$4,130,324

Current Active Organizations and Grant Numbers

1. Wake Forest University
Winston-Salem, North Carolina —HC-95178
2. McMaster University
Hamilton, Ontario —HC-95179
3. University of Washington
Seattle, Washington —HC-95180
4. Case Western Reserve University
Cleveland, Ohio —HC-95181
5. Wake Forest University
Winston-Salem, North Carolina —HC-95182
6. Minneapolis Medical
Research Foundation
Minneapolis, Minnesota —HC-95183
7. Trustees of Columbia
University of NY
New York, New York —HC-95184

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

The multicenter, randomized trial is determining whether addition of an ACE inhibitor to standard therapy in patients with known coronary artery disease and preserved left ventricular function will prevent CVD mortality and reduce risk of MI and the need for revascularization.

Obligations

Funding History:

Fiscal Year 1999—\$2,850,253

Fiscal Years 1996-98—\$9,304,830

Total Funding to Date—\$12,155,083

Current Active Organization and Contract Number

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

Public Access Defibrillation (PAD) Community Trial, Initiated in Fiscal Year 1999

The primary objective of this program is to determine whether volunteers trained in the use of automatic external defibrillators for out-of-hospital cardiac arrest victims will significantly increase survival to hospital discharge compared with community volunteers trained in standard life-saving techniques.

Obligations

Funding History:

Fiscal Year 1999—\$2,923,418

Total Funding to Date—\$2,923,418

Current Active Organization and Contract Number

1. University of Washington
Seattle, Washington —HC-95177

Raynaud's Treatment Study, Initiated in Fiscal Year 1992

The goal of this randomized multicenter clinical trial of primary Raynaud's patients is to test the efficacy of Nifedipine XL and temperature biofeedback and to compare the two treatments. The outcome is a self-reported, 1-month attack rate collected 1 year after randomization.

Obligations

Funding History:

Fiscal Year 1999—\$0

Fiscal Years 1992-98—\$5,905,609

Total Funding to Date—\$5,905,609

Current Active Organization and Contract Number

1. University of Medicine and Dentistry
of New Jersey
New Brunswick, New Jersey —HC-25120

Women's Angiographic Vitamin and Estrogen Trial (WAVE), Initiated in Fiscal Year 1996

The multicenter, randomized trial is assessing whether or not HRT and/or antioxidant treatment stabilize or inhibit progression and induce regression of coronary plaques in women. The trial is also examining the mechanisms by which these treatments modify atherosclerosis. The primary end points are angiographic changes.

Obligations

Funding History:

Fiscal Year 1999—\$3,877,675

Fiscal Years 1996-98—\$5,538,899

Total Funding to Date—\$9,416,574

Current Active Organizations and Grant Numbers

1. George Washington University
Washington, DC —HV-68165
2. University of Alabama
Birmingham, Alabama —HV-68166
3. Duke University
Durham, North Carolina —HV-68167
4. Medlantic Research Institute
Washington, DC —HV-68168
5. Hartford Hospital
Hartford, Connecticut —HV-68169
6. The Johns Hopkins University
Baltimore, Maryland —HV-68170

Women's Ischemia Syndrome Evaluation (WISE), Initiated in Fiscal Year 1996

The multicenter trial seeks to improve diagnostic reliability of cardiovascular testing in the evaluation of ischemic heart disease in women. Secondary objectives are to develop safe, efficient, and cost-effective diagnostic approaches for evaluating women with suspected ischemic heart disease; to determine the frequency of myocardial ischemia in the absence of significant epicardial coronary stenosis; and to ascertain the frequency of nonischemic or noncardiac chest pain.

Obligations

Funding History:

Fiscal Year 1999—\$856,054

Fiscal Years 1996-98—\$4,641,931

Total Funding to Date—\$5,497,985

Current Active Organizations and Contract Numbers

1. University of Alabama
Birmingham, Alabama —HV-68161
2. University of Pittsburgh
Pittsburgh, Pennsylvania —HV-68162
3. University of Florida
Gainesville, Florida —HV-68163
4. Allegheny Singer Research Institute
Pittsburgh, Pennsylvania —HV-68164

Lung Diseases Program

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

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

Obligations

Funding History:

Fiscal Year 1999—\$6,837,000

Fiscal Years 1994-98—\$19,697,000

Total Funding to Date—\$26,534,000

Current Active Organizations and Contract Numbers

1. Vanderbilt University
Nashville, Tennessee —HR-46054
2. University of Washington
Seattle, Washington —HR-46055
3. Duke University Medical Center
Durham, North Carolina —HR-46056
4. University of Michigan
Ann Arbor, Michigan —HR-46057
5. University of Pennsylvania Hospital
Philadelphia, Pennsylvania —HR-46058
6. University of California
San Francisco, 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

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|---|-----------|
| 10. University of Maryland Baltimore, Maryland | —HR-46063 |
| 11. Coordinating Center: Massachusetts General Hospital Boston, Massachusetts | —HR-46064 |

Asthma and Pregnancy Studies, Initiated in Fiscal Year 1994

This 4-year multicenter collaborative study involving a high percentage of minorities is determining the effects of asthma and its treatment on pregnancy and how pregnancy affects asthma. Women were enrolled from 11 clinical centers as part of the NICHD Maternal Fetal Medicine Units Clinical Network.

Obligations

Funding History:

- Fiscal Year 1999—\$0
- Fiscal Years 1994-98—\$3,903,553
- Total Funding to Date—\$3,903,553

Current Active Organizations and Grant Numbers

- | | |
|---|-----------|
| 1. Magee-Women's Hospital Pittsburgh, Pennsylvania | —HD-21410 |
| 2. University of Tennessee Memphis, Tennessee | —HD-21414 |
| 3. Wake Forest University Winston Salem, North Carolina | —HD-27860 |
| 4. University of Chicago Chicago, Illinois | —HD-27861 |
| 5. University of Alabama Birmingham, Alabama | —HD-27869 |
| 6. University of Cincinnati Cincinnati, Ohio | —HD-27905 |
| 7. Ohio State University Columbus, Ohio | —HD-27915 |
| 8. Wayne State University Detroit, Michigan | —HD-27917 |
| 9. University of Texas Southwest Medical Center Dallas, Texas | —HD-34116 |
| 10. University of Miami Miami, Florida | —HD-34122 |
| 11. Thomas Jefferson University Philadelphia, Pennsylvania | —HD-34136 |
| 12. University of Utah Salt Lake City, Utah | —HD-34208 |
| 13. University of Texas Health Sciences Center San Antonio, Texas | —HD-34210 |

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

The purpose of this study was to determine whether regular use of either of two types of anti-inflammatory medications in combination with as-needed use of beta₂ agonist bronchodilator resulted in greater lung function; less bronchial hyperresponsiveness, patient morbidity, and use of health care resources; and improved quality of life during a 5-year period. Long-term safety and side effects of the three medications were monitored throughout the study. In addition, due to the large minority populations, investigators were able to compare the effectiveness of the medications in different minority populations.

Obligations

Funding History:

- Fiscal Year 1999—\$6,551,000
- Fiscal Years 1991-98—\$41,162,800
- Total Funding to Date—\$47,713,800

Current Active Organizations and Contract Numbers

- | | |
|--|-----------|
| 1. The Johns Hopkins University Baltimore, Maryland | —HR-16044 |
| 2. University of California, San Diego La Jolla, California | —HR-16045 |
| 3. University of New Mexico Albuquerque, New Mexico | —HR-16046 |
| 4. Hospital for Sick Children Toronto, Ontario, Canada | —HR-16047 |
| 5. National Jewish Center for Immunology and Respiratory Medicine Denver, Colorado | —HR-16048 |
| 6. Brigham and Women's Hospital Boston, Massachusetts | —HR-16049 |
| 7. Asthma, Inc. Seattle, Washington | —HR-16050 |
| 8. Washington University St. Louis, Missouri | —HR-16051 |
| 9. The Johns Hopkins University Baltimore, Maryland | —HR-16052 |

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 1999—\$7,545,000

Fiscal Year 1997-98—\$6,077,000

Total Funding to Date—\$13,662,000

Current Active Organizations and Contract Numbers

1. Baylor College of Medicine
Houston, Texas —HR-76101
2. Brigham and Women's Hospital
Boston, Massachusetts —HR-76102
3. University of California
San Diego, California —HR-76103
4. Cedars-Sinai Medical Center
Los Angeles, California —HR-76104
5. Cleveland Clinic Foundation
Cleveland, Ohio —HR-76105
6. Columbia University
New York, New York —HR-76106
7. Duke University Medical Center
Durham, North Carolina —HR-76107
8. University of Maryland
Baltimore, Maryland —HR-76108
9. Mayo Foundation
Rochester, Minnesota —HR-76109
10. University of Michigan
Ann Arbor, Michigan —HR-76110
11. National Jewish Center for
Immunology/Respiratory Medicine
Denver, Colorado —HR-76111
12. 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. Washington University
St. Louis, Missouri —HR-76117
18. University of Washington
Seattle, Washington —HR-76118
19. The Johns Hopkins University
Baltimore, Maryland —HR-76119

Pediatric Asthma Clinical Research Network, Initiated in Fiscal Year 1999

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

Obligations

Funding History:

Fiscal Year 1999—\$4,175,379

Total Funding to Date—\$4,175,379

Current Active Organizations and Grant Numbers

1. Washington University
St. Louis, Missouri —HL-64287
2. National Jewish Medical and
Research Center
Denver, Colorado —HL-64288
3. University of California
San Diego, California —HL-64295
4. University of Wisconsin
Madison, Wisconsin —HL-64305
5. University of Arizona
Tucson, Arizona —HL-64307
6. Pennsylvania State University
Hershey, Pennsylvania —HL-6431

Retinoid Treatment in Emphysema: Feasibility Studies, 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 1999—\$884,000

Total Funding to Date—\$884,000

Current Active Organizations and Grant Numbers

1. Boston University
Boston, Massachusetts —HR-96141
2. University of Pittsburgh
Pittsburgh, Pennsylvania —HR-96142
3. University of California
Los Angeles, California —HR-96143
4. University of California
San Diego, California —HR-96144
5. Columbia University
New York, New York —HR-96145

Blood Diseases and Resources Program

Clinical Course of Sickle Cell Disease (CSSCD), Initiated in Fiscal Year 1977

This collaborative study in a primarily minority population is designed to identify and evaluate the factors that determine the clinical course of, and the presence or absence of complications in SCD.

Obligations

Funding History:

Fiscal Year 1999—\$350,462

Fiscal Years 1977-98—\$58,117,176

Total Funding to Date—\$58,467,638

Current Active Organization and Contract Number

1. New England Research Institutes, Inc.
Watertown, Massachusetts —HB-47110

Cord Blood Stem Cell Transplantation Study, Initiated in Fiscal Year 1996

The multicenter study is designed to show whether umbilical cord blood stem cell transplants from unrelated, newborn donors are a safe and efficient alternative to bone marrow transplantation for children and adults with a variety of cancers, blood diseases, and genetic disorders.

Obligations

Funding History:

Fiscal Year 1999—\$1,456,000

Fiscal Years 1996-98—\$20,521,661

Total Funding to Date—\$21,977,661

Current Active Organizations and Contract Numbers

1. Emmes Corporation
Potomac, Maryland —HB-67132
2. Dana-Farber Cancer Center
Boston, Massachusetts —HB-67133
3. Fred Hutchinson Cancer Research Center
Seattle, Washington —HB-67134
4. University of California at Los Angeles
Los Angeles, California —HB-67135
5. Children's Hospital of Orange County
Orange, California —HB-67136
6. Indiana University
Indianapolis, Indiana —HB-67137
7. Duke University Medical Center
Durham, North Carolina —HB-67138
8. University of Minnesota
Minneapolis, Minnesota —HB-67139

9. Duke University Medical Center
Durham, North Carolina —HB-67141
10. University of California at Los Angeles
Los Angeles, California —HB-67142

Multicenter Study of Hydroxyurea in Sickle Cell Anemia (MSH) Adult Follow-up, Initiated in Fiscal Year 1996

The MSH was designed to test the efficacy of orally administered hydroxyurea in the lowering of painful crisis rates of sickle cell anemia in a primarily minority population. The trial was stopped early because of proof of efficacy of hydroxyurea in decreasing painful sickle cell crises, hospitalizations for painful crises, acute chest syndrome, and total number of units of transfused blood by approximately 50 percent. The Data Coordinating Center is now in active follow-up of adult patients for the long-term effects, if any, of hydroxyurea.

Obligations

Funding History:

Fiscal Year 1999—\$0

Fiscal Years 1996-98—\$1,650,307

Total Funding to Date—\$1,650,307

Current Active Organization and Contract Number

1. Maryland Medical Research Institute
Baltimore, Maryland —HB-67129

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 1999—\$609,000

Fiscal Years 1994-98—\$7,555,733

Total Funding to Date—\$8,245,733

Current Active Organization and Contract Number

1. University of Minnesota
Minneapolis, Minnesota —HB-47095

Viral Activation Transfusion Study (VATS), Initiated in Fiscal Year 1995

This trial is designed to determine if activation of HIV-1 and cytomegalovirus occurs following blood transfusion in HIV-1-infected persons, thereby adversely affecting their prognosis. This study is also evaluating the role of donor leukocytes producing this activation by examining the effect of removing leukocytes by filtration or abolishing their ability to proliferate by gamma irradiation.

Obligations

Funding History:

Fiscal Year 1999—\$0

Fiscal Years 1995-98—\$14,668,555

Total Funding to Date—\$14,668,555

Current Active Organizations and Contract Numbers

1. Case Western Reserve University
Cleveland, Ohio —HB-57115
2. Georgetown University
Washington, DC —HB-57116

3. The Miriam Hospital
Providence, Rhode Island —HB-57117
4. Mt. Sinai Medical Center
New York, New York —HB-57118
5. The Ohio State University
Columbus, Ohio —HB-57119
6. University of California, San Diego
La Jolla, California —HB-57120
7. University of California
San Francisco, California —HB-57121
8. University of North Carolina
Chapel Hill, North Carolina —HB-57122
9. University of Pittsburgh
Pittsburgh, Pennsylvania —HB-57123
10. University of Texas
Galveston, Texas —HB-57124
11. University of Washington
Seattle, Washington —HB-57125
12. Central Laboratory:
Irwin Memorial Blood Center
San Francisco, California —HB-57126
13. Coordinating Center:
New England Research Institutes, Inc.
Watertown, Massachusetts —HB-57127

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 1999—\$59,100,000

Fiscal Years 1992-98*—\$316,900,000

Total Funding to Date—\$376,000,000

Current Active Organizations and Contract Numbers

| | | | |
|---|-----------|--|-----------|
| 1. Fred Hutchinson Cancer Research Center Seattle, Washington | —WH-22110 | 17. State University of New York at Buffalo Buffalo, New York | —WH-32122 |
| 2. Fred Hutchinson Cancer Research Center Seattle, Washington | —WH-32100 | 18. University of California, Irvine Irvine, California | —WH-42107 |
| 3. University of Minnesota Twin Cities Minneapolis, Minnesota | —WH-32101 | 19. George Washington University Washington, DC | —WH-42108 |
| 4. University of Iowa College of Medicine Iowa City, Iowa | —WH-32102 | 20. Stanford University Palo Alto, California | —WH-42109 |
| 5. University of Alabama at Birmingham Birmingham, Alabama | —WH-32105 | 21. Baylor College of Medicine Houston, Texas | —WH-42110 |
| 6. Wake Forest University Winston-Salem, North Carolina | —WH-32106 | 22. University of Texas Health Science Center at San Antonio San Antonio, Texas | —WH-42111 |
| 7. Northwestern University Chicago, Illinois | —WH-32108 | 23. Ohio State University Columbus, Ohio | —WH-42112 |
| 8. Brigham and Women's Hospital Boston, Massachusetts | —WH-32109 | 24. University of Nevada School of Medicine Reno, Nevada | —WH-42113 |
| 9. University of Medicine and Dentistry of New Jersey Newark, New Jersey | —WH-32110 | 25. Kaiser Foundation Research Institute Oakland, California | —WH-42114 |
| 10. Emory University Atlanta, Georgia | —WH-32111 | 26. State University of New York at Stony Brook Stony Brook, New York | —WH-42115 |
| 11. University of Pittsburgh Pittsburgh, Pennsylvania | —WH-32112 | 27. University of Massachusetts Medical School Worcester, Massachusetts | —WH-42116 |
| 12. University of California, Davis Davis, California | —WH-32113 | 28. University of North Carolina at Chapel Hill Chapel Hill, North Carolina | —WH-42117 |
| 13. University of Arizona Tucson, Arizona | —WH-32115 | 29. Wayne State University Detroit, Michigan | —WH-42118 |
| 14. University of Tennessee Memphis, Tennessee | —WH-32118 | 30. Albert Einstein College of Medicine New York, New York | —WH-42119 |
| 15. Memorial Hospital of Rhode Island Rhode Island | —WH-32119 | | |
| 16. University of California San Diego San Diego, California | —WH-32120 | | |

* 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 Centers for Disease Control: \$4,000,000 in FY 1999 and \$12,000,000 from FY 1996-98.

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|---|-----------|--|-----------|
| 31. Harbor-UCLA Research and Education Institute Torrance, California | —WH-42120 | 37. University of Cincinnati Medical Center Cincinnati, Ohio | —WH-42126 |
| 32. Kaiser Foundation Research Institute Oakland, California | —WH-42121 | 38. University of Florida College of Medicine Gainesville, Florida | —WH-42129 |
| 33. Medical College of Wisconsin Milwaukee, Wisconsin | —WH-42122 | 39. University of Hawaii at Manoa Honolulu, Hawaii | —WH-42130 |
| 34. Medlantic Research Institute Washington, DC | —WH-42123 | 40. University of Miami Miami, Florida | —WH-42131 |
| 35. Rush Presbyterian-St.Luke's Medical Center Chicago, Illinois | —WH-42124 | 41. University of Wisconsin, Madison Madison, Wisconsin | —WH-42132 |
| 36. UCLA School of Medicine Los Angeles, California | —WH-42125 | | |



12. Minority Activities

Throughout its history, the NHLBI has been a leader in conducting and supporting research to alleviate the health disparities that exist between various segments of the U.S. population. Projects with a strong minority component have been initiated so that comparisons can be made between various populations. In addition, programs that focus exclusively on minority health issues have been given high priority.

Since FY 1991, the Institute has had procedures in place to ensure full compliance with the NIH Policy on Inclusion of Minorities and Women in 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 strong justification for limiting the diversity of the study population exists. Thus, all segments of the population, both minority and nonminority, stand to benefit from the NHLBI research programs. Highlighted in this chapter are selected projects that have a particular focus on minority populations.

The NHLBI supports minority activities through its outreach to high schools, colleges, and universities, especially minority institutions. The Institute also actively recruits minorities into its training and career development programs (see Chapter 13) to ensure that highly qualified investigators from various races and ethnic populations are available to conduct future cardiovascular, lung, and blood and sleep research.

The following is a description of studies that reflect the Institute's research portfolio related to minority health; additional information can be found in Chapters 9 through 11 of the Fact Book.

Heart and Vascular Diseases

Risk Factors

Epidemiology

Long-term epidemiologic studies are pivotal in uncovering risk factors that lead to disease.

- Early Natural History of Arteriosclerosis (see Chapter 9): Examines the association

between risk factor development and the evolution of atherosclerosis and hypertension in a childhood population that has now reached adulthood; 38 percent of the participants are black.

- CARDIA (see Chapter 10): Determines the evolution of CHD risk factors in young adults who are now reaching early middle age; 50 percent of the participants are black.
- ARIC (see Chapter 10): Investigates the association of CHD risk factors with development of atherosclerosis and CVD in an adult population; 38 percent of the participants are black.
- CHS (see Chapter 10): Examines risk factors for CHD and stroke in the elderly; 20 percent of the participants are minority.
- Strong Heart Study (see Chapter 9): Compares risk factor levels and morbidity and mortality from CVD among American Indians from three different geographic locations.
- Jackson Heart Study (see Chapter 10): Identifies environmental and genetic factors influencing the evolution and progression of CVD in blacks.

In addition, several smaller investigator-initiated epidemiologic studies are investigating gene-environment interactions related to specific CVD risk factors in selected groups such as blacks, Samoans, and Japanese Americans.

Treatment and Control

Since CVD evolves over a period of decades, early intervention programs that involve multiple risk factor reduction strategies can aid in preventing CVD in later years.

- CATCH (see Chapter 11): Assesses the outcomes of health behavior interventions (school food service modifications, enhanced physical education, no tobacco use policy, classroom health curricula, and family education) for primary prevention of CVD; 35 percent of the participants are minority.

Presently, the study is examining the schools in the original trial to determine whether they have maintained the level of implementation demonstrated during the research phase.

As a follow-up to the Institute-initiated Studies of Children's Activity and Nutrition, three independent investigators are continuing to track the original cohort from childhood to adolescence. Adolescent-relevant measures of smoking behavior, feelings associated with depression, peer influences, and changing parental influences have been added to the risk factors being assessed. Two of the three studies include a significant proportion of black and Hispanic children.

Education

The NHLBI, through its education programs (see Chapter 2), disseminates health-related information to physicians, health care professionals, patients, and the public on ways to prevent or treat diseases within its mandate. The Institute has developed the following approaches to combat cardiovascular health disparities among four major cultural/ethnic groups—blacks, Asians, Hispanics, and American Indians.

- National Physicians' Network: Provides continuing education opportunities and other information to clinicians and other health professionals who provide health care to blacks. A Web-based interactive self-study education program for doctors and nurses will be developed.
- National Asian American, Pacific Islander Cardiovascular Health Strategy Workshop in May 1999: Established a set of priorities for a national research agenda, community outreach strategies, and community-based services in this targeted population.
- Salud para su Corazón: Disseminates information on CVD prevention/intervention and treatment, and promotes heart healthy behaviors in Hispanic communities.
- Strengthening the Heartbeat of American Indian/Alaska Native Communities: Develops culturally appropriate materials to encourage behavior changes that will improve cardiovascular health in three tribal communities.

In addition to the activities mentioned above, the Institute prepares publications on preventing CVD specifically designed for minority populations. Included among them are the following:

- *Improving Cardiovascular Health in African Americans—Package of Seven Easy-To-Read Booklets*
- *Package of Eight Easy-to-Read Booklets in Spanish and English on Preventing Heart Disease*
- *From Heart to Heart: A Bilingual Group Discussion Guide* (includes videotape) in English and Spanish
- *Bringing Heart Health to Latinos: A Guide for Building Community Programs*

High Blood Pressure

Etiology and Pathophysiology

High blood pressure is a serious health problem that is especially prevalent and severe among minorities.

- Molecular Genetics of Hypertension (see Chapter 9): Determines the etiology and pathogenesis of hypertension 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): Establishes a collaborative network to identify major genes associated with high blood pressure and to investigate the interactions between genetic and environmental determinants of hypertension in black, white, Hispanic, and Asian populations.

The Institute supports a number of investigator-initiated projects that examine antecedents of hypertension in children to determine racial differences in blood pressure regulation. Researchers are investigating early relationships between cardiovascular reactivity and development of pathobiologic markers of hypertension risk (i.e., increased resting blood pressure, left ventricular mass, and relative wall thickness) in adolescent normotensive blacks.

Researchers are also examining the association of SES and stress reactivity to determine if this is the pathophysiologic link to CVD in blacks.

The role of dietary factors, particularly macronutrients, in the etiology of high blood pressure is another area under investigation. By conducting epidemiologic studies among diverse population samples of varied ethnicity, SES, and dietary habits in four countries, investigators hope to elucidate the influences on blood pressure of the amount and type of proteins, lipids, carbohydrates, amino acids, calcium, magnesium, antioxidants, fiber, and caffeine.

A number of studies are being supported to identify genes linked to hypertension in blacks, Mexican Americans, and whites to determine whether part of the disparity in prevalence can be attributed to genetic differences between the groups. Among the genes under investigation are those that are associated with the renin-angiotensin system.

Treatment and Control

Identifying effective treatment strategies for various populations requires large-scale studies with representative populations in sufficient numbers.

- ALLHAT (see Chapter 11): Compares the combined incidence of fatal CHD and nonfatal MI among patients receiving angiotensin converting enzyme (ACE) inhibitors, calcium antagonists, or alpha-1-blockers and patients in a control group receiving a diuretic, and in a subset, determines whether cholesterol-lowering therapy reduces all-cause mortality in moderately hypercholesterolemic individuals compared with a control group; 32 percent of the participants are black and 19 percent are Hispanic.
- Dietary Patterns, Sodium Intake, and Blood Pressure (DASH 2) (see Chapter 9): Compares the effects of three levels of sodium intake and two different diets (reference diet versus diet high in fruits and vegetables and low in fat) on blood pressure; 50 percent of the participants are black.
- PREMIER (see Chapter 9): Compares the effectiveness of two multicomponent lifestyle interventions (reduced salt intake, increase physical activity, moderation of alcohol intake, and weight loss)—where one of the interventions also includes the DASH diet—

on blood pressure control; 40 percent of the participants are black.

Investigator-initiated studies focus on specific areas that may contribute to racial differences in blood pressure control. One project examines whether variation in genes of the renin-angiotensin-aldosterone system predicts interindividual difference in blood pressure response to diuretic therapy among hypertensive blacks and whites. Another focuses on variability in the ACE gene between blacks and whites to explain racial differences in the antihypertensive responsiveness to ACE inhibitors.

Because stress may be a major contributor to CVD among blacks, intervention programs involving transcendental meditation and aerobic activities are being conducted in this population to evaluate their effectiveness in reducing blood pressure levels.

Developing effective approaches to improve patient compliance with therapy is an important area of research. Scientists are evaluating the use of an electronic home monitor connected to the physician's office among a patient population involving 50 percent blacks to determine whether the technology will improve hypertension care.

Education

The NHBPEP (see Chapter 2) has developed a number of outreach strategies directed towards minority populations to inform them of the importance of blood pressure control. Included are a toll-free number that individuals can call to request information on hypertension in English or Spanish; mini-telenovelas (*Más vale prevenir que lamentar*)—"health moments" to reinforce CVD prevention messages—that can be aired on local Spanish-language television stations; a Spanish version of the High Blood Pressure Education Month Kit; and several publications for health professionals, patients, and the public. They include the following:

- *Control de la Presión Arterial Alta: Guía Para La Mujer de Edad Mayor*
- *Controlling High Blood Pressure: A Guide for Older Women* in English and Spanish

- *Churches as an Avenue to High Blood Pressure Control*
- *Working With Religious Congregations: A Guide for Health Professionals*

High Serum Cholesterol

The Institute supports a number of individual investigator-initiated projects to identify specific genes that influence the lipoprotein profile in various populations, i.e., Mexican Americans, Samoans, Japanese Americans, blacks, and whites. Research findings could offer an explanation for differences in susceptibility to CHD found among individual groups.

Education

The NCEP (see Chapter 2) designed the following two cookbooks for minority audiences. They contain recipes that cut back on fats, especially saturated fat, and cholesterol.

- *Heart-Healthy Home Cooking African American Style*
- *Delicious Heart-Healthy Latino Recipes*

Obesity

Etiology

The latest NHANES data show that the proportion of Americans who are overweight continues to rise and black women are especially at risk. To understand the reasons for the racial disparity among women, the Institute initiated a long-term program that examines the development of obesity and CVD risk factors in a biracial cohort of young girls.

- NGHS (see Chapter 9): Determines whether the disparity in the development of obesity in pubescent girls results from differences in diet, physical activity, or psychosocial, socioeconomic, or other environmental factors and whether such distinctions, in turn, lead to black-white difference in other CVD risk factors, such as high blood pressure and blood lipid levels. The study has been extended so that the cohort can be tracked during late adolescence-early adulthood, a transition period where obesity-related changes in CVD risk factors seem to occur.

An investigator-initiated study using the NGHS cohort, starting at ages 18 to 19 years, will

determine the hemodynamic changes (cardiac output and total peripheral resistance) that occur with developing obesity and their influence on ethnic difference in blood pressure regulation. Another independent research project is using data from the NGHS to conduct a genetic epidemiologic study of CHD risk factors in black and white girls with the goal of identifying genes involved in determining black-white differences in lipid metabolism and obesity.

Prevention

The NHLBI has initiated a program to prevent obesity in high-risk preadolescent black girls.

- *Decreasing Weight Gain in African American Preadolescent Girls* (see Chapter 11): Tests 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.

In addition, the Institute supports a number of investigator-initiated studies focusing on the effectiveness of individual intervention strategies among diverse populations. Black and Hispanic preschool children at Head Start sites, along with their parents, are participating in an intervention program involving nutrition education and weight-control activities. Another project consisting primarily of Asians, Hispanics, and whites is testing an integrated, multicomponent, school and community-based intervention to reduce the prevalence of obesity.

Whether multiple perceptions and behaviors related to weight loss cluster according to sociodemographic characteristics is the subject of a study that is relying on data from the NHANES III. Blacks and Mexican Americans at various SES levels constitute the major proportion of the population surveyed. Research findings will offer information that can be applied to the design of culturally sensitive intervention programs for minorities.

Physical Inactivity

The Institute is supporting research on the development of effective physical activity intervention programs for hard-to-reach groups.

- ACT (see Chapter 11): Develops and subsequently evaluates the effectiveness of several interventions (delivered in a health care setting) to increase physical activity among sedentary individuals; 31 percent of the participants are minority.

The NHLBI is supporting several investigator-initiated studies on increasing physical activity among minority populations. Two projects involving Latino women and low-SES women with low literacy skills are seeking to encourage sustained increases in physical activity among sedentary and underserved groups. A project among adolescent girls, many of whom are black, seeks to provide positive physical activity experiences that are culturally relevant and enhance social and environmental support for exercise. Obese adolescents—50 percent of whom are black—are the subjects of a study related to finding the optimal dose of exercise for primary prevention of CHD.

Smoking

The Institute supports a number of investigator-initiated smoking intervention studies that specifically target minorities. A multicomponent intervention on smoking cessation and maintenance is being tested in black, Hispanic, and white pregnant woman who are socioeconomically disadvantaged. Another study is tracking a mostly black cohort of teenagers to assess determinants of smoking onset, and a third program focuses on a biracial population of elderly smokers to evaluate the effectiveness of an intervention strategy on smoking cessation.

Psychosocial Factors

The NHLBI supports research aimed at understanding the role of race/ethnicity, psychosocial and environmental factors, and low SES on the development of CHD. In another study, the biobehavioral basis of CHD risk and management is an area of focus. Scientists are investigating the relationships among behavioral risk-promoting variables, presumed mediating variables (sympathetic nervous system activity and insulin metabolism), and CHD risk factors, and will determine whether behavioral interventions can reduce CHD risk; 50 to 65 percent of the population within the subprojects are black or Hispanic.

The NHLBI is also supporting research on the impact of depression, anxiety, and lack of social support on prognoses after a CHD event.

- ENRICH (see Chapter 11): Determines the effects of psychosocial interventions on morbidity and mortality in post-MI patients who are depressed and socially isolated and/or who perceive themselves as lacking support from family and friends; 40 percent of the participants are minority.

Ischemic Heart Disease

The NHLBI supports a major multicenter program involving basic and clinical research on ischemic heart disease in blacks:

- Ischemic Heart Disease in Blacks (see Chapter 9): Elucidates the pathophysiological basis for excess morbidity and mortality from ischemic heart disease in blacks, and subsequently develops therapeutic strategies to address these problems. One of the centers includes a diabetic population.

Diabetes

The NHLBI supports research to elucidate the pathogenic mechanisms involved in the relationship between diabetes mellitus and elevated risk for CVD. Blacks, Hispanics, and American Indians have a high prevalence of diabetes.

- Glucose Tolerance and Risk for Cardiovascular Disease in the Elderly (see Chapter 9): Examines the longitudinal relationship between impaired glucose tolerance, insulin resistance, CVD risk factors, and CVD among Japanese American men.
- IRAS (see Chapter 9): Investigates the relationship of insulin and insulin resistance to clinical and subclinical CVD and other CVD risk factors among white, black, and Hispanic diabetics and nondiabetics.
- Prevention of Cardiovascular Disease in Diabetes Mellitus (see Chapter 11): Evaluates the benefits of different therapies to reduce cardiovascular complications in diabetes; 33 percent of the participants are minority.

The NHLBI is supporting research on the genetic relationships between noninsulin-dependent diabetes mellitus (NIDDM) and atherosclerosis. One subproject includes two sets

of Hispanic families identified with NIDDM, one with CHD and one without. Japanese American families are the focus of a project to characterize the genetic epidemiology of CHD risk factors. Genes under investigation are linked to risk factors associated with high LDL; risk factors that characterize the insulin resistance syndrome and NIDDM; and lipoprotein(a) levels and apolipoprotein(a) phenotypes. A third study, involving blacks and Hispanics, is examining the genetic determinants of insulin resistance and visceral adiposity to determine the extent to which they, along with metabolic CVD risk factors, share common genetic influences.

Other investigator-initiated studies focused on diabetes and CVD risk among minority populations include an epidemiologic survey to compare the prevalence of diabetes and CVD risk factors among native Mexicans and Mexican Americans and a study to elucidate dietary factors that may contribute to elevated risk for CVD among a population consisting of blacks, whites, and Hispanics with existing insulin resistance, including impaired glucose tolerance and NIDDM. Data collected from the large population studies on the relationship of diabetes to CVD provide the largest multiethnic population base to assess the magnitude of this problem.

Lung Diseases

The NHLBI supports research in a number of lung diseases that disproportionately affect minorities. They include asthma, sarcoidosis, and tuberculosis (TB).

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. Understanding the role each has in the development of the disorder is the goal.

- CSGA (see Chapter 9): Seeks to identify genes associated with asthma and to elucidate their functional role in the development of the disease; 58 percent of the participants are minority.

The NHLBI also supports a number of investigator-initiated projects on the etiology and pathophysiology of asthma. One group of scientists is using genomic screening to search for the genetic basis of asthma in a large sample of Asian siblings already known to differ widely in their airway responsiveness (sensitivity to histamine) and lung function.

Other investigators are examining the complex interactions between environmental factors and genetic background to determine the onset of asthma in the early life of a pediatric population consisting of 40 percent Hispanics. Their aim is to determine whether a better understanding of the gene-environment interactions in the development of immune responses of individuals who are genetically predisposed to asthma will allow researchers to design more effective primary prevention strategies.

Understanding the mechanisms associated with asthma onset triggered by environmental factors is the focus of several studies. Investigators are examining the role of viruses in exacerbation of asthma in a population that is 50 percent minority.

Another project is studying how pulmonary infection due to *Mycoplasma pneumoniae* exacerbates asthma and prolongs abnormalities in lung function following infection in a population with 40 percent minorities. Scientists hypothesize that a subgroup of patients with asthma have inadequate or inappropriate immune responsiveness to *Mycoplasma* which results in chronic infection.

Circadian change in airway function is an important aspect of asthma, as more than 70 percent of deaths and 80 percent of respiratory arrests occur during sleep. Researchers are investigating the mechanisms associated with nocturnal asthma that cause changes in airway function leading to the worsening of symptoms in a population that is 36 percent minority.

Another study, involving a population that is 77 percent minority, is focused on regulation of airway circulation in bronchial asthma. It is comparing the responsiveness of blood flow in the airway with alpha-adrenergic stimulation in asthmatics and nonasthmatics and will determine the effects of steroids on enhanced alpha-adrenergic responsiveness.

Treatment and Control

The Institute supports research that seeks to identify optimal drug strategies for the treatment and management of asthma. Because the disorder is disproportionately high among minority children, it is important that they are well represented in clinical trials.

- ACRN (See Chapter 9): Establishes an interactive network of asthma clinical research groups, including one at Harlem Hospital, which serves a predominantly minority population, to conduct studies of novel therapies for asthma and disseminate findings to the practicing community.
- CAMP (see Chapter 11): Seeks to determine whether regular use of either of two types of anti-inflammatory medications results in greater lung function, less bronchial hyperresponsiveness, and improved quality of life for asthmatic children; 33 percent of the participants are minority.
- Pediatric Asthma Clinical Research Network (see Chapter 11): Establishes an interactive network of clinical research groups to evaluate current and novel therapies and management strategies for children with asthma. Investigators will recruit a large minority population into the program.

Asthma and Pregnancy

Asthma is one of the most common illnesses that complicates pregnancy. It can produce serious maternal and fetal complications.

- Asthma and Pregnancy Studies (see Chapter 11): Consist of an observational study, *Asthma in Pregnancy*, to evaluate the relationship between maternal asthma severity and the frequency of preterm delivery, and a clinical trial, *Asthma Therapy in Pregnancy Trial*, to determine the effect of asthma therapy on reducing the incidence of emergency department visits or hospitalization during pregnancy. Minority participation in the observational study is 54 percent blacks and 9 percent Hispanics, and in the clinical trial is 62 percent blacks and 8 percent Hispanics.

Translational Activities

Ensuring full utilization of modern asthma treatment strategies is an important goal of the NHLBI.

- Interventions to Improve Asthma Management and Prevention in Schools (see Chapter 10): Develops and evaluates innovative programs involving students with asthma, their families, and their families' physician, as well as teachers, other school staff, and students without asthma, to ensure optimal asthma management and prevention in three schools; 90 percent of the participants are minority.

The Institute supports a number of investigator-initiated projects that evaluate the effectiveness of various strategies to control asthma. One study, conducted in urban black communities of Baltimore, is examining the ability of two asthma interventions to reduce emergency room visits, improve medication adherence, and alter asthma morbidity. One strategy (known as ACCESS) provides assistance to families in accessing medical care; the other combines ACCESS with an adherence intervention that assists families in establishing appropriate adherence to asthma medication.

A New York-based study is establishing a collaboration with school nurses and primary care physicians to form a network of care focusing on preventive aspects of asthma. It will identify school children with asthma and work with their families and physicians to develop an asthma management plan for each child that includes supervision of medicine-taking at school. The project will refer children who lack continuing care to physicians who practice using the NAEPP Guidelines.

In San Diego, scientists are evaluating an intervention project to reduce tobacco-related morbidity among low SES Hispanic children with asthma. By collaborating with Latina counselors, researchers have developed a culturally sensitive behavioral program that focuses on reducing environmental tobacco smoke (ETS) exposure in asthmatic children. They are comparing the effectiveness of behavioral counseling for reduction of ETS exposure with general asthma management education to reduce asthma severity in affected children.

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. The experimental group will be compared with a control group receiving no intervention.

A randomized controlled trial is being conducted on 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, two telephone contacts, and a monetary incentive to increase follow-up visits to primary care providers.

Education

The NAEPP (see Chapter 2) has developed easy-to-read material on asthma treatment and control directed to low-literacy audiences.

- *Facts About Controlling Your Asthma*
- *El asma: cómo controlar esta enfermedad*

Sarcoidosis

Research is directed at understanding the disproportionate prevalence of sarcoidosis among blacks and women.

- ACCESS (see Chapter 10): Assesses the role of environmental and familial factors in the etiology of the disease. Sixty-three percent of the study participants are minority.

The Institute also supports investigator-initiated studies on the causes of sarcoidosis. One study aims to determine whether hereditary susceptibility predisposes blacks to sarcoidosis and to identify sarcoidosis susceptibility genes in blacks.

Another project is elucidating 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.

Tuberculosis

Beginning in FY 1993, the NHLBI announced five annual competitions for Tuberculosis

Academic Awards (TBAAAs). A total of 24 awards were made, and 13 grants that resulted from the last 3 competitions received funding in FY 1999.

The broad goal of the TBAA program is to improve prevention, management, and control of TB by increasing opportunities for health-care practitioners to learn modern principles and practices. Among its objectives are to promote coordinated clinical approaches to the care of patients of various ethnic groups who have TB; to raise awareness among health-care providers of unique ethnic, cultural, and socioeconomic dimensions of TB; to focus educational efforts in areas where TB incidence is persistently high (e.g., immigrant communities, refugee centers, homeless shelters, correctional facilities); to promote development of minority faculty capable of providing appropriate instruction in diagnosis and management of TB; and to enhance TB education programs in minority medical schools and in the communities that they serve.

The NHLBI also supports investigator-initiated research aimed at improving TB control among minority populations. Two projects evaluate educational strategies to improve medication adherence and clinic attendance among TB-infected adolescents from minority communities in California. The program based in San Diego is specifically aimed at Latino adolescents; the Los Angeles program encompasses Hispanic and Asian American communities. A third project, in San Francisco, has been very effective in administering TB prophylaxis to a mostly homeless population. In Chicago, investigators are testing a TB community-outreach intervention, modeled after a program previously developed for AIDS prevention, among injection-drug users. Another study situated in Harlem, New York, is comparing alternative methods designed for inner-city TB patients to ensure completion of treatment and preventive therapy.

Blood Diseases

Sickle Cell Disease

Sickle cell disease affects approximately 72,000 people in the United States, most of whom trace their ancestry to Africa. The disease occurs in about 1 in every 500 black births.

Since 1972, the NHLBI has supported an extensive research program to improve

understanding of the pathophysiology of SCD and uncover better approaches to diagnosis and treatment of the disease and prevention of its myriad complications.

Institute-initiated programs that were active during FY 1999 include the following:

- Comprehensive Sickle Cell Centers Program (see Chapter 9): Provides an environment in which resources, facilities, and personnel can be coordinated to expedite development and application of new knowledge for improved diagnosis and treatment of SCD and prevention of its complications.
- Clinical Course of Sickle Cell Disease (see Chapter 11): Identifies and evaluates the factors that determine the clinical course and presence or absence of complications in SCD.

The Institute also supports a large portfolio of investigator-initiated basic and clinical research.

Basic Research

In an attempt to find a universal cure for all SCD patients, the NHLBI sponsors research into gene therapy as a possible approach. This technically difficult work is being pursued actively by researchers around the country.

Animal models of SCD are being developed and used to evaluate new drugs and to study gene regulation, gene therapy, blood flow, and pathogenic mechanisms.

The NHLBI Reference Laboratory to Evaluate Therapies for SCD is using a battery of standardized tests for preclinical evaluation of potential new therapeutic agents for SCD.

Over the past 2 years, momentum has built in support of the idea that SCD should be viewed as a disease of the blood vessels as well as a disease of abnormal hemoglobin. Researchers are investigating the effects on the endothelium (the lining of blood vessels) that appear to be induced specifically by blood cells from SCD patients, in the expectation that the findings may ultimately point the way to development of new therapeutics.

Clinical Research

Since 1991, the Multicenter Transplantation Study has been evaluating the use of bone marrow transplantation for children with SCD who

have HLA-matched sibling donors. Investigators are currently exploring a mixed-chimerism protocol for children that would allow a less toxic regimen than is currently needed to be used before the transplant.

The Multicenter Study of Hydroxyurea (MSH) Patient Follow-up is continuing to observe the patient cohort that participated in the adult hydroxyurea clinical trial that ended successfully in 1995. In addition to addressing issues of long-term safety, the researchers are also looking at the long-term efficacy of hydroxyurea in maintaining elevated fetal hemoglobin levels.

The Pediatric Hydroxyurea Study Group (PED HUG) was established to test the safety and efficacy of hydroxyurea use in children and infants with SCD. It showed that children respond to the medication in a manner similar to adults; fetal hemoglobin levels and total hemoglobin were increased and complications associated with sickle cell anemia were lower. In addition, the study demonstrated that the drug does not adversely affect growth and development between ages 5 and 15 years. Plans are under way to study the effectiveness of hydroxyurea in preventing onset of chronic end organ damage in young children with sickle cell anemia.

Several investigators are studying the unusual features of basal nutrient metabolism and resting energy expenditure that have been found in children and adults with SCD. The studies have implications for improving understanding of impaired growth seen in children and suggesting changes in nutritional intake that may be required by both children and adults with SCD.

Education

The NHLBI has developed a number of publications on sickle cell disease that target minorities.

- *Datos Sobre La Anemia Falciforme (Facts About Sickle Cell Anemia)*
- *Facts About Sickle Cell Anemia*

Cooley's Anemia

Cooley's anemia is an inherited disorder of the red blood cell that primarily affects people of Mediterranean, African, Southeast Asian, Chinese, and Asiatic Indian origin.

NHLBI research in Cooley's anemia includes efforts to develop oral chelators to remove the iron overload caused by repetitive transfusion therapy, exploration of hormone therapy for patients surviving into their teens, testing of drugs to enhance fetal hemoglobin production (hydroxyurea and butyrate), investigation of gene therapy approaches to cure the disease, development of *in utero* therapies to treat or cure affected fetuses, and studies to improve the safety of the nation's blood supply.

During FY 1999, the Institute announced competition for a new program that will establish a network of clinical research centers capable of performing clinical trials of promising new therapeutic agents.

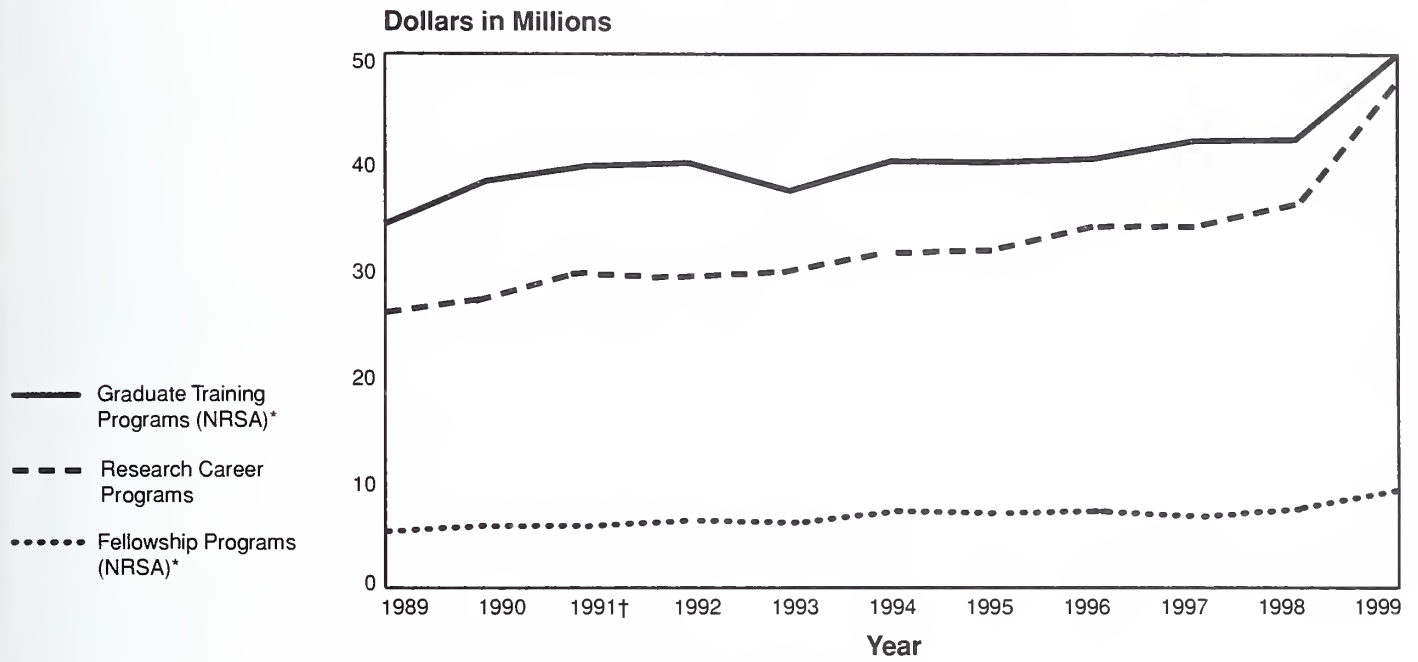
Women's Health Initiative

Coronary heart disease, cancer, and osteoporosis are the most common causes of death, disability, and impaired quality of life in postmenopausal women. The WHI (see Chapters 2 and 11) seeks to answer questions on benefits and risks of HRT, changes in dietary patterns, and calcium/vitamin D supplements in disease prevention. Several of the centers have recruited primarily minority population: blacks, Hispanics, Asian Americans and Pacific Islanders, and American Indians.

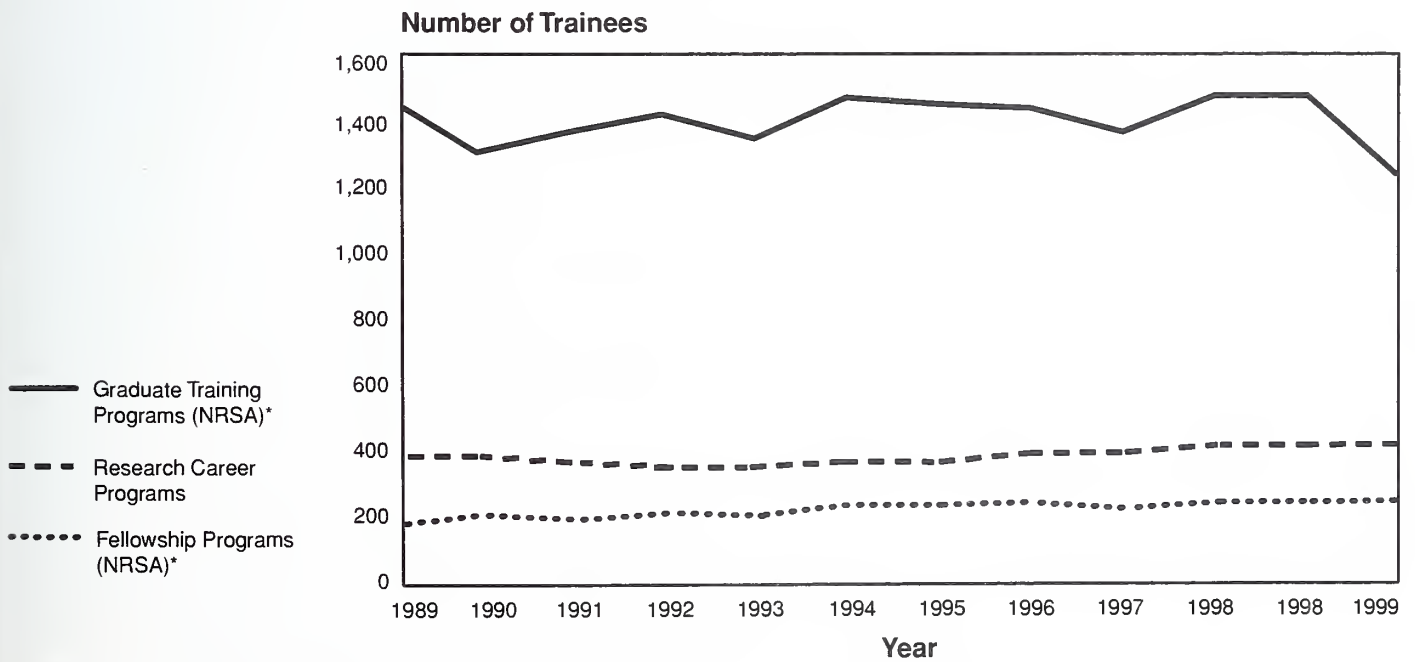


13. Research Training and Career Development Programs

NHLBI Research Training and Career Development Obligations: Fiscal Years 1989-99



NHLBI Full-Time Training Positions: Fiscal Years 1989-99



* National Research Service Awards.

† In FY 1991, the NIH increased the salary ceiling for research career awards from \$40,000 to \$50,000 and implemented a new stipend schedule for NRS Awards.

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 1999

| | Number of Awards Obligated | Trainees (Full-Time Training Positions) | Direct Cost | Indirect Cost | Total Cost | Percent of Total NHLBI Training Program Dollars |
|---|----------------------------|---|---------------------|---------------------|----------------------|---|
| Fellowship Programs | | | | | | |
| Predocutorial Fellowship Award for Minority Students (F31) | 13 | 13 | \$ 346,163 | \$ 0 | \$ 346,163 | 0.6% |
| Individual NRSA (F32) | 237 | 237 | 8,806,680 | 0 | 8,806,680 | 14.8 |
| Senior Fellowships NRSA (F33) | 2 | 2 | 90,536 | 0 | 90,536 | 0.2 |
| Minority Access to Research Careers (MARC) Fellowships NRSA (F34) | 0 | 0 | 0 | 0 | 0 | 0.0 |
| Intramural NRSA (F35) | 0 | 0 | 0 | 0 | 0 | 0.0 |
| Subtotal, Fellowships | 252 | 252 | 9,243,379 | 0 | 9,243,379 | 15.5 |
| Graduate Training Programs | | | | | | |
| Institutional NRSA (T32) | 194 | 1,185 | 42,817,579 | 2,733,037 | 45,550,616 | 76.5 |
| Minority Institutional NRSA (T32) | 3 | 53 | 846,940 | 54,060 | 901,000 | 1.5 |
| Off-Quarter Professional Student Training NRSA (T34, T35) | 34 | | 1,301,276 | 83,060 | 1,384,336 | 2.3 |
| Minority Access to Research Careers (MARC) (T36) | 0 | 0 | 5,000 | 0 | 5,000 | 0.0 |
| Short-Term Training for Minority Students (T35M) | 21 | | 2,319,420 | 174,580 | 2,494,000 | 4.2 |
| Subtotal, Training Grants | 252 | 1,238 | 47,290,215 | 3,044,737 | 50,334,952* | 84.5 |
| Total, Training Programs | 504 | 1,490 | \$56,533,594 | \$ 3,044,737 | \$59,578,331* | 100.0% |

* Excludes assessment of \$1,216,000.

History of Training Obligations by Activity: Fiscal Years 1989-99

(Dollars in Thousands)

| | 1989* | 1990 | 1991* | 1992 | Fiscal Year | | 1995 | 1996 | 1997 | 1998 | 1999 |
|--|-----------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| | | | | | 1993 | 1994 | | | | | |
| Fellowship Programs | | | | | | | | | | | |
| Predoctoral Fellowship Award for Minority Students (F31) | \$ — | \$ — | \$ — | \$ 55 | \$ 97 | \$ 199 | \$ 304 | \$ 551 | \$ 388 | \$ 466 | \$346 |
| Individual NRSA (F32) | 5,271 | 5,654 | 5,554 | 6,041 | 5,867 | 6,853 | 6,651 | 6,483 | 6,281 | 6,969 | 8,807 |
| Senior Fellowships NRSA (F33) | 95 | 129 | 205 | 141 | 141 | 141 | 99 | 233 | 179 | 125 | 90 |
| Minority Access to Research Careers Fellowships NRSA (F34) | 13 | — | — | — | — | — | — | — | — | — | — |
| Intramural NRSA (F35) | 30 | 91 | 133 | 146 | 70 | 69 | 49 | — | — | — | — |
| Subtotal, Fellowships | 5,409 | 5,874 | 5,892 | 6,383 | 6,175 | 7,262 | 7,103 | 7,267 | 6,848 | 7,560 | 9,243 |
| Graduate Training Programs | | | | | | | | | | | |
| Institutional NRSA (T32) | 32,273 | 36,751 ^A | 37,533 ^B | 37,355 ^C | 34,846 ^D | 36,534 ^E | 36,270 ^F | 36,718 ^G | 38,253 ^H | 37,904 ^I | 45,551 ^J |
| Minority Institutional NRSA (T32) | 348 | 398 | 432 | 684 | 35 | 735 | 982 | 679 | 898 | 706 | 901 |
| Minority Summer Hypertension NRSA (T35, T34) | 80 | — | — | — | — | — | — | — | — | — | — |
| Minority Summer Pulmonary NRSA (T34, T35) | — | — | — | — | — | — | — | — | — | — | — |
| Off-Quarter Professional Student Training NRSA (T34, T35) | 1,386 | 957 | 1,150 | 1,106 | 1,744 | 1,132 | 951 | 1,001 | 1,216 | 1,435 | 1,384 |
| Minority Access to Research Careers (MARC) (T36) | 10 | 19 | 19 | 22 | 15 | 5 | 5 | 5 | 5 | 5 | 5 |
| Short-Term Training for Minority Students (T35M) | — | — | 339 | 717 | 573 | 1,616 | 1,760 | 1,834 | 1,612 | 1,964 | 2,494 |
| Subtotal, Training Grants | 34,097 | 38,125^A | 39,473^B | 39,884^C | 37,213^D | 40,022^E | 39,968^F | 40,237^G | 41,984^H | 42,014^I | 50,335^J |
| Total, Training Programs | \$39,506 | \$43,999^A | \$45,365^B | \$46,267^C | \$43,388^D | \$47,284^E | \$47,071^F | \$47,504^G | \$48,832^H | \$49,574^I | \$59,578^J |

* Stipend increase occurred in FY 1989 and 1991.

^A Excludes assessment of \$444,740.

^B Excludes assessment of \$405,800.

^C Excludes assessment of \$466,000.

^D Excludes assessment of \$888,000.

^E Excludes assessment of \$864,000.

^F Excludes assessment of \$964,000.

^G Excludes assessment of \$982,000.

^H Excludes assessment of \$1,004,000.

^I Excludes assessment of \$1,032,000.

^J Excludes assessment of \$1,216,000.

Full-Time Training Positions* by Activity: Fiscal Years 1989-99

| | (Number of Positions) | | | | | | | | | | |
|---|-----------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | 1989 | 1990 | 1991 | 1992 | Fiscal Year | | 1995 | 1996 | 1997 | 1998 | 1999 |
| | | | | | 1993 | 1994 | | | | | |
| Fellowship Programs | | | | | | | | | | | |
| Predoctoral Fellowship Award for Minority Students (F31) | — | — | — | 3 | 4 | 7 | 13 | 21 | 15 | 19 | 13 |
| Individual NRSA (F32) | 184 | 206 | 191 | 209 | 200 | 229 | 222 | 220 | 210 | 225 | 237 |
| Senior Fellowships NRSA (F33) | 3 | 5 | 6 | 4 | 4 | 4 | 4 | 7 | 5 | 4 | 2 |
| Minority Access to Research Careers (MARC) Fellowships NRSA (F34) | — | — | — | — | — | — | — | — | — | — | — |
| Intramural NRSA (F35) | 1 | 3 | 4 | 5 | 3 | 2 | 2 | — | — | — | — |
| Subtotal, Fellowships | 188 | 214 | 201 | 221 | 211 | 242 | 241 | 248 | 230 | 248 | 252 |
| Graduate Training Programs | | | | | | | | | | | |
| Institutional NRSA (T32) | 1,257 | 1,205 | 1,218 | 1,240 | 1,124 | 1,237 | 1,201 | 1,216 | 1,179 | 1,423 | 1,185 |
| Minority Institutional NRSA (T32) | 30 | 21 | 19 | 24 | 1 | 30 | 47 | 30 | 43 | 52 | 53 |
| Minority Summer Hypertension NRSA (T34, T35) | 5 | — | — | — | — | — | — | — | — | — | — |
| Minority Summer Pulmonary NRSA (T34, T35) | — | — | — | — | — | — | — | — | — | — | — |
| Off-Quarter Professional Student Training NRSA (T34, T35) | 148 | 79 | 103 | 102 | 181 | 100 | 76 | 78 | 68 | — | — |
| Minority Access to Research Careers (MARC) (T36) | — | — | (4) | (4) | (4) | (2) | (2) | (2) | (2) | — | — |
| Short-Term Training for Minority Students (T35M) | — | — | 26 | 53 | 40 | 102 | 125 | 113 | 75 | — | — |
| Subtotal, Training Grants | 1,440 | 1,305 | 1,366 | 1,419 | 1,346 | 1,469 | 1,449 | 1,437 | 1,365 | 1,475 | 1,238 |
| Total, Training Programs | 1,628 | 1,519 | 1,567 | 1,640 | 1,557 | 1,711 | 1,690 | 1,685 | 1,595 | 1,723 | 1,490 |

* Recommended positions.

NHLBI Research Career Programs: Fiscal Years 1989-99

| Program | (Number of Awards) | | | | | | | | | | |
|--|--------------------|------------|------------|------------|------------|-------------|------------|------------|------------|------------|------------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | Fiscal Year | | 1996 | 1997 | 1998 | 1999 |
| | | | | | | 1994 | 1995 | | | | |
| Mentored Research Scientist Development Award for Minority Faculty (K01) | — | — | — | — | — | — | — | — | 5 | 19 | 30 |
| Minority Institutional Faculty Mentored Research Scientist Development Award (K01) | — | — | — | — | — | — | — | — | 1 | — | — |
| Independent Scientist Award (K02) | — | — | — | — | — | — | — | 3 | 8 | 14 | 18 |
| Research Career Development Award (K04) | 92 | 74 | 65 | 50 | 40 | 34 | 30 | 25 | 18 | 10 | 6 |
| Research Career Award (K06) | 11 | 9 | 8 | 7 | 6 | 3 | 3 | 3 | 3 | 3 | 2 |
| Preventive Cardiology Academic Award (K07) | 22 | 22 | 23 | 18 | 14 | 11 | 7 | — | — | — | — |
| Preventive Pulmonary Academic Award (K07) | 12 | 16 | 20 | 14 | 11 | 8 | 4 | — | — | — | — |
| Transfusion Medicine Academic Award (K07) | 20 | 18 | 18 | 14 | 12 | 9 | 5 | 2 | — | — | — |
| Systemic Pulmonary and Vascular Diseases Academic Award (K07) | — | — | 2 | 6 | 11 | 11 | 15 | 11 | 9 | 3 | 3 |
| Asthma Academic Award (K07) | — | — | — | — | 3 | 6 | 9 | 9 | 9 | 6 | 3 |
| Tuberculosis Academic Award (K07) | — | — | — | — | 6 | 12 | 15 | 19 | 23 | 20 | 13 |
| Sleep Academic Award (K07) | — | — | — | — | — | — | — | 8 | 12 | 20 | 20 |
| Nutrition Academic Award (K07) | — | — | — | — | — | — | — | — | — | 10 | 10 |
| Clinical Investigator Award (K08) | 135 | 141 | 137 | 152 | 180 | 208 | 222 | 254 | 267 | 278 | 262 |
| Physician Scientist Award (K11) | 77 | 90 | 82 | 79 | 60 | 46 | 22 | 12 | — | — | — |
| Minority School Faculty Development Award (K14) | 22 | 22 | 18 | 18 | 15 | 12 | 11 | 15 | 9 | — | — |
| Research Development Award for Minority Faculty (K14) | — | — | — | — | — | 13 | 28 | 36 | 34 | 37 | 22 |
| Mentored Patient-Oriented Research Career Development Award (K23) | — | — | — | — | — | — | — | — | — | — | 13 |
| Mid-Career Investigator Award in Patient-Oriented Research (K24) | — | — | — | — | — | — | — | — | — | — | 11 |
| Clinical Research Curriculum Award (K30) | — | — | — | — | — | — | — | — | — | — | 9 |
| Total | 391 | 392 | 373 | 358 | 358 | 373 | 371 | 397 | 398 | 420 | 422 |

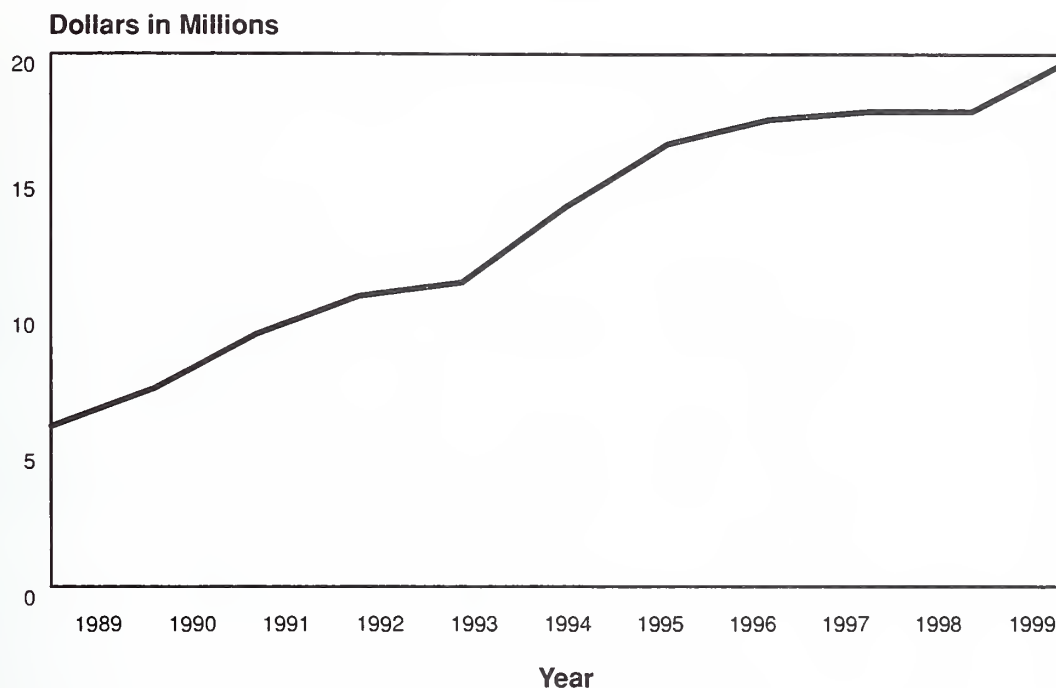
NHLBI Research Career Programs Obligations: Fiscal Years 1989-99

(Dollars in Thousands)

| Program | 1989 | 1990 | 1991* | 1992 | Fiscal Year | | 1996 | 1997 | 1998 | 1999 | |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | | | | | 1993 | 1994 | | | | | |
| Mentored Research Scientist Development Award for Minority Faculty (K01) | \$ — | \$ — | \$ — | \$ — | \$ — | \$ — | \$ — | \$ — | \$ 460 | \$1,824 | \$3,644 |
| Minority Institutional Faculty Mentored Research Scientist Development Award (K01) | — | — | — | — | — | — | — | 106 | — | — | — |
| Independent Scientist Award (K02) | — | — | — | — | — | — | 207 | 545 | 933 | 1,548 | — |
| Research Career Development Award (K04) | 4,859 | 4,609 | 4,279 | 3,221 | 2,595 | 2,224 | 2,006 | 1,693 | 1,226 | 684 | 568 |
| Research Career Award (K06) | 331 | 303 | 270 | 239 | 194 | 102 | 104 | 105 | 103 | 103 | 70 |
| Preventive Cardiology Academic Award (K07) | 2,618 | 2,526 | 2,921 | 2,376 | 1,801 | 1,397 | 957 | — | — | — | — |
| Preventive Pulmonary Academic Award (K07) | 984 | 1,301 | 1,851 | 1,332 | 1,040 | 726 | 309 | — | — | — | — |
| Transfusion Medicine Academic Award (K07) | 1,719 | 1,590 | 1,658 | 1,452 | 1,155 | 868 | 485 | 326 | — | — | — |
| Systemic Pulmonary and Vascular Diseases Academic Award (K07) | — | — | 242 | 894 | 1,820 | 1,863 | 2,295 | 1,715 | 1,415 | 386 | 423 |
| Asthma Academic Award (K07) | — | — | — | — | 233 | 502 | 749 | 740 | 764 | 509 | 248 |
| Tuberculosis Academic Award (K07) | — | — | — | — | 454 | 906 | 1,155 | 1,496 | 1,831 | 1,566 | 1,161 |
| Sleep Academic Award (K07) | — | — | — | — | — | — | 699 | 1,027 | 1,734 | 1,736 | — |
| Nutrition Academic Award (K07) | — | — | — | — | — | — | — | — | 1,491 | 1,480 | — |
| Clinical Investigator Award (K08) | 8,445 | 8,860 | 10,370 | 11,733 | 14,125 | 16,635 | 18,090 | 21,093 | 22,238 | 23,122 | 29,741 |
| Physician Scientist Award (K11) | 5,328 | 6,376 | 6,651 | 6,598 | 5,110 | 3,993 | 1,903 | 1,023 | 0 | — | — |
| Minority School Faculty Development Award (K14) | 1,280 | 1,334 | 1,226 | 1,265 | 1,081 | 893 | 810 | 1,158 | 729 | 618 | — |
| Research Development Award for Minority Faculty (K14) | — | — | — | — | — | 1,289 | 2,812 | 3,607 | 3,468 | 3,099 | 2,538 |
| Mentored Patient-Oriented Research Career Development Award (K23) | — | — | — | — | — | — | — | — | — | — | 1,687 |
| Mid-Career Investigator Award in Patient-Oriented Research (K24) | — | — | — | — | — | — | — | — | — | — | 1,054 |
| Clinical Research Curriculum Award (K30) | — | — | — | — | — | — | — | — | — | — | 1,772 |
| Total | \$25,564 | \$26,899 | \$29,468 | \$29,110 | \$29,608 | \$31,398 | \$31,675 | \$33,862 | \$33,912 | \$36,069 | \$47,670 |

* Salary ceiling on Research Career Awards increased from \$40,000 to \$50,000.

NHLBI Minority Biomedical Research Training, Career Development, and Research Supplements Program Obligations: Fiscal Years 1989-99



NHLBI Minority Biomedical Research Training, Career Development, and Research Supplements Program Obligations: Fiscal Years 1989-99

(Dollars in Thousands)

| Program | Fiscal Year | | | | | | | | | | |
|--|----------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Minority Biomedical Research Support (MBRS) | \$2,368 | \$2,418 | \$2,561 | \$2,672 | \$2,540 | \$2,433 | \$2,313 | \$2,503 | \$2,722 | \$2,978 | \$3,423 |
| Minority Access to Research Careers (MARC) | 23 | 19 | — | — | — | — | — | 5 | 5 | 5 | — |
| Minority Hypertension Research Development Summer Program | 80 | — | — | — | — | — | — | — | — | — | — |
| Minority Institutional Research Training Program | 348 | 398 | 567 | 684 | 608 | 735 | 982 | 679 | 898 | 706 | 901 |
| Minority School Faculty Development Award | 1,280 | 1,334 | 1,226 | 1,265 | 1,081 | 893 | 810 | 1,158 | 729 | 618 | 444 |
| Research Development Award for Minority Faculty | — | — | — | — | — | 1,289 | 2,812 | 3,607 | 3,468 | 3,099 | 2,083 |
| Minority Research Supplements Programs | 1,763 | 3,059 | 4,596 | 5,367 | 6,273 | 6,754 | 7,264 | 6,714 | 7,021 | 7,043 | 6,518 |
| Reentry Supplements | — | — | — | — | — | — | — | 140 | 89 | 249 | 106 |
| MARC Summer Research Training Program | 25 | 34 | 32 | 20 | 48 | 31 | 28 | 32 | 17 | 0 | 10 |
| Short-Term Training for Minority Students | — | — | 339 | 717 | 573 | 1,616 | 1,760 | 1,834 | 1,612 | 1,964 | 2,494 |
| Minority Predoctoral Fellowship | — | — | — | 55 | 114 | 199 | 304 | 551 | 388 | 436 | 345 |
| Mentored Research Scientist Development Award for Minority Faculty | — | — | — | — | — | — | — | — | 460 | 376 | 2,738 |
| Minority Institutional Faculty Mentored Research Scientist Development Award | — | — | — | — | — | — | — | — | 106 | 101 | 905 |
| Total Minority Programs | \$5,887 | \$7,262 | \$9,321 | \$10,780 | \$11,237 | \$13,950 | \$16,273 | \$17,223 | \$17,515 | \$17,575 | \$19,968 |

NHLBI Research Supplements Program for Underrepresented Minorities by Award Type: Fiscal Years 1989-99

(Number of Awards)

| Award Type | Fiscal Year | | | | | | | | | | |
|---------------|-------------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Investigator | 33 | 50 | 54 | 45 | 51 | 46 | 49 | 42 | 38 | 31 | 32 |
| Postdoctoral | — | — | 9 | 25 | 29 | 31 | 39 | 49 | 47 | 50 | 47 |
| Graduate | 6 | 16 | 24 | 37 | 45 | 55 | 42 | 37 | 36 | 48 | 53 |
| Undergraduate | 4 | 11 | 16 | 22 | 20 | 35 | 27 | 12 | 23 | 25 | 17 |
| High School | — | — | 2 | 1 | 5 | 15 | 10 | 8 | 9 | 11 | 6 |
| Total | 43 | 77 | 105 | 130 | 150 | 182 | 167 | 148 | 153 | 165 | 155 |

NHLBI Research Supplements Program Obligations for Underrepresented Minorities by Award Type: Fiscal Years 1989-99

(Dollars in Thousands)

| Award Type | Fiscal Year | | | | | | | | | | |
|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 |
| Investigator | \$1,626 | \$2,749 | \$3,449 | \$2,959 | \$3,270 | \$2,894 | \$3,319 | \$2,552 | \$2,412 | \$2,185 | \$2,331 |
| Postdoctoral* | — | — | 478 | 1,392 | 1,574 | 1,882 | 2,153 | 2,899 | 3,172 | 3,032 | 3,110 |
| Graduate† | 99 | 255 | 501 | 843 | 1,263 | 1,585 | 1,402 | 1,116 | 1,181 | 1,527 | 1,806 |
| Undergraduate† | 19 | 55 | 162 | 171 | 150 | 332 | 351 | 120 | 273 | 246 | 166 |
| High School* | — | — | 6 | 3 | 16 | 61 | 40 | 27 | 32 | 53 | 27 |
| Total | \$1,744 | \$3,059 | \$4,596 | \$5,368 | \$6,273 | \$6,754 | \$7,265 | \$6,714 | \$7,070 | \$7,043 | \$7,440 |

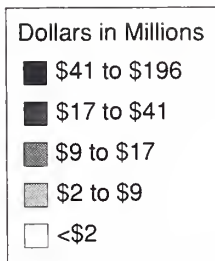
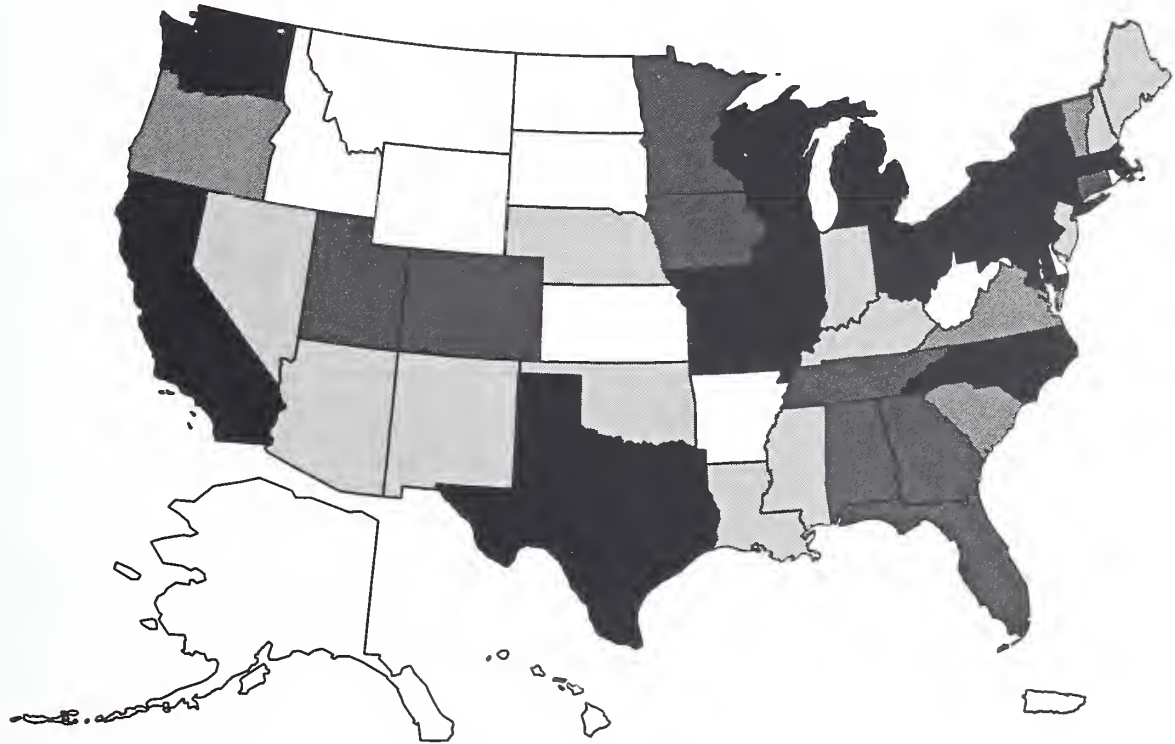
* Implemented in FY 1991.

† Implemented in FY 1989.



14. Geographic Distribution of Awards: Fiscal Year 1999

Geographic Distribution of Awards by State:
Fiscal Year 1999



Geographic Distribution of Awards by State or Country: Fiscal Year 1999

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|--|-----------|-------------------|-----------------|-------------------|-----------------------------------|----------------|-----------|------------------|
| | No. | Dol. | No. | Dol. | No. | Dol. | No. | Dol. |
| Alabama | | | | | | | | |
| Auburn University at Auburn | 3 | \$943,701 | 3 | \$943,701 | 0 | \$0 | 0 | \$0 |
| Diversified Scientific, Inc. | 1 | 99,970 | 1 | 99,970 | 0 | 0 | 0 | 0 |
| Elgavish Paramagnetics, Inc. | 1 | 370,419 | 1 | 370,419 | 0 | 0 | 0 | 0 |
| New Century Pharmaceuticals | 1 | 71,229 | 1 | 71,229 | 0 | 0 | 0 | 0 |
| University of Alabama at Birmingham | 75 | 22,312,525 | 62 | 16,222,025 | 7 | 910,452 | 6 | 5,180,048 |
| University of Alabama in Huntsville | 1 | 165,491 | 1 | 165,491 | 0 | 0 | 0 | 0 |
| University of South Alabama | 16 | 4,216,763 | 16 | 4,216,763 | 0 | 0 | 0 | 0 |
| Vectorlogics, Inc. | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| Total Alabama | 99 | 28,280,098 | 86 | 22,189,598 | 7 | 910,452 | 6 | 5,180,048 |
| Arizona | | | | | | | | |
| Arizona State University | 1 | 202,500 | 1 | 202,500 | 0 | 0 | 0 | 0 |
| Gila River Indian Community Council | 1 | 504,858 | 1 | 504,858 | 0 | 0 | 0 | 0 |
| Guided Therapy Systems, Inc. | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| IMARX Pharmaceutical Corporation | 1 | 459,697 | 1 | 459,697 | 0 | 0 | 0 | 0 |
| Lipogenics, Inc. | 1 | 122,619 | 1 | 122,619 | 0 | 0 | 0 | 0 |
| University of Arizona | 28 | 7,510,510 | 23 | 5,399,216 | 4 | 495,544 | 1 | 1,615,750 |
| Total Arizona | 33 | 8,900,184 | 28 | 6,788,890 | 4 | 495,544 | 1 | 1,615,750 |
| Arkansas | | | | | | | | |
| Arkansas Children's Hospital, Little Rock | 1 | 117,899 | 1 | 117,899 | 0 | 0 | 0 | 0 |
| Arkansas Children's Hospital Research Institute | 1 | 323,336 | 1 | 323,336 | 0 | 0 | 0 | 0 |
| University of Arkansas at Pine Bluff | 1 | 75,559 | 1 | 75,559 | 0 | 0 | 0 | 0 |
| University of Arkansas Medical Sciences, Little Rock | 2 | 502,806 | 2 | 502,806 | 0 | 0 | 0 | 0 |
| Total Arkansas | 5 | 1,019,600 | 5 | 1,019,600 | 0 | 0 | 0 | 0 |
| California | | | | | | | | |
| American National Red Cross, Los Angeles | 1 | 1,446,453 | 0 | 0 | 0 | 0 | 1 | 1,446,453 |
| Anatomix | 1 | 312,416 | 1 | 312,416 | 0 | 0 | 0 | 0 |
| Anticancer, Inc. | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| Beckman Research Institute | 1 | 279,203 | 1 | 279,203 | 0 | 0 | 0 | 0 |
| Burnham Institute | 2 | 731,686 | 2 | 731,686 | 0 | 0 | 0 | 0 |
| California Institute of Technology | 2 | 590,916 | 2 | 590,916 | 0 | 0 | 0 | 0 |
| California State Polytechnic University, Pomona | 0 | 130,050 | 0 | 130,050 | 0 | 0 | 0 | 0 |
| California State University, Los Angeles | 0 | 102,945 | 0 | 102,945 | 0 | 0 | 0 | 0 |
| Cedars-Sinai Medical Center | 4 | 970,854 | 3 | 669,798 | 0 | 0 | 1 | 301,056 |
| Centaur Pharmaceuticals, Inc. | 1 | 100,061 | 1 | 100,061 | 0 | 0 | 0 | 0 |

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|---|--------|-----------|-----------------|-----------|-----------------------------------|---------|-----------|-----------|
| | No. | Dol. | No. | Dol. | No. | Dol. | No. | Dol. |
| California (continued) | | | | | | | | |
| Cerus Corporation | 1 | 258,000 | 1 | 258,000 | 0 | 0 | 0 | 0 |
| Charles R. Drew University of Medicine and Science. | 1 | 251,073 | 0 | 0 | 1 | 251,073 | 0 | 0 |
| Children's Hospital, Oakland . | 7 | 1,663,641 | 6 | 1,609,673 | 1 | 53,968 | 0 | 0 |
| Children's Hospital of Los Angeles. | 7 | 3,586,295 | 7 | 3,586,295 | 0 | 0 | 0 | 0 |
| Children's Hospital of Orange County. | 1 | 320,956 | 1 | 320,956 | 0 | 0 | 0 | 0 |
| City of Hope National Medical Center | 1 | 1,388,491 | 1 | 1,388,491 | 0 | 0 | 0 | 0 |
| Cooke Pharmaceutical | 1 | 387,402 | 1 | 387,402 | 0 | 0 | 0 | 0 |
| DIMX, Inc. | 2 | 470,706 | 2 | 470,706 | 0 | 0 | 0 | 0 |
| Gen-Probe, Inc. | 1 | 1,656,055 | 0 | 0 | 0 | 0 | 1 | 1,656,055 |
| Good Samaritan Hospital. | 1 | 236,426 | 1 | 236,426 | 0 | 0 | 0 | 0 |
| Harbor-UCLA Research and Education Institute. | 9 | 2,000,287 | 7 | 1,483,287 | 0 | 0 | 2 | 517,000 |
| Idun Pharmaceuticals. | 1 | 99,401 | 1 | 99,401 | 0 | 0 | 0 | 0 |
| Immusol, Inc. | 2 | 546,662 | 2 | 546,662 | 0 | 0 | 0 | 0 |
| J. David Gladstone Institutes. . | 14 | 6,630,422 | 11 | 6,515,066 | 3 | 115,356 | 0 | 0 |
| Kaiser Foundation Hospitals. . | 1 | 304,559 | 1 | 304,559 | 0 | 0 | 0 | 0 |
| Kaiser Foundation Research Institute. | 7 | 3,688,955 | 7 | 3,688,955 | 0 | 0 | 0 | 0 |
| Kaiser Foundation Research Institute. | 3 | 3,255,592 | 0 | 0 | 0 | 0 | 3 | 3,255,592 |
| La Jolla Institute for Experimental Medicine | 1 | 322,431 | 1 | 322,431 | 0 | 0 | 0 | 0 |
| Loma Linda University | 4 | 853,268 | 4 | 853,268 | 0 | 0 | 0 | 0 |
| Magnesensors, Inc. | 1 | 65,853 | 1 | 65,853 | 0 | 0 | 0 | 0 |
| Mallard Medical Co., Inc. | 1 | 105,000 | 1 | 105,000 | 0 | 0 | 0 | 0 |
| Maxia Pharmaceuticals, Inc. . . | 1 | 92,509 | 1 | 92,509 | 0 | 0 | 0 | 0 |
| Medicalworks | 1 | 99,693 | 1 | 99,693 | 0 | 0 | 0 | 0 |
| Mission Medical, Inc. | 2 | 601,567 | 2 | 601,567 | 0 | 0 | 0 | 0 |
| Mission Research Corporation. | 1 | 331,117 | 1 | 331,117 | 0 | 0 | 0 | 0 |
| Nimbus, Inc. | 1 | 723,433 | 0 | 0 | 0 | 0 | 1 | 723,433 |
| Northern California Institute of Research and Education. | 8 | 1,966,125 | 8 | 1,966,125 | 0 | 0 | 0 | 0 |
| Pacific Biometrics, Inc. | 1 | 85,320 | 1 | 85,320 | 0 | 0 | 0 | 0 |
| Palo Alto Institute for Research and Education. | 1 | 213,080 | 1 | 213,080 | 0 | 0 | 0 | 0 |
| Palo Alto Medical Foundation Research Institute. | 1 | 97,790 | 1 | 97,790 | 0 | 0 | 0 | 0 |
| Polymer Technology Group, Inc. | 1 | 393,451 | 1 | 393,451 | 0 | 0 | 0 | 0 |
| Public Health Foundation Enterprises | 1 | 331,350 | 1 | 331,350 | 0 | 0 | 0 | 0 |
| SACNAS | 0 | 5,000 | 0 | 0 | 0 | 5,000 | 0 | 0 |
| Salk Institute for Biological Studies. | 3 | 716,294 | 2 | 677,926 | 1 | 38,368 | 0 | 0 |
| San Diego State University . . . | 8 | 2,952,503 | 8 | 2,952,503 | 0 | 0 | 0 | 0 |

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|---|------------|--------------------|-----------------|--------------------|-----------------------------------|------------------|-----------|-------------------|
| | No. | Dol. | No. | Dol. | No. | Dol. | No. | Dol. |
| California (continued) | | | | | | | | |
| Sangamo Biosciences, Inc. | 1 | 99,796 | 1 | 99,796 | 0 | 0 | 0 | 0 |
| Sangart, Inc. | 3 | 559,736 | 3 | 559,736 | 0 | 0 | 0 | 0 |
| Scios, Inc. | 1 | 374,993 | 1 | 374,993 | 0 | 0 | 0 | 0 |
| Scripps Research Institute | 55 | 21,541,177 | 49 | 20,717,452 | 6 | 823,725 | 0 | 0 |
| Sidney Kimmel Cancer Center | 1 | 428,391 | 1 | 428,391 | 0 | 0 | 0 | 0 |
| Somagenics Corporation | 0 | 70,000 | 0 | 70,000 | 0 | 0 | 0 | 0 |
| Sri International | 4 | 1,954,388 | 4 | 1,954,388 | 0 | 0 | 0 | 0 |
| Stanford University | 59 | 17,990,882 | 47 | 15,538,749 | 10 | 976,011 | 2 | 1,476,122 |
| Thoratec Laboratories Corporation. | 1 | 246,519 | 1 | 246,519 | 0 | 0 | 0 | 0 |
| Torrey Pines Institute/Molecular Studies. | 1 | 263,680 | 1 | 263,680 | 0 | 0 | 0 | 0 |
| U.S. Department of Veterans Affairs Medical Center, Palo Alto | 1 | 500,000 | 0 | 0 | 0 | 0 | 1 | 500,000 |
| University of California, Lawrence Berkeley Laboratory. | 12 | 6,186,191 | 11 | 6,134,355 | 1 | 51,836 | 0 | 0 |
| University of California, Berkeley. | 6 | 1,469,432 | 5 | 1,258,302 | 1 | 211,130 | 0 | 0 |
| University of California, Davis | 28 | 7,543,440 | 23 | 5,665,637 | 3 | 263,474 | 2 | 1,614,329 |
| University of California, Irvine | 14 | 3,243,925 | 11 | 2,282,646 | 2 | 52,608 | 1 | 908,671 |
| University of California, Los Angeles. | 50 | 20,037,242 | 44 | 17,286,851 | 2 | 342,858 | 4 | 2,407,533 |
| University of California, Riverside | 3 | 568,477 | 2 | 523,209 | 1 | 45,268 | 0 | 0 |
| University of California, San Diego | 73 | 31,362,784 | 53 | 27,129,748 | 16 | 2,106,452 | 4 | 2,126,584 |
| University of California, San Francisco | 80 | 28,609,718 | 67 | 25,122,718 | 11 | 1,719,488 | 2 | 1,767,512 |
| University of California, Santa Barbara | 3 | 405,703 | 2 | 373,983 | 1 | 31,720 | 0 | 0 |
| University of Southern California | 26 | 9,584,317 | 26 | 9,584,317 | 0 | 0 | 0 | 0 |
| Urogen Corporation | 1 | 99,926 | 1 | 99,926 | 0 | 0 | 0 | 0 |
| Veterans Medical Research Foundation, San Diego | 3 | 477,228 | 3 | 477,228 | 0 | 0 | 0 | 0 |
| Vision Metrics, Inc. | 1 | 99,510 | 1 | 99,510 | 0 | 0 | 0 | 0 |
| Total California | 537 | 195,182,746 | 452 | 169,394,071 | 60 | 7,088,335 | 25 | 18,700,340 |
| Colorado | | | | | | | | |
| Allos Therapeutics, Inc. | 1 | 377,076 | 1 | 377,076 | 0 | 0 | 0 | 0 |
| Colorado State University | 3 | 372,162 | 2 | 348,199 | 1 | 23,963 | 0 | 0 |
| Keystone Symposia. | 3 | 70,000 | 3 | 70,000 | 0 | 0 | 0 | 0 |
| National Jewish Medical and Research Center | 34 | 13,743,718 | 30 | 12,459,019 | 1 | 43,348 | 3 | 1,241,351 |
| R Vision Corporation | 1 | 422,651 | 1 | 422,651 | 0 | 0 | 0 | 0 |

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|---|-----------|-------------------|-----------------|-------------------|-----------------------------------|------------------|-----------|------------------|
| | No. | Dol. | No. | Dol. | No. | Dol. | No. | Dol. |
| Colorado (continued) | | | | | | | | |
| TDA Research, Inc. | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| University of Colorado at Boulder | 5 | 1,043,846 | 4 | 879,489 | 1 | 164,357 | 0 | 0 |
| University of Colorado Health Sciences Center | 44 | 13,506,105 | 39 | 11,598,043 | 4 | 1,192,280 | 1 | 715,782 |
| Total Colorado | 92 | 29,635,558 | 81 | 26,254,477 | 7 | 1,423,948 | 4 | 1,957,133 |
| Connecticut | | | | | | | | |
| Electro Energy, Inc. | 1 | 374,873 | 1 | 374,873 | 0 | 0 | 0 | 0 |
| Hartford Hospital | 1 | 727,447 | 0 | 0 | 0 | 0 | 1 | 727,447 |
| Institute for Pharmaceutical Discovery, Inc. | 2 | 235,165 | 2 | 235,165 | 0 | 0 | 0 | 0 |
| John B. Pierce Laboratory, Inc. | 5 | 981,421 | 4 | 943,053 | 1 | 38,368 | 0 | 0 |
| Symbiotech, Inc. | 1 | 371,028 | 1 | 371,028 | 0 | 0 | 0 | 0 |
| University of Connecticut School of Medical and Dentistry | 7 | 1,551,217 | 7 | 1,551,217 | 0 | 0 | 0 | 0 |
| Yale University | 63 | 18,587,409 | 51 | 16,664,277 | 11 | 1,338,617 | 1 | 584,515 |
| Total Connecticut | 80 | 22,828,560 | 66 | 20,139,613 | 12 | 1,376,985 | 2 | 1,311,962 |
| Delaware | | | | | | | | |
| Compact Membrane Systems, Inc. | 1 | 402,025 | 1 | 402,025 | 0 | 0 | 0 | 0 |
| University of Delaware | 2 | 213,992 | 2 | 213,992 | 0 | 0 | 0 | 0 |
| Total Delaware | 3 | 616,017 | 3 | 616,017 | 0 | 0 | 0 | 0 |
| District of Columbia | | | | | | | | |
| American National Red Cross .. | 13 | 4,242,507 | 11 | 4,006,908 | 2 | 235,599 | 0 | 0 |
| American Registry of Pathology, Inc. | 1 | 180,000 | 1 | 180,000 | 0 | 0 | 0 | 0 |
| Carnegie Institution of Washington, DC | 0 | 22,660 | 0 | 22,660 | 0 | 0 | 0 | 0 |
| Children's National Medical Center | 2 | 630,024 | 2 | 630,024 | 0 | 0 | 0 | 0 |
| Children's Research Institute .. | 1 | 288,290 | 1 | 288,290 | 0 | 0 | 0 | 0 |
| George Washington University .. | 5 | 5,301,049 | 2 | 455,436 | 0 | 0 | 3 | 4,845,613 |
| Georgetown University | 21 | 5,371,859 | 18 | 4,448,551 | 1 | 31,492 | 2 | 891,816 |
| Howard University | 5 | 1,367,957 | 4 | 1,350,452 | 1 | 17,505 | 0 | 0 |
| Lisboa Associates, Inc. | 1 | 132,031 | 1 | 132,031 | 0 | 0 | 0 | 0 |
| Medlantic Research Institute .. | 4 | 2,405,119 | 2 | 878,261 | 0 | 0 | 2 | 1,526,858 |
| Millennium Health | 1 | 375,200 | 1 | 375,200 | 0 | 0 | 0 | 0 |
| Ogilvy Public Relations Worldwide | 1 | 1,288,358 | 0 | 0 | 0 | 0 | 1 | 1,288,358 |
| Smithsonian Institution | 0 | 50,000 | 0 | 50,000 | 0 | 0 | 0 | 0 |
| U.S. Department of Agriculture .. | 1 | 149,570 | 1 | 149,570 | 0 | 0 | 0 | 0 |
| U.S. National Aeronautics and Space Administration | 1 | 20,000 | 0 | 0 | 0 | 0 | 1 | 20,000 |
| Total District of Columbia .. | 57 | 21,824,624 | 44 | 12,967,383 | 4 | 284,596 | 9 | 8,572,645 |

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|---|-----------|-------------------|-----------------|-------------------|-----------------------------------|----------------|-----------|------------------|
| | No. | Dol. | No. | Dol. | No. | Dol. | No. | Dol. |
| Florida | | | | | | | | |
| Alpha One Foundation | 1 | 26,000 | 1 | 26,000 | 0 | 0 | 0 | 0 |
| Bethune-Cookman College . . . | 0 | 168,664 | 0 | 168,664 | 0 | 0 | 0 | 0 |
| Better Control Medical Computers | 1 | 392,475 | 1 | 392,475 | 0 | 0 | 0 | 0 |
| Florida Agricultural and Mechanical University | 0 | 326,443 | 0 | 326,443 | 0 | 0 | 0 | 0 |
| Florida Atlantic University . . . | 1 | 233,460 | 1 | 233,460 | 0 | 0 | 0 | 0 |
| Florida State University | 1 | 186,842 | 1 | 186,842 | 0 | 0 | 0 | 0 |
| Infinite Biomedical Technologies, Inc. | 2 | 239,907 | 2 | 239,907 | 0 | 0 | 0 | 0 |
| Mount Sinai Medical Center, Miami Beach | 2 | 2,213,684 | 2 | 2,213,684 | 0 | 0 | 0 | 0 |
| Nanoptics, Inc. | 1 | 99,510 | 1 | 99,510 | 0 | 0 | 0 | 0 |
| University of Florida | 29 | 8,417,951 | 25 | 7,327,348 | 2 | 176,869 | 2 | 913,734 |
| University of Miami | 14 | 4,155,914 | 12 | 2,606,037 | 1 | 265,367 | 1 | 1,284,510 |
| University of Miami, Coral Gables | 3 | 1,872,843 | 1 | 1,337,839 | 1 | 233,379 | 1 | 301,625 |
| University of South Florida . . . | 6 | 1,243,819 | 6 | 1,243,819 | 0 | 0 | 0 | 0 |
| Total Florida | 61 | 19,577,512 | 53 | 16,402,028 | 4 | 675,615 | 4 | 2,499,869 |
| Georgia | | | | | | | | |
| Clark Atlanta University | 1 | 92,244 | 1 | 92,244 | 0 | 0 | 0 | 0 |
| Emory University | 53 | 14,270,566 | 47 | 12,799,254 | 5 | 479,352 | 1 | 991,960 |
| Georgia Institute of Technology | 2 | 329,695 | 2 | 329,695 | 0 | 0 | 0 | 0 |
| Georgia State University | 1 | 210,707 | 1 | 210,707 | 0 | 0 | 0 | 0 |
| Medical College of Georgia . . . | 19 | 5,163,184 | 19 | 5,163,184 | 0 | 0 | 0 | 0 |
| Morehouse School of Medicine | 3 | 1,966,058 | 3 | 1,966,058 | 0 | 0 | 0 | 0 |
| Savannah State College | 1 | 95,055 | 1 | 95,055 | 0 | 0 | 0 | 0 |
| U.S. Centers for Disease Control and Prevention | 2 | 4,660,000 | 0 | 0 | 0 | 0 | 2 | 4,660,000 |
| University of Georgia | 3 | 507,356 | 3 | 507,356 | 0 | 0 | 0 | 0 |
| Total Georgia | 85 | 27,294,865 | 77 | 21,163,553 | 5 | 479,352 | 3 | 5,651,960 |
| Hawaii | | | | | | | | |
| Kuakini Medical Center | 1 | 395,719 | 1 | 395,719 | 0 | 0 | 0 | 0 |
| University of Hawaii at Hilo . . | 0 | 154,907 | 0 | 154,907 | 0 | 0 | 0 | 0 |
| University of Hawaii at Manoa | 2 | 1,330,414 | 1 | 142,984 | 0 | 0 | 1 | 1,187,430 |
| Total Hawaii | 3 | 1,881,040 | 2 | 693,610 | 0 | 0 | 1 | 1,187,430 |
| Illinois | | | | | | | | |
| Critical Concepts, Inc. | 1 | 364,953 | 1 | 364,953 | 0 | 0 | 0 | 0 |
| Finch University of Health Science/Chicago Medical School | 1 | 185,937 | 1 | 185,937 | 0 | 0 | 0 | 0 |
| Humana Hospital-Michael Reese | 3 | 213,187 | 2 | 197,436 | 1 | 15,751 | 0 | 0 |
| Illinois Institute of Technology | 1 | 525,687 | 1 | 525,687 | 0 | 0 | 0 | 0 |
| Lidon Technologies, LLC | 2 | 495,900 | 2 | 495,900 | 0 | 0 | 0 | 0 |
| Loyola University Medical Center | 17 | 3,453,791 | 16 | 3,422,071 | 1 | 31,720 | 0 | 0 |
| Northern Illinois University . . . | 1 | 64,856 | 1 | 64,856 | 0 | 0 | 0 | 0 |

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|---|------------|-------------------|-----------------|-------------------|-----------------------------------|------------------|-----------|------------------|
| | No. | Dol. | No. | Dol. | No. | Dol. | No. | Dol. |
| Illinois (continued) | | | | | | | | |
| Northwestern University, Chicago | 35 | 10,368,254 | 31 | 7,671,353 | 1 | 52,669 | 3 | 2,644,232 |
| Northwestern University, Evanston | 10 | 2,322,820 | 8 | 2,084,714 | 2 | 238,106 | 0 | 0 |
| Rush University | 1 | 83,614 | 1 | 83,614 | 0 | 0 | 0 | 0 |
| Rush-Presbyterian-St Luke's Medical Center | 11 | 3,256,136 | 8 | 1,687,090 | 1 | 45,268 | 2 | 1,523,778 |
| Southern Illinois University School of Medicine | 3 | 356,803 | 3 | 356,803 | 0 | 0 | 0 | 0 |
| U.S. Department of Veterans Affairs Medical Center, Hines | 1 | 135,526 | 1 | 135,526 | 0 | 0 | 0 | 0 |
| University of Chicago | 36 | 10,809,597 | 29 | 9,771,543 | 7 | 1,038,054 | 0 | 0 |
| University of Illinois at Chicago | 36 | 9,323,038 | 32 | 8,724,569 | 4 | 598,469 | 0 | 0 |
| University of Illinois at Urbana-Champaign | 7 | 1,863,674 | 7 | 1,863,674 | 0 | 0 | 0 | 0 |
| Total Illinois | 166 | 43,823,773 | 144 | 37,635,726 | 17 | 2,020,037 | 5 | 4,168,010 |
| Indiana | | | | | | | | |
| Indiana University/Purdue University at Indianapolis | 48 | 13,374,461 | 42 | 12,413,779 | 5 | 927,195 | 1 | 33,487 |
| Indiana University Bloomington | 1 | 92,901 | 1 | 92,901 | 0 | 0 | 0 | 0 |
| Methodist Research Institute | 1 | 215,434 | 1 | 215,434 | 0 | 0 | 0 | 0 |
| Purdue University, West Lafayette | 3 | 653,675 | 3 | 653,675 | 0 | 0 | 0 | 0 |
| University of Notre Dame | 3 | 1,020,698 | 3 | 1,020,698 | 0 | 0 | 0 | 0 |
| Total Indiana | 56 | 15,357,169 | 50 | 14,396,487 | 5 | 927,195 | 1 | 33,487 |
| Iowa | | | | | | | | |
| Civco Medical Instruments Company, Inc. | 1 | 99,510 | 1 | 99,510 | 0 | 0 | 0 | 0 |
| Goldfinch Diagnostics, Inc. | 1 | 394,239 | 1 | 394,239 | 0 | 0 | 0 | 0 |
| Maharishi University of Management | 3 | 1,206,242 | 3 | 1,206,242 | 0 | 0 | 0 | 0 |
| Medical Imaging Applications. University of Iowa | 1 | 97,804 | 1 | 97,804 | 0 | 0 | 0 | 0 |
| Total Iowa | 76 | 28,913,558 | 63 | 25,256,202 | 11 | 1,515,247 | 2 | 2,142,109 |
| Total Iowa | 82 | 30,711,353 | 69 | 27,053,997 | 11 | 1,515,247 | 2 | 2,142,109 |
| Kansas | | | | | | | | |
| Kansas State University | 2 | 336,503 | 2 | 336,503 | 0 | 0 | 0 | 0 |
| University of Kansas, Lawrence | 4 | 675,610 | 3 | 645,354 | 1 | 30,256 | 0 | 0 |
| University of Kansas Medical Center | 1 | 171,973 | 1 | 171,973 | 0 | 0 | 0 | 0 |
| Wichita State University | 1 | 133,458 | 1 | 133,458 | 0 | 0 | 0 | 0 |
| Total Kansas | 8 | 1,317,544 | 7 | 1,287,288 | 1 | 30,256 | 0 | 0 |

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|---|-----------|------------------|-----------------|------------------|-----------------------------------|----------------|-----------|----------------|
| | No. | Dol. | No. | Dol. | No. | Dol. | No. | Dol. |
| Kentucky | | | | | | | | |
| Infrared Diagnostics, Inc. | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| University of Kentucky | 25 | 4,591,700 | 22 | 4,398,104 | 2 | 60,001 | 1 | 133,595 |
| University of Louisville | 14 | 2,934,357 | 13 | 2,912,500 | 1 | 21,857 | 0 | 0 |
| Total Kentucky. | 40 | 7,626,057 | 36 | 7,410,604 | 3 | 81,858 | 1 | 133,595 |
| Louisiana | | | | | | | | |
| Louisiana State University Medical Center, New Orleans | 10 | 1,859,198 | 10 | 1,859,198 | 0 | 0 | 0 | 0 |
| Louisiana State University Medical Center, Shreveport . . | 2 | 410,582 | 2 | 410,582 | 0 | 0 | 0 | 0 |
| Pennington Biomedical Research Center | 4 | 2,250,496 | 4 | 2,250,496 | 0 | 0 | 0 | 0 |
| Tulane University of Louisiana | 20 | 3,821,662 | 18 | 3,735,342 | 2 | 86,320 | 0 | 0 |
| Total Louisiana | 36 | 8,341,938 | 34 | 8,255,618 | 2 | 86,320 | 0 | 0 |
| Maine | | | | | | | | |
| Jackson Laboratory | 8 | 1,704,838 | 5 | 1,604,698 | 3 | 100,140 | 0 | 0 |
| Maine Medical Center | 2 | 459,403 | 2 | 459,403 | 0 | 0 | 0 | 0 |
| Sea Run Holdings, Inc. | 1 | 378,833 | 1 | 378,833 | 0 | 0 | 0 | 0 |
| University of New England . . . | 1 | 167,609 | 1 | 167,609 | 0 | 0 | 0 | 0 |
| Total Maine | 12 | 2,710,683 | 9 | 2,610,543 | 3 | 100,140 | 0 | 0 |
| Maryland | | | | | | | | |
| American Type Culture Collection | 1 | 32,027 | 0 | 0 | 0 | 0 | 1 | 32,027 |
| Biotech Research Laboratories. Clinical Trials and Surveys Corporation. | 2 | 1,078,156 | 1 | 99,894 | 0 | 0 | 1 | 978,262 |
| Dorlin Pharmaceuticals, Inc. . . | 1 | 473,429 | 0 | 0 | 0 | 0 | 1 | 473,429 |
| Emmes Corporation | 1 | 99,700 | 1 | 99,700 | 0 | 0 | 0 | 0 |
| Emmes Corporation | 2 | 946,243 | 0 | 0 | 0 | 0 | 2 | 946,243 |
| Federation of American Societies for Experimental Biology. . . . | 2 | 21,000 | 2 | 21,000 | 0 | 0 | 0 | 0 |
| Henry M. Jackson Foundation for the Advancement of Military Medicine. | 3 | 896,787 | 3 | 896,787 | 0 | 0 | 0 | 0 |
| Individual Monitoring System, Inc. | 1 | 99,990 | 1 | 99,990 | 0 | 0 | 0 | 0 |
| Infrared Fiber Systems, Inc. . . | 1 | 541,089 | 1 | 541,089 | 0 | 0 | 0 | 0 |
| Johns Hopkins University | 146 | 48,528,562 | 124 | 40,898,649 | 13 | 2,353,847 | 9 | 5,276,066 |
| Kennedy Krieger Research Institute, Inc. | 1 | 252,709 | 1 | 252,709 | 0 | 0 | 0 | 0 |
| Key Technologies, Inc. | 1 | 112,476 | 1 | 112,476 | 0 | 0 | 0 | 0 |
| Maryland Biotechnology Institute | 2 | 593,000 | 2 | 593,000 | 0 | 0 | 0 | 0 |
| Maryland Medical Research Institute | 2 | 1,768,384 | 1 | 1,299,871 | 0 | 0 | 1 | 468,513 |
| Ogden Bioservices Corporation. | 1 | 67,000 | 0 | 0 | 0 | 0 | 1 | 67,000 |
| Peace Technology, Inc. | 1 | 2,021,344 | 0 | 0 | 0 | 0 | 1 | 2,021,344 |
| Prospect Associates, Ltd. | 2 | 5,287,152 | 0 | 0 | 0 | 0 | 2 | 5,287,152 |
| Protocell, Inc. | 1 | 98,845 | 1 | 98,845 | 0 | 0 | 0 | 0 |

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|--|------------|-------------------|-----------------|-------------------|-----------------------------------|------------------|-----------|-------------------|
| | No. | Dol. | No. | Dol. | No. | Dol. | No. | Dol. |
| Maryland (continued) | | | | | | | | |
| Quality Biological, Inc. | 1 | 374,999 | 1 | 374,999 | 0 | 0 | 0 | 0 |
| Robin Medical, Inc. | 3 | 575,000 | 3 | 575,000 | 0 | 0 | 0 | 0 |
| Tissue Engineering Sciences, Inc. | 1 | 99,527 | 1 | 99,527 | 0 | 0 | 0 | 0 |
| Towson State University. | 1 | 102,150 | 1 | 102,150 | 0 | 0 | 0 | 0 |
| U.S. Agricultural Research Center | 2 | 620,000 | 0 | 0 | 0 | 0 | 2 | 620,000 |
| U.S. Bureau of the Census | 1 | 300,000 | 0 | 0 | 0 | 0 | 1 | 300,000 |
| U.S. National Cancer Institute . | 1 | 1,000,000 | 0 | 0 | 0 | 0 | 1 | 1,000,000 |
| U.S. National Center for Health Statistics | 1 | 240,000 | 0 | 0 | 0 | 0 | 1 | 240,000 |
| U.S. National Center/Research Resources | 1 | 300,000 | 0 | 0 | 0 | 0 | 1 | 300,000 |
| U.S. National Heart, Lung, and Blood Institute. | 1 | 449,676 | 0 | 0 | 0 | 0 | 1 | 449,676 |
| U.S. PHS Agency for Health Care Policy and Research. | 1 | 100,000 | 0 | 0 | 0 | 0 | 1 | 100,000 |
| U.S. PHS Indian Health Service Supply Service | 1 | 53,417 | 0 | 0 | 0 | 0 | 1 | 53,417 |
| U.S. PHS Public Advisory Groups. | 0 | 3,124,000 | 0 | 3,124,000 | 0 | 0 | 0 | 0 |
| U.S. Substance Abuse and Mental Health Service Administration | 0 | 349,000 | 0 | 0 | 0 | 0 | 0 | 349,000 |
| University of Maryland Baltimore County Campus .. | 1 | 84,228 | 1 | 84,228 | 0 | 0 | 0 | 0 |
| University of Maryland Baltimore Professional School | 29 | 8,434,812 | 23 | 7,364,144 | 4 | 221,826 | 2 | 848,842 |
| Westat, Inc. | 1 | 5,349,000 | 0 | 0 | 0 | 0 | 1 | 5,349,000 |
| Total Maryland | 217 | 84,473,702 | 169 | 56,738,058 | 17 | 2,575,673 | 31 | 25,159,971 |
| Massachusetts | | | | | | | | |
| Abiomed Research and Development, Inc. | 1 | 81,480 | 1 | 81,480 | 0 | 0 | 0 | 0 |
| Abiomed, Inc. | 4 | 3,169,467 | 2 | 500,099 | 0 | 0 | 2 | 2,669,368 |
| Aphios Corporation | 1 | 99,998 | 1 | 99,998 | 0 | 0 | 0 | 0 |
| Axya Medical, Inc. | 1 | 307,820 | 1 | 307,820 | 0 | 0 | 0 | 0 |
| Beth Israel Deaconess Medical Center. | 57 | 15,618,577 | 47 | 14,616,848 | 9 | 975,657 | 1 | 26,072 |
| Biophysics Assay Laboratory, Inc. | 1 | 98,999 | 1 | 98,999 | 0 | 0 | 0 | 0 |
| Biopolymer Technologies International. | 1 | 99,922 | 1 | 99,922 | 0 | 0 | 0 | 0 |
| Bioseq, Inc. | 1 | 68,231 | 1 | 68,231 | 0 | 0 | 0 | 0 |
| Boston Biomedical Research Institute. | 4 | 894,343 | 3 | 862,623 | 1 | 31,720 | 0 | 0 |
| Boston Medical Center. | 12 | 4,748,340 | 11 | 4,704,992 | 1 | 43,348 | 0 | 0 |
| Boston University. | 69 | 34,330,408 | 62 | 25,740,106 | 5 | 1,635,419 | 2 | 6,954,883 |
| Brigham and Women's Hospital | 120 | 45,110,181 | 97 | 40,279,740 | 20 | 2,066,666 | 3 | 2,763,775 |
| Cardiotech International, Inc. . | 4 | 545,808 | 4 | 545,808 | 0 | 0 | 0 | 0 |

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|--|------------|--------------------|-----------------|--------------------|-----------------------------------|------------------|-----------|-------------------|
| | No. | Dol. | No. | Dol. | No. | Dol. | No. | Dol. |
| Massachusetts (continued) | | | | | | | | |
| CBR Laboratories, Inc. | 1 | 115,388 | 1 | 115,388 | 0 | 0 | 0 | 0 |
| Center for Blood Research | 9 | 8,131,067 | 9 | 8,131,067 | 0 | 0 | 0 | 0 |
| Children's Hospital, Boston . . . | 34 | 9,762,294 | 28 | 9,140,362 | 6 | 621,932 | 0 | 0 |
| Covalent Associates, Inc. | 1 | 342,748 | 1 | 342,748 | 0 | 0 | 0 | 0 |
| Dana-Farber Cancer Institute. . | 10 | 2,938,714 | 10 | 2,938,714 | 0 | 0 | 0 | 0 |
| E.P., Ltd. | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| Engineering Partnership, Ltd. . | 1 | 89,530 | 1 | 89,530 | 0 | 0 | 0 | 0 |
| Foster-Miller, Inc. | 1 | 99,898 | 1 | 99,898 | 0 | 0 | 0 | 0 |
| Gene Regulation Laboratories . | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| Gwathmey, Inc. | 3 | 1,366,240 | 3 | 1,366,240 | 0 | 0 | 0 | 0 |
| Harvard University. | 1 | 272,724 | 1 | 272,724 | 0 | 0 | 0 | 0 |
| Harvard University. | 50 | 16,586,342 | 42 | 15,473,405 | 8 | 1,112,937 | 0 | 0 |
| Hebrew Rehabilitation Center for the Aged | 1 | 257,168 | 1 | 257,168 | 0 | 0 | 0 | 0 |
| Implant Sciences Corporation . | 2 | 359,468 | 2 | 359,468 | 0 | 0 | 0 | 0 |
| Ionoptix Corporation | 1 | 356,620 | 1 | 356,620 | 0 | 0 | 0 | 0 |
| Leukosite, Inc. | 1 | 275,863 | 1 | 275,863 | 0 | 0 | 0 | 0 |
| Marine Biological Laboratory . | 0 | 5,000 | 0 | 5,000 | 0 | 0 | 0 | 0 |
| Massachusetts General Hospital | 64 | 20,375,072 | 61 | 19,167,663 | 3 | 637,409 | 0 | 570,000 |
| Massachusetts Institute of Technology | 11 | 5,333,070 | 9 | 5,257,334 | 2 | 75,736 | 0 | 0 |
| Masstrace, Inc. | 1 | 99,300 | 1 | 99,300 | 0 | 0 | 0 | 0 |
| Microwave Medical Systems, Inc. | 1 | 99,158 | 1 | 99,158 | 0 | 0 | 0 | 0 |
| New England Medical Center . | 20 | 4,450,131 | 18 | 4,156,161 | 1 | 217,595 | 1 | 76,375 |
| New England Research Institutes, Inc. | 7 | 3,389,737 | 5 | 1,030,454 | 0 | 0 | 2 | 2,359,283 |
| Newton Scientific, Inc. | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| Northeastern University. | 2 | 414,231 | 2 | 414,231 | 0 | 0 | 0 | 0 |
| Nutrinx Corporation | 1 | 95,915 | 1 | 95,915 | 0 | 0 | 0 | 0 |
| Organogenesis Inc. | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| Pentose Pharmaceuticals, Inc. . | 2 | 200,000 | 2 | 200,000 | 0 | 0 | 0 | 0 |
| Physical Sciences, Inc. | 1 | 101,934 | 1 | 101,934 | 0 | 0 | 0 | 0 |
| Rare Earth Medical, Inc. | 1 | 99,909 | 1 | 99,909 | 0 | 0 | 0 | 0 |
| Schepens Eye Research Institute | 2 | 76,988 | 0 | 0 | 2 | 76,988 | 0 | 0 |
| Science Research Laboratory, Inc. | 1 | 329,296 | 1 | 329,296 | 0 | 0 | 0 | 0 |
| St. Elizabeth's Medical Center of Boston. | 8 | 2,255,306 | 8 | 2,255,306 | 0 | 0 | 0 | 0 |
| Thermal Technologies, Inc. . . . | 1 | 355,869 | 1 | 355,869 | 0 | 0 | 0 | 0 |
| Tufts University, Boston | 7 | 1,783,382 | 6 | 1,715,543 | 1 | 67,839 | 0 | 0 |
| University of Massachusetts Medical School | 21 | 8,123,313 | 18 | 6,664,652 | 2 | 205,274 | 1 | 1,253,387 |
| Variagenics, Inc. | 1 | 99,938 | 1 | 99,938 | 0 | 0 | 0 | 0 |
| Whalen Biomedical, Inc. | 3 | 1,158,774 | 2 | 495,257 | 0 | 0 | 1 | 663,517 |
| Whitehead Institute for Biomedical Research | 2 | 72,400 | 0 | 0 | 2 | 72,400 | 0 | 0 |
| Worcester Polytechnic Institute | 1 | 100,656 | 1 | 100,656 | 0 | 0 | 0 | 0 |
| Total Massachusetts | 554 | 195,547,017 | 478 | 170,369,437 | 63 | 7,840,920 | 13 | 17,336,660 |

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|---|------------|-------------------|-----------------|-------------------|-----------------------------------|------------------|-----------|------------------|
| | No. | Dol. | No. | Dol. | No. | Dol. | No. | Dol. |
| Michigan | | | | | | | | |
| Aastrom Biosciences, Inc. | 3 | 566,802 | 3 | 566,802 | 0 | 0 | 0 | 0 |
| Case Western Reserve University, Henry Ford Health Sciences Center..... | 7 | 4,506,362 | 6 | 4,396,738 | 0 | 0 | 1 | 109,624 |
| Michigan Critical Care Consultants, Inc. | 3 | 601,713 | 3 | 601,713 | 0 | 0 | 0 | 0 |
| Michigan State University | 13 | 1,967,312 | 12 | 1,930,612 | 1 | 36,700 | 0 | 0 |
| National Center for Women and Wellness..... | 1 | 89,877 | 1 | 89,877 | 0 | 0 | 0 | 0 |
| Oakland University | 1 | 56,459 | 1 | 56,459 | 0 | 0 | 0 | 0 |
| Sentec Corporation..... | 1 | 99,856 | 1 | 99,856 | 0 | 0 | 0 | 0 |
| Thromgen, Inc. | 2 | 421,035 | 2 | 421,035 | 0 | 0 | 0 | 0 |
| University of Michigan at Ann Arbor..... | 84 | 27,323,088 | 71 | 24,337,389 | 10 | 1,408,746 | 3 | 1,576,953 |
| Wayne State University | 22 | 5,598,402 | 20 | 4,576,677 | 1 | 26,322 | 1 | 995,403 |
| Western Michigan University . | 1 | 137,038 | 1 | 137,038 | 0 | 0 | 0 | 0 |
| Total Michigan..... | 138 | 41,367,944 | 121 | 37,214,196 | 12 | 1,471,768 | 5 | 2,681,980 |
| Minnesota | | | | | | | | |
| Advanced Medical Electronics Corporation..... | 1 | 377,531 | 1 | 377,531 | 0 | 0 | 0 | 0 |
| Brimson Laboratories..... | 1 | 309,692 | 1 | 309,692 | 0 | 0 | 0 | 0 |
| Data Sciences International, Inc. | 1 | 129,964 | 1 | 129,964 | 0 | 0 | 0 | 0 |
| H.V. Setty Enterprises, Inc. ... | 1 | 405,081 | 1 | 405,081 | 0 | 0 | 0 | 0 |
| Intratherapeutics, Inc. | 1 | 546,235 | 1 | 546,235 | 0 | 0 | 0 | 0 |
| Mayo Foundation | 46 | 10,841,629 | 37 | 9,966,490 | 8 | 628,070 | 1 | 247,069 |
| Minneapolis Medical Research Foundation, Inc. | 4 | 690,510 | 3 | 269,762 | 0 | 0 | 1 | 420,748 |
| Survivalink Corporation | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| University of Minnesota..... | 1 | 232,291 | 0 | 0 | 0 | 0 | 1 | 232,291 |
| University of Minnesota, Twin Cities | 71 | 21,186,508 | 61 | 18,234,474 | 6 | 1,035,440 | 4 | 1,916,594 |
| Total Minnesota..... | 128 | 34,819,441 | 107 | 30,339,229 | 14 | 1,663,510 | 7 | 2,816,702 |
| Mississippi | | | | | | | | |
| Jackson State University..... | 1 | 184,012 | 0 | 0 | 1 | 184,012 | 0 | 0 |
| University of Mississippi..... | 1 | 43,174 | 0 | 0 | 1 | 43,174 | 0 | 0 |
| University of Mississippi Medical Center | 11 | 3,488,307 | 6 | 2,272,924 | 3 | 92,383 | 2 | 1,123,000 |
| Total Mississippi..... | 13 | 3,715,493 | 6 | 2,272,924 | 5 | 319,569 | 2 | 1,123,000 |
| Missouri | | | | | | | | |
| Barnes-Jewish Hospital | 17 | 5,204,451 | 17 | 5,204,451 | 0 | 0 | 0 | 0 |
| Children's Mercy Hospital, Kansas City..... | 1 | 124,850 | 1 | 124,850 | 0 | 0 | 0 | 0 |
| St. Louis University | 17 | 4,025,200 | 16 | 3,771,424 | 0 | 0 | 1 | 253,776 |
| University of Missouri, Columbia..... | 25 | 5,410,584 | 22 | 5,317,160 | 3 | 93,424 | 0 | 0 |
| University of Missouri, Kansas City..... | 2 | 142,932 | 2 | 142,932 | 0 | 0 | 0 | 0 |

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|---|------------|-------------------|-----------------|-------------------|-----------------------------------|------------------|-----------|------------------|
| | No. | Dol. | No. | Dol. | No. | Dol. | No. | Dol. |
| Missouri (continued) | | | | | | | | |
| Washington University..... | 107 | 30,691,138 | 89 | 27,981,030 | 16 | 1,789,824 | 2 | 920,284 |
| Total Missouri | 169 | 45,599,155 | 147 | 42,541,847 | 19 | 1,883,248 | 3 | 1,174,060 |
| Montana | | | | | | | | |
| University of Montana..... | 1 | 261,815 | 1 | 261,815 | 0 | 0 | 0 | 0 |
| Total Montana | 1 | 261,815 | 1 | 261,815 | 0 | 0 | 0 | 0 |
| Nebraska | | | | | | | | |
| Creighton University..... | 1 | 45,766 | 0 | 0 | 1 | 45,766 | 0 | 0 |
| University of Nebraska, Lincoln..... | 1 | 208,910 | 1 | 208,910 | 0 | 0 | 0 | 0 |
| University of Nebraska Medical Center..... | 11 | 2,719,498 | 10 | 2,604,768 | 1 | 114,730 | 0 | 0 |
| Total Nebraska..... | 13 | 2,974,174 | 11 | 2,813,678 | 2 | 160,496 | 0 | 0 |
| Nevada | | | | | | | | |
| Sierra Biomedical Research Corporation..... | 2 | 695,930 | 2 | 695,930 | 0 | 0 | 0 | 0 |
| University of Nevada at Reno. | 13 | 3,220,723 | 10 | 2,254,732 | 2 | 70,088 | 1 | 895,903 |
| Total Nevada | 15 | 3,916,653 | 12 | 2,950,662 | 2 | 70,088 | 1 | 895,903 |
| New Hampshire | | | | | | | | |
| Create, Inc. | 8 | 1,935,400 | 8 | 1,935,400 | 0 | 0 | 0 | 0 |
| Dartmouth College..... | 12 | 2,924,713 | 9 | 2,670,750 | 3 | 253,963 | 0 | 0 |
| University of New Hampshire | 1 | 102,500 | 1 | 102,500 | 0 | 0 | 0 | 0 |
| Total New Hampshire..... | 21 | 4,962,613 | 18 | 4,708,650 | 3 | 253,963 | 0 | 0 |
| New Jersey | | | | | | | | |
| AMT, Inc..... | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| Array Medical, Inc. | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| Collagen Matrix, Inc. | 1 | 99,890 | 1 | 99,890 | 0 | 0 | 0 | 0 |
| Menssana Research, Inc. | 1 | 375,000 | 1 | 375,000 | 0 | 0 | 0 | 0 |
| Newark Beth Israel Medical Center..... | 1 | 149,167 | 1 | 149,167 | 0 | 0 | 0 | 0 |
| Princeton University..... | 1 | 291,310 | 1 | 291,310 | 0 | 0 | 0 | 0 |
| Rutgers, The State University of New Jersey, New Brunswick. | 1 | 195,000 | 1 | 195,000 | 0 | 0 | 0 | 0 |
| University of Medicine and Dentistry of New Jersey- R.W. Johnson Medical School | 11 | 2,512,747 | 10 | 2,476,047 | 1 | 36,700 | 0 | 0 |
| University of Medicine and Dentistry of New Jersey..... | 10 | 3,293,442 | 9 | 1,898,599 | 0 | 0 | 1 | 1,394,843 |
| Veritas Medical Technologies, Inc. | 2 | 539,177 | 2 | 539,177 | 0 | 0 | 0 | 0 |
| Total New Jersey | 30 | 7,655,733 | 28 | 6,224,190 | 1 | 36,700 | 1 | 1,394,843 |
| New Mexico | | | | | | | | |
| Lovelace Biomedical and Environmental Research | 1 | 126,190 | 1 | 126,190 | 0 | 0 | 0 | 0 |
| New Mexico Highlands University..... | 0 | 103,288 | 0 | 103,288 | 0 | 0 | 0 | 0 |

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|---|-----------|------------------|-----------------|------------------|-----------------------------------|----------------|-----------|----------------|
| | No. | DoI. | No. | DoI. | No. | DoI. | No. | DoI. |
| New Mexico (continued) | | | | | | | | |
| New Mexico State University, Las Cruces..... | 0 | 136,037 | 0 | 136,037 | 0 | 0 | 0 | 0 |
| University of New Mexico, Albuquerque..... | 12 | 4,223,185 | 9 | 3,582,420 | 2 | 205,788 | 1 | 434,977 |
| Total New Mexico..... | 13 | 4,588,700 | 10 | 3,947,935 | 2 | 205,788 | 1 | 434,977 |
| New York | | | | | | | | |
| Aaron Diamond AIDS Research Center..... | | | | | | | | |
| | 2 | 683,000 | 2 | 683,000 | 0 | 0 | 0 | 0 |
| Albany Medical College of Union University..... | | | | | | | | |
| | 10 | 1,703,879 | 8 | 1,270,596 | 2 | 433,283 | 0 | 0 |
| Angion Biomedica Corporation..... | | | | | | | | |
| | 2 | 208,575 | 2 | 208,575 | 0 | 0 | 0 | 0 |
| Applied Image, Inc. | | | | | | | | |
| | 1 | 115,260 | 1 | 115,260 | 0 | 0 | 0 | 0 |
| Beth Israel Medical Center.... | | | | | | | | |
| | 1 | 245,385 | 1 | 245,385 | 0 | 0 | 0 | 0 |
| Central New York Research Corporation..... | | | | | | | | |
| | 1 | 223,361 | 1 | 223,361 | 0 | 0 | 0 | 0 |
| City College of New York.... | | | | | | | | |
| | 1 | 229,927 | 1 | 229,927 | 0 | 0 | 0 | 0 |
| Columbia University, New York Morningside..... | | | | | | | | |
| | 4 | 1,153,415 | 3 | 876,478 | 0 | 0 | 1 | 276,937 |
| Columbia University Health Sciences..... | | | | | | | | |
| | 76 | 30,477,018 | 64 | 27,591,139 | 9 | 952,389 | 3 | 1,933,490 |
| Conversion Energy Enterprises | | | | | | | | |
| | 1 | 450,619 | 1 | 450,619 | 0 | 0 | 0 | 0 |
| Cornell University, Ithaca.... | | | | | | | | |
| | 2 | 645,232 | 2 | 645,232 | 0 | 0 | 0 | 0 |
| Foster-Miller Technologies, Inc. | | | | | | | | |
| | 2 | 199,460 | 2 | 199,460 | 0 | 0 | 0 | 0 |
| Health Science Center at Brooklyn..... | | | | | | | | |
| | 4 | 946,256 | 4 | 946,256 | 0 | 0 | 0 | 0 |
| Health Science Center at Syracuse..... | | | | | | | | |
| | 5 | 2,669,499 | 5 | 2,669,499 | 0 | 0 | 0 | 0 |
| Hospital for Special Surgery.. | | | | | | | | |
| | 1 | 135,340 | 1 | 135,340 | 0 | 0 | 0 | 0 |
| Institute for Basic Research in Developmental Disabilities.. | | | | | | | | |
| | 1 | 292,692 | 1 | 292,692 | 0 | 0 | 0 | 0 |
| Lifelink Monitoring, Inc. | | | | | | | | |
| | 1 | 164,280 | 1 | 164,280 | 0 | 0 | 0 | 0 |
| Mary Imogene Bassett Hospital | | | | | | | | |
| | 1 | 186,250 | 1 | 186,250 | 0 | 0 | 0 | 0 |
| Masonic Medical Research Laboratory, Inc. | | | | | | | | |
| | 2 | 645,725 | 2 | 645,725 | 0 | 0 | 0 | 0 |
| Mohawk Innovative Technology, Inc. | | | | | | | | |
| | 1 | 350,073 | 1 | 350,073 | 0 | 0 | 0 | 0 |
| Montefiore Medical Center, Bronx..... | | | | | | | | |
| | 3 | 429,980 | 3 | 429,980 | 0 | 0 | 0 | 0 |
| Mount Sinai School of Medicine of CUNY..... | | | | | | | | |
| | 22 | 9,318,117 | 19 | 8,955,139 | 2 | 241,974 | 1 | 121,004 |
| Narrows Institute for Biomedical Research, Inc. ... | | | | | | | | |
| | 1 | 157,955 | 1 | 157,955 | 0 | 0 | 0 | 0 |
| New York Academy of Sciences..... | | | | | | | | |
| | 1 | 10,000 | 1 | 10,000 | 0 | 0 | 0 | 0 |
| New York Blood Center..... | | | | | | | | |
| | 3 | 1,776,479 | 3 | 1,776,479 | 0 | 0 | 0 | 0 |
| New York Medical College... | | | | | | | | |
| | 15 | 6,140,853 | 14 | 6,104,153 | 1 | 36,700 | 0 | 0 |
| New York University Medical Center..... | | | | | | | | |
| | 16 | 3,843,097 | 14 | 3,645,168 | 2 | 197,929 | 0 | 0 |

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|--|------------|--------------------|-----------------|--------------------|-----------------------------------|------------------|-----------|------------------|
| | No. | Dol. | No. | Dol. | No. | Dol. | No. | Dol. |
| New York (continued) | | | | | | | | |
| North Shore University Hospital | 3 | 445,428 | 3 | 445,428 | 0 | 0 | 0 | 0 |
| OSI Pharmaceuticals, Inc. | 1 | 107,811 | 1 | 107,811 | 0 | 0 | 0 | 0 |
| Picower Institute for Medical Research | 1 | 118,665 | 1 | 118,665 | 0 | 0 | 0 | 0 |
| Public Health Research Institute | 2 | 606,552 | 2 | 606,552 | 0 | 0 | 0 | 0 |
| Queens College | 1 | 236,528 | 1 | 236,528 | 0 | 0 | 0 | 0 |
| Riverside Research Institute. . . | 1 | 115,637 | 1 | 115,637 | 0 | 0 | 0 | 0 |
| Rockefeller University | 6 | 3,731,681 | 6 | 3,731,681 | 0 | 0 | 0 | 0 |
| Roswell Park Cancer Institute . | 3 | 774,236 | 3 | 774,236 | 0 | 0 | 0 | 0 |
| Sloan-Kettering Institute for Cancer Research | 10 | 2,407,457 | 8 | 2,267,007 | 1 | 38,368 | 1 | 102,082 |
| St. Luke's-Roosevelt Institute for Health Sciences. | 8 | 4,759,418 | 7 | 4,727,698 | 1 | 31,720 | 0 | 0 |
| State University of New York at Stony Brook. | 17 | 4,428,631 | 16 | 3,756,788 | 0 | 0 | 1 | 671,843 |
| State University of New York at Buffalo. | 11 | 2,762,933 | 8 | 2,144,031 | 2 | 124,006 | 1 | 494,896 |
| Trasonic Systems, Inc. | 1 | 264,405 | 1 | 264,405 | 0 | 0 | 0 | 0 |
| Trudeau Institute, Inc. | 2 | 625,019 | 2 | 625,019 | 0 | 0 | 0 | 0 |
| University of Rochester | 40 | 11,946,552 | 37 | 11,510,516 | 3 | 436,036 | 0 | 0 |
| Wadsworth Center | 1 | 40,368 | 0 | 0 | 1 | 40,368 | 0 | 0 |
| Weill Medical College of Cornell University | 38 | 19,187,716 | 37 | 19,077,246 | 1 | 110,470 | 0 | 0 |
| Yeshiva University | 20 | 10,974,162 | 15 | 8,687,601 | 4 | 414,950 | 1 | 1,871,611 |
| Total New York | 346 | 126,934,926 | 308 | 118,404,870 | 29 | 3,058,193 | 9 | 5,471,863 |
| North Carolina | | | | | | | | |
| Bennett College | 0 | 5,847 | 0 | 0 | 0 | 5,847 | 0 | 0 |
| Data Spectrum Corporation. . . | 1 | 371,954 | 1 | 371,954 | 0 | 0 | 0 | 0 |
| Duke University | 96 | 29,835,606 | 80 | 25,602,074 | 11 | 1,177,564 | 5 | 3,055,968 |
| East Carolina University | 4 | 690,807 | 4 | 690,807 | 0 | 0 | 0 | 0 |
| Epigenesis Pharmaceuticals, Inc. | 1 | 777,064 | 1 | 777,064 | 0 | 0 | 0 | 0 |
| Magnetic Imaging Technologies, Inc. | 3 | 590,774 | 3 | 590,774 | 0 | 0 | 0 | 0 |
| Molichem-Magellan | 1 | 842,392 | 1 | 842,392 | 0 | 0 | 0 | 0 |
| North Carolina Agricultural and Technical State University . . . | 0 | 137,659 | 0 | 137,659 | 0 | 0 | 0 | 0 |
| North Carolina Central University | 2 | 762,196 | 2 | 762,196 | 0 | 0 | 0 | 0 |
| North Carolina State University at Raleigh | 4 | 761,254 | 3 | 719,574 | 1 | 41,680 | 0 | 0 |
| Research Triangle Institute. . . | 0 | 500,000 | 0 | 0 | 0 | 0 | 0 | 500,000 |
| University of North Carolina at Chapel Hill | 64 | 26,037,988 | 56 | 23,363,147 | 4 | 755,599 | 4 | 1,919,242 |
| Wake Forest University | 45 | 16,659,785 | 37 | 12,983,592 | 3 | 668,147 | 5 | 3,008,046 |
| Total North Carolina | 221 | 77,973,326 | 188 | 66,841,233 | 19 | 2,648,837 | 14 | 8,483,256 |
| North Dakota | | | | | | | | |
| University of North Dakota . . . | 2 | 324,380 | 2 | 324,380 | 0 | 0 | 0 | 0 |
| Total North Dakota | 2 | 324,380 | 2 | 324,380 | 0 | 0 | 0 | 0 |

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|---|------------|-------------------|-----------------|-------------------|-----------------------------------|------------------|-----------|------------------|
| | No. | Dol. | No. | Dol. | No. | Dol. | No. | Dol. |
| Ohio | | | | | | | | |
| Biomec, Inc. | 1 | 107,262 | 1 | 107,262 | 0 | 0 | 0 | 0 |
| Case Western Reserve University | 65 | 20,268,399 | 54 | 17,853,276 | 10 | 1,788,634 | 1 | 626,489 |
| Children's Hospital Medical Center, Cincinnati | 32 | 11,296,966 | 30 | 11,021,014 | 2 | 275,952 | 0 | 0 |
| Cleveland Clinic Foundation .. | 48 | 12,211,953 | 36 | 9,951,470 | 8 | 382,959 | 4 | 1,877,524 |
| Cleveland Medical Devices, Inc. | 1 | 434,295 | 1 | 434,295 | 0 | 0 | 0 | 0 |
| Cleveland State University. ... | 1 | 315,335 | 1 | 315,335 | 0 | 0 | 0 | 0 |
| Enable Medical Corporation .. | 1 | 439,674 | 1 | 439,674 | 0 | 0 | 0 | 0 |
| Inotek Corporation | 4 | 551,634 | 4 | 551,634 | 0 | 0 | 0 | 0 |
| Medical College of Ohio at Toledo | 4 | 1,634,028 | 4 | 1,634,028 | 0 | 0 | 0 | 0 |
| Norfolk Engineering | 1 | 374,944 | 1 | 374,944 | 0 | 0 | 0 | 0 |
| Northeastern Ohio Universities College of Medicine | 1 | 112,293 | 1 | 112,293 | 0 | 0 | 0 | 0 |
| Ohio State University | 25 | 6,139,207 | 21 | 4,750,057 | 2 | 78,380 | 2 | 1,310,770 |
| University of Akron | 1 | 267,965 | 1 | 267,965 | 0 | 0 | 0 | 0 |
| University of Cincinnati | 46 | 15,274,967 | 39 | 14,072,961 | 5 | 843,973 | 2 | 358,033 |
| University of Toledo | 2 | 288,450 | 2 | 288,450 | 0 | 0 | 0 | 0 |
| Wright State University | 4 | 611,378 | 4 | 611,378 | 0 | 0 | 0 | 0 |
| Total Ohio. | 237 | 70,328,750 | 201 | 62,786,036 | 27 | 3,369,898 | 9 | 4,172,816 |
| Oklahoma | | | | | | | | |
| Oklahoma Blood Institute | 1 | 583,869 | 0 | 0 | 0 | 0 | 1 | 583,869 |
| Oklahoma Medical Research Foundation | 6 | 2,096,518 | 6 | 2,096,518 | 0 | 0 | 0 | 0 |
| Oklahoma State University, Stillwater | 1 | 501,550 | 1 | 501,550 | 0 | 0 | 0 | 0 |
| University of Oklahoma Health Sciences Center | 13 | 4,652,184 | 11 | 4,581,471 | 2 | 70,713 | 0 | 0 |
| University of Oklahoma, Norman | 1 | 107,650 | 1 | 107,650 | 0 | 0 | 0 | 0 |
| Total Oklahoma | 22 | 7,941,771 | 19 | 7,287,189 | 2 | 70,713 | 1 | 583,869 |
| Oregon | | | | | | | | |
| Bend Research, Inc. | 1 | 182,282 | 1 | 182,282 | 0 | 0 | 0 | 0 |
| Electrical Geodesics, Inc. | 1 | 426,529 | 1 | 426,529 | 0 | 0 | 0 | 0 |
| Helix Research Company | 1 | 180,963 | 0 | 0 | 0 | 0 | 1 | 180,963 |
| Oregon Center for Applied Science | 1 | 404,730 | 1 | 404,730 | 0 | 0 | 0 | 0 |
| Oregon Graduate Institute of Science and Technology | 1 | 192,208 | 1 | 192,208 | 0 | 0 | 0 | 0 |
| Oregon Health Sciences University | 25 | 6,677,666 | 21 | 6,107,835 | 4 | 569,831 | 0 | 0 |
| Oregon Research Institute | 1 | 673,642 | 1 | 673,642 | 0 | 0 | 0 | 0 |
| Oregon State University | 2 | 381,336 | 2 | 381,336 | 0 | 0 | 0 | 0 |
| University of Oregon | 2 | 559,701 | 2 | 559,701 | 0 | 0 | 0 | 0 |
| Total Oregon | 35 | 9,679,057 | 30 | 8,928,263 | 4 | 569,831 | 1 | 180,963 |

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|---|------------|--------------------|-----------------|-------------------|-----------------------------------|------------------|-----------|------------------|
| | No. | Dol. | No. | Dol. | No. | Dol. | No. | Dol. |
| Pennsylvania | | | | | | | | |
| Allegheny University of Health Sciences..... | 5 | 445,694 | 3 | 402,697 | 2 | 42,997 | 0 | 0 |
| Allegheny-Singer Research Institute..... | 2 | 671,477 | 1 | 336,142 | 0 | 0 | 1 | 335,335 |
| Carnegie-Mellon University... | 3 | 1,178,311 | 3 | 1,178,311 | 0 | 0 | 0 | 0 |
| Children's Hospital of Philadelphia..... | 34 | 13,273,900 | 30 | 12,910,693 | 4 | 363,207 | 0 | 0 |
| Children's Hospital of Pittsburgh..... | 5 | 768,925 | 5 | 768,925 | 0 | 0 | 0 | 0 |
| Drexel University..... | 1 | 185,248 | 1 | 185,248 | 0 | 0 | 0 | 0 |
| Eagle Vision Pharmaceutical Corporation..... | 1 | 101,923 | 1 | 101,923 | 0 | 0 | 0 | 0 |
| Fox Chase Cancer Center..... | 2 | 389,741 | 2 | 389,741 | 0 | 0 | 0 | 0 |
| Industrial Science and Technology Network..... | 1 | 98,716 | 1 | 98,716 | 0 | 0 | 0 | 0 |
| Institute for Cancer Research.. | 1 | 388,806 | 1 | 388,806 | 0 | 0 | 0 | 0 |
| KDL Medical Technologies, Inc. | 0 | 94,058 | 0 | 94,058 | 0 | 0 | 0 | 0 |
| Magee-Women's Hospital.... | 2 | 194,560 | 2 | 194,560 | 0 | 0 | 0 | 0 |
| MCP Hahnemann University . | 9 | 3,505,301 | 8 | 3,466,933 | 1 | 38,368 | 0 | 0 |
| Medical Diagnostic Research Foundation..... | 1 | 112,963 | 1 | 112,963 | 0 | 0 | 0 | 0 |
| Message Pharmaceuticals, Inc. | 1 | 302,953 | 1 | 302,953 | 0 | 0 | 0 | 0 |
| Molecular Targeting Technology, Inc. | 1 | 134,600 | 1 | 134,600 | 0 | 0 | 0 | 0 |
| Octagen Corporation..... | 1 | 104,000 | 1 | 104,000 | 0 | 0 | 0 | 0 |
| Pennsylvania State University, Hershey Medical Center.... | 29 | 11,909,922 | 24 | 9,475,192 | 3 | 114,104 | 2 | 2,320,626 |
| Pennsylvania State University, University Park..... | 10 | 1,642,919 | 9 | 1,606,219 | 1 | 36,700 | 0 | 0 |
| PTI Research, Inc. | 1 | 99,625 | 1 | 99,625 | 0 | 0 | 0 | 0 |
| Spectrasonics Imaging..... | 1 | 99,846 | 1 | 99,846 | 0 | 0 | 0 | 0 |
| Temple University..... | 16 | 6,300,762 | 13 | 4,622,674 | 2 | 393,053 | 1 | 1,285,035 |
| Thomas Jefferson University.. | 23 | 6,959,974 | 19 | 6,477,917 | 4 | 482,057 | 0 | 0 |
| Transicoil, Inc. | 1 | 705,180 | 0 | 0 | 0 | 0 | 1 | 705,180 |
| University of Pennsylvania ... | 123 | 40,986,722 | 104 | 36,838,881 | 16 | 2,669,921 | 3 | 1,477,920 |
| University of Pittsburgh at Pittsburgh..... | 60 | 15,929,146 | 51 | 13,847,150 | 4 | 313,549 | 5 | 1,768,447 |
| Wistar Institute of Anatomy and Biology..... | 3 | 450,275 | 3 | 450,275 | 0 | 0 | 0 | 0 |
| Total Pennsylvania..... | 337 | 107,035,547 | 287 | 94,689,048 | 37 | 4,453,956 | 13 | 7,892,543 |
| Rhode Island | | | | | | | | |
| Brown University..... | 3 | 345,855 | 2 | 303,684 | 1 | 42,171 | 0 | 0 |
| Gordon Research Conferences. | 4 | 74,930 | 4 | 74,930 | 0 | 0 | 0 | 0 |
| Memorial Hospital of Rhode Island..... | 3 | 2,096,686 | 1 | 600,376 | 1 | 35,127 | 1 | 1,461,183 |
| Miriam Hospital..... | 7 | 2,637,549 | 7 | 2,637,549 | 0 | 0 | 0 | 0 |
| Pro-Change Behavior Systems. | 1 | 112,089 | 1 | 112,089 | 0 | 0 | 0 | 0 |

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|---|------------|-------------------|-----------------|-------------------|-----------------------------------|------------------|-----------|------------------|
| | No. | Dol. | No. | Dol. | No. | Dol. | No. | Dol. |
| Rhode Island (continued) | | | | | | | | |
| Rhode Island Hospital, Providence | 5 | 1,232,709 | 5 | 1,232,709 | 0 | 0 | 0 | 0 |
| Total Rhode Island | 23 | 6,499,818 | 20 | 4,961,337 | 2 | 77,298 | 1 | 1,461,183 |
| South Carolina | | | | | | | | |
| Clemson University | 2 | 234,435 | 1 | 202,715 | 1 | 31,720 | 0 | 0 |
| Medical University of South Carolina..... | 32 | 7,585,684 | 26 | 7,011,664 | 5 | 534,778 | 1 | 39,242 |
| University of South Carolina at Columbia..... | 4 | 1,376,629 | 4 | 1,376,629 | 0 | 0 | 0 | 0 |
| Total South Carolina..... | 38 | 9,196,748 | 31 | 8,591,008 | 6 | 566,498 | 1 | 39,242 |
| South Dakota | | | | | | | | |
| Aberdeen Area Tribal Chairmen's Health Board ... | 1 | 370,182 | 1 | 370,182 | 0 | 0 | 0 | 0 |
| Missouri Breaks Research, Inc. | 1 | 324,907 | 1 | 324,907 | 0 | 0 | 0 | 0 |
| University of South Dakota ... | 1 | 34,325 | 0 | 0 | 1 | 34,325 | 0 | 0 |
| Total South Dakota..... | 3 | 729,414 | 2 | 695,089 | 1 | 34,325 | 0 | 0 |
| Tennessee | | | | | | | | |
| Chattanooga Group | 1 | 143,698 | 1 | 143,698 | 0 | 0 | 0 | 0 |
| East Tennessee State University | 7 | 1,233,941 | 7 | 1,233,941 | 0 | 0 | 0 | 0 |
| Gene Rx, Inc. | 3 | 646,510 | 3 | 646,510 | 0 | 0 | 0 | 0 |
| Meharry Medical College..... | 9 | 969,023 | 7 | 685,969 | 2 | 283,054 | 0 | 0 |
| Oak Ridge Associated Universities..... | 1 | 291,782 | 1 | 291,782 | 0 | 0 | 0 | 0 |
| St. Jude Children's Research Hospital..... | 4 | 2,124,129 | 4 | 2,124,129 | 0 | 0 | 0 | 0 |
| University of Memphis..... | 5 | 2,037,568 | 5 | 2,037,568 | 0 | 0 | 0 | 0 |
| University of Tennessee at Memphis..... | 22 | 4,741,041 | 18 | 3,622,010 | 3 | 370,790 | 1 | 748,241 |
| University of Tennessee at Knoxville..... | 1 | 188,487 | 1 | 188,487 | 0 | 0 | 0 | 0 |
| Vanderbilt University..... | 59 | 14,529,438 | 46 | 12,254,692 | 12 | 1,793,054 | 1 | 481,692 |
| Total Tennessee | 112 | 26,905,617 | 93 | 23,228,786 | 17 | 2,446,898 | 2 | 1,229,933 |
| Texas | | | | | | | | |
| Baylor College of Medicine ... | 59 | 18,250,385 | 48 | 16,014,741 | 9 | 1,246,229 | 2 | 989,415 |
| Biotex, Inc. | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| Cooper Institute for Aerobics Research | 2 | 837,615 | 2 | 837,615 | 0 | 0 | 0 | 0 |
| Lynntech, Inc. | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| Microfab Technologies, Inc. ... | 1 | 99,227 | 1 | 99,227 | 0 | 0 | 0 | 0 |
| Proportional Technologies, Inc. | 3 | 846,507 | 3 | 846,507 | 0 | 0 | 0 | 0 |
| Rice University | 5 | 1,254,494 | 5 | 1,254,494 | 0 | 0 | 0 | 0 |
| Southwest Foundation for Biomedical Research | 4 | 6,770,953 | 4 | 6,770,953 | 0 | 0 | 0 | 0 |
| TEF Labs | 1 | 108,133 | 0 | 0 | 0 | 0 | 1 | 108,133 |
| Texas A&M Prairie View University..... | 0 | 163,291 | 0 | 163,291 | 0 | 0 | 0 | 0 |

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|---|------------|-------------------|-----------------|-------------------|-----------------------------------|------------------|-----------|------------------|
| | No. | Dol. | No. | Dol. | No. | Dol. | No. | Dol. |
| Texas (continued) | | | | | | | | |
| Texas A&M University Health Science Center | 6 | 1,561,416 | 6 | 1,561,416 | 0 | 0 | 0 | 0 |
| Texas A&M University Systems | 2 | 321,204 | 2 | 321,204 | 0 | 0 | 0 | 0 |
| Texas A&M University, Kingsville | 0 | 109,339 | 0 | 109,339 | 0 | 0 | 0 | 0 |
| Texas Engineering Experiment Station | 17 | 3,053,355 | 16 | 3,009,647 | 1 | 43,708 | 0 | 0 |
| Texas Southern University | 1 | 500,000 | 1 | 500,000 | 0 | 0 | 0 | 0 |
| Texas Technical University Health Sciences Center | 4 | 671,963 | 4 | 671,963 | 0 | 0 | 0 | 0 |
| University of North Texas Health Science Center | 7 | 1,234,987 | 5 | 1,122,091 | 2 | 112,896 | 0 | 0 |
| University of Texas at Austin | 3 | 437,545 | 2 | 418,357 | 1 | 19,188 | 0 | 0 |
| University of Texas at Dallas | 1 | 247,587 | 1 | 247,587 | 0 | 0 | 0 | 0 |
| University of Texas Health Center at Tyler | 6 | 924,691 | 6 | 924,691 | 0 | 0 | 0 | 0 |
| University of Texas Health Science Center, Houston | 27 | 6,909,995 | 22 | 6,360,662 | 4 | 144,229 | 1 | 405,104 |
| University of Texas Health Science Center, San Antonio | 18 | 4,283,945 | 15 | 3,685,931 | 2 | 210,557 | 1 | 387,457 |
| University of Texas M.D. Anderson Cancer Center | 3 | 813,930 | 3 | 813,930 | 0 | 0 | 0 | 0 |
| University of Texas Medical Branch, Galveston | 13 | 2,679,390 | 12 | 2,647,670 | 1 | 31,720 | 0 | 0 |
| University of Texas at San Antonio | 0 | 434,037 | 0 | 430,257 | 0 | 3,780 | 0 | 0 |
| University of Texas Southwestern Medical Center at Dallas | 51 | 19,906,344 | 48 | 18,947,101 | 3 | 959,243 | 0 | 0 |
| Total Texas | 236 | 72,620,333 | 208 | 67,958,674 | 23 | 2,771,550 | 5 | 1,890,109 |
| Utah | | | | | | | | |
| Axon Medical, Inc. | 1 | 331,183 | 1 | 331,183 | 0 | 0 | 0 | 0 |
| Brigham Young University | 2 | 302,619 | 2 | 302,619 | 0 | 0 | 0 | 0 |
| Latter Day Saints Hospital | 1 | 489,163 | 0 | 0 | 0 | 0 | 1 | 489,163 |
| Link Research, Inc. | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| University of Utah | 52 | 14,732,821 | 47 | 14,170,431 | 5 | 562,390 | 0 | 0 |
| Utah Artificial Heart Institute | 1 | 998,404 | 1 | 998,404 | 0 | 0 | 0 | 0 |
| Total Utah | 58 | 16,954,190 | 52 | 15,902,637 | 5 | 562,390 | 1 | 489,163 |
| Vermont | | | | | | | | |
| University of Vermont and State Agricultural College | 29 | 9,304,162 | 25 | 8,881,383 | 3 | 347,432 | 1 | 75,347 |
| Total Vermont | 29 | 9,304,162 | 25 | 8,881,383 | 3 | 347,432 | 1 | 75,347 |
| Virginia | | | | | | | | |
| CW Optics, Inc. | 1 | 198,482 | 1 | 198,482 | 0 | 0 | 0 | 0 |
| Eastern Virginia Medical School of the Medical College of Hampton Roads | 4 | 625,981 | 4 | 625,981 | 0 | 0 | 0 | 0 |
| Empirical Technologies Corporation | 1 | 99,356 | 1 | 99,356 | 0 | 0 | 0 | 0 |

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|--|------------|-------------------|-----------------|-------------------|-----------------------------------|------------------|-----------|-------------------|
| | No. | Dol. | No. | Dol. | No. | Dol. | No. | Dol. |
| Virginia (continued) | | | | | | | | |
| Gamma-A Technologies, Inc. | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| Hampton University. | 0 | 10,800 | 0 | 0 | 0 | 10,800 | 0 | 0 |
| Personal Improvement Computer Systems | 1 | 99,517 | 1 | 99,517 | 0 | 0 | 0 | 0 |
| Talisman, Ltd. | 0 | 98,000 | 0 | 98,000 | 0 | 0 | 0 | 0 |
| U.S. National Science Foundation | 0 | 349,000 | 0 | 0 | 0 | 0 | 0 | 349,000 |
| University of Virginia, Charlottesville. | 46 | 12,047,433 | 36 | 10,815,845 | 10 | 1,231,588 | 0 | 0 |
| Virginia Commonwealth University | 12 | 2,698,456 | 11 | 2,503,134 | 1 | 195,322 | 0 | 0 |
| Virginia Polytechnic Institute and State University. | 1 | 194,358 | 1 | 194,358 | 0 | 0 | 0 | 0 |
| Total Virginia. | 67 | 16,521,383 | 56 | 14,734,673 | 11 | 1,437,710 | 0 | 349,000 |
| Washington | | | | | | | | |
| Asthma, Inc. | 1 | 578,471 | 0 | 0 | 0 | 0 | 1 | 578,471 |
| Barlow Scientific | 3 | 598,908 | 3 | 598,908 | 0 | 0 | 0 | 0 |
| Center for Health Studies. | 2 | 591,920 | 2 | 591,920 | 0 | 0 | 0 | 0 |
| EKOS Corporation | 4 | 1,133,578 | 4 | 1,133,578 | 0 | 0 | 0 | 0 |
| Fred Hutchinson Cancer Research Center | 14 | 27,247,648 | 12 | 6,274,031 | 0 | 0 | 2 | 20,973,617 |
| Puget Sound Blood Center and Program. | 2 | 362,863 | 2 | 362,863 | 0 | 0 | 0 | 0 |
| Quantigraphics, Inc. | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| Softcare, Inc. | 1 | 99,776 | 1 | 99,776 | 0 | 0 | 0 | 0 |
| Spencer Technologies | 1 | 351,982 | 1 | 351,982 | 0 | 0 | 0 | 0 |
| Statistics and Epidemiology Research Corporation | 1 | 3,785,258 | 0 | 0 | 0 | 0 | 1 | 3,785,258 |
| The Hope Heart Institute | 1 | 237,830 | 1 | 237,830 | 0 | 0 | 0 | 0 |
| University of Washington | 107 | 46,833,564 | 80 | 34,529,072 | 18 | 2,125,907 | 9 | 10,178,585 |
| Virginia Mason Research Center | 1 | 51,001 | 1 | 51,001 | 0 | 0 | 0 | 0 |
| Washington State University | 5 | 1,101,032 | 4 | 1,066,707 | 1 | 34,325 | 0 | 0 |
| Total Washington. | 144 | 83,073,831 | 112 | 45,397,668 | 19 | 2,160,232 | 13 | 35,515,931 |
| West Virginia | | | | | | | | |
| Marshall University | 1 | 101,064 | 1 | 101,064 | 0 | 0 | 0 | 0 |
| West Virginia University | 5 | 800,314 | 5 | 800,314 | 0 | 0 | 0 | 0 |
| Total West Virginia | 6 | 901,378 | 6 | 901,378 | 0 | 0 | 0 | 0 |
| Wisconsin | | | | | | | | |
| Avidcare Corporation. | 1 | 487,055 | 1 | 487,055 | 0 | 0 | 0 | 0 |
| Blood Center of Southeastern Wisconsin | 8 | 3,553,209 | 7 | 3,413,686 | 1 | 139,523 | 0 | 0 |
| Marquette University | 2 | 363,573 | 2 | 363,573 | 0 | 0 | 0 | 0 |
| Marshfield Clinic | 2 | 7,064,266 | 1 | 652,266 | 0 | 0 | 1 | 6,412,000 |
| Medical College of Wisconsin | 51 | 15,523,215 | 44 | 14,365,961 | 6 | 515,795 | 1 | 641,459 |
| Mirus Corporation | 2 | 199,217 | 2 | 199,217 | 0 | 0 | 0 | 0 |
| University of Wisconsin, Madison | 61 | 17,317,968 | 53 | 16,364,193 | 6 | 337,929 | 2 | 615,846 |
| Total Wisconsin | 127 | 44,508,503 | 110 | 35,845,951 | 13 | 993,247 | 4 | 7,669,305 |

| Institution | Totals | | Research Grants | | Research Training and Development | | Contracts | |
|--|-------------|------------------------|-----------------|------------------------|-----------------------------------|---------------------|------------|----------------------|
| | No. | Dol. | No. | Dol. | No. | Dol. | No. | Dol. |
| Wyoming | | | | | | | | |
| Blue Sky Batteries, Inc. | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| Total Wyoming. | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| Puerto Rico | | | | | | | | |
| Central University of the Caribbean | 1 | 169,619 | 1 | 169,619 | 0 | 0 | 0 | 0 |
| University of Puerto Rico Medical Sciences. | 1 | 234,491 | 1 | 234,491 | 0 | 0 | 0 | 0 |
| University of Puerto Rico, Rio Piedras | 0 | 271,150 | 0 | 271,150 | 0 | 0 | 0 | 0 |
| Total Puerto Rico. | 2 | 675,260 | 2 | 675,260 | 0 | 0 | 0 | 0 |
| Total US | 4813 | \$1,585,020,155 | 4107 | \$1,343,796,587 | 503 | \$59,546,611 | 203 | \$181,676,957 |
| Australia | | | | | | | | |
| Institute of Medical and Veterinary Science | 1 | 125,097 | 1 | 125,097 | 0 | 0 | 0 | 0 |
| Walter And Elizabeth Hall Institute Medical Research. . . | 1 | 166,913 | 1 | 166,913 | 0 | 0 | 0 | 0 |
| Total Australia | 2 | 292,010 | 2 | 292,010 | 0 | 0 | 0 | 0 |
| Canada | | | | | | | | |
| Clinical Research Institute of Montreal | 2 | 450,000 | 2 | 450,000 | 0 | 0 | 0 | 0 |
| Hospital for Sick Children, Toronto | 4 | 946,944 | 3 | 599,638 | 0 | 0 | 1 | 347,306 |
| McMaster University | 1 | 309,085 | 0 | 0 | 0 | 0 | 1 | 309,085 |
| University of British Columbia | 2 | 645,920 | 2 | 645,920 | 0 | 0 | 0 | 0 |
| University of Calgary | 1 | 175,000 | 1 | 175,000 | 0 | 0 | 0 | 0 |
| University of Manitoba | 1 | 91,372 | 1 | 91,372 | 0 | 0 | 0 | 0 |
| Total Canada | 11 | 2,618,321 | 9 | 1,961,930 | 0 | 0 | 2 | 656,391 |
| Spain | | | | | | | | |
| Municipal Institute of Medical Research | 1 | 68,892 | 1 | 68,892 | 0 | 0 | 0 | 0 |
| Total Spain | 1 | 68,892 | 1 | 68,892 | 0 | 0 | 0 | 0 |
| United Kingdom | | | | | | | | |
| University of London University College London . . | 1 | 136,781 | 1 | 136,781 | 0 | 0 | 0 | 0 |
| University of Cambridge | 1 | 31,720 | 0 | 0 | 1 | 31,720 | 0 | 0 |
| University of Southampton . . . | 1 | 225,000 | 1 | 225,000 | 0 | 0 | 0 | 0 |
| University of Warwick | 1 | 100,000 | 1 | 100,000 | 0 | 0 | 0 | 0 |
| Total United Kingdom | 4 | 493,501 | 3 | 461,781 | 1 | 31,720 | 0 | 0 |
| Total Other | 18 | \$3,472,724 | 15 | \$2,784,613 | 1 | \$31,720 | 2 | \$656,391 |
| Grand Total | 4831 | \$1,588,492,879 | 4122 | \$1,346,581,200 | 504 | \$59,578,331 | 205 | \$182,333,348 |



Appendixes

Mortality Adjusted to 1940 Standard

Types of Research Activity

List of Abbreviations

Index





Mortality Adjusted to 1940 Standard

Death Rates for Cardiovascular and Noncardiovascular Diseases, U.S., 1978 and 1998

| Cause of Death | Rate* | | Rate Change | Percent Change |
|----------------------------|-------|-------|-------------|----------------|
| | 1978 | 1998† | | |
| All Causes | 595 | 471 | -124 | -21 |
| Cardiovascular Diseases | 268 | 161 | -107 | -40 |
| Coronary Heart Disease | 156 | 79 | -77 | -49 |
| Stroke | 44 | 25 | -19 | -44 |
| Other | 68 | 57 | -11 | -16 |
| Noncardiovascular Diseases | 327 | 310 | -17 | -5 |

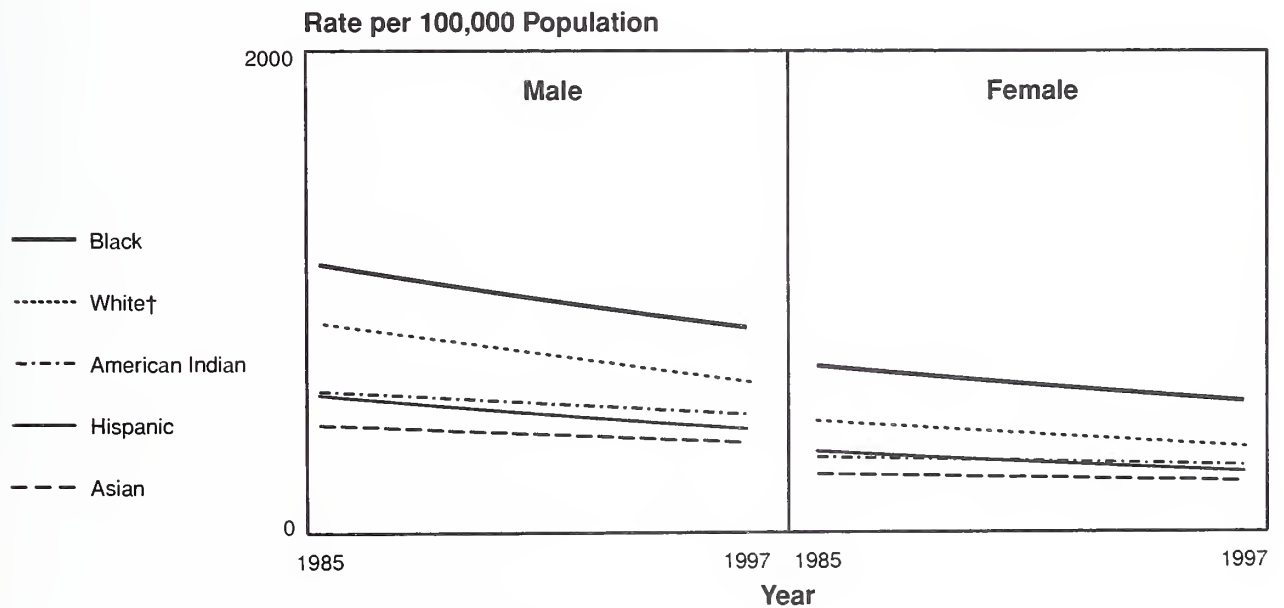
* Rate per 100,000 population, age-adjusted to the 1940 standard.

† Data for 1998 are preliminary or estimated by the NHLBI.

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

Source: Vital statistics of the U.S., NCHS.

Death Rates* for Heart Disease by Gender, Race, and Ethnicity, Ages 45 and Older, U.S., 1985-97



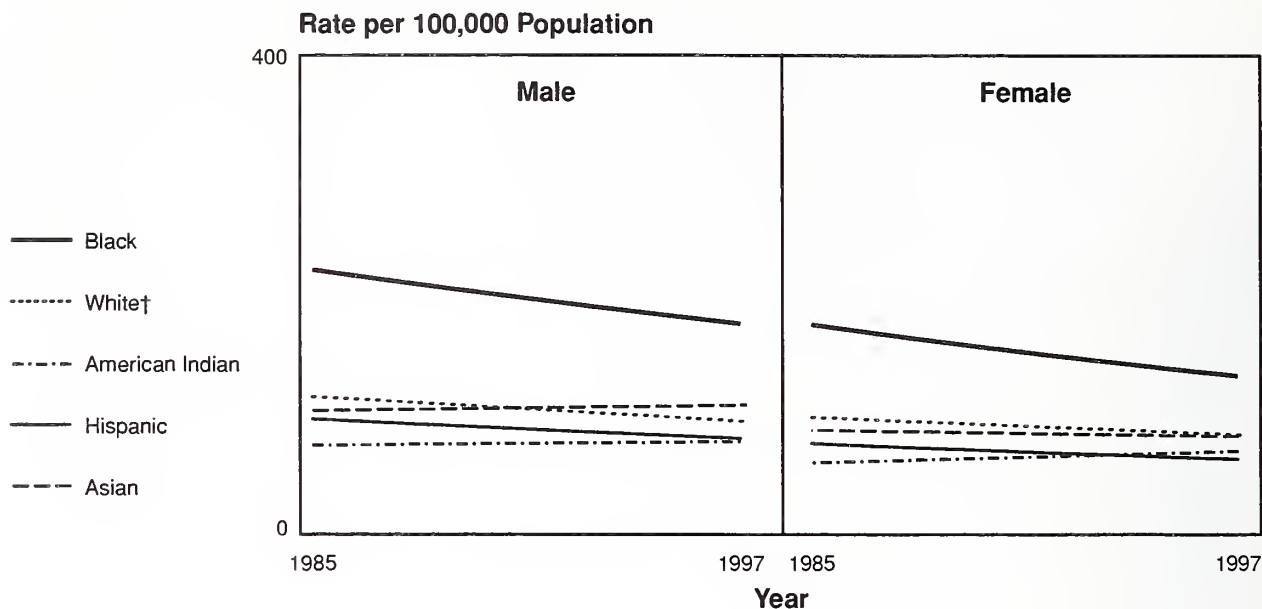
* Age-adjusted to the 1940 U.S. population.

† Non-Hispanic.

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

Source: Vital statistics of the U.S., NCHS.

Death Rates for Stroke by Gender, Race, and Ethnicity, Ages 45 and Older, U.S., 1985-97



* Age-adjusted to the 1940 U.S. population.

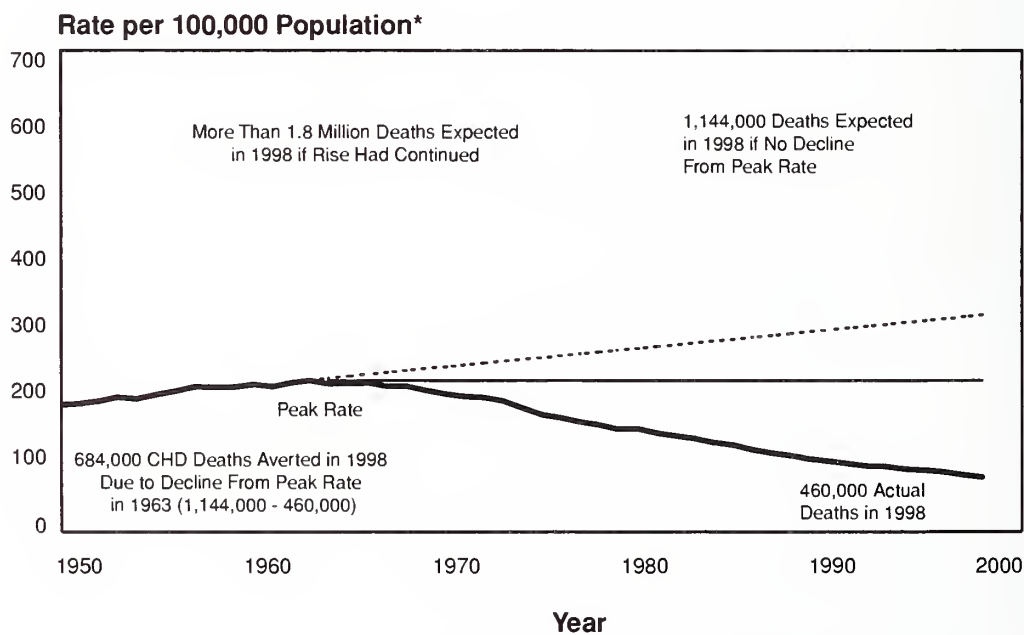
† Non-Hispanic.

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

Source: Vital statistics of the U.S., NCHS.

Death Rates for Coronary Heart Disease, U.S., 1950-98

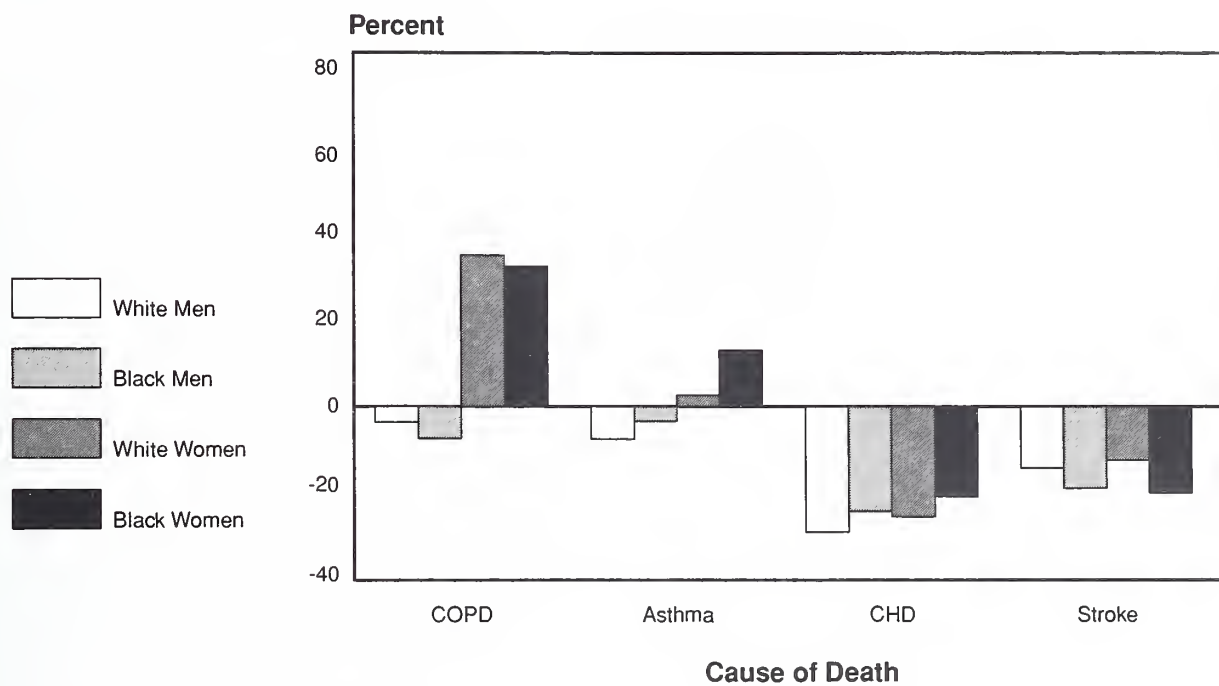
Actual Rate and Expected Rates if Rise Had Continued or Reached a Plateau



* Age-adjusted to the 1940 U.S. population. (Comparability ratio applied to 1968-78 rates.)

Source: Vital statistics of the U.S., NCHS. Data for 1998 are preliminary.

Change in Death Rates* for Selected Causes by Race and Gender, U.S., 1988-98



* Age-adjusted to the 1940 U.S. population.
Source: Vital statistics of the U.S., NCHS.

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.

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.

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.

James A. Shannon Director's Award (R55): To provide a limited award to investigators to further develop, test, and refine research tech-

niques; perform secondary analysis of available data sets; test the feasibility of innovative and creative approaches; and conduct other discrete projects that can demonstrate their research capabilities and lend additional weight to their already meritorious applications.

Research Centers

Specialized Centers of Research (SCOR)

Grants (P50): To support both basic and clinical research related to an Institute-identified theme. The spectrum of SCOR activities comprises multidisciplinary approaches to specific disease entities or biomedical problem areas. The SCOR grants differ from research program projects in that they are in response to an announcement of programmatic needs of the Institute. Centers may be asked to perform additional studies because of urgently needed information or may serve as a regional or national resource for special purpose research.

Comprehensive Centers Grants (P60): To support a multipurpose unit designed to bring together into a common focus divergent but related facilities within a given community; to foster biomedical research and development at both the fundamental and clinical levels; to initiate and expand community education, screening, and counseling programs; and to educate medical and allied health professionals concerning problems of diagnosis and treatment of specific diseases such as sickle cell anemia.

Research Career Programs

Mentored Research Scientist Development Award for Minority Faculty (K01): To support underrepresented minority faculty members with varying levels of research experience to prepare them for research careers as independent investigators.

Minority Institution Faculty Mentored Research Scientist Development Award (K01): To support at minority institutions faculty members who have the interest and potential to conduct state-of-the-art research in the areas of cardiovascular, pulmonary, or hematologic disease, or in sleep disorders.

Independent Scientist Award (K02): To enhance the research capability of promising individuals

in the formative stages of their careers of independent research in the sciences related to heart, lung, and blood diseases, blood resources, and sleep disorders.

Research Career Development Award (RCDA) (K04): To foster the development of young scientists with outstanding research potential for careers of independent research in the sciences related to heart, lung, and blood diseases and blood resources. New grants are no longer awarded.

Research Career Awards (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 Awards (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 (PCAA), the Preventive Pulmonary Academic Award (PPAA), the Transfusion Medicine Academic Award (TMAA), the Pulmonary Academic Award (PAA), and the Academic Awards in Systemic Pulmonary and Vascular Diseases. New grants are no longer awarded in the Pulmonary Academic Program.

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.

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.

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.

Professional Continuing Education (Development) Training (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 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.

Historical Black College and University Scientist Award (UH1): To strengthen and augment the human resources at historically black colleges and universities (HBCUs) by recruiting an established research scientist into their biomedical or behavioral sciences department; to enhance the career of the recruited research scientist; and to strengthen other HBCU resources for the conduct of biomedical or behavioral research in areas related to cardiovascular, lung, and blood health and disease; transfusion medicine; and sleep disorders.

Individual National Research Service Awards (NRSA)

Predocctoral Individual NRSA (F31): To provide predoctoral individuals with supervised research training in areas related to heart, lung, and blood diseases, blood resources, and sleep disorders leading toward the research degree (e.g., Ph.D.)

Postdoctoral Individual NRSA (F32): To provide postdoctoral research training to individuals to broaden their scientific background and extend their potential for research in areas related to heart, lung, and blood diseases and blood resources.

NRSA for Senior Fellows (F33): To provide experienced scientists with an opportunity to make major changes in the direction of their research careers, to broaden their scientific background, to acquire new research capabilities, to enlarge their command of an allied research field, or to take time from regular professional responsibilities for the purpose of broadening their research capabilities.

Minority Access to Research Careers (MARC) Faculty Fellowships (F34): To provide fellowships to faculty members from minority institutions to enable them to obtain advanced training in areas related to heart, lung, and blood diseases, blood resources, and sleep disorders.

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.

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.

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

| | | | |
|---------|---|---------|---|
| AAA | abdominal aortic aneurysm | CIDA | Clinical Investigator Development Award |
| ACCESS | A Case-Controlled Etiologic Study of Sarcoidosis | COPD | chronic obstructive pulmonary disease |
| ACE | angiotensin converting enzyme | CSCC | Comprehensive Sickle Cell Centers |
| ACES | Azithromycin and Coronary Artery Events Study | CSGA | Collaborative Studies on the Genetics of Asthma |
| ACRN | Asthma Clinical Research Network | CVD | cardiovascular diseases |
| ACT | Activity Counseling Trial | DASH | Dietary Approaches to Stop Hypertension |
| AFFIRM | Atrial Fibrillation Follow-up: Investigations in Rhythm Management | DBDR | Division of Blood Diseases and Resources |
| AIDS | acquired immunodeficiency syndrome | DECA | Division of Epidemiology and Clinical Applications |
| ALLHAT | Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial | DELTA | Dietary Effects on Lipoproteins and Thrombogenic Activity |
| ARDS | adult respiratory distress syndrome | DHVD | Division of Heart and Vascular Diseases |
| ARDSNET | Acute Respiratory Distress Syndrome Clinical Network | DIR | Division of Intramural Research |
| ARIC | Atherosclerosis Risk in Communities | DLD | Division of Lung Diseases |
| AVID | Antiarrhythmic Versus Implantable Defibrillator | ENRICHD | Enhancing Recovery in Coronary Heart Disease |
| BARI | Bypass Angioplasty Revascularization Investigation | ERA | Estrogen Replacement and Atherosclerosis |
| CAMP | Childhood Asthma Management Program | ESCAPE | Evaluation Study of Congestive Heart Failure and Pulmonary Artery Catheterization Effectiveness |
| CARDIA | Coronary Artery Risk Development in Young Adults | FDA | Food and Drug Administration |
| CATCH | Child and Adolescent Trial for Cardiovascular Health | FIRST | First Independent Research Support and Transition |
| CCSCD | Clinical Course of Sickle Cell Disease | FY | fiscal year |
| CHD | coronary heart disease | HBCU | Historically Black Colleges and Universities |
| CHF | congestive heart failure | HEW | Department of Health, Education, and Welfare (now HHS) |
| CHS | Cardiovascular Health Study | HHS | Health and Human Services (formerly HEW) |

| | | | |
|--------|---|---------|---|
| HIV | human immunodeficiency virus | NHBPEP | National High Blood Pressure Education Program |
| HIVIG | HIV Immunoglobulin | NHI | National Heart Institute |
| HRT | hormone replacement therapy | NHIS | National Health Interview Survey |
| ICD | International Classification of Diseases; also, implantable cardiac defibrillator | NHLBI | National Heart, Lung, and Blood Institute (formerly NHI and NHLI) |
| IRAS | Insulin Resistance and Atherosclerosis Study | NHLI | National Heart and Lung Institute |
| IVAS | Innovative Ventricular Assist System | NICHD | National Institute of Child Health and Human Development |
| JHS | Jackson Heart Study | NIDDK | National Institute of Diabetes and Digestive and Kidney Diseases |
| MAGIC | Magnesium in Coronaries | NIDDM | Noninsulin-dependent diabetes mellitus |
| MARC | Minority Access to Research Careers | NIH | National Institutes of Health |
| MBRS | Minority Biomedical Research Support | NRSA | National Research Service Award |
| MERIT | Method to Extend Research in Time | OD | Office of the Director |
| MESA | Multi-Ethnic Study of Atherosclerosis | OEI | Obesity Education Initiative |
| MGS | Mammalian Genotyping Service | OPEC | Office of Prevention, Education, and Control |
| MI | myocardial infarction | ORMH | Office of Research on Minority Health |
| MOST | Most Selection Trial in Sinus Node Dysfunction | P2C2 | Pediatric Pulmonary Cardiac Complication of HIV |
| MSH | Multicenter Study of Hydroxyurea in Sickle Cell Anemia | PA | Program Announcement |
| NAEPP | National Asthma Education and Prevention Program | PAD | Public Access Defibrillation |
| NCEP | National Cholesterol Education Program | PCDD | Prevention of Cardiovascular Disease in Diabetes Mellitus |
| NCHS | National Center for Health Statistics | PEACE | Prevention of Events With Angiotensin Converting Enzyme Inhibitor Therapy |
| NCSDR | National Center on Sleep Disorders Research | PHS | Public Health Service |
| NETT | National Emphysema Treatment Trial | R&D | research and development |
| NHAAP | National Heart Attack Alert Program | REDS | Retrovirus Epidemiology Donor Study |
| NHANES | National Health and Nutrition Examination Survey | REMATCH | Randomized Evaluation of Mechanical Assistance for the Treatment of Chronic Heart Failure |
| | | RFA | Request for Applications |
| | | RFP | Request for Proposals |

| | | | |
|------|------------------------------------|-----------|--|
| RMS | research management and support | TB | tuberculosis |
| RPG | research project grants | VATS | Viral Activation Transfusion Study |
| SBIR | Small Business Innovation Research | WAVE | Women's Angiographic Vitamin and Estrogen Trial |
| SCD | sickle cell disease | WELL-HART | Women's Estrogen/Progestin Lipid-Lowering Hormone Atherosclerosis Regression Trial |
| SCOR | Specialized Center(s) of Research | WHI | Women's Health Initiative |
| SEP | Special Emphasis Panel | WISE | Women's Ischemia Syndrome Evaluation |
| SHHS | Sleep Heart Health Study | WHO | World Health Organization |
| SIDS | sudden infant death syndrome | | |
| STTR | Small Business Technology Transfer | | |



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