NIH ALMANAC

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Contents

Foreword

Published annually, the *NIH Almanac* presents pertinent facts about the National Institutes of Health--the Federal Government's principal biomedical research agency. It is designed as a ready reference source on NIH's 14 research institutes and 2 divisions, the National Library of Medicine, the Clinical Center--a combined research hospital and laboratory complex--the National Center for Research Resources, and the John E. Fogarty International Center for Advanced Study in the Health Sciences.

A publication of related interest is the *NIH Extramural Programs*, a compendium of the scientific programs of the NIH components that award grants and contracts. For more detailed information about these components, the reader is referred to the listing of current NIH publications and printed material contained in the *NIH Publications List*.

The National Institutes of Health

Begun as a one-room Laboratory of Hygiene in 1887, the National Institutes of Health today is one of the world's foremost biomedical research centers. An agency of the Department of Health and Human Services, the NIH is the Federal focal point for health research.

NIH is the steward of biomedical and behavioral research for the Nation. Its mission is science in pursuit of fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to extend healthy life and reduce the burdens of illness and disability. The goals of the agency are as follows: 1) foster fundamental creative discoveries, innovative research strategies, and their applications as a basis to advance significantly the Nation's capacity to protect and improve health; 2) develop, maintain, and renew scientific human and physical resources that will assure the Nation's capability to prevent disease; 3) expand the knowledge base in biomedical and associated sciences in order to enhance the Nation's economic well-being and ensure a continued high return on the public investment in research; 4) exemplify and promote the highest level of scientific integrity, public accountability, and social responsibility in the conduct of science.

In realizing these goals, the NIH provides leadership and direction to programs designed to improve the health of the Nation by conducting and supporting research: in the causes, diagnosis, prevention, and cure of human diseases; in the processes of human growth and development; in the biological effects of environmental contaminants; in the understanding of mental, addictive and physical disorders; in directing programs for the collection, dissemination, and exchange of information in medicine and health, including the development and support of medical libraries and the training of medical librarians and other health information specialists.

Part 1 Historical Data

Chronology of Events

(By Year)

1798--The Marine Hospital Service was established with the July 16 signing by President John Adams of an act for the relief of sick and disabled seamen.
1799--An amending act of March 2 extended benefits of the Marine Hospital Service to officers and men of the U.S. Navy.
1802--The admission of foreign seamen to Marine hospitals on a reimbursable basis was authorized on May 3.
1803--The first permanent Marine hospital was authorized on May 3 to be built in Boston, Mass.
1807--Dr. Benjamin Waterhouse was appointed physician in charge of the Boston Marine Hospital on November 27. He was the first to introduce interns and residents into hospitals in the United States.
1836--The Library of the Office of the Surgeon General of the Army was established (the present National Library of Medicine).
1865--John Shaw Billings, M.D., was assigned to supervise the Surgeon General's Library, which he built into a national resource of biomedical literature.
1870--A bill dated June 29 provided for administration of Marine hospitals within a Bureau of the Treasury Department with a medical officer in charge.
1871--Dr. John Maynard Woodworth was appointed supervising surgeon of the Marine Hospital Service in April, marking the beginning of central control of Marine hospitals.
1873--Regulations were approved on December 1 for appointment and promotion of physicians in the Marine Hospital Service, establishing the first career service for civilian employees in the Federal Government.
1875--A bill passed on March 3 authorized admission of Navy seamen and seamen of other government services to Marine hospitals on a reimbursable basis.

In recognition of Dr. Woodworth's progress in reorganizing the Marine Hospital Service, his title was changed by law to supervising Surgeon General on March 3.
1878--The first Federal Quarantine Act was passed April 29.

On December 21, Congress appropriated funds "for investigating the origin and causes of epidemic diseases, especially yellow fever and cholera."
1879--The National Board of Health was created by law on March 3. It represented the first organized, comprehensive, national medical research effort of the Federal Government.

Dr. John B. Hamilton was appointed Surgeon General of the Marine Hospital Service, April 3.
1884--The seamen's hospital tax was abolished on July 1. The cost of maintaining Marine hospitals was paid out of a tonnage tax, which continued until 1906.
1887--A bacteriological laboratory, known as the Laboratory of Hygiene, was established under Dr. Joseph J. Kinyoun at the Marine Hospital, Staten Island, N.Y., in August, for research on cholera and other infectious diseases (renamed Hygienic Laboratory in 1891.)
1889--The commissioned corps was authorized on January 4 establishing by law the policy of a mobile corps subject to duty anywhere upon assignment.
1890--Congress gave the Marine Hospital Service interstate quarantine authority on March 27.
1891--The Hygienic Laboratory moved from Staten Island, N.Y., to the Butler Building, Service Headquarters, Washington, D.C., in June.

Dr. Walter Wyman was appointed Surgeon General of the Marine Hospital Service on June 1.
1893--A new Quarantine Act, passed February 15, strengthened the Quarantine Act of 1878 and repealed the act establishing the National Board of Health.
1899--The Marine Hospital Service was directed by Congress on March 2 to investigate leprosy in the United States.

Dr. Milton J. Rosenau succeeded Dr. Kinyoun as director of the Hygienic Laboratory on May 1.
1902--The earliest studies of Rocky Mountain spotted fever took place in Montana.

A bill approved July 1 changed the name of the Marine Hospital Service to the Public Health and Marine Hospital Service and established an advisory board for the Hygienic Laboratory. It later became the National Advisory Health Council.

The 57th Congress enacted Public Law 244 to regulate the shipment of biologics. The technical responsibilities of the program were assigned to the Hygienic Laboratory.

The Advisory Board for the Biologics Control Division was established July 1.

The Pan American Sanitary Bureau was established December 2. The Public Health and Marine Hospital Service began international health cooperation.
1904--The Hygienic Laboratory moved to a new building on a 5-acre tract at 25th and E Streets NW, Washington, D.C., on March 16.
1906--Medical care for merchant seamen and other beneficiaries of the Public Health and Marine Hospital Service began to be supported by direct congressional appropriations, with the repeal of the tonnage tax on June 30.
1909--Dr. John F. Anderson was appointed director of the Hygienic Laboratory, October 1.
1912--Dr. Rupert Blue was appointed Surgeon General of the Public Health and Marine Hospital Service on January 13.

The name Public Health and Marine Hospital Service was changed to Public Health Service (PHS) on August 14, and the research program was expanded to include other-than-communicable diseases field investigations, navigable stream pollution, and information dissemination.
1914--Dr. Joseph Goldberger announced his views of pellagra as a dietary deficiency, emphasizing the importance of dietary deficiency diseases.
1915--Dr. George W. McCoy was appointed Hygienic Laboratory director on Nov.20.
1918--The Chamberlain-Kahn Act, passed July 9, provided for the study of venereal diseases. The PHS made grants to 25 institutions, establishing a precedent for the Federal Government to seek assistance of scientists through grants.

The PHS reserve corps was established by law on October 27, during the influenza pandemic, as a means of coping with the emergencies.
1920--Dr. Hugh Smith Cumming was appointed PHS Surgeon General on Mar.3.
1921--The Rocky Mountain Spotted Fever Laboratory was established in a former school building in Hamilton, Mont., on September 20 as a recognized PHS field station.
1922--The Library of the Office of the Surgeon General (Army) was renamed the Army Medical Library in January.

A Special Cancer Investigations Laboratory was established by PHS investigators at Harvard Medical School on August 1.
1929--On January 19, the Narcotics Control Act was passed, authorizing construction of two hospitals for drug addicts, and creation of a PHS Narcotics Division.
1930--On April 9, the Advisory Board for the

Hygienic Laboratory became the National Advisory Health Council.

On May 26 the Ransdell Act redesignated the Hygienic Laboratory as the National *Institute* of Health, authorizing $750,000 for construction of two buildings for NIH, and creating a system of fellowships.

On June 14, Public Law 357 authorized creation of a separate Bureau of Narcotics in the Treasury Department and changed the PHS Narcotics Division to the Division of Mental Hygiene. The law gave the Surgeon General authority to investigate the causes, treatment, and prevention of mental and nervous diseases.

1935--A narcotic "farm" at Lexington, Ky., was completed and opened on May 29.

On August 10, Mr. and Mrs. Luke I. Wilson made a gift of 45 acres of their estate "Tree Tops" for use of the National Institute of Health in Bethesda, Md.

Title VI of the Social Security Act was passed August 14 authorizing the expenditure of up to $2 million on health grants to the states for "investigation of disease and problems of sanitation."

1936--Dr. Thomas Parran was appointed PHS Surgeon General on April 6.

1937--The Rocky Mountain Laboratory became part of the National Institute of Health in February, and was administratively made part of the Division of Infectious Diseases.

Dr. Lewis R. Thompson was appointed director of the National Institute of Health on February 1.

With the reorganization of the National Institute of Health into eight divisions, the biologics control program, previously the responsibility of the Division of Pathology and Bacteriology, NIH, was assigned to a newly established Division of Biologics Control (redesignated Biologics Control Laboratory, 1944).

The National Cancer Institute Act was signed on July 23.

1938--The National Advisory Cancer Council recommended approval of the first awards for fellowships in cancer research on January 3.

Mrs. Luke I. Wilson made a second gift of 10.7 acres, to NIH on May 28.

The cornerstone for Building 1 was laid June 30.

Congress approved construction of new, larger laboratory facilities, and NIH moved to Bethesda, Md., in July.

Mrs. Luke I. Wilson made a third gift, 14.4 acres of land, to NIH on September 30.

The narcotics hospital at Fort Worth, Tex., was dedicated on October 28.

1939--Under a Reorganization Act dated April 3, the PHS was transferred from the Treasury Department to the Federal Security Agency.

1940--Mrs. Luke I. Wilson made a fourth gift, 11.6 acres of land, to NIH on September 27.

President Franklin D. Roosevelt dedicated the buildings and the grounds of the National Institute of Health on October 31.

1942--Dr. Rolla Eugene Dyer was appointed director of the National Institute of Health on February 1.

A final gift of land was made by Mrs. Luke I. Wilson on March 17 bringing the total to 92 acres. This was the nucleus of the present 306.4-acre reservation. Additional land was acquired through a series of purchases.

1943--NIH was given bureau status in the PHS on November 11.

1944--The PHS act was approved on July 1, consolidating and revising existing public health legislation, and giving NIH the legislative basis for its postwar program, with general authority to conduct research. Under this act NCI became a division of NIH.

1946--The Research Grants Office was created at NIH in January to administer the Office of Scientific Research and Development projects transferred to the PHS at the end of World War II and to operate a program of extramural research grants and fellowship awards.

The National Mental Health Act was passed July 3.

On August 12, the Research Grants Office became the Research Grants Division (later renamed Division of Research Grants). The division was instructed by the National Advisory Health Council to establish study sections for scientific and technical review of research grant applications, and to explore neglected areas of research in the health sciences.

The Hospital Survey and Construction Act, introduced by Senators Lister Hill and Harold H. Burton, was passed on August 13, authorizing the Hill-Burton program.

1948--Dr. Leonard A. Scheele was appointed PHS Surgeon General on April 6.

On June 16 the National Heart Act was signed. It authorized the National Heart Institute and changed the name of the National *Institute* of Health to National *Institutes* of Health.

The National Dental Research Act, passed June 24, authorized the National Institute of Dental Research.

The National Heart Institute was established August 1.

The National Institute of Dental Research was established September 16.

Construction of the Clinical Center was started in November.

The National Microbiological Institute and the Experimental Biology and Medicine Institute were established on November 1.

The Rocky Mountain Laboratory and Biologics Control Laboratory became two of the four components of the National Microbiological Institute on November 1.

1949--The purchase of 115.8 acres from the Town & Country Golf Club, Inc., for $600,000 was concluded February 11.

The purchase of 47.9 acres of land from Mr. and Mrs. G. Freeland Peter for $505,000 was concluded on February 14.

The National Institute of Mental Health was established on April 15, with the abolishment of the Division of Mental Hygiene.

The first issue of *The NIH Record* was published May 20.

The purchase of 50.2 acres of land from the Sisters of the Visitation for $173,058 was concluded on June 28.

Dr. Frank B. Rogers became director of the Army Medical Library in October.

1950--The Omnibus Medical Research Act, signed August 15, authorized the National Institute of Neurological Diseases and Blindness and the National Institute of Arthritis and Metabolic Diseases, the latter absorbing the Experimental Biology and Medicine Institute. The act also gave the Surgeon General authority to establish new institutes.

Dr. William H. Sebrell, Jr., was appointed NIH director on October 1.

The National Institute of Neurological Diseases and Blindness and the National Institute of Arthritis and Metabolic Diseases were established November 22.

1951--The first R. E. Dyer Lecture was given by Dr. George W. Beadle, California Institute of Technology, June 21.

President Harry S. Truman laid the Clinical Center cornerstone on June 22.

1952--The Army Medical Library was renamed Armed Forces Medical Library in April.

1953--The first NIH Lecture was given on January 21 by Dr. Severo Ochoa of New York University College of Medicine.

PHS became part of the newly created Department of Health, Education, and Welfare on April 11.

The Clinical Center was dedicated on July 2, extending the clinical dimension of PHS research programs.

The first patient was admitted to the Clinical Center on July 6.

1954--A central data processing facility was established in the Office of the Director, NIH.

The NIH Graduate School Program began on September 27.

1955--The biologics control function was placed in the newly formed Division of Biologics Standards in June. The Division of Research Services and Division of Business Operations were also formed.

The Cancer Chemotherapy National Service Center was established April 1 to coordinate the first national cancer chemotherapy program.

The Mental Health Study Act was passed July 28.

Dr. James A. Shannon was appointed NIH

director on August 1.

The National Microbiological Institute became the National Institute of Allergy and Infectious Diseases (NIAID) by order of the Surgeon General on December 29. The Biologics Control Laboratory was detached from the institute and expanded to division status within NIH.

1956--In January the biometric facility became the Biometrics Branch in the new Division of Research Services.

Dr. Leroy E. Burney was appointed PHS Surgeon General August 8.

The Armed Forces Medical Library was designated the National Library of Medicine (NLM) and placed under PHS October 1.

1957--The Center for Aging Research was established November 27 as the focal center for NIH extramural activities in gerontology.

1958--On July 16 the Division of General Medical Sciences was established by order of the Surgeon General, extending research into noncategorical areas covered until that time by the Division of Research Grants.

The Center for Aging Research was transferred from the National Heart Institute to the Division of General Medical Sciences on November 4.

1959--The Office of Administrative Management was formed July 15, consolidating the Division of Business Operations and other managerial responsibilities.

Congress appropriated $2 million for the establishment of one or two private research centers on August 19.

1960--On March 8 the Surgeon General approved establishment of a Computation and Data Processing Branch in the Division of Research Services.

NIH acquired 513 acres of farmland near Poolesville, Md., on May 6. This land became the site of the NIH Animal Center.

The International Health Research Act was passed July 12, extending NIH international programs.

1961--The Surgeon General established the Center for Research in Child Health in the Division of General Medical Sciences on February 17.

Dr. Luther L. Terry was appointed PHS Surgeon General March 24.

On May 26, DHEW Secretary Abraham A. Ribicoff dedicated the new NIDR building.

The first Jules Freund Lecture was given by Dr. Merrill W. Chase of the Rockefeller Institute on November 15.

The NIH European Office was established in Paris, France, on December 18.

1962--The NIH Latin American Office was established in Rio de Janeiro, Brazil, on July 1.

The Division of Research Facilities and Resources was established July 15.

Public Law 87-838, passed October 17, authorized the National Institute of Child Health and Human Development and the National Institute of General Medical Sciences.

Five acres of land for a Gerontology Research Center were donated by the City of Baltimore in December.

1963--The NIH Pacific Office was established in Tokyo, Japan, on January 1.

The National Institute of Child Health and Human Development and the National Institute of General Medical Sciences were established on January 30.

The Center for Research in Child Health and the Center for Research in Aging (established in 1956) were transferred from NIGMS to NICHD.

The surgical wing for the Clinical Center was dedicated September 5.

The first NIH International Lecture was given October 31 by Dr. Walsh McDermott of Cornell University Medical College.

1964--The Medical Literature Analysis and Retrieval System (MEDLARS) became operational at the NLM in January.

The Division of Computer Research and Technology was established on April 16.

On September 19 Congress authorized planning funds for a central environmental health research facility.

A special virus-leukemia program was initiated under a special appropriation, included in the FY 1965 appropriation signed into law on September 19.

1965--On January 7, the Surgeon General announced that the National Environmental Health Sciences Center would be located in Research Triangle Park, N.C.

The NIH Animal Center, Poolesville, Md., officially opened May 27 with 2 days of orientation for NIH employees, area residents and the press after completion of the first of three phases of an $18 million construction program.

NIH received a $20,250,000 supplemental appropriation on August 31 to intensify and expand support of research in heart disease, cancer, stroke and related diseases.

Dr. William H. Stewart, appointed PHS Surgeon General September 24, took office on October 2.

A reorganization of the DHEW provided for an expansion of the secretary's office with the creation of three new assistant secretaries, including an assistant secretary for health and scientific affairs.

Dr. Philip R. Lee was appointed to the new position of assistant secretary for health and scientific affairs on November 2.

1966--The Division of Regional Medical Programs was created on February 1 to administer grants under the Heart Disease, Cancer and Stroke Amendments of 1965. Dr. Robert Q. Marston was appointed NIH associate director for regional medical programs and chief of the division.

At a White House meeting June 27, the NIH director and institute directors discussed with the President how the benefits of research findings in health could be brought more rapidly to all the people. Later in the year, a report to the President described current NIH research efforts on the major U.S. disease problems and set forth the status of those problems, the nature of present and planned investigative efforts and the problems of and opportunities for further research.

A Division of Environmental Health Sciences was established in NIH November 1 to conduct, foster and coordinate research on the biological, chemical, and physical effects of environmental agents. Dr. Paul Kotin, scientific director for etiology, NCI, was named director of the new division.

An advisory committee to the NIH director was appointed on November 9 to provide advice on the further development of NIH research and related programs.

1967--The National Institute of Mental Health was separated from NIH and raised to bureau status in PHS by a reorganization that became effective January 1. NIMH's Division of Clinical, Behavioral and Biological Research, within the mental health Intramural Research Program, comprising activities conducted in the Clinical Center and other NIH facilities, continued here under an agreement for joint administration between the two companion bureaus. The Toxicology Information Program was established at NLM, January 1, in response to recommendations of the President's Science Advisory Committee. The program includes the entire range of chemical effects on living organisms.

The PHS Audiovisual Facility, renamed the National Medical Audiovisual Center, became an NLM component July 1.

On September 26, the deed for 509.25 acres of Research Triangle Park, N.C., to serve as a permanent site for the Division of Environmental Health Sciences, was presented to the Surgeon General.

1968--Establishment of the John E. Fogarty International Center for Advanced Study in the Health Sciences (FIC) was given departmental approval February 26. The center became operational on July 1, at which time the NIH Office of International Research was abolished and certain of its functions were transferred to FIC and NIAID.

Under a reorganization of health activities announced on April 1, NIH assumed status as a new operating agency within the department, with the NIH director reporting directly to the assistant secretary for health and scientific Affairs. Under the reorganization, the Bureau of Health Manpower and the National Library of Medicine became components of NIH.

On June 15 the four-story $7.5 million Gerontology Research Center building--located at and operated in cooperation with Baltimore City Hospitals--was officially opened.

A proposed facility to house the biomedi-

cal communications network was designated the Lister Hill National Center for Biomedical Communications by passage of P.L. 90-456 on August 3.

Established by the DHEW secretary on August 9, the Center for Population Research conducts a contract and grant program in population and reproduction research. The center was designated by the President as the primary Federal agency responsible for population research and training.

On August 16 the National Eye Institute was created to build an enlarged program based on blindness research formerly conducted in the National Institute of Neurological Diseases and Blindness. The legislation also changed the NINDB name to the National Institute of Neurological Diseases.

Dr. Robert Q. Marston was sworn in as NIH director on August 29.

A Nobel Prize in Physiology or Medicine was awarded on October 16 to Dr. Marshall W. Nirenberg, chief of NHI's Laboratory of Biochemical Genetics, for discovering the key to deciphering the genetic code. He was the first NIH Nobel laureate, and the first Federal employee to receive a Nobel Prize.

On October 24 the President signed into law (P.L. 90-639) legislation changing the name of the NIND to the National Institute of Neurological Diseases and Stroke.

The National Eye Institute was established on December 26.

1969--A further reorganization of the NIH internal structure announced January 4 renamed the Bureau of Health Manpower as the Bureau of Health Professions Education and Manpower Training and expanded it to include seven divisions, one of which was the Division of Research Resources (DRR).

The Division of Environmental Health Sciences was elevated to institute status on January 12, thus becoming the 10th NIH institute.

Dr. Roger O. Egeberg was named DHEW assistant secretary for health and scientific affairs on July 14, succeeding Dr. Lee.

On November 10, the DHEW secretary redesignated the National Heart Institute as the National Heart and Lung Institute.

1970--A reorganization of the Bureau of Health Professions Education and Manpower Training renamed it the Bureau of Health Manpower Education on September 18. DRR was separated from the bureau and became a division within NIH.

1971--Dr. Merlin K. DuVal was appointed DHEW assistant secretary for health and scientific affairs on July 1, succeeding Dr. Egeberg.

The White House Conference on Aging recommended creating a separate National Institute on Aging on December 2.

On December 23 the President signed the National Cancer Act of 1971 initiating a National Cancer Program, establishing the President's Cancer Panel, a National Cancer Advisory Board and 15 new research, training and demonstration cancer centers.

1972--The National Institute of Arthritis and Metabolic Diseases was renamed the National Institute of Arthritis, Metabolism, and Digestive Diseases on May 19.

On July 1, DBS transferred from NIH and officially became a sixth bureau---Bureau of Biologics--in the Food and Drug Administration. The bureau continues to use NIH facilities and buildings.

The DHEW secretary approved a reorganization of NHLI on July 14, elevating the institute to bureau status within NIH. A bureau-level organization was established for the National Cancer Institute on July 27.

On October 25 Public Law 92-564 established a temporary National Commission on Multiple Sclerosis (supported by NINDS).

Dr. Christian B. Anfinsen, NIAMDD, won the Nobel Prize in Chemistry for his work on ribonuclease.

1973--Dr. Charles C. Edwards was appointed DHEW assistant secretary for health on April 18, succeeding Dr. DuVal.

Dr. Robert S. Stone was sworn in as the 10th NIH director on May 29.

The Bureau of Health Manpower Education was transferred from NIH to the new Health Resources Administration on July 1 and renamed the Bureau of Health Resources Development.

The National Institute of Mental Health rejoined the National Institutes of Health on July 1. On September 25, NIMH became part of the new Alcoholism, Drug Abuse and Mental Health Administration.

1974--The Research on Aging Act of 1974, creating the National Institute on Aging, was signed into law on May 31.

On July 23, the National Cancer Act Amendments of 1974 were signed by the President to improve the National Cancer Program. It also established a President's Biomedical Research Panel.

The National Institute on Aging was established on October 7.

The Interagency Primate Steering Committee was established by the DHEW assistant secretary for health with NIH as the lead agency.

Institutional Relations Branch was transferred on October 27 from DRG to the immediate Office of the Director, NIH, and renamed the Office for Protection From Research Risks.

1975--On March 13 the National Institute of Neurological Diseases and Stroke was renamed the National Institute of Neurological and Communicative Disorders and Stroke.

Dr. Theodore Cooper was appointed DHEW assistant secretary for health on July 1, succeeding Dr. Edwards.

Dr. Donald S. Fredrickson was sworn in as the 11th NIH director on July 1.

The Adult Development and Aging Branch and the Gerontology Research Center were separated from NICHD to become the core on the National Institute on Aging also on July 1.

1976--On June 25, the National Heart and Lung Institute was renamed the National Heart, Lung, and Blood Institute.

Dr. D. Carleton Gajdusek, NINCDS, shared the Nobel Prize in Physiology or Medicine with Dr. Baruch Blumberg, Institute for Cancer Research. Dr. Gajdusek was honored for his research on kuru and Dr. Blumberg for his work on the Australia antigen at the National Institute of Arthritis and Metabolic Diseases (1957-1964).

1977--Construction of the Ambulatory Care Research Facility was started in April.

On July 13, Dr. Julius B. Richmond took the oath of office as DHEW assistant secretary for health and Surgeon General, becoming the first person to hold both offices simultaneously.

1978--On November 15 the DHEW secretary announced the establishment of the National Toxicology Program under direction of NIEHS.

1979--Dr. Hans J. Muller Eberhard, Scripps Clinic and Research Foundation, delivered the first Kinyoun Lecture on April 24.

A protocol of cooperation in the exchange of information on medicine and public health between the United States and China was signed on June 22 in Beijing's historic Great Hall. The DHEW secretary signed on behalf of the U.S.

On July 18 NCI and the National Naval Medical Center, Bethesda, Md., agreed to cooperate in a cancer treatment research program.

1980--DHEW became the Department of Health and Human Services (DHHS) on May 14. A separate Department of Education was established.

On May 22, the Lister Hill Center for Biomedical Communications was dedicated as part of NLM.

1981--On May 14 Dr. Edward N. Brandt, Jr., was sworn in as assistant secretary for health.

The National Institute of Arthritis, Metabolic, and Digestive Diseases was renamed the National Institute of Arthritis, Diabetes, and Digestive and Kidney diseases on June 23.

On June 30 Dr. Fredrickson stepped down as NIH director. Dr. Thomas E. Malone was appointed acting director.

The Ambulatory Care Research Facility was officially dedicated on October 22. The research hospital was renamed the Warren Grant Magnuson Clinical Center in honor of the former chairman of the Senate Committee on Appropriations. Sen. Magnuson was involved in support of biomedical research at NIH since 1937.

Dr. C. Everett Koop became PHS Surgeon

General on November 16.

1982--On April 22 NIADDK was converted to bureau status, joining NCI, NHLBI, and NLM. Dr. James B. Wyngaarden, chairman of the Duke University department of medicine, was appointed NIH director on April 29.

The National Institute of Child Health and Human Development marked its 20th anniversary on September 20.

NIGMS celebrated its 20th anniversary by establishing the DeWitt Stetten, Jr., Lectureship. Dr. David S. Hogness, Stanford University, gave the first lecture, October 13.

The National Institute on Aging opened its first on-campus research unit in the NIH Clinical Center.

The NIEHS facility in Research Triangle Park, N.C., was dedicated on November 15.

Lasker Foundation Awards were presented on November 17 to three NIH scientists: Dr. Elizabeth Neufeld, NIADDK; Dr. Roscoe O. Brady, NINCDS; and Dr. Robert C. Gallo, NCI.

1983--On January 18, Bldg. 1 was officially named the James A. Shannon Bldg. in honor of the former NIH director (1955-1968).

The first multidisciplinary pain clinic in the U.S. devoted exclusively to research was opened in the Clinical Center March 21 by NIDR.

NCI dedicated its R.A. Bloch International Cancer Information Center on October 2. The building houses the institute's information programs that serve health professionals and scientists.

In December, the Clinical Center celebrated its 30th anniversary of operation.

1984--NIH purchased the Convent of the Sisters of the Visitation of Washington along with about 11 acres of land for $4.5 million.

In May NCI scientists headed by Dr. Robert C. Gallo, Jr., uncovered strong evidence that variants of a human cancer virus--called HTLV-III--are the primary cause of acquired immunodeficiency syndrome (AIDS).

DCRT celebrated its 20th anniversary in May.

NIH and Howard Hughes Medical Institute launched a multimillion dollar cooperative program in August to help increase the vigor of American biomedical research and continue the flow of new doctors into research areas.

The former Convent was dedicated Sept. 19 as the Mary Woodard Lasker Center for Health Research and Education.

1985--NIH and the Howard Hughes Medical Institute chose the first 25 HHMI-NIH research scholars in June.

In July the NIA celebrated its 10th anniversary.

1986--In May the National Institute of Arthritis and Musculoskeletal and Skin Diseases became a separate institute separated from its parent NIADDK--now called the National Institute of Diabetes and Digestive and Kidney Diseases. Also created was the National Center for Nursing Research.

NIH held the First Intramural Research Day on Sept. 25 featuring symposia and poster sessions.

In June NIAID funded 14 centers to evaluate experimental drugs in the treatment of AIDS.

NIH opened its year-long centennial celebration--A Century of Science for Health--on Oct. 16.

1987--NIH scheduled monthly events, hosted by individual components throughout the year, to commemorate its 100th anniversary.

NIAID awarded contracts to five medical centers to establish AIDS treatment evaluation units.

NIEHS celebrated its 20th anniversary, while NIGMS and DRR marked their 25th.

Fifty-six promising science students--one from each state and U.S. possession--were honored by NIH as centennial scholars.

On July 23 President Reagan named a 13-member Commission on the Human Immunodeficiency Virus Epidemic, which held its first meeting following the announcement.

NIH became a smoke-free agency on Sept. 1 banning smoking in all buildings.

Hundreds of NIH alumni from the U.S. and abroad returned to the campus on Oct. 15-16 to help close out the year-long celebration of the NIH centennial.

1988--NIH was honored by Spain with the presentation of the Grand Cross of the Civil Order of Health.

The NICHD celebrated its 25th anniversary and NIAID and NIDR marked their 40th.

The Children's Inn at NIH, a temporary home away from home for NIH pediatric patients was dedicated. A gift of $2.5 million from Merck and Co. Inc. was donated toward the construction of the building.

"Sky Horizon," a sculpture created by Louise Nevelson, was given to NIH by Edwin C. Whitehead, founder of the Whitehead Institute of Biomedical Research.

Officials from NICHD, NINDS, and NIMH broke ground for a facility they will share--Bldg. 49, the Child Health and Neurosciences Building.

November marked the establishment of the National Institute on Deafness and Other Communication Disorders. The parent institute was renamed the National Institute of Neurological Disorders and Stroke.

1989--On May 10, Bldg. 31 was named the Claude Denson Pepper Bldg. to honor NIH's "legislative father."

The NIH Record marked its 40th year of publication in May.

On May 22, NIH conducted its first gene transfer in humans. A cancer patient was infused with tumor-infiltrating lymphocytes (TIL) that had been altered by insertion of a gene. This allowed scientists to track the special cancer-fighting cells in the body to increase the understanding of TIL therapy.

1990--The National Center for Human Genome Research was established in January.

DRR and DRS merged in March and named the National Center for Research Resources.

On June 21 the Children's Inn at NIH opened its doors to pediatric patients and their families. The President and Mrs. Bush attended the ceremonies.

The Recombinant DNA Advisory Committee approved the first experiments involving transfer of human genes for therapeutic purposes on July 31. The treatment was initiated on September 14 in a 4-year-old girl with adenosine deaminase deficiency.

The National Institute of Neurological Disorders and Stroke and the National Institute of Diabetes and Digestive and Kidney Diseases marked their 40th anniversaries.

It was announced in September that the gene that caused osteoarthritis was isolated by scientists supported by the National Institute of Arthritis and Musculoskeletal Diseases.

The Office of Research on Women's Health was established to strengthen NIH's efforts to improve the prevention, diagnosis and treatment of illness in women and to enhance research related to diseases and conditions that affect women.

1991--On January 29, NIH scientists treated the first cancer patients with human gene therapy. Two patients received transfusions of special cancer-killing cells removed from their own tumors and armed in the laboratory with a gene capable of producing a potent antitumor toxin, tumor necrosis factor.

Dr. Bernadine Healy was confirmed as NIH's 13th director on Mar. 21. She is the first woman appointed to this post.

In August the National Center for Human Genome Research announced the start of a new, unified effort to develop a ''framework'' map of the human genome—expected to take 2 to 3 years to complete.

1992--On October 1, the National Institute on Alcohol Abuse and Alcoholism, National Institute on Drug Abuse, and National Institute of Mental Health were transferred from ADAMHA to NIH.

Two components--NICHD and NIGMS--celebrated their 30th anniversaries on September 21 and October 17 respectively.

Legislative Chronology

This legislative chronology is limited to enactments that had a major influence upon the Marine Hospital Service as it evolved into the PHS, to legislation leading to the establishment of the National Institutes of

Health, and to specific NIH legislation with the exception of appropriations bills, unless such bills provided significant new authorities for or restrictions on NIH components.

July 16, 1798--"An Act for the relief of sick and disabled Seamen" established the Marine Hospital Service for merchant seamen. The Marine Hospital Service--forerunner of the present-day PHS--became a component of the Treasury Department. A monthly hospital tax of 20 cents was deducted from the pay of merchant seamen in the first prepaid medical care plan in the United States. (1 Stat. L. 605.)

March 2, 1799--An amending act to the legislation of 1798 extended Marine Hospital Service benefits to officers and men of the U.S. Navy. This arrangement continued until 1818 after which the Navy built its own hospitals. However, the deduction of 20 cents per month from the pay of Navy and Marine Corps personnel continued until June 15, 1943. (1 Stat. L. 729.)

June 29, 1870--A bill to reorganize the Marine Hospital Service and establish a central controlling office in Washington, D.C., was enacted. This act also increased the amount of hospital tax paid by seamen from 20 cents to 40 cents per month, a tax which continued until 1884. (16 Stat. L. 169.) (After the seamen's hospital tax was abolished July 1, 1884, the cost of maintaining Marine hospitals was paid out of a tonnage tax until 1906. Since then medical care for merchant seamen and other beneficiaries of the service has been supported by direct congressional appropriations.)

March 3, 1875--An act was passed authorizing the admission of seamen from the Navy and other government services to Marine hospitals on a reimbursable basis.

The Surgeon General of the Marine Hospital Service was to be appointed by the President, by and with the advice and consent of the Senate. (18 Stat. L. 377.)

April 29, 1878--The first Federal Quarantine Act "to prevent the introduction of contagious or infectious diseases into the United States" was passed. (20 Stat. L. 37.)

March 3, 1879--The National Board of Health was created by law and given quarantine powers; first organized, comprehensive Federal medical research effort. (20 Stat. L. 484.)

January 4, 1889--A bill to establish a commissioned officer corps in the Marine Hospital Service was passed. This law established a mobile corps subject to duty anywhere upon assignment, a policy that had been in effect since Dr. Woodworth assumed leadership of the Marine Hospital Service in 1871. (25 Stat. L. 639.)

March 27, 1890--Congress gave the Marine Hospital Service interstate quarantine authority. (26 Stat. L. 31.)

February 15, 1893--A new Quarantine Act was passed following outbreaks of cholera in Europe, strengthening the inadequate Quarantine Act of 1878 by giving the Federal Government the right of quarantine inspection. The act of March 3, 1879, was repealed. (27 Stat. L. 449.)

March 2, 1899--The Marine Hospital Service was directed by Congress to investigate leprosy in the United States. (30 Stat. L. 976.)

March 3, 1901--An appropriation of $35,000 was made for the Hygienic Laboratory building (first legislative mention of Hygienic Laboratory). Thus "investigations of contagious and infectious diseases and matters pertaining to public health" were given definite status in law. (31 Stat. L. 1086.)

July 1, 1902--A bill to increase the efficiency and change the name of the Marine Hospital Service to Public Health and Marine Hospital Service was enacted. The law authorized the establishment of specified administrative divisions and, for the first time, designated a bureau of the Federal Government as an agency in which public health matters could be coordinated. (32 Stat. L. 712.)

Another law, usually referred to as the Biologics Control Act, authorized the Public Health and Marine Hospital Service to regulate the transportation or sale for human use of viruses, serums, vaccines, antitoxins, and analogous products in interstate traffic or from any foreign country into the United States. (P.L. 57-244, 32 Stat. L. 728.)

August 14, 1912--Under an act, the name Public Health and Marine Hospital Service was changed to Public Health Service. The legislation broadened the PHS research program to include "diseases of man" and contributing factors such as pollution of navigable streams, and information dissemination. (37 Stat. L. 309.)

July 9, 1918--The Chamberlain-Kahn Act provided for the study of venereal diseases by the PHS. (40 Stat. L. 886.)

October 27, 1918--A PHS reserve corps was established. The 1918 influenza pandemic emphasized the need for a reserve corps to meet such emergency situations. (40 Stat. L. 1017.)

January 19, 1929--The Narcotics Control Act provided for construction of two hospitals for the care and treatment of drug addicts, and authorized creation of a Narcotics Division in the PHS Office of the Surgeon General. (P.L. 70-672, 45 Stat. L. 1085.)

April 9, 1930--A law changed the name of the Advisory Board for the Hygienic Laboratory to the National Advisory Health Council. (P.L. 71-106, 46 Stat. L. 152.)

May 26, 1930--The Ransdell Act reorganized, expanded, and redesignated the Hygienic Laboratory as the National *Institute* of Health. The act authorized $750,000 for the construction of two buildings for NIH and authorized a system of fellowships. (P.L. 71-251, 46 Stat. L. 379.)

June 14, 1930--A law authorized creation of a separate Bureau of Narcotics in the Treasury Department to control trading in narcotic drugs and their use for therapeutic purposes. Also, the legislation redesignated the PHS Narcotics Division to the Division of Mental Hygiene, giving the Surgeon General authority to investigate abuse of narcotics and the causes, treatment, and prevention of mental and nervous diseases. (P.L. 71-357, 46 Stat. L. 585.)

August 14, 1935--The Social Security Act was an event of major importance in the progress of public health in the United States. This act authorized health grants to the states on the principle that the most effective way to prevent the interstate spread of disease is to improve state and local public health programs. With this legislation, the PHS became adviser and practical assistant to state and local health services. (P.L. 74-271, 49 Stat. L. 634.)

August 5, 1937--A law established the National Cancer Institute to conduct and support research relating to the cause, diagnosis, and treatment of cancer. The law authorized the Surgeon General to make grants-in-aid for research in the field of cancer, provide fellowships, train personnel, and assist the states in their efforts toward cancer prevention and control. (P.L. 75-244, 50 Stat. L. 559.)

April 3, 1939--The Reorganization Act of 1939 transferred the PHS from the Treasury Department to the Federal Security Agency. (P.L. 76-19, 53 Stat. L. 561.)

July 1, 1944--The PHS act consolidated and revised laws pertaining to the PHS and divided the service into the Office of the Surgeon General, Bureau of Medical Services, Bureau of State Services, and the National Institute of Health. The act gave the Surgeon General broad powers to conduct and support research into the diseases and disabilities of man, authorized projects and fellowships, and made the National Cancer Institute a division of NIH. The act also empowered the Surgeon General to treat at PHS medical facilities, for purposes of study, persons not otherwise eligible for such treatment. (P.L. 78-410, 58 Stat. L. 682.) Under this provision, the Clinical Center was later established. (Under this act, the Research Grants Office, January 1, 1946; the Experimental Biology and Medicine Institute and the National Microbiological Institute, November 1, 1948; and the Division of Research Services, January 1, 1956, were established.)

July 3, 1946--The National Mental Health Act was designed to improve the mental health of U.S. citizens through research into the causes, diagnosis, and treatment of psychiatric disorders. It authorized the Surgeon General to support research, training, and assistance to state mental health

programs. (P.L. 79-487, 60 Stat. L. 421.) (The National Institute of Mental Health was established under the authority of this law on April 15, 1949.)

August 13, 1946--The Hospital Survey and Construction Act (Hill-Burton Act) authorized grants to the states for construction of hospitals and public health centers, for planning construction of additional facilities, and for surveying existing hospitals and other facilities. (P.L. 79-725, 60 Stat. L. 1040.)

July 8, 1947--Under P.L. 80-165, research construction provisions of the Appropriations Act for FY 1948 provided funds "for the acquisition of a site, and the preparation of plans, specifications, and drawings, for additional research buildings and a 600-bed clinical research hospital and necessary accessory buildings related thereto to be used in general medical research...."

June 16, 1948--The National Heart Act authorized the National Heart Institute to conduct, assist, and foster research; provide training; and assist the states in the prevention, diagnosis, and treatment of heart diseases. In addition, the act changed the name of National *Institute* of Health to National *Institutes* of Health. (P.L. 80-655, 62 Stat. L. 464.)

June 24, 1948--The National Dental Research Act authorized the National Institute of Dental Research to conduct, assist, and foster dental research; provide training; and cooperate with the states in the prevention and control of dental diseases. (P.L. 80-755, 62 Stat. L. 598.)

August 15, 1950--The Omnibus Medical Research Act authorized the Surgeon General to establish the National Institute of Neurological Diseases and Blindness, as well as additional institutes, to conduct and support research and research training relating to other diseases and groups of diseases. (P.L. 81-692, 64 Stat. L. 443.) (The National Institute of Arthritis and Metabolic Diseases and the National Institute of Neurological Diseases and Blindness were established under the authority of this act on November 22, 1950. Under this same act, the National Institute of Allergy and Infectious Diseases was established on December 29, 1955, replacing the National Microbiological Institute which was originally established November 1, 1948, under authority of section 202 of the PHS act.)

April 1, 1953--Reorganization plan #1 assigned the PHS to the new Department of Health, Education, and Welfare.

July 28, 1955--The Mental Health Study Act authorized the Surgeon General to award grants to nongovernmental organizations for partial support of a nationwide study and reevaluation of the problems of mental illness. Under this act, the Joint Committee on Mental Illness and Health was awarded grant support for 3 years. (P.L. 84-182, 69 Stat. L. 381.)

July 3, 1956--The National Health Survey Act authorized the Surgeon General to survey sickness and disabilities in the United States on a sampling basis. (P.L. 84-652, 70 Stat. L. 489.)

July 28, 1956--The Alaska Mental Health Enabling Act provided for territorial treatment facilities to eliminate the need to transport the mentally ill outside Alaska. It also authorized PHS grants to Alaska for its mental health program. (P.L. 84-830, 70 Stat. L. 709.)

July 30, 1956--The Health Research Facilities Act of 1956 (Title VII of the PHS act) authorized a PHS program of Federal matching grants to public and nonprofit institutions for the construction of health research facilities. (P.L. 84-835, 70 Stat. L. 717.)

August 2, 1956--The Health Amendments Act of 1956 authorized the Surgeon General to assist in increasing the number of adequately trained nurses and professional public health personnel. It also authorized PHS grants to support the development of improved methods of care and treatment of the mentally ill. (P.L. 84-911, 70 Stat. L. 923.)

August 3, 1956--An amendment to Title III of the PHS act, the National Library of Medicine Act, placed the Armed Forces Medical Library under the PHS, and renamed it the National Library of Medicine. (P.L. 84-941.)

June 30, 1958--The Mutual Security Act of 1958 amended P.L. 83-480, authorizing the President to enter into agreements with friendly nations to use foreign currencies accruing under title I for collection, translation, and dissemination of scientific information and to conduct research and support scientific activities overseas. (P.L. 85-477.)

July 12, 1960--Congress passed the International Health Research Act. The law authorized the Surgeon General to establish and make grants for fellowships in the United States and participating foreign countries; make grants or loans of equipment and other materials to participating foreign countries for use by public or nonprofit institutions and agencies; participate in international health meetings, conferences, and other activities; and facilitate the interchange of research scientists and experts between the United States and participating foreign countries. (P.L. 86-610, 74 Stat. L. 364.)

September 15, 1960--A law amended the PHS act to authorize grants-in-aid to universities, hospitals, laboratories, and other public and nonprofit institutions to strengthen their programs of research and research training in the sciences related to health. The act also authorized the use of funds appropriated for research or research training to be set aside by the Surgeon General in a special account for general research support grants. (P.L. 86-798, 74 Stat. L. 1053.)

October 17, 1962--An act authorized the Surgeon General to establish the National Institute of General Medical Sciences and the National Institute of Child Health and Human Development. The latter was authorized to conduct and support research and training relating to maternal health; child health; human development, in particular the special health problems of mothers and children; and the basic sciences relating to the processes of human growth and development. The former was authorized to conduct and support research in the basic medical sciences and related behavioral sciences that have significance for two or more institutes, or which are outside the general area of responsibility of any other institute. (P.L. 87-838, 76 Stat. L. 1072.) (On January 30, 1963, the NICHD and the NIGMS were established under this act.)

September 24, 1963--A law amended the Health Research Facilities Act of 1956 (Title VII to the PHS act) to allow grants for multipurpose facilities that would provide teaching space as well as essential research space. (P.L. 88-129, 77 Stat. L. 164.)

October 24, 1963--The Maternal and Child Health and Mental Retardation Planning Amendments of 1963 amended the Social Security Act of 1935 by authorizing a five-point grant program of $265 million, over a 5-year period. Major provisions designed to prevent mental retardation included increased Federal grants for maternal and child health services and crippled children's service administered by the Children's Bureau; a new 5-year program of grants to the states for health care of expectant mothers who have, or are likely to have, conditions associated with childbearing which may lead to mental retardation; funds for research to improve maternal and child health and crippled children's services; and grants to the states to assist in developing plans for comprehensive state and community programs to combat mental retardation. (P.L. 88-156, 77 Stat. L. 273.)

October 31, 1963--A companion measure to P.L. 88-156 was the Mental Retardation Facilities and Community Mental Health Centers Construction Act of 1963. This act authorized a total of $329 million over 5 years for grants to assist in the construction of mental retardation research centers and community mental health centers, and to train teachers of mentally retarded and other handicapped children. (P.L. 88-164, 77 Stat. L. 282.)

August 18, 1964--The Hospital and Medical Facilities Amendments of 1964 extended the Hospital Survey and Construction Act of 1946 (Hill-Burton Act) for 5 years with a total authorization of $1.4 billion. (P.L. 88-443, 78 Stat. L. 447.)

August 27, 1964--Graduate Public Health Training Amendments of 1964 extended the authorization for public health traineeships

and training grants to schools of public health, nursing, and engineering for 5 years, through June 30, 1969. (P.L. 88-497, 78 Stat. L. 613.)

September 19, 1964--The Appropriations Act for 1965 included $10 million for establishment of a virus-leukemia program. (P.L. 88-605.)

August 4, 1965--The Mental Retardation Facilities and Community Mental Health Centers Construction Act Amendments of 1965 provided monies through FY 1972 to help finance initial staffing of community mental health centers which were authorized in the original act; extended and increased appropriations authority for mental retardation education research and demonstration projects; and authorized increased annual funds through FY 1969 for training teachers of the handicapped young. (P.L. 89-105.)

August 9, 1965--The Health Research Facilities Amendments of 1965 extended the program for construction of health research facilities for 3 years with $280 million authorized for that period in lieu of the previous $50 million annual appropriations authorizations. (P.L. 89-115.)

August 31, 1965--A supplemental appropriations act resulting from recommendations of the President's Commission on Heart Disease, Cancer and Stroke provided an additional $20,250,000 (shared by NCI, NHI, NIGMS and NINDB) to intensify and expand support of research in the three major "killer" diseases. (P.L. 89-156.)

October 6, 1965--The Heart Disease, Cancer and Stroke Amendments of 1965 provided for establishment of regional cooperative programs in research, training, continuing education and demonstration activities in patient care among medical schools, clinical research institutions and hospitals so that the latest treatment methods for the three diseases may be more widely available to patients. Under this act, the Division of Regional Medical Programs was created February 1, 1966. (P.L. 89-239.)

October 22, 1965--The Medical Library Assistance Act was passed, authorizing NLM's extramural programs. (P.L. 89-291.)

August 3, 1968--A law authorized the designation of a national center for biomedical communications as the Lister Hill National Center for Biomedical Communications. (P.L. 90-456.)

August 16, 1968--An amendment to the PHS act authorized the secretary to establish a National Eye Institute and to rename NINDB the National Institute of Neurological Diseases. The new institute was formed from NINDB programs to conduct and support research for new treatment and cures, and training relating to blinding eye diseases and visual disorders. (P.L. 90-489.)

The Health Manpower Act of 1968 extended and expanded the following five health laws then in effect: Health Professions Educational Assistance Act of 1963, as amended; Nurse Training Act of 1964, as amended; Allied Health Professions Personnel Training Act of 1966; Health Research Facilities Act of 1956, as amended; and Public Health Service Act of 1944, as amended. The measure provided a 2-year extension, through FY 1971, of the above legislation except for the Allied Health Professions Act, extended only through FY 1970. (P.L. 90-490.)

October 24, 1968--The President signed legislation further amending the name of NIND to National Institute of Neurological Diseases and Stroke. (P.L. 90-639.)

March 12, 1970--An amendment to the PHS act extended and made coterminous through June 30, 1973, the authority to make formula grants to schools of public health, project grants for graduate training in public health, and traineeships for professional public health personnel. (P.L. 91-208, 84 Stat. 52.)

March 13, 1970--The Medical Library Assistance Extension Act of 1970 amended the PHS act to improve and extend the provisions relating to assistance to medical libraries and related instrumentalities for 3 years through June 30, 1973. (P.L. 91-212, 84 Stat. 63.)

October 30, 1970--The PHS act was amended to provide: 1) extension of research contract authority in areas of public health through June 30, 1974; 2) authorization of mission-related clinical training (as well as research training) by the NIGMS; 3) clarification of terms in the regulation of biological products; 4) clarifying and technical directives relating to appointment, compensation and functions of advisory councils and committees, and 5) extension of statutory authority for regional medical programs, comprehensive medical planning, and health services research and development. (P.L. 91-515.)

November 2, 1970--The Health Training Improvement Act of 1970 extended and amended allied health professions training authority (which expired June 30, 1970) and established eligibility of new health professions educational assistance schools for "start-up" grants. (P.L. 91-519.)

December 24, 1970--The Congress enacted the Family Planning Services and Population Research Act of 1970 to expand, improve and better coordinate family planning services and population research activities of the Federal Government. (P.L. 91-572.)

May 22, 1971--Congress passed into law the Supplemental Appropriations Bill, which included $100 million for cancer research. This appropriation was made in response to the President's State of the Union address, in which he called for "an intensive campaign to find a cure for cancer." The appropriation includes authority under grants and contracts, as well as direct construction authority for NCI. (P.L. 92-18.)

July 9, 1971--A law amended the Public Health Service Act to provide for extension of student loan scholarship programs for up to four fiscal years. (P.L. 92-52.)

November 18, 1971--The President signed the Comprehensive Health Manpower Training Act of 1971 to provide increased manpower in the health professions, and the Nurse Training Act of 1971 to provide training for increased numbers of nurses. (P.L. 92-157, P.L. 92-158.)

December 23, 1971--The National Cancer Act of 1971 enlarged the authorities of NCI and NIH in order to advance the national effort against cancer. The authority of the director, NCI, was expanded, a National Cancer Advisory Board was established, and appropriations in excess of $400 million were authorized for 1972, with further increases in subsequent years. (P.L. 92-218.)

May 16, 1972--The National Sickle Cell Anemia Control Act of 1972 became law and established a national program for diagnosis and treatment of, and counseling and research in, sickle cell disease. (P.L. 92-294.)

May 19, 1972--The need for further support of research and training in the field of digestive diseases was emphasized by adding a new section 434 to the PHS act and renaming NIAMD the National Institute of Arthritis, Metabolism, and Digestive Diseases. (P.L. 92-305.)

August 29, 1972--The National Cooley's Anemia Control Act authorized over $9 million for 3 years for research in the diagnosis and treatment of Cooley's anemia, and for counseling and public information programs. (P.L. 92-414.)

September 19, 1972--The National Heart, Blood Vessel, Lung, and Blood Act expanded the authorities of the National Heart and Lung Institute to augment the national effort against heart, lung, and blood diseases. Appropriations of $375 million for 1973 were authorized with further increases in subsequent years. (P.L. 92-423.)

October 25, 1972--The National Advisory Commission on Multiple Sclerosis Act established a commission charged to determine the most productive avenue of researching possible causes and cures of MS, and make specific recommendations for the maximum utilization of national resources directed toward MS. (P.L. 92-563.)

June 18, 1973--The Health Programs Extension Act of 1973 extended the medical library assistance programs of NLM (with the exception of the construction program) for 1 year. Population research and family planning activities were also extended through FY 1974, along with other Federal health programs. (P.L. 93-45.)

November 16, 1973--The Emergency Medical Services System Act of 1973 amended the PHS act to provide assistance and encouragement for the development of comprehensive area emergency medical

services systems, including grants and contracts for the support of research in emergency medical techniques, methods, devices, and delivery. (P.L. 93-154.)

April 22, 1974--The Sudden Infant Death Syndrome Act of 1974 amended the PHS act to authorize specific and general research on the sudden infant death syndrome through the NICHD. The collection, analysis, and public dissemination of information and data and the support of counseling programs were also authorized. The act did not authorize specific funds for research, but did authorize appropriations of $9 million over a 3-year period for the other programs. (P.L. 93-270.)

May 31, 1974--The Research on Aging Act of 1974 established a National Institute on Aging. The act authorized the NIA to conduct and support biomedical, social, and behavioral research and training related to the aging process and the diseases and other special problems and needs of the aged. (P.L. 93-296.)

June 22, 1974--The Energy Supply and Coordination Act directed the secretary through NIEHS to study the effects of chronic exposure to sulfur oxides, and authorized $3.5 million for that purpose. (P.L. 93-319.)

July 12, 1974--The National Research Act of 1974 amended the PHS act by repealing existing research training and fellowship authorities and consolidating such authorities in the national research service awards authority. The NRSA's (both individual and institutional grants) are restricted on the basis of subject area shortages and would involve service obligations and payback provisions. The act established a temporary National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research within the department to make a comprehensive investigation of the ethical principles involved in biomedical and behavioral research (including psychosurgery and living fetus research), and to develop ethical guidelines for conducting such research. Also, a permanent National Advisory Council for the Protection of Subjects of Biomedical and Behavioral Research was to be established. (P.L. 93-348.)

July 23, 1974--The National Cancer Act Amendments of 1974 authorized $2.565 billion over a 3-year period to extend and improve the National Cancer Program as well as $210.5 million over 3 years for cancer control programs. The act also: 1) established the President's Biomedical Research Panel to make a comprehensive investigation of Federal biomedical and behavioral research; 2) extended indefinitely the research contract authority of section 301(h) of the PHS act; 3) provided that the director, NIH, shall be appointed by the President by and with the advice of the Senate; and 4) required peer review of NIH and ADAMHA grant applications and contract projects. (P.L. 93-352.)

The Health Services Research, Health Statistics, and Medical Libraries Act of 1974 extended and amended NLM program authorities ($37.5 million over a 2-year period). The act also extended the FIC's authority to engage in international cooperative efforts in health. (P.L. 93-353.)

The National Diabetes Mellitus Research and Education Act provided for regional research and training centers ($40 million authorized over a 3-year period), a long-range plan prepared by a National Commission on Diabetes, expanded research and training programs, a Diabetes Mellitus Coordinating Committee, and an associate director for diabetes in the National Institute of Arthritis, Metabolism, and Digestive Diseases. (P.L. 93-354.)

October 29, 1974--The Federal Fire Prevention and Control Act authorized $5 million and $8 million for fiscal years 1975-76 for establishment of 25 research and treatment centers, 25 burn units, and 90 burn programs by NIH. (P.L. 93-498.)

January 4, 1975--The National Arthritis Act established a National Commission on Arthritis and Related Musculoskeletal Diseases, authorized $2 million to develop a long-range plan involving research, training, services and data systems; established an associate director for arthritis in NIAMDD; and provided 3-year authorizations for arthritis screening, detection, prevention, and referral projects and for arthritis research and demonstration centers. (P.L. 93-640.)

July 29, 1975--A law extended and amended authorities of Title X relating to family planning and population research and made Title X sole authority for all departmental extramural, collaborative, and intramural research in "biomedical, contraceptive development, behavioral, and program implementation fields related to family planning and population;" and created two temporary national commissions for the control of epilepsy and Huntington's disease. (P.L. 94-63.)

April 22, 1976--The Health Research and Health Services Amendments 1) extended authorization through FY 1977 and amended provisions governing the programs of the National Heart and Lung Institute, placed increased emphasis on blood-related research, and changed the institute's name to the National Heart, Lung, and Blood Institute; 2) mandated studies by the President's Biomedical Research Panel and the National Commission for the Protection of Human Subjects of the implications of public disclosure of information contained in grant applications and contract proposals; 3) authorized broad-based genetic diseases research under section 301 of the PHS act, and provided for programs of counseling, testing, and information dissemination about genetically transmitted diseases; and 4) extended authorization through FY 1977 for national research service awards for NIH and ADAMHA. The act prohibited consideration of political affiliation in making appointments to health advisory committees. (P.L. 94-278.)

October 19, 1976--The 1976 Arthritis, Diabetes, and Digestive Diseases Amendments 1) provided for an arthritis data system; 2) emphasized public information and encouragement of proper treatment for arthritis; 3) established a National Arthritis Advisory Board; 4) provided for a National Diabetes Board; and 5) established a National Commission on Digestive Diseases to develop a long-range plan for research. (P.L. 94-562.)

October 21, 1976--The Emergency Medical Services Amendments of 1976 extended the National Commission on Arthritis; extended the Commission for the Protection of Human Subjects of Biomedical and Behavioral Research; and authorized research and demonstration programs on burn injuries under Title XII of the PHS act. (P.L. 94-573.)

August 1, 1977--Health Planning and Health Services Research and Statistics Extension, Biomedical Research Extension, and Health Services Extension Acts of 1977 continued the following programs through September 30, 1978: the Medical Library Assistance Program; cancer research and control programs; heart, blood vessel, lung and blood disease research, prevention and control programs; national research service awards; population research and voluntary family planning programs; and sudden infant death syndrome information and counseling programs. It also extended various health service programs. (P.L. 95-83.)

August 7, 1977--The Clean Air Act Amendments established a coordinating committee to review and comment on plans, execution, and results of research relating to the stratosphere. NCI and NIEHS are members. It also established a Task Force on Environmental Cancer and Heart and Lung Disease, with NCI, NHLBI, and NIEHS among the members. (P.L. 95-95.)

September 29, 1977--The Food and Agriculture Act of 1977 designated the Department of Agriculture as the lead agency of the Federal Government for agricultural research (except with respect to the biomedical aspects of human nutrition concerned with diagnosis or treatment of disease). The act also required establishment of procedures for coordinating nutrition research in areas of mutual interest between DHEW and Department of Agriculture. (P.L. 95-113.)

November 9, 1977--The Federal Mine Safety and Health Amendments of 1977 gave the HEW secretary authority to appoint an advisory committee on coal or other mine health research. One member of this

committee is to be the director of the NIH or delegate. (P.L. 95-164.)

November 23, 1977--The Saccharin Study and Labeling Act extended the Commission for the Protection of Human Subjects until November 1, 1978. (P.L. 95-203.)

November 9, 1978--The Family Planning, Population Research and SIDS Amendments authorized a 3-year extension for the aforementioned programs through FY 1981. This was the only authority for population research programs in NICHD, the Center for Population Research. (P.L. 95-613.)

Amendments to the Community Mental Health Centers Act authorized a 3-year extension for NLM programs, and NRSA's expiring September 30, 1981, and a 2-year extension for each of the following: Community Mental Health Centers, NHLBI, and NCI. This legislation also authorized the secretary, HEW, to: 1) conduct studies and tests of substances for carcinogenicity, teratogenicity, mutagenicity and other harmful biological effects; 2) establish and conduct a comprehensive research program on the biological effects of low-level radiation; 3) conduct and support research and studies on human nutrition; and 4) publish an annual report which lists all substances known to be carcinogenic and to which a significant number of Americans are exposed. (P.L. 95-622.)

Other important provisions of this act included the authority given to the director of NIH to appoint 200 experts and consultants for the use of NIH components other than NCI and NHLBI and the establishment of the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research.

The Health Services Research, Health Statistics, and Health Care Technology Act of 1978 (P.L. 95-623) established in the Office of the Assistant Secretary for Health, the National Center for Health Care Technology, and reauthorized for 3 years the National Center for Health Statistics and the National Center for Health Services Research.

The legislation also established the National Council on Health Care Technology on which the director, NIH, serves as an ex officio member. The director, NIH, is required annually to submit to the center a listing of all technologies under development which appear likely to be used in the practice of medicine.

NLM is required to disseminate, publish, and make available all standards, norms, and criteria developed by the council concerning the use of particular health care technologies. (P.L. 95-623.)

October 17, 1979--The Department of Education Organization Act established a Department of Education and renamed the DHEW the Department of Health and Human Services. (P.L. 96-88.)

December 12, 1979--The Emergency Medical Services Systems Amendments and Sudden Infant Death Syndrome Amendments of 1979 required the NICHD to assure that "adequate amounts" of its appropriated dollars are used for research into identification of infants at risk of SIDS and for prevention of SIDS. In addition, the NICHD is required to provide information on expenditure of funds for these purposes, the number of SIDS grant applications received and approved, the latest research findings on SIDS, and estimate of needs for funds in succeeding years. (P.L. 96-142.)

December 29, 1979--Public Law 96-167 extended the tax exemption for NRSA's for 1 year.

Public Law 96-171 required that the NIH director, in consultation with the secretary of transportation, conduct a study to determine the effect of aging on the ability of individuals to perform the duties of pilots. The report on the study was to be submitted to Congress within 1 year after enactment.

September 26, 1980--P.L. 96-359 requires the HHS secretary to conduct a study to determine the long-term effects of hypochloremic metabolic ankylosis resulting from chloride-deficient formulas. The responsibility for the study was assigned to NICHD.

December 12, 1980--P.L. 96-517 revised the patent and trademark laws and in particular awarded title to the patent rights for inventions made with Federal assistance to nonprofit organizations and small businesses.

The Clinical Center was redesignated as the Warren Grant Magnuson Clinical Center of NIH. (P.L. 96-518.)

December 17, 1980--P.L. 96-538 reauthorized for 2 years programs for NHLBI and NCI; changed the name of the NIAMDD to the National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases, extensively revised its authorities, and reauthorized its programs for 3 years; and required the NINCDS to conduct a study and submit a report on spinal cord regeneration and other neurological research.

P.L. 96-541 extended for 1 year the tax exemption on NRSA's.

August 13, 1981--P.L. 97-35, the Omnibus Budget Reconciliation Act of 1981, reauthorized NRSA's for 2 years through FY 1983, reauthorized the Medical Libraries Assistance program for 1 year, and repealed the prohibition in Title X against using other PHS authority to fund population research, thus eliminating the need for reauthorizations for this program located in the NICHD.

July 22, 1982--The Small Business Innovation Development Act of 1982 requires that each Federal agency with an annual research and development budget exceeding $100 million set aside a certain portion of its extramural R&D budget for a Small Business Innovation Research (SBIR) program as follows: 0.2 percent in FY 1983; 0.6 percent in FY 1984; 1.0 percent in FY 1985; and 1.25 percent in FY 1986 and all subsequent years. (P.L. 97-219.)

September 3, 1982--The Tax Equity and Fiscal Responsibility Act of 1982 included among its provisions an extension of the partial exclusion of NRSA's from taxable gross income. This extension will expire at the end of calendar year 1983; during this time, the Treasury Department will complete a study of the taxability of NRSA's and other government educational grants which, like NRSA's, have payback or service requirements. (P.L. 97-248.)

January 4, 1983--The Orphan Drug Act made changes in the law to encourage development and marketing of orphan drugs (drugs for rare diseases or conditions which are not economically feasible for private industry to develop and market). The act included a requirement to prepare radioepidemiological tables relating radiation-related cancer to specific radiation doses, and a report on the risks of thyroid cancer associated with doses of I_{131}. These responsibilities were assigned to NIH and NCI respectively. The act further provided that NHLBI help develop and support not less than 10 comprehensive sickle cell centers. (P.L. 97-414.)

July 30, 1983--The supplemental appropriations for FY 1983 provided funds for PHS AIDS activities, $9.375 million of which was earmarked for NIH. This marked the first time the Congress directly appropriated money for AIDS research for NIH. The supplemental also provided $5.9 million for NLM and development of a Biomedical Information Communication Center in Portland, Oreg. (P.L. 98-63.).

October 1 and **November 17, 1983**--Continuing resolutions supported unauthorized NIH programs including NRSA and Medical Library Assistance. (P.L. 98-107 and P.L. 98-151.)

May 24, 1984--P.L. 98-297 designated the convent and surrounding land as the Mary Woodard Lasker Center for Health Research and Education.

October 12 and **November 8, 1984**--Appropriations legislation reauthorized NRSA's, provided construction funds for NIH, and medical library funding. (P.L. 98-473, P.L. 98-619.)

October 19, 1984--The National Organ Transplant Act authorized the secretary to establish a Task Force on Organ Procurement and Transplantation to examine relevant issues and report to the Congress within 12 months. Its membership included the director, NIH, ex officio. OMAR will sponsor the required conference on bone marrow transplantation. (P.L. 98-507.)

October 24, 1984--The Veterans' Dioxin and Radiation Exposure Compensation Standards Act required the director, NIH, to conduct a study of devices and techniques for determin-

ing previous radiation exposure and submit a report; to enter into an interagency agreement with the VA administrator to identify agencies capable of furnishing such services; and to provide an independent expert who could prepare radiation dose estimates for use by VA administrator in adjudicating claims. (P.L. 98-542.)

October 30, 1984--The Health Promotion and Disease Prevention Amendments of 1984 amended the PHS act to extend provisions relating to health promotion and disease prevention and to establish centers for research and demonstration in those areas. It required that the director, NIH, be consulted as to procedures for peer review of applications; that NCHSR cooperate with NIH in its responsibilities pertaining to health care technologies; and that the director, NIH, serve on the newly established National Advisory Council on Health Care Technology Assessment. (P.L. 98-551.)

The Human Services Reauthorization Act, Title V, ordered the secretary, through NCI, to establish or support at least one facility for cancer screening and research in St. George, Utah, to be affiliated with a health science center and accessible to most residents of the areas that received greatest fallout from Nevada nuclear tests. (P.L. 98-558.)

August 15, 1985--The Orphan Drug Act was amended, establishing a 20-member National Commission on Orphan Diseases, to be appointed by the secretary (including NIH representative), to assess the activities of NIH and other entities in connection with research and dissemination of knowledge related to rare diseases. NIH was required to allocate to the commission $1 million from its FY 1986 appropriation. (P.L. 99-91.)

November 20, 1985--The Health Research Extension Act of 1985 reauthorized NIH programs for 3 years; established the National Institute ofArthritis and Musculoskeletal and Skin Diseases, renaming the remaining component the National Institute of Diabetes and Digestive and Kidney Diseases; created a new National Center for Nursing Research; established positions of associate director for prevention in OD, NCI, NHLBI, and NICHD; and required the development of guidelines for the care and use of laboratory animals. Additional provisions included establishment of committees to develop a plan for research into methods that reduce animal use or animal pain, to study research on lupus erythematosus, to study the NRSA program, to plan and develop Federal initiatives in spinal cord injury research, to study personnel for health needs of the elderly through the year 2020, to review research activities in learning disabilities, and to review the research programs of NIDDK. The act also established NIH and all of its ICD's in law and consolidated and made uniform many authorities and responsibilities of institute directors and advisory councils. (P.L. 99-158.)

December 12, 1985--Under the Balanced Budget and Emergency Deficit Control Act of 1985 (Gramm-Rudman-Hollings), aimed at reducing the Federal deficit to zero within 5 years, starting in FY 1986, budget authority was reduced in accordance with the deficit targets. For NIH this reduction amounted to $236 million. The revised total NIH appropriation after "sequestration" became $5.3 billion, 4.3 percent below the original FY 1986 appropriation. The mandated across-the-board reduction was applied again to the total amount appropriated to each NIH institute, to each research mechanism, and to each identified program, project, or activity. (P.L. 99-177.)

In the FY 1986 Labor-HHS-Education Appropriation bill, the number of new and competing renewal research project grants to be supported by NIH (6,100) was specified in law for the first time. The act, which included $5.498 billion for NIH, provided that $4.5 million of this amount be transferred to the departmental management account for construction of the Mary Babb Randolph Cancer Center in West Virginia and that $70 million for AIDS research be added to the account of the Office of the Director. (P.L . 99-178.)

December 23, 1985--The Food Security Act, title XVII, subtitle F, amended the Animal Welfare Act, requiring the secretary of agriculture to promulgate standards including exercise of dogs and consideration of the psychological well-being of primates, minimization of pain and distress, use of anesthetics, and consideration of alternatives; formation of an institutional animal committee at each research facility; and provision of annual training for those involved in animal care and treatment. An information service was established at the National Agricultural Library, in cooperation with NLM. Title XIV, subtitle B, required an assessment of existing scientific literature relating to dietary cholesterol and calcium to be conducted by the secretaries of agriculture and HHS. (P.L. 99-198.)

December 28, 1985--P.L. 99-231 designated 1986 as the "Sesquicentennial Year of the National Library of Medicine."

July 2, 1986--The Urgent Supplemental Appropriations Act provided an additional $6 million for NCI cancer research and demonstration centers and specified that funds for the Clinical Center should be available for payment of nurses at rates of pay authorized for VA nurses. (P.L. 99-349.)

October 6, 1986--P.L. 99-443 amended the Small Business Act to extend by 5 years the Small Business Innovation Research Program.

October 16, 1986--P.L. 99-489 designated the period from October 1, 1986, through September 30, 1987, as "National Institutes of Health Centennial Year" and requested the President to issue a proclamation calling upon the people of the United States to observe the year with appropriate ceremonies and activities.

October 18, 1986--P.L. 99-500 and P.L. 99-591 (October 31, corrected version), making continuing appropriations for FY 1987, included $6.18 billion for NIH, a requirement to support 6,200 research project grants, funding for 10,700 research trainees and 559 centers; and $247.7 million in AIDS money for components.

October 20, 1986--The Federal Technology Transfer Act amended the Stevenson-Wydler Technology Innovation Act of 1980, authorizing directors of government-operated Federal laboratories to enter into collaborative R&D agreements with other government agencies, universities, and private organizations; established a Federal Laboratory Consortium in the National Bureau of Standards; and mandated that royalties received by a Federal agency be shared with the inventor. (P.L. 99-502.)

November 14, 1986--Title IX, the Alzheimer's Disease and Related Dementias Services Research Act, of P.L. 99-660 established an interagency council and an advisory panel on Alzheimer's disease (AD). It authorized the director, NIA, to make awards for distinguished research on AD, to plan for and conduct research, to establish an AD clearinghouse, to make a grant to or enter into a contract with a national organization representing Alzheimer's patients, to establish an information system and national toll-free telephone line, and to provide information to caregivers of Alzheimer's patients and to safety and transportation personnel. Title III--Vaccine Compensation--named the director, NIH, as an ex officio member of the newly established Advisory Commission on Childhood Vaccines.

July 11, 1987--The FY 1987 Supplemental Appropriations bill, P.L. 100-71, allocated funds to NIA for clinical trials, to NCNR and HRSA for studies related to the nurse shortage and nurse retention, and to OD/NIH for costs associated with pay raises and the new Federal Employees Retirement System.

September 29, 1987--The Balanced Budget and Emergency Deficit Control Reaffirmation Act of 1987 ("Gramm-Rudman-Hollings II") adjusted the original deficit target reduction in FY 1988 appropriations, including Labor-HHS-Education. (P.L. 100-119.)

October 8, 1987--P.L. 100-126 designated October 1, 1987, as "National Medical Research Day," acknowledging 100 years of contributions by NIH and other federally supported research institutions to improving the health and well-being of Americans and all humankind.

November 29, 1987--The Older Americans Act Amendments, Title III--Alzheimer's

Disease Research, authorized the director, NIA, to provide for conduct of clinical trials on therapeutic agents for Alzheimer's disease recommended for further analysis by NIA and FDA. It also authorized the President to call a White House Conference on Aging in 1991. (P.L. 100-175.)

December 22, 1987--P.L. 100-202, making further continuing appropriations for the fiscal year ending September 30, 1988, provided $6.667 billion to NIH, including $448 million to be allocated among the institutes for AIDS. It also restricted forward or multiyear funding, required expeditious testing of experimental drugs for AIDS, and included $3.8 million for a National Center on Biotechnology Information within NLM.

September 20, 1988--The Labor-HHS-Education Appropriations Act, 1989, provided $7,152,207,000 for NIH (which included a 1.2 percent across-the-board reduction and a $6.8 million reduction for procurement reform). Of the amount appropriated for NINCDS, up to $96,100,000 was to go to the new National Institute on Deafness and Other Communication Disorders, following enactment of authorizing legislation. The pay rate for NIH nurses and allied health specialists having direct patient care responsibilities was equated to that of nurses at the Veterans Administration. Fifteen million dollars was appropriated to develop specifications and design for a consolidated office building at NIH, $14 million for the new Building 49, and $5 million for renovation of AIDS facilities. In addition, a biotechnology training program was established, as well as human genome and biotechnology panels.

Funds were authorized to support no less than 13,252 FTEs, including an additional 200 for AIDS and 150 for non-AIDS. Funding was also authorized for new magnetic resonance imaging equipment at the cardiac energetic laboratory and for a National Bone Marrow Registry at NHLBI; $8.7 million was earmarked for AIDS clinical trials. Building 31 was renamed the Claude Denson Pepper Building. (P.L. 100-436.)

September 22, 1988--The Treasury, Postal Service and General Government Appropriations Act, 1989, provided that no Federal agency could receive funds appropriated for FY 1989 unless it had in place a written policy ensuring that its workplaces were free from illegal use, possession, or distribution of controlled substances. This restriction also applied to grant recipients, contractors, and parties to other agreements. (Subsequent legislation required implementation of this law in January 1989.) (P.L . 100-440.)

September 29, 1988--The National Defense Authorization Act, FY 1989, provided a special pay retention bonus for medical officers below grade O-7 who met certain criteria. Although officers of the commissioned corps were not specifically mentioned, 42 U.S.C. 210(a) states that they shall receive special pay received by commissioned medical and dental officers of the Armed Forces. (P.L. 100-456.)

October 4, 1988--P.L. 100-471 amended the PHS act to authorize the secretary, HHS, to make grants to the states to provide drugs determined to prolong the life of individuals suffering from AIDS; $15 million was authorized to be appropriated through March 31, 1989. (Funds appropriated for FY 1989 were transferred from NIH and other PHS agencies to pay for this program, according to transfer authority contained in P.L. 100-436.)

October 28, 1988--The National Deafness and Other Communication Disorders Act of 1988 established that institute at NIH and renamed NINCDS the National Institute of Neurological Disorders and Stroke. The legislation included a program, a data system and information clearinghouse, centers, and an advisory board, as well as a Deafness and Other Communication Disorders Interagency Coordinating Committee, to be chaired by the director of NIH or designee. (P.L. 100-553.)

November 4, 1988--Title I of the Health Omnibus Programs Extension of 1988 (HOPE), the National Institute on Deafness and Other Communication Disorders and Health Research Extension Act of 1988, established the NIDCD and reauthorized expiring programs of NIH for 2 years. Since the new institute had already been established by P.L. 100-553, the provision in this bill is not valid. (P.L. 100-607)

A National Center for Biotechnology Information was established in the National Library of Medicine; the provision for VA pay for nurses and allied health professionals was reiterated; NCI, NHLBI, and NRSA programs were reauthorized; responsibility for the primary care training program was shifted to HRSA; the Interagency Technical Committee was abolished; the Alzheimer's disease provisions of P.L. 99-660 were shifted to the NIA section of the PHS act; the moratorium on fetal research was extended through November 4, 1990; funds were appropriated for the Biomedical Ethics Advisory Board and a report specified; the secretary was directed to consult with the director, NIH, on establishment of a National Commission on Sleep Disorders, which would include among the ex officio members the directors of NINCDS, NHLBI, NIMH, NIA, and NICHD, with a report and a plan required. Finally, the bill extended confidentiality provisions to subjects of all biomedical, behavioral, clinical, or other research, including research on mental health.

Title II, "Programs with Respect to Acquired Immune Deficiency Syndrome," laid the foundation for a Federal policy on AIDS. In addition to provisions for AIDS research, the bill included provisions for information dissemination, education, prevention, anonymous testing, and establishment of a National Commission on AIDS. The review process for AIDS-related grants was expedited, provision was made for priority requests for personnel and administrative support, a clinical research review committee was established within NIAID, the AIDS outpatient capacity at the Clinical Center was doubled, community-based clinical trials were mandated, awards for international clinical research were authorized, research centers were supported, and information services were expanded. An Office of AIDS Research was established within OD. Title VI, the Health Professions Reauthorization Act of 1988, established a loan repayment program for scientists who agree to conduct AIDS research while employed at NIH. (P.L. 100-607.)

November 21, 1989--Departments of Labor, Health and Human Services, and Education, and Related Agencies Appropriations Act, 1990, provided for the purchase of an advanced design supercomputer and named four NIH buildings for members of Congress. (P. L. 101-166)

November 29, 1989--An act to provide for the construction of biomedical facilities in order to ensure a continued supply of specialized strains of mice essential to biomedical research in the United States, and for other purposes, provided authority to make construction grants for this purpose. (P.L. 100-190)

August 18, 1990--Ryan White Comprehensive AIDS Resources Emergency Act of 1990, authorized NIH to make demonstration grants to community health centers and other entities providing primary health care and servicing a significant number of pediatric patients and pregnant women with HIV disease. Awardees were to provide clinical data to NIH for evaluation. (P.L. 101-381)

November 5, 1990--Omnibus Budget Reconciliation Act of Response, Compensation, and Liability Act of 1980 (under which NIEHS operates some programs) and called on the secretary, with NCI, to review periodically the appropriate frequency for performing screening mammography.

Treasury, Postal Service and General Government Appropriations Act, 1991, established the PHS senior biomedical research service. (P.L. 101-509)

Departments of Labor, Health and Human Services, and Education, and Related Agencies Appropriations Act, 1991, provided for the first time, a 1 percent NIH director's transfer authority for high-priority activities and capped the NIH contribution for salaries for individuals receiving extramural funding. (P.L. 101-517)

November 15, 1990--Clean Air Act Amendments of 1990, required NIEHS to conduct a study of mercury exposure; to be available, with NCI, for membership on a panel for the Mickey Leland Urban Air Toxics Research

Center and an interagency task force on air pollution; and authorized an NIEHS program of basic research on human health risks from air pollutants. (P.L. 101-549)

Home Health Care and Alzheimer's Disease Amendments of 1990, broadened the authority for Alzheimer's disease research centers and authorized Claude D. Pepper Older Americans Independence Centers grants. (P.L. 101-557)

November 16, 1990--The NIH Amendments of 1990, had two purposes: it authorized a nonprofit organization the National Foundation for Biomedical Research (membership amended by P.L. 102-170) and created NICHD's National Center for Medical Rehabilitation Research. (P.L. 101-613)

Hazardous Materials Transportation Uniform Safety Act of 1990, authorized NIEHS to provide grants for the training and education of workers who are or may be engaged in activities related to hazardous waste removal, containment or emergency response. (P.L. 101-615)

Transplant Amendments of 1990, reauthorized and amended the PHS act as it concerns the National Bone Marrow Donor Registry in the NHLBI and called for the establishment of national standards and procedures. (P.L. 101-616)

August 14, 1991--Terry Beirn Community Based AIDS Research Initiative Act of 1991, authorized this initiative in the PHS act and NIAID. (P.L. 102-96)

November 26, 1991--Departments of Labor, Health and Human Services, and Education, and Related Agencies Appropriations Act, 1992, established NCI's Matsunaga-Conte Prostate Cancer Research Center, a women's health study, and provided authority to transfer funds to emergency activities. (P.L. 102-170)

December 9, 1991--The High Performance Computing Act of 1991, authorized Federal agencies such as NIH to allow recipients of research grant funds to pay for computer networking expenses. (P.L. 102-194)

February 4, 1992--The American Technology Preeminence Act of 1991 gave authority to the directors of Federal laboratories (NIH) to give research equipment that is excess to the needs of the laboratory to an educational institution or nonprofit organization for the conduct of technical and scientific education and research activities (P.L. 102-245)

July 10, 1992--The Alcohol, Drug Abuse, and Mental Health (ADAMHA) Reorganization Act, amended by the PHS act to provide for the incorporation of the three ADAMHA research institutes--NIMH, NIAAA, and NIDA--into the NIH as of October 1, 1992. A new PHS act section 409 was added and defined "health services research" as research endeavors that study the impact of organization, financing, and management of health services of the quality, cost, access to and outcomes of care. This is an entirely new programmatic undertaking for NIH and these three new institutes. Of particular interest are provisions that authorize a bypass budget for these three institutes for FY 1994 and 1995. (P.L. 102-321)

October 13, 1992--The DES Education and Research Amendments of 1992, require the director, NIH, to establish a program for the conduct and support of research and training, dissemination of health information, and other programs with respect to the diagnosis and treatment of conditions associated with exposure to DES. (P.L. 102-409)

The Agency for Health Care Policy and Research Reauthorization Act of 1992, requires that the NLM establish an information center on health service research, and on selected technology assessments and clinical practice guidelines produced by AHCPR and other public and private sources. The AHCPR administrator, in consultation with the NLM director, is required to develop and publish criteria for the inclusion of practice guidelines and technology assessments in the information center database. (P.L. 102-410)

October 24, 1992--The Cancer Registries Act requires the establishment of a national program of cancer registries, with the overall goal being the assurance of minimal standards for quality and completeness of (cancer) case information. Provisions also require the DHHS secretary, acting through the NCI director, to conduct a study for the purpose of determining the factors contributing to the fact that breast cancer mortality rates in 9 states and the District of Columbia are elevated compared to rates in the other 43 states. (P.L. 102-515)

The Energy Policy Act of 1992 authorizes electric and magnetic fields research and public information activities by the NIEHS director. (P.L. 102-486)

October 26, 1992--The Preventive Health Amendments of 1992 provide authorities regarding the coordination of Federal programs related to preventable cases of infertility arising as a result of sexually transmitted diseases; also delineates coordination between the director, CDC, and director, NIH. (P.L. 102-531)

October 28, 1992--The Small Business Innovation Research and Development and Enhancement Act of 1992 reauthorizes the SBIR program through September 30, 2000, and increases set aside percentages for each Federal agency with an extramural budget for research and development in excess of $100 million in FY 1992 (1.25 percent) upward to 2.5 percent by 1997 and onward. Legislation also requires enhancement of agency outreach efforts to increase participation of women-owned and socially and economically disadvantaged small business concerns, and tracking of awards to document their participation in the program. (P.L. 102-564)

The Housing and Community Development Act of 1992 requires the secretary, HHS, acting through the director, CDC, and director, NIEHS, to jointly conduct a study of the sources of lead exposure in children who have elevated blood lead levels (or other indicators of elevated lead body burden) as defined by the director, CDC. (P.L. 102-550)

November 4, 1992--The National Aeronautics and Space Administration (NASA) Authorization Act includes provisions offered as an amendment requiring NIH and NASA to jointly establish a working group, with equal representation from NASA and NIH, to coordinate biomedical research activities in areas where microgravity environment may contribute to significant progress in the understanding and treatment of diseases and other medical conditions; establishment of a joint program of biomedical research grants in the above described areas, where such research requires access to a microgravity environment, and annual issuance of joint research opportunity announcements; creation of a joint program of graduate research fellowships in biomedical research; and establishment and submission of a plan for the "conduct of joint biomedical research activities by the republics of the former Soviet Union and the United States." (P.L. 102-588)

June 10, 1993--The NIH Revitalization Act of 1993 reauthorized certain expiring authorities of the NIH; mandated establishment of the Office of Research Integrity in DHHS; lifted the moratorium on human fetal tissue transplantation research; mandated inclusion of women and minorities in clinical research protocols; created in statute the Office of Alternative Medicine, the Office of Research on Women's Health, the Office of Research on Minority Health, the Office of Biobehavioral and Social Sciences Research, and the National Center for Human Genome Research; mandated establishment of an intramural laboratory and clinical research program on obstetrics and gynecology within NICHD and the National Center on Sleep Disorders Research in NHLBI; codified in statute the establishment of the Office of AIDS Research, and strengthened and expanded its authorities, including authorizing OAR receipt of all appropriated AIDS funds for distribution to the ICDs; authorized the establishment of an NIH director's discretionary fund; provided the director, NIH, with extramural construction authority; required from extramural construction funds a $5 million set aside for Centers of Excellence; mandated establishment of the IDeA program; required the NCI to conduct the Long Island breast cancer study; authorized establishment of scholarship and loan repayment programs for individuals from disadvantaged backgrounds; changed the designation from center to institute for NINR and from division to center for the Division of Blood Resources, NHLBI; and provided other new NIH authorities and directives.

(P.L. 103-43)

August 3, 1993--The Government Performance and Results Act of 1993 seeks to curb fraud, wast and mismanagement in the operation of the Federal Government by establishing performance standards. (P.L. 103-62)

December 14, 1993--The Preventive Health Amendments of 1993 required the director, NIAID, to conduct or support research and research training regarding the cause, early detection, prevention and treatment of tuberculosis, and authorized to be appropriated $50 million for FY 1994 and such sums as necessary for FYs 1995-98. (P.L. 103-183)

September 30, 1994--The Department of Labor, HHS, and Education Appropriations Act , 1995, provided for the first time a consolidated appropriation for NIH AIDS research to the Office of AIDS Research. (P.L. 103-333)

October 25, 1994--The Dietary Supplement Health and Education Act of 1993 mandated establihsment of an Office of Dietary Supplements within NIH to conduct and coordinate NIH research relating to dietary supplements and the extent to which their use reduces the risk of certain diseases. (P.L. 103-417)

May 22, 1995--The Paperwork Reduction Act of 1995 amends the U.S. Code to reduce by 5 percent the Federal paperwork burdens imposed on individuals, small businesses, state and local governments, education and nonprofit institutions and Federal contractors; also had the effect of establishing in statute the NIH Office of Information Resources Management. (P.L. 104-13)

December 21, 1995—The Federal Reports Elimination and Sunset Act of 1995 provides for improvement of the efficiency of agency operations by reducing staff time and resources spent on producing "unnecessary" reports to Congress. (P.L. 104-66)

November 1, 1995--The Biotechnology Process Patents Protection Act of 1995 strengthens patent protection and clarifies the circumstances under which a patent using biotechnological processes can be issued; allows U.S. researchers to enforce their patents claiming a certain starting material against the unfair importation of products made overseas using such material; and stops international theft of intellectual property; and makes U.S. patent law consistent with that of the Europeans and the Japanese. (P.L. 104-41)

January 26, 1996--The Balanced Budget Downpayment Act I, a continuing resolution, contained an amendment prohibiting the use of NIH funds for human embryo research; and cited NIH's FY 1996 funding in P.L. 104-91, such that the prohibition would continue for the duration of the FY 1996 funding year. (P.L. 104-99)

March 7, 1996--The National Technolgy Transfer and Advancement act of 1995 amended the Stevenson-Wydler Technology Innovation Act of 1980 with respect to reinvention made under Cooperative Research and Development Agreements; addressed the assignment of intellectual property rights and the use and deregulation of royalty income. (P.L. 104-113)

April 24, 1996—The Antiterrorism and Effective Death Penalty Act of 1996 required that the Secretary, HHS, establish safety procedures for use of biological agents, training in handling and proper laboratory containment, safeguards to prevent their use for criminal purposes, and procedures to protect the public safety. The act provided, however, that the Secretary must ensure availability of biological agents for research purposes. (P.L. 104-132)

May 20, 1996—The Ryan White CARE Reauthorization Act revised and extended authorization of the 1990 act, which provided for care and services for persons living with HIV/AIDS. Title IV provisions require the administrator, HRSA, to consult with the director, NIH, in carrying out a grants program to provide health care and opportunities for women, infants, children, and youth to participate as voluntary subjects of clinical research on HIV disease that is of potential benefit to them. (P.L. 104-146)

July 29, 1996—The Traumatic Brain Injury Act amended the PHS Act to provide for the conduct of expanded studies and establishment of innovative programs with respect to traumatic brain injury. The act authorizes the Secretary, acting through the director, NIH, to award grants or contracts for the conduct of basic and applied research regarding traumatic brain injury. (P.L. 104-166)

October 2, 1996—The Electronic Freedom of Information Act established the right of the public to obtain access to Agency records, including electronically stored documents, and requires Federal agencies to make available certain Agency information to the public for inspection and copying. (P.L. 104-231)

October 18, 1996—The General Accounting Office Management Reform Act amended the PHS Act to limit the amount NIH may obligate for administrative expenses each fiscal year and repealed a requirement that the U.S. Comptroller General conduct, audit, and report to the Congress regarding the National Foundation for Biomedical Research. (P.L. 104-316)

August 6, 1997—The Safe Drinking Water Act amendments reauthorized the Safe Drinking Water Act, toughened standards and required the Environmental Protection Agency to consult with NIH and the CDC in announcing an interim national primary drinking water regulation for a contaminant in the case of an urgent threat to public health. (P.L. 104-182)

Biographical Sketches of the Directors of the National Institutes of Health

Joseph James Kinyoun, M.D.

Founder and director of the Hygienic Laboratory, Dr. Joseph J. Kinyoun introduced scientific research into the Marine Hospital Service. His interest in bacteriology and his isolation of the cholera organism laid the groundwork for the present health research program of NIH.

Born in East Bend, N.C., on November 25, 1860, Dr. Kinyoun received his M.D. degree from New York University in 1882 and did postgraduate work in Europe under the German bacteriologist, Robert Koch.

Dr. Kinyoun joined the Marine Hospital Service in 1886. In a one-room laboratory on Staten Island, N.Y., he applied new techniques he had learned in Europe, enabling him to isolate the organism that causes cholera. The Hygienic Laboratory was established in August 1887 and Dr. Kinyoun served as its director until April 30, 1899.

During his government career, Dr. Kinyoun designed the Kinyoun-Francis sterilizer, a shipboard disinfecting apparatus. In 1903 he retired from public service, and after working in private industry and as a professor at the George Washington University, he became a bacteriologist in the District of Columbia Health Department, a post which he held until his death on February 14, 1919.

Milton Joseph Rosenau, M.D.

As second director of the Hygienic Laboratory, Dr. Milton J. Rosenau was responsible for expanding its scope of investigations.

Dr. Rosenau was born in Philadelphia on January 1, 1869. After receiving his M.D. from the University of Pennsylvania, he did postgraduate work in Europe in the field of sanitation and public health.

In 1890 he received his commission in the Marine Hospital Service. He became director of the Hygienic Laboratory on May 1, 1899.

A pioneer in the study of anaphylaxis, he also conducted research on yellow fever, malaria, typhoid fever, poliomyelitis, disinfectants, and the pasteurization of milk. His *Preventive Medicine and Hygiene* is a standard text for students of public health.

On September 30, 1909, Dr. Rosenau resigned from government service to join the staff of Harvard Medical School. In 1936 he went to the University of North Carolina where he served as director of the Public Health School until his death on April 9, 1946.

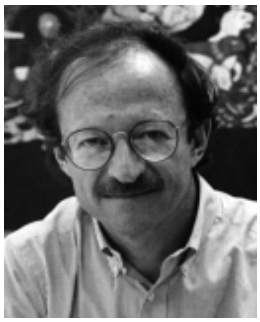
John F. Anderson, M.D.

Dr. John F. Anderson, third director of the Hygienic Laboratory, was among the early scientists who made the Laboratory well-

Directors of the National Institutes of Health

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
Joseph J. Kinyoun	Nov. 25, 1860	Aug. 1887	Apr. 30, 1899 [1]
Milton J. Rosenau	Jan. 1, 1869	May 1, 1899	Sept. 30, 1909
John F. Anderson	Mar. 14, 1873	Oct. 1, 1909	Nov. 19, 1915
George W. McCoy	June 4, 1876	Nov. 20, 1915	May 25, 1930
.....		May 26, 1930	Jan. 31, 1937 [2]
Lewis R. Thompson	Aug. 6, 1883	Feb. 1, 1937	Jan. 31, 1942
Rolla E. Dyer	Nov. 4, 1886	Feb. 1, 1942	June 15, 1948
.....		June 16, 1948	Sept. 30, 1950 [3]
William H. Sebrell, Jr	Sept. 11, 1901	Oct. 1, 1950	July 31, 1955
James A. Shannon	Aug. 9, 1904	Aug. 1, 1955	Aug. 31, 1968
Robert Q. Marston	Feb. 12, 1923	Sept. 1, 1968	Jan. 21, 1973
Robert S. Stone	Feb. 10, 1922	May 29, 1973	Jan. 31, 1975
Donald S. Fredrickson	Aug. 8, 1924	July 1, 1975	June 30, 1981
James B. Wyngaarden	Oct. 19, 1924	Apr. 29, 1982	July 31, 1989
Bernadine Healy	Aug. 2, 1944	Apr. 9, 1991	June 30, 1993
Harold E. Varmus	Dec 18, 1939	Nov. 23, 1993	

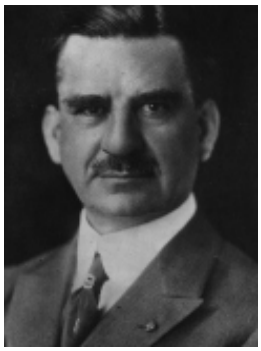
[1] Director, Hygienic Laboratory.
[2] Director, National Institute of Health.
[3] Director, National Institutes of Health.



Dr. Varmus
1993-

Dr. Kinyoun
1887-1899

Dr. Rosenau
1899-1909

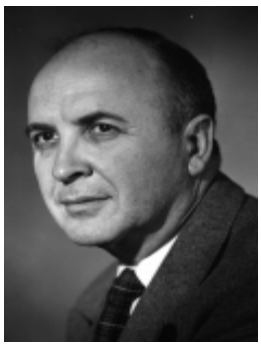


Dr. Anderson
1909-1915

Dr. McCoy
1915-1937

Dr. Thompson
1937-1942

Dr. Dyer
1942-1950



Dr. Sebrell
1950-1955

Dr. Shannon
1955-1968

Dr. Marston
1968-1973

Dr. Stone
1973-1975

Dr. Fredrickson
1975-1981

Dr. Wyngaarden
1982-1989

Dr. Healy
1991-1993

known in scientific circles.

Dr. Anderson was born in Fredericksburg, Va., March 14, 1873. After receiving his M.D. degree at the University of Virginia, he went abroad to study bacteriology. Upon returning in 1898, he joined the Marine Hospital Service and on October 1, 1909, succeeded Dr. Rosenau as director of the Hygienic Laboratory.

Throughout his career in the service, he was actively engaged in research. He studied serum and vaccine therapy, immunology, cholera, typhus, poliomyelitis, and public health and sanitation problems. He worked with Dr. Rosenau on hypersusceptibility, anaphylaxis, and tuberculosis, and with Dr. Joseph Goldberger on the transmission of measles to monkeys, providing science with an experimental animal for that disease.

Dr. Anderson served as director of the Hygienic Laboratory until November 19, 1915, when he resigned to become director of the Research and Biological Laboratories and later vice president of E. R. Squibb & Sons. He died on September 29, 1958.

George Walter McCoy, M.D.

Dr. George W. McCoy was during his lifetime the Nation's greatest authority on leprosy. For his many contributions to public health, he won the Sedgwick Memorial Medal of the American Public Health Association in 1921.

Born in Cumberland Valley, Pa., on June 4, 1876, he entered the Marine Hospital Service in 1900 after graduating from the University of Pennsylvania Medical School.

During his first assignment at the Marine hospital in San Francisco, he became interested in leprosy. While heading the U.S. Plague Laboratory in San Francisco from 1908 to 1911, he discovered that the California ground squirrel was responsible for the spread of the organism causing tularemia.

On November 20, 1915, he became fourth director of the Hygienic Laboratory, renamed "National Institute of Health" in 1930. During this period he conducted important studies in influenza, poliomyelitis, smallpox, tularemia, amoebic dysentery, and pneumonia. Dr. McCoy served as director until January 31, 1937.

After conducting a nationwide survey on leprosy, Dr. McCoy retired from PHS on June 30, 1938, and joined the staff of Louisiana State University in New Orleans. He died on April 2, 1952.

Lewis Ryers Thompson, M.D.

Dr. Lewis R. Thompson was intensely interested in research on industrial health problems and on problems of stream pollution.

Born in Lafayette, Ind., August 6, 1883, he joined PHS in 1910, having graduated from Louisville Medical College. After becoming chief of the Division of Scientific Research in 1930, he administered field investigations of stream pollution, malaria, cancer, nutritional diseases, child hygiene, milk, dental problems, and industrial hygiene. When the division was merged with NIH, Dr. Thompson became director on February 1, 1937.

Dr. Thompson was largely responsible for securing the present-day site of NIH and for securing appropriations for the construction of the first six buildings. He served as director until January 31, 1942, and after retiring from PHS in 1947 became a scientific director of the international health division of the Rockefeller Foundation. He died on November 12, 1954.

Rolla Eugene Dyer, M.D.

Dr. Rolla E. Dyer's major research contributions were in the field of infectious diseases; in particular, endemic typhus. He demonstrated how endemic typhus is spread and helped develop a vaccine to protect against the disease.

Born in Delaware County, Ohio, November 4, 1886, Dr. Dyer received his M.D. from the University of Texas and joined PHS in 1916.

His first assignment involved fieldwork on bubonic plague in New Orleans. Five years later he joined the staff of the Hygienic Laboratory, became chief of the Division of Infectious Diseases in 1936, and director of NIH in 1942.

As director, Dr. Dyer organized the Division of Research Grants, assisted in planning the Clinical Center, and helped establish three new institutes: the National Heart Institute, the National Institute of Dental Research, and National Institute of Mental Health.

After retiring from active duty on September 30, 1950, Dr. Dyer served as a member of the scientific board of directors of the international health division of the Rockefeller Foundation. He died June 2, 1971.

William Henry Sebrell, Jr, M.D.

A leading international authority on nutrition, Dr. William H. Sebrell first recognized and described the dietary deficiency disease, ariboflavinosis, and made significant contributions to knowledge of dietary needs and deficiencies.

Born in Portsmouth, Va., on September 11, 1901, Dr. Sebrell received his M.D. degree from the University of Virginia and joined PHS in 1926.

He began his research career under Dr. Joseph Goldberger who demonstrated that pellagra is a deficiency disease. During the 1930's, Dr. Sebrell made many important contributions to our knowledge of the anemias and the role of diet in cirrhosis of the liver.

During World War II, Dr. Sebrell was codirector of the National Nutrition Program which coordinated activities of all state agencies working in the field of nutrition. This program aided food production and the maintenance of civilian health during the war years.

In 1948 he became director of the Experimental Biology and Medicine Institute, and on October 1, 1950, was appointed director of NIH. He held this post until his retirement on July 31, 1955.

Dr. Sebrell helped formulate the first international standards of nutrition for the League of Nations, and pioneered in gaining acceptance of scientific nutrition as a regular function of modern state and local health departments.

James A. Shannon, M.D.

Dr. James A. Shannon, widely recognized in the scientific world for his original research in kidney function, chemotherapy, and malaria, has throughout his career, been devoted to medical research, teaching, and public service.

Born in Hollis, N.Y., on August 9, 1904, he received his M.D. in 1929 and a Ph.D. in physiology in 1935 from New York University.

Following his internship at Bellevue Hospital in New York, Dr. Shannon taught in the department of physiology at New York University College of Medicine from 1931 to 1941, and directed research at the university's Goldwater Memorial Hospital from 1940 to 1945.

During periods of leave, he served as guest investigator at the physiological laboratory, University of Cambridge, England, and as a member of the staff of the Marine Biological Laboratory at Woods Hole, Mass.

During World War II, Dr. Shannon played a prominent part in malaria research activities of the National Research Council and was consultant on tropical diseases to the secretary of war. In recognition of this work, he received the Presidential Medal for Merit, the highest award at that time for civilian service in government.

Before joining PHS in 1949, he was director of the Squibb Institute for Medical Research (1946-49), and special consultant to the PHS Surgeon General.

Dr. Shannon then served as associate director in charge of research in the National Heart Institute until 1952. After holding the post of associate director, NIH, for 3 years, he became its director on August 1, 1955.

Among his many honors were the Public Welfare Medal of the National Academy of Sciences for "eminence in the application of science to the public welfare" (1962), the Rockefeller Public Service Award for Science, Technology, or Engineering (1964), and the Presidential Distinguished Federal Civilian Service Award (1966).

On retiring as NIH director (August 31,

1968), Dr. Shannon joined the NAS as special advisor to the president. In February 1970 he became professor and special assistant to the president, Rockefeller University. He retired from those positions in 1975, and now resides in Portland, Oreg.

Robert Q. Marston, M.D.

Dr. Robert Quarles Marston became director of NIH on September 1, 1968, after serving for 5 months as administrator of the Health Services and Mental Health Administration.

Born in Toano, Va., on February 12, 1923, he received his B.S. degree in 1943 from the Virginia Military Institute, and his M.D. from the Medical College of Virginia in 1947. As a Rhodes scholar, he worked for the next 2 years with Nobel prizewinner Howard Florey at Oxford University, Oxford, England, earning a B.Sc. from that institution in 1949.

After an internship at Johns Hopkins Hospital and a year's residency at Vanderbilt University Hospital in Nashville, Tenn., he was stationed at NIH from 1951 to 1953 as a member of the Armed Forces Special Weapons Project, conducting research on the role of infection after whole body irradiation. He completed his residency at the Medical College of Virginia in Richmond the following year.

While a Markle fellow, he served as assistant professor of medicine at the Medical College of Virginia from 1954 to 1957, and as assistant professor of bacteriology and immunology at the University of Minnesota in Minneapolis for 1 year. He returned to the Medical College of Virginia in 1959 as associate professor of medicine and assistant dean in charge of student affairs.

In 1961, Dr. Marston became director of the University of Mississippi Medical Center and dean of the School of Medicine in Jackson, Miss., and was appointed vice chancellor there in 1965.

He became an associate director of NIH and director of the newly created Division of Regional Medical Programs on February 1, 1966.

On April 1, 1968, Dr. Marston was named administrator of the Health Services and Mental Health Administration, under a departmental reorganization.

He became acting director of the National Institute of Neurological Diseases and Stroke on January 21, 1973. He left the Federal service in April 1973 to become a scholar-in-residence at the University of Virginia. He also was named the first distinguished fellow of the Institute of Medicine, NAS.

On January 11, 1974, Dr. Marston was named president of the University of Florida at Gainesville.

Robert S. Stone, M.D.

Dr. Robert S. Stone, former vice president for health services and dean of the school of medicine at the University of New Mexico, became director of NIH on May 29, 1973.

Born February 10, 1922, in New York City, he received his B.A. in 1942 from Brooklyn College and his M.D. from the State University of New York College of Medicine in 1950. Dr. Stone was an instructor in pathology at Columbia University College of Physicians and Surgeons from 1950 to 1952.

Following his 1950-1952 internship and assistant residency in pathology at New York's Presbyterian Hospital, Dr. Stone moved to Los Angeles and joined the faculty of UCLA's School of Medicine, department of pathology.

From 1957 to 1959 as part of his academic duties he was deputy coroner at Los Angeles County, and for several years was pathologist for the Los Angeles Shriners Hospital for Crippled Children.

While on sabbatical as a visiting scientist at the Rockefeller Institute in 1959, he was credited with demonstrating by electron microscopy that the Shope papilloma virus of rabbits could be found in mature skin cells, but was undetectable, although presumed present, in younger growing cells.

Based on his observation of autopsies of atomic bomb victims in Hiroshima, Japan, Dr. Stone was one of the first researchers to suggest that radiation exposure increases the incidence of certain known diseases rather than creating new types. He served as chief of research in pathology for the Atomic Bomb Casualty Commission from 1959 to 1960.

He contributed to the concept of developing a method control population to study the normal incidence of various diseases for comparison, as was subsequently done.

It was as a result of this work and his continuing interest that he was appointed to the NAS Advisory Committee on the Atomic Bomb Casualty Commission.

Dr. Stone joined the University of New Mexico School of Medicine as chairman of the department of pathology in 1963, and became dean of the school in 1968. Prior to his appointment as NIH director, he took a year's leave from the university and was a visiting professor at the Sloan School of Management, MIT.

He became dean of the School of Medicine of the University of Oregon Health Sciences Center and vice president of the Health Sciences Center in August 1975. He has since been appointed dean of the College of Medicine at Texas A & M University in August of 1978.

Donald S. Fredrickson, M.D.

Dr. Donald S. Fredrickson, internationally known authority on lipid metabolism and its disorders, became NIH director on July 1, 1975. Immediately prior to this appointment, he had served for 1 year (1974-1975) as president of the Institute of Medicine, NAS.

His association with NIH, however, spans more than two decades beginning in 1953 when he joined the scientific staff of the then National Heart Institute (renamed the National Heart, Lung, and Blood Institute in 1976) as a clinical associate.

During his research career in the Federal service, Dr. Fredrickson held numerous positions at NIH, several in the heart institute simultaneously. From 1955 to 1961 he was a member of the Laboratory of Cellular Physiology and Metabolism. He then served as clinical director (1961-1966), while continuing his research as head of the section of molecular diseases, Laboratory of Metabolism (1962-1966). He was appointed institute director in 1966, serving in that capacity until 1968. He combined this executive responsibility with research as chief of the Molecular Diseases Branch (1966-1974), and as director of intramural research (1969-1974).

His earliest research interests centered on the metabolism of sterols. Later he focused on the structure of the plasma lipoproteins, their importance in the transport of fats, and the genetic factors regulating their metabolism and concentration in blood. It was during this period that he discovered two new genetic disorders: Tangier disease (absence of high density lipoproteins) and cholesteryl ester storage disease, a lysosomal enzyme deficiency.

In 1965 he and his coworkers introduced a system for identifying and classifying blood-lipid abnormalities on the basis of plasma lipoprotein patterns. From this work came recognition of new monogenic causes of hyperlipidemia: type 3 and type 5 hyperlipoproteinemia and what is called familial hypertriglyceridemia. The system received prompt acceptance by the WHO and is now used widely by laboratories around the world.

Research findings of Dr. Fredrickson and colleagues have also included the discovery of several previously unknown apolipoproteins, and new knowledge including descriptions concerning the structure and function of various apoproteins.

He was born August 8, 1924, in Canon City, Colo. He received both his B.S. (1946) and M.D. (1949) from the University of Michigan, and was certified by the American Board of Internal Medicine in 1957. He did postgraduate work at Peter Bent Brigham and Massachusetts General Hospitals and the Harvard Medical School prior to coming to NIH in 1953.

Dr. Fredrickson is a member of numerous professional societies in addition to the NAS and the American Academy of Arts and Sciences.

He resigned as NIH director on June 30, 1981, returning to the NAS as a visiting scholar.

James B. Wyngaarden, M.D.

Dr. James B. Wyngaarden, an internationally recognized authority on the regulation of purine biosynthesis and the genetics of gout, and a nationally respected advisor on various aspects of the administration of biomedical research, became the 12th director on April 30, 1982. Immediately prior to his appointment, he was professor and chairman of the department of medicine at Duke University School of Medicine, a position he had held since 1967.

He has had a long association with the NIH. From 1953 to 1954, he was a research associate in the Laboratory of Chemical Pharmacology of the then National Heart Institute, and from 1954 to 1956, he was a clinical associate at the then National Institute of Arthritis and Metabolic Diseases. After leaving in 1956 to become associate professor at the Duke University School of Medicine, he continued an association with NIH. He has held grants from several NIH components.

Dr. Wyngaarden has been active on various NIH study groups, evaluation committees, and review panels over the years, including a term with the board of scientific counselors of the then NIAMD (1971-1974). He also served as a consultant to the NIH as a member of study sections (1958-1960; 1967-1969).

He has also served as advisor to the broader scientific community as a member of the National Academy of Sciences since 1974, and was active from 1975 to 1982 on an NAS committee set up to study the Nation's overall need for biomedical and behavioral researchers; consultant for the President's Office of Science and Technology (1966-1972), a member of the President's Science Advisory Committee (1972-1973), and a member of the U.S. Atomic Energy Commission's Advisory Committee on Biology and Medicine.

Dr. Wyngaarden is the coauthor of *Cecil Textbook of Medicine*. In collaboration with former NIH director, Dr. Fredrickson, and others, he edited *The Metabolic Basis of Inherited Disease*. The original work was published in 1960.

He was born October 19, 1924, in East Grand Rapids, Mich., attended Calvin College there, and Western Michigan University in 1943-1944. In 1948 he graduated first in his class from the University of Michigan Medical School.

Dr. Wyngaarden trained in internal medicine at the Massachusetts General Hospital and did postdoctoral work at the Public Health Research Institute of the City of New York, under the direction of Dr. DeWitt Stetten, Jr., former NIGMS director. After serving as research associate at NIH from 1953 to 1956, he went to Duke and in 1959 became director of the medical research training program there as well as associate professor of medicine and biochemistry. In 1961 he became professor of medicine and associate professor of biochemistry.

In 1963 and 1964, he was a visiting scientist at the Institut de Biologie-Physiocochemique in Paris. Shortly after his return to this country, he left Duke to become professor and chairman of the department of medicine and professor of biochemistry at the University of Pennsylvania. He returned to Duke in 1967.

Dr. Wyngaarden has received many honorary degrees: University of Michigan (D.Sc., 1980), Medical College of Ohio (D.Sc., 1984), University of Illinois at Chicago (D.Sc., 1985), George Washington University (D.Sc., 1986), and Tel Aviv University (Ph.D., 1987).

He is a diplomate of the American Board of Internal Medicine. He has served on editorial boards of numerous professional publications.

Dr. Wyngaarden is a member of a number of professional societies including the NAS Institute of Medicine, the American Academy of Arts and Sciences, the American Society for Clinical Investigation, and is a past president of the Association of American Physicians. He is a fellow of the Royal College of Physicians of London and was elected to the Royal Academy of Sciences of Sweden in 1987.

Bernadine Healy, M.D.

Dr. Bernadine Healy became NIH director in April 1991. Shortly after her appointment, she launched the NIH Women's Health Initiative, a $500 million effort to study the causes, prevention, and cures of diseases that affect women. She also established the Shannon Award, grants designed to foster creative, innovative approaches in biomedical research and keep talented scientists in a competitive system. Under her leadership, the NIH is formulating it first strategic plan to guide research efforts into the 21st century.

Prior to her appointment, she was chairman of the Research Institute of the Cleveland Clinic Foundation, where she directed the research programs of nine departments including efforts in cardiovascular disease, neurobiology, immunology, cancer, artificial organs, and molecular biology. From her appointment in November 1985, she also served as a staff member of the clinic's department of cardiology.

In February 1984, Dr. Healy became deputy director of the Office of Science and Technology Policy at the White House. Her appointment, made by President Reagan and confirmed by the Senate in June of 1984, involved her heavily in life science and regulatory issues at the Federal level. She served as chairman of the White House Cabinet Working Group on Biotechnology, was executive secretary of the White House Science Council's Panel on the Health of Universities, and served as member of several advisory groups, including the councils of the NHLBI, NCI, as well as the White House Working Group on Health Policy and Economics. From June 1976 until February 1984, she was professor of medicine at Johns Hopkins University School of Medicine and Hospital, where she also had clinical responsibilities, directed a program in cardiovascular research, and was director of the coronary care unit. In addition to serving on the medical school faculty, she assumed the role of assistant dean for postdoctoral programs and faculty development.

Among her other professional affiliations, Dr. Healy has served on the board of governors of the American College of Cardiology and has been president of the American Federation of Clinical Research (1983-84) and was chairman of its public policy committee for several years. She was president of the American Heart Association in 1988-1989 and has served as a member of its board of directors since 1983. As AHA president, she initiated a women's minority leadership task force and a women and heart disease program that took hold in affiliates nationwide.

She is a member of the Institute of Medicine of NAS. In 1989 she was elected as a member of the board of overseers of Harvard College and has served on the board of trustees of Vassar College. She has also been chairman of the Ohio Council on Research and Economic Development, and served on several other advisory committees and boards, including the Ohio Board of Regents.

Dr. Healy has been active in several Federal advisory groups. Until her NIH appointment, she was a member of the advisory committee to the NIH director. She has been a member of the White House Science Council and chairman of the advisory panel for new developments in biotechnology of the Office of Technology Assessment of the U.S. Congress and a member of the NASA Life Sciences Strategic Planning Study Committee. In 1990 she was appointed to the President's Council of Advisers on Science and Technology (PCAST) and served as its vice-chairman. She also chaired the advisory panel for basic research for the 1990's of the Office of Technology Assessment, and served on the special medical advisory committee of the Department of Veterans Affairs.

A native of New York City, she graduated from Hunter College High School. She received her bachelor's degree from Vassar College in 1965, and her M.D., cum laude, from Harvard Medical School in June 1970. She completed training in internal medicine and cardiology at Johns Hopkins School of Medicine.

Dr. Healy has written extensively in the

areas of cardiovascular research and medicine, and has served on the editorial boards of numerous scientific journals.

She stepped down as director of NIH on June 30, 1993, to return the Cleveland Clinic in Ohio.

Ruth Kirschstein, M.D. (Acting)

Dr. Ruth Kirschstein, director of the National Institute of General Medical Sciences, became acting director of NIH on July 1, 1993, at the request of DHHS Secretary Donna Shalala. A 38-year veteran of NIH, she became NIH deputy director in November 1993.

Harold E. Varmus, M.D.

Dr. Harold E. Varmus became 14th director of NIH on November 23, 1993. Winner of the Nobel Prize in 1989 for his work in cancer research, he comes to NIH from the University of California, San Francisco. He is a leader in the study of cancer-causing genes called "oncogenes," and an internationally recognized authority on retroviruses, the viruses that cause AIDS and many cancers in animals.

Prior to his appointment, he was professor of microbiology, biochemistry, and biophysics, and the American Cancer Society professor of molecular virology at UCSF. He has been working at the cutting edge of modern cell and molecular biology, and has had an active relationship with NIH for about 30 years as an intramural scientist, grantee, and public advisor.

Dr. Varmus and his UCSF colleague Dr. J. Michael Bishop shared the 1989 Nobel in Physiology or Medicine for demonstrating that cancer genes (oncogenes) can arise from normal cellular genes, called proto-oncogenes. While investigating a retroviral gene, v-src, responsible for causing tumors in chickens, they discovered a nonviral src gene, very similar to v-src, present in the normal cells of birds and mammals.

In recent years his work has assumed special relevance to AIDS, through a focus on biochemical properties of HIV, and to breast cancer, through investigation of mammary tumors in mice. His research activities included grants from NCI, NIAID, NIGMS, American Cancer Society, and the Melanie Bronfman Award for Breast Cancer.

Dr. Varmus has served as chairman of the board of biology for the National Research Council, an advisor to the Congressional Caucus for Biomedical Research, a member of the joint steering committee for Public Policy of Biomedical Societies, and cochairman of the New Delegation for Biomedical Research, a coalition of leaders in the biomedical community. He directed "Winding Your Way Through DNA," a popular public symposium on recombinant DNA staged by UCSF.

Author or editor of 4 books and nearly 300 scientific papers, he has been elected to the Institute of Medicine, the National Academy of Sciences, and the American Academy of Arts and Sciences. His most recent book, *Genes and the Biology of Cancer*, intended for a general audience, was coauthored with Robert Weinberg for the Scientific American Library. He as edited several professional journals, and served on a variety of review and advisory boards for government, biotechnology firms, and pharmaceutical companies.

Dr. Varmus was a member of the IOM committee that advised the Department of Defense on the use of $210 million allocated by Congress in 1992 for breast cancer research. In 1986 he chaired the subcommittee of the International Committee on the Taxonomy of Viruses that gave the AIDS virus its name HIV.

He was born December 18, 1939, in Oceanside, N.Y., and attended public schools in Freeport, Long Island; his father practiced family medicine and his mother was a psychiatric social worker. He is a graduate of Amherst College (B.A., 1961), where he majored in English literature and edited the school newspaper; Harvard University (M.A., 1962); and Columbia University (M.D., 1966). While in medical school, he worked for 3 months at a mission hospital in northern India.

After an internship and residency in internal medicine at Columbia-Presbyterian Hospital in New York, he served as a clinical associate for 2 years (1968-70) at the National Institute of Arthritis and Metabolic Diseases, where he did his first scientific work in the area of bacterial genetics with Dr. Ira Pastan, who is now chief of NCI's Laboratory of Molecular Biology. He came to UCSF as a postdoctoral fellow in Bishop's laboratory in 1970, initiating a long-standing collaboration to study tumor viruses, and was appointed to the faculty later that year.

He became a full professor in 1979 and an ACS research professor in 1984.

Deputy Directors of the National Institutes of Health

Name	*Date of birth*	*Dates of office*	
		From	*To*
C. J. Van Slyke	Dec. 1, 1900	Dec. 3, 1958	Dec. 1, 1959
David E. Price	July 5, 1914	July 1, 1960	June 30, 1962
Stuart M. Sessoms	July 16, 1921	Aug. 1, 1962	July 31, 1968
G. Burroughs Mider[1]	Aug. 9, 1907	July 1, 1960	May 19, 1968
John F. Sherman	Sept. 4, 1919	Nov. 1, 1968	Mar. 16, 1974
Robert W. Berliner[2]	Mar. 10, 1915	Feb. 23, 1969	Sept. 1, 1973
Carl M. Leventha[3]	July 28, 1933	Sept. 1973	Feb. 1974
DeWitt Stetten, Jr.[2]	May 31, 1909	Mar. 17, 1974	Sept. 11, 1979
Ronald W. Lamont-Havers	Mar. 6, 1920	Aug. 4, 1974	Sept. 25, 1976
Thomas E. Malone	June 3, 1926	Mar. 24, 1977	Aug. 1, 1986
Robert Goldberger[2]	June 2, 1933	Sept. 11, 1979	June 26, 1981
Joseph E. Rall[3]	Feb. 3, 1920	July 2, 1981	June 6, 1982
Philip S. Chen, Jr.[3]	July 3, 1932	June 7, 1982	Mar. 18, 1983
William F. Raub[4]	Nov. 25, 1939	Apr. 3, 1983	November 1991
Joseph E. Rall[5]	Feb. 3, 1920	June 1983	May 13, 1991
Kathryn Bick[4]	May 3, 1932	May 19, 1987	March 1990
John Diggs[4]	March 23, 1936	August 1990	June 14, 1993
Lance Liotta[5]	.....	July 6, 1992	.....
Ruth L. Kirschstein	Oct. 12, 1926	November 1993	.....
Michael Gottesman[5]	Oct. 7, 1946	November 1993	.....
Wendy Baldwin[4]	.....	February 1994	.....
Anthony Itteilag	.....	January 7, 1996	.....

[1] Had title "Director of Laboratories and Clinics."
[2] For Science.
[3] For Science, Acting.
[4] For Extramural Research.
[5] For Intramural Research.

Biographical Sketches of the NIH Deputy Directors

Cassius James Van Slyke, M.D.

Dr. Van Slyke, first deputy director of NIH, served in that position from December 3, 1958, until his retirement on December 1, 1959. Born in Benton, Minn., on December 1, 1900, he received his M.D. in 1928 from the University of Minnesota and entered the PHS reserve corps that same year.

In 1932 he was commissioned in the regular corps and from 1936 to 1944 pursued a distinguished research career at the PHS Venereal Disease Research Laboratory in Staten Island, N.Y. In 1944, he was made assistant chief, Venereal Disease Division, Washington, D.C.

Dr. Van Slyke joined NIH in 1946 as chief of the newly established Research Grants Office, later renamed the Division of Research Grants, serving there until named director of NHI on August 1, 1948. He left NHI on November 30, 1952, to serve as associate director of NIH, a post he held until named NIH deputy director.

He died on April 21, 1966.

David E. Price, M.D.

A native of San Diego, Calif., Dr. Price was born on July 5, 1914. He earned his medical degree at the University of California School of Medicine at Berkeley in 1940, and served his internship at the PHS Hospital in San Francisco. In 1946, he received his doctorate in public health at Johns Hopkins University

School of Hygiene and Public Health.

Following a tour of duty in the Venereal Disease Division, PHS, he was assigned first to the DRG as assistant to the chief (1946-47) and then to the NCI as chief of the Research Grants Branch (1947-48). He returned to DRG in 1948 as chief, a post he held until he was named NIH associate director for extramural affairs (1950-52).

After a series of key appointments in the Office of the Surgeon General, the Bureau of Medical Services and the Bureau of State Services, Dr. Price was named deputy director of NIH on July 1, 1960. Two years later, he was appointed deputy surgeon general, PHS.

He retired from the service in 1965. Since his retirement, he has been associated with the Ford Foundation and the American Public Health Association.

Dr. Price was director of planning of the medical institutions, the Johns Hopkins Medical Institution, Baltimore, Md. He retired on July 1, 1980, from Johns Hopkins.

Stuart M. Sessoms, M.D.

Dr. Sessoms came to NIH in 1953 as a member of the NCI staff. From 1955 to 1957 he was assistant director of the Clinical Center. He was appointed assistant director, NCI, on January 1, 1958, prior to his appointment in November 1958 as chief of NCI's Cancer Chemotherapy National Service Center.

During this period, Dr. Sessoms served also as NCI associate director (1960), and associate director for collaborative research (1961) with responsibility for the institute's Virology Research Resources Branch, in addition to his duties at the Cancer Chemotherapy National Service Center.

He became the third NIH deputy director on August 1, 1962, serving in that capacity until his retirement July 31, 1968. On retirement, he held the rank of assistant surgeon general (rear admiral) in the PHS.

During his career at NIH, Dr. Sessoms was the recipient of two Meritorious Service Awards for his accomplishments as head of the Cancer Chemotherapy National Service Center, and for "outstanding ability and achievements in the development, operation and staffing" of the Regional Medical Programs.

A native of Roseboro, N.C., he was born July 16, 1921. He received his B.S. in pharmacy at the University of North Carolina in 1943 and his M.D. from the Medical College of Virginia in 1946.

On retiring after 25 years of government service, Dr. Sessoms joined Duke University.

On Jan. 1, 1976, he was named president of Blue Cross and Blue Shield of North Carolina.

G. Burroughs Mider, M.D.

Dr. Mider, whose career at NIH reaches back to 1939, is well-known on the campus. Just prior to transferring to the National Library of Medicine, an NIH component, in 1968, Dr. Mider had served for 8 years as NIH director of laboratories and clinics (1960-68), in which he functioned as deputy director as well.

He first came to NIH as a research fellow, NCI, in 1939. On completing the fellowship, he became an instructor in pathology and assistant professor of pathology (1941-44) at Cornell Medical College. Concurrently, he was an assistant pathologist at New York Hospital.

Then came assignments as associate professor of pathology, University of Virginia School of Medicine (1944-45) and research associate in surgery and professor of cancer research, University of Rochester School of Medicine and Dentistry (1945-52).

On returning to NIH in 1952, he became NCI associate director in charge of research. In 1960 he was appointed NIH director of laboratories and clinics. In May 1968, Dr. Mider transferred to the NLM as special assistant to the director for medical program development and evaluation. The following year he was named acting deputy director, and in 1970 became NLM deputy director.

In 1960, he was the recipient of a DHEW Distinguished Service Award. Dr. Mider retired from the Library on June 30, 1972, to become executive officer for the Universities Associated for Research and Education in Pathology, Inc., and the American Society of Experimental Pathology.

John F. Sherman, Ph.D.

Dr. Sherman was appointed deputy director of NIH on November 1, 1968, after a long career in research and research grants administration. He was designated by HEW Secretary Richardson as acting director of NIH on January 21, 1973, and served until a new director was appointed May 29, 1973. He then returned to the position of deputy director.

He came to NIH in January 1953 as a research pharmacologist in the Laboratory of Tropical Diseases, National Microbiological Institute which became the NIAID in 1955.

In July 1956, Dr. Sherman joined the staff of the NIAMD as assistant to the chief of extramural programs. He became assistant chief of the institute's extramural programs in August 1957, and deputy chief in October 1958.

On July 1, 1961, he was appointed associate director for extramural programs, NINDB. He rejoined the NIAMD in 1962 as associate director for extramural programs, serving in that capacity until January 1, 1964, when he was named NIH associate director for extramural programs.

Dr. Sherman was born on September 4, 1919, in Oneonta, N.Y. He received his B.S. in 1949 from Union University College of Pharmacy in Albany, N.Y., and his Ph. D. in pharmacology in 1953 from Yale University.

He is the author of numerous scientific papers and articles in his field of research. In 1971, he received a DHEW Distinguished Service Award.

Dr. Sherman left NIH in 1974 to become vice president of the Association of American Medical Colleges and director of the association's department of planning and policy development.

Robert W. Berliner, M.D.

Dr. Berliner, the first NIH deputy director for science, is an internationally renowned renal physiologist whose research in the field has contributed to understanding of the control of the excretion of sodium and potassium salts.

For 12 years (1950-62), he was chief of the Laboratory of Kidney and Electrolyte Metabolism, NHI, and from 1954 to 1968 served as the institute's director of intramural research.

In 1968, he was appointed director of laboratories and clinics, NIH. He was named to the newly created post of deputy director for science in 1969.

Prior to joining NIH in 1950, Dr. Berliner was assistant professor of medicine at Columbia University, and research associate with the New York City department of hospitals.

Born in New York City on March 10, 1915, he received his B.S. from Yale University and his M.D. from Columbia University in 1939. He served his internship and residency at the Presbyterian Hospital and Goldwater Memorial Hospital, respectively, both in New York.

He was elected to the National Academy of Sciences in 1968. Other honors include the PHS Distinguished Service Award (1962), the Homer W. Smith Award (1965), the Modern Medicine Award for Distinguished Achievement (1969), and the American Heart Association's Research Achievement Award (1970).

Dr. Berliner left NIH to accept appointment as dean of the Yale University Medical School in September 1973.

DeWitt Stetten, Jr, M.D, Ph.D.

Dr. Stetten, an eminent medical educator and researcher in metabolic diseases, was named NIH deputy director for science on March 17, 1974.

He was born on May 31, 1909, in New York City. He received his A.B. degree from Harvard College in 1930, and his M.D. and Ph. D. from Columbia University in 1934 and 1940, respectively. From 1934 to 1937, he took his internship and residency at Bellevue Hospital in New York. Dr. Stetten then joined the staff at Columbia University for 9 years, serving successively as assistant instructor and assistant professor of biochemistry. In 1947, he was appointed assistant

professor in biological chemistry at the Harvard Medical School. From 1948 to 1954, he was chief of the division of nutrition and physiology for the Public Health Research Institute of New York City.

Dr. Stetten first came to NIH in 1954 as director of the intramural research program of the National Institute of Arthritis and Metabolic Diseases. In that capacity, he directed institute programs on basic and clinical research in diabetes, vitamin deficiencies, and disorders of the blood, bone, and liver. He left NIH in 1962 to become the first dean of the Rutgers Medical School, a position he held until his return to NIH on October 1, 1970, as director of the National Institute of General Medical Sciences.

The American Diabetes Association awarded Dr. Stetten the Banting Medal in 1957. In 1963, he delivered the 22nd annual NIH Lecture on the "History and Natural History of Gout."

Among his many honors were the DHEW Superior Service Honor Award (1973) DHEW Distinguished Service Award (1977).

He also received honorary D.Sc. degrees from Washington University (1974), and from the College of Medicine and Dentistry of New Jersey (1976).

Author of more than 100 original papers in his field of research, and coauthor of the early editions of the textbook, *Principles of Biochemistry*. Dr. Stetten served on the editorial boards of numerous scientific and medical journals. He was president of the Foundation for Advanced Education in the Sciences (1972-74), and was a member of the National Academy of Sciences and the NAS Council. He was president of the Society for Experimental Biology and Medicine, 1977-79.

Dr. Stetten was named senior scientific advisor to the NIH director in September 1979. He died on August 28, 1990.

Ronald W. Lamont-Havers, M.D.

Dr. Lamont-Havers, internationally known rheumatologist, was appointed deputy director of NIH on August 4, 1974, after serving in an acting capacity since May 20.

Prior to this appointment, he had been deputy director of the National Institute of Arthritis, Metabolism, and Digestive Diseases (1972-74), and NIH associate director for extramural research and training for 4 years (1968-72).

A native of England, Dr. Lamont-Havers was born on March 6, 1920. He received his B.A. in 1942 from the University of British Columbia, Canada, and M.D. in 1946 from the University of Toronto. He took staff and residency training (1946-48) at the Vancouver General Hospital, and residency in internal medicine (1949-51) at the Queen Mary Veterans Hospital in Montreal. From 1951 to 1953, he was a fellow of the Canadian Arthritis and Rheumatism Society at Columbia Presbyterian Hospital, College of Physicians and Surgeons, Columbia University. He also received a diploma in internal medicine in 1953 from McGill University.

He came to NIH in 1964 as associate director for extramural programs, NIAMD. From 1955 to 1964 he was national medical director of the Arthritis Foundation and an instructor in medicine, College of Physicians and Surgeons, Columbia University. Previously, he served as medical director of the Canadian Arthritis and Rheumatism Society, British Columbia division, Vancouver, from 1953 to 1955, and as associate medical director, Student Health Service, University of British Columbia (1948-49).

Dr. Lamont-Havers, author or coauthor of numerous papers on arthritis and rheumatism, was honored in June 1973 with a DHEW Superior Service Award.

He left NIH in September 1976 to become deputy for research policy and administration to the general director, Massachusetts General Hospital, Boston.

Thomas E. Malone, Ph. D.

Dr. Malone, whose career at the NIH began in 1962, was named the sixth deputy director of NIH in March 1977.

He was born in Henderson, N.C., on June 3, 1926. He earned his B.S. and M.S. degrees from North Carolina Central University in 1948 and 1949 respectively, and his Ph.D. from Harvard University in 1952. During the period 1950-52 he held a teaching fellowship at Harvard University.

Dr. Malone was professor of zoology at N.C. Central University in Durham from 1952 to 1958. He left that position to accept a postdoctoral fellowship of the NAS National Research Council, serving as a resident research associate at Argonne National Laboratory from 1958 to 1959. He subsequently served on the faculty at Loyola University in Chicago until joining the NIH staff in 1962.

He came to NIH as a member of the Grants Associates Program. After completing a year's training, he joined the staff of the National Institute of Dental Research in 1963, serving in several capacities--from 1963 to 1964 he was assistant chief of the research grants section; 1964 to 1966, deputy chief, extramural programs; and 1966 to 1967, chief, periodontal diseases and soft tissue studies, extramural programs.

In 1967 Dr. Malone accepted a position as professor and chairman of the department of biology at the American University of Beirut, Lebanon. He returned to NIDR in 1969, where he was associate director for extramural programs until 1972 when he was appointed NIH associate director for extramural research and training, a position which he held until his appointment as deputy director of NIH.

He is a member of the Institute of Medicine and of numerous other professional organizations in health research and administration.

In June 1971 Dr. Malone received the DHEW Superior Service Award and was honored in April 1974 with the DHEW Distinguished Service Award . In October 1975 the American College of Dentists presented him with a Certificate of Merit. He received a Senior Executive Service Presidential Merit Award in 1980 and a Senior Executive Service Presidential Distinguished Executive Rank Award in 1983.

He served as a member of the U.S. Delegation to the 31st through 35th World Health Assemblies and has participated in numerous other international health activities.

Upon the resignation of Dr. Fredrickson, Dr. Malone was named acting NIH director until the appointment of Dr. Wyngaarden.

Robert Goldberger, M.D.

A highly regarded scientist in the biomedical research community, Dr. Goldberger became NIH deputy director for science in September 1979.

After receiving his A.B. degree from Harvard College in 1954, he attended the New York University Medical School, where he obtained an M.D. in 1958. He interned at Mt. Sinai Hospital in New York, and then spent 2 years as a postdoctoral fellow at the University of Wisconsin's Institute for Enzyme Research. He came to the NIH as a research associate in the National Heart Institute in 1961, working with Dr. C. B. Anfinsen on the mechanism by which newly synthesized polypeptide chains attain three-dimensional structures characteristic of native proteins. In 1963 he was a visiting scientist at the Weizmann Institute of Science.

Dr. Goldberger served as a biochemist in the Laboratory of Chemical Biology, NIAMD, from 1963 to 1966, when he became chief of that laboratory's Biosynthesis and Control Section. He worked on regulation of gene expression in bacteria.

In 1973 he moved to the NCI's Division of Cancer Biology and Diagnosis, where, as chief of the cellular regulation section, he worked on hormonal regulation of gene expression in avian liver.

Dr. Goldberger has written one book on biochemistry and has edited a multivolume treatise on biological regulation. From 1970 to 1971 he served as president of NIH's Inter-Assembly Council of the Assemblies of Scientists. He received the Superior Service Award, DHEW, in 1973 and the Meritorious Service Medal, USPHS, in 1977.

At the end of June 1981, he left NIH to accept a dual position as provost of Columbia University and vice president for health sciences, and as a professor of chemistry.

William F. Raub, Ph.D.

Dr. Raub was appointed deputy director in August 1986. Since June 1983, he had served as deputy director for extramural research and training coordinating the development and implementation of policies affecting extramural programs.

Upon the resignation of Dr. James B. Wyngaarden, July 31, 1989, Dr. Raub was named acting NIH director.

He was NIH associate director for extramural research and training previous to this appointment. He has served as associate director, National Eye Institute (1975-78), and chief, Biotechnology Resources Branch, Division of Research Resources (1969-75). He joined NIH in 1966.

Dr. Raub led the effort to develop the PROPHET system, a national computer resource for pharmacologists and others who study chemical/biological interactions. PROPHET is the most nearly comprehensive set of information-handling tools for this area of science ever to be presented in a unified system, and offered as a service to the biomedical community.

A graduate of Wilkes College in Wilkes-Barre, Pa., in 1961, he received his Ph.D. in 1965 from the University of Pennsylvania.

Joseph E. Rall, M.D., Ph.D.

Dr. Rall was appointed deputy director for intramural research in June 1983. He advises the NIH director on general scientific matters and intramural research policies and coordinates the intramural research program.

With NIH since 1955, he was director of the division of intramural research at the National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases for more than 20 years.

Dr. Rall received his M.D. from Northwestern University School of Medicine (1945) and Ph.D. from the University of Minnesota (1952). He has received honorary degrees from North Central College, Naperville, Ill. (1966), the Free University of Brussels (1975), and the University of Naples (1985). He was elected to the NAS in 1980 and to the American Academy of Arts and Sciences in 1985. In 1988 he was invited to become a member of the scientific advisory committee for the International Human Frontier Science Program.

He is a member of many organizations and the coauthor of more than 160 scientific articles. His research involves the areas of thyroid hormones, iodine metabolism, and thyroid diseases.

In addition to the Van Meter Prize (1950) and the Robert Williams Distinguished Leadership Award of the Endocrine Society (1983), Dr. Rall has received the Arthur S. Flemming Award (1959), the DHHS Superior Service Award (1965) and Distinguished Service Award (1968).

Katherine L. Bick, Ph.D.

Dr. Bick was named NIH deputy director for extramural research in April 1987. As a principal advisor to the NIH director, she coordinates the development and implementation of policies affecting NIH extramural programs.

She joined NIH in 1976 as a scientist administrator in the Neurological Disorders Program, NINCDS. In September 1983 she was appointed NINCDS deputy director, after serving in an acting capacity since February 1981. While in this position she received a PHS Special Achievement Award for sustained superior work performance.

A native of Canada, Dr. Bick received her undergraduate degree from Acadia University, Nova Scotia, and earned her Ph.D. from Brown University. She has held academic positions at Georgetown University and California State University, Northridge, and research positions at the UCLA School of Medicine and the University of Western Ontario.

Among her many honors are the PHS Superior Service Award (1986), Senior Executive Service Bonus Award for Performance (1984-88), and the NIH Director's Award (1977). In 1989 she received a Presidential Senior Rank Award.

Dr. Bick left NIH in April 1990.

John W. Diggs, Ph.D.

Dr. Diggs was appointed NIH deputy director for extramural research on July 29, 1990. He had been director of the NIAID Division of Extramural Activities since 1982.

He was born in Gleason, Tenn., on March 23, 1936. A biology major at Lane College in Jackson, Tenn., he earned his M.S. (1969) and Ph.D. (1972) in physiology from Howard University. His postdoctoral work included serving as a senior research physiologist at Walter Reed Army Institute of Research.

Dr. Diggs joined NINDS in 1974 as a health scientist administrator and received the institute's Special Achievement Award in 1979. He received the NIH Director's Award in 1985, the Presidential Meritorious Executive Rank Award in 1987, and the PHS Superior Service Award in 1990.

Included in his other honors are the Super Achiever in Science Award of Lane College National Alumni (1989), Merit Award of the District of Columbia General Hospital (1989), Outstanding Service Award of Montgomery Count Department of Health (1989), Outstanding Service Award of Maryland Congress of Parents and Teachers, Inc. (1989), the Distinguished Senior Professional Award from the International Professional Management Association (1986), and Howard's Distinguished Alumni Award (1979).

Lance A. Liotta, Ph.D, M.D.

Dr. Liotta was named NIH deputy director for intramural research effective July 6. He joins the Office of the Director after simultaneously serving since 1982 in three NCI Laboratory of Pathology positions: chief, tumor invasion and metastases section; lab chief; and codirector, Anatomic Pathology Residency Program.

He earned his A.B. degree in general science and biology from Hiram College in Ohio, followed by his Ph.D. in biomedical engineering and biomathematics from Case Western Reserve University. In 1976 he earned his M.D. from Case Western and joined NIH as a PHS resident physician in the NCI Laboratory of Pathology.

Dr. Liotta has devoted his career to the study of cancer invasion and metastasis, the major cause of cancer treatment failure. He was one of the first scientists to investigate this process at the molecular level. In 1975 he proposed that tumor cell attachment and degradation of the basement membrane (a collagenous sheath that surrounds epithelial ducts, blood vessels and nerves, and separates tissue compartments) was crucial to invasion and metastasis.

He found that disruption of the basement membrane is the general hallmark of the transition from in situ to invasive cancer for all human epithelial cancers. He discovered metallo-proteinases produced by tumor cells that degrade the metastasis; TIMP-2 (Dr. William Stetler-Stevenson), a new protein that inhibits invasion and angiogenesis; laminin-binding proteins (Dr. Mark Sobel) that mediate tumor cell attachment; and autotaxin (Dr. Mary Stracke), a protein that profoundly stimulates motility.

Dr. Liotta's group also developed the first synthetic compound (CAI) (Dr. Elise Kohn) that blocks cancer metastasis growth by inhibiting selected signal transduction pathways. CAI has now entered clinical phase I trials under support from the Division of Cancer Treatment.

He is a member of the International Metastasis Research Society, American Association for Cancer Research, American Association of Pathologists, American Society of Cell Biology, American Society for Clinical Investigation, and the International Academy of Pathology.

Dr. Liotta has received numerous awards including three PHS Commissioned Corps Medals, the Arthur S. Flemming Award, the Warner Lambert/Parke Davis Award, the Josef Steiner Prize, and the Lil Gruber Research Award. He holds more than 30 patents for his work.

Ruth Kirschstein, M.D.

Dr. Kirschstein, director of NIGMS became NIH deputy director in November 1993. She was appointed director of NIGMS on September 1, 1974.

A native of Brooklyn, N.Y., she received her B.A. degree in 1947 from Long Island

Associate Directors of the National Institutes of Health

Name	Date of birth	Dates of Office	
		From	To
Norman H. Topping	Jan. 12, 1908	1948	1952
David E. Price	July 5, 1914	Dec. 1, 1950	Jan. 30, 1952
James A. Shannon	Aug. 9, 1904	Dec. 1, 1952	Jul. 31, 1955
C.J. Van Slyke	Dec. 1, 1900	Dec. 1, 1952	Dec. 2, 1958
Joseph E. Smadel	Jan. 10, 1907	May 1, 1956	Jun. 30, 1960
Kenneth M. Endicott	June 6, 1916	Jan. 6, 1958	Jun. 30, 1960
Jack Masur	June 16, 1908	Jul. 1, 1960	Mar. 8, 1969
Charles V. Kidd	Jan. 22, 1914	Sep. 13, 1960	Dec. 9, 1964
Ernest M. Allen	Dec. 1, 1904	Aug. 10, 1960	Jan. 8, 1963
Martin M. Cummings	Sept. 7, 1920	Jul. 11, 1963	Jan. 1, 1964
John F. Sherman	Sept. 4, 1919	Jan. 1, 1964	Oct. 31, 1968
Robert Q. Marston	Feb. 12, 1923	Feb. 1, 1966	Mar. 31, 1968
Thomas J. Kennedy, Jr.	June 6, 1920	Aug. 8, 1968	Aug. 31, 1974
R.W. Lamont-Havers	Mar. 6, 1920	Nov. 3, 1968	Oct. 1, 1972
Richard L. Seggel	Jan. 11, 1914	Jan. 4, 1969	Nov. 28, 1971
Leonard D. Fenninger	Oct. 3, 1917	Nov. 10, 1969	May 4, 1973
Thomas C. Chalmers	Dec. 8, 1917	Feb. 9, 1970	Oct. 20, 1973
Storm Whaley	Mar. 15, 1916	Jul. 1, 1970	Feb. 3, 1992
Leon M. Schwartz	Apr. 26, 1928	Feb. 6, 1972	Jun. 30, 1979
Thomas E. Malone	June 3, 1926	Nov. 26, 1972	Mar. 24, 1977
Leon Jacobs	Mar. 26, 1915	Jul. 30, 1972	Jul. 3, 1978
Robert S. Gordon, Jr.	Mar. 26, 1926	Nov. 7, 1974	Sep. 1, 1975
Joseph G. Perpich	July 22, 1941	Feb. 15, 1976	Dec. 12, 1981
Mortimer Lipsett	Feb. 20, 1921	Aug. 29, 1976	Jun. 30, 1982
Seymour Perry	May 26, 1921	Jan. 3, 1978	March 1980
William F. Raub	Nov. 25, 1939	Apr. 4, 1978	Apr. 2, 1983
Charles U. Lowe (Actg)	Aug. 24, 1921	Jan. 3, 1980	Jul. 9, 1982
Edwin D. Becker	May 3, 1930	March 1980	April 1988
Calvin Baldwin	Dec. 22, 1925	Aug. 1, 1980	Jan. 31, 1986
Mark S. Beaubien (Actg)	Oct. 20, 1921	Jul. 1, 1982	Jan. 18, 1984
Jay R. Shapiro (Actg)	July 26, 1931	Jul. 1, 1982	July 1983
J. Richard Crout	Dec. 30, 1929	Jul. 12, 1982	Apr. 16, 1984
Michael I. Goldberg	Mar. 18, 1944	Nov. 28, 1982	Sep. 17, 1984
Philip S. Chen, Jr.	July 3, 1932	Jul. 28, 1983	.....
John L. Decker	June 27, 1921	Aug. 1, 1983	Jun. 1, 1990
Craig K. Wallace	Dec. 4, 1928	Jan. 19, 1984	Feb. 8, 1991
George Galasso	June 3, 1932	Feb. 5, 1984	Jan. 2, 1996
Jay Moskowitz	Jan. 9, 1943	January 1986	April 1993
John D. Mahoney	Feb. 19, 1945	June 1986	April 1993
William T. Friedewald	Mar. 7, 1939	November 1986	Aug. 31, 1991
Itzhak Jacoby (Actg)	Apr. 17, 1984	Jul. 10, 1987	.....
Anthony S. Fauci	Dec. 24, 1940	Apr. 5, 1988	.....
Norman D. Mansfield	June 26, 1935	Oct. 10, 1988	February 1992
John Ferguson (Actg)	Dec. 29, 1932	September 1989	June 29, 1991
James D. Watson	1928	Oct. 1, 1989	Apr. 10, 1992
Saul Rosen (Actg)	.....	June 1990	June 1994
William R. Harlan	Nov. 30, 1930	June 30, 1991	.....
Vivian Pinn	Apr. 21, 1941	September 1991	.....
Stephen A. Ficca	Jan. 28, 1946	February 1992	.....
R. Anne Thomas	Sep. 17, 1945	Feb. 3, 1992	.....
William E. Paul	June 12, 1936	Marc 1994	.....
Leamon Lee	Oct. 9, 1934	July 10, 1994	.....
John Ruffin	.....	.....	.....
Diane Wax	.....	June 1995	.....
Norman Anderson	Oct. 16, 1955	July 1995	.....
Lana Skirboll	.....	.....	.....

Secretaries of the Department of Health and Human Services*

Name	Dates of office	
	From	To
Oveta Culp Hobby	Apr. 11, 1953	Jul. 31, 1955
Marion B. Folsom	Aug. 1, 1955	Jul. 31, 1958
Arthur S. Flemming	Aug. 1, 1958	Jan. 1, 1961
Abraham A. Ribicoff	Jan. 20, 1961	Jul. 13, 1962
Anthony J. Celebrezze	Jul. 31, 1962	Aug. 17, 1965
John W. Gardner	Aug. 18, 1965	Feb. 29, 1968
Wilbur J. Cohen	May 9, 1968	Jan. 19, 1969
Robert H. Finch	Jan. 22, 1969	Jun. 24, 1970
Elliot L. Richardson	Jun. 24, 1970	Jan. 29, 1973
Caspar W. Weinberger	Feb. 12, 1973	Aug. 10, 1975
David Mathews	Aug. 8, 1975	Jan. 20, 1977
Joseph A. Califano, Jr	Jan. 26, 1977	Jul. 19, 1979
Patricia Roberts Harris	Jul. 27, 1979	Jan. 19, 1981
Richard S. Schweiker	Jan. 22, 1981	Feb. 3, 1983
Margaret M. Heckler	Mar. 9, 1983	Dec. 12, 1985
Otis R. Bowen	Dec. 13, 1985	Jan. 20, 1989
Louis Sullivan	Mar. 1, 1989	January 1993
Donna Shalala	Jan. 22, 1993	.....

* Name changed from Department of Health, Education, and Welfare on May 14, 1980; separate Department of Education formed.

Administrators of the Federal Security Agency

Name	Dates of office
Paul V. McNutt	1939-45
Watson B. Miller	1945-47
Oscar R. Ewing	1947-53
Oveta Culp Hobby	January 1953-April 1953[1]

[1]The Department of Health, Education, and Welfare was established by act of Congress on Apr. 11, 1953.

Surgeons General of the Public Health Service

Name	Date of birth	Dates of office
John Maynard Woodworth	Aug. 15, 1837	April 1871--Mar. 14, 1879[1]
John B. Hamilton	Dec. 1, 1847	Apr. 3, 1879--May 31, 1891[2]
Walter Wyman	Aug. 17, 1848	June 1, 1891--Nov. 21, 1911[3]
Rupert Blue	May 30, 1867	Jan. 13, 1912--Mar. 1, 1920[4]
Hugh Smith Cumming	Aug. 17, 1869	Mar. 3, 1920--Jan. 31, 1936[5]
Thomas Parran	Sept. 28, 1892	Apr. 6, 1936--Apr. 5, 1948
Leonard A. Scheele	July 25, 1907	Apr. 6, 1948--Aug. 2, 1956
Leroy E. Burney	Dec. 31, 1906	Aug. 8, 1956--Jan. 29, 1961
Luther L. Terry	Sept. 15, 1911	Mar. 24, 1961--Oct. 1, 1965
William H. Stewart	May 19, 1921	Oct. 2, 1965--Aug. 1, 1969
Jesse L. Steinfeld	Jan. 6, 1927	Dec. 18, 1969--Jan. 20, 1973
Julius B. Richmond	Sept. 16, 1916	July 13, 1977--Jan. 20, 1981
C. Everett Koop	Oct. 14, 1916	Nov. 16, 1981--Oct. 1, 1988
Antonia Novello	Aug. 23, 1944	Mar. 9, 1989--Jun. 30, 1993
Joycelyn Elders	.....	Sept. 7, 1993--
Audrey F. Manley (Actg)	.....	

[1]Served as supervising surgeon of the Marine Hospital Service until Mar. 3, 1875, when his title was changed to supervising Surgeon General.
[2]Surgeon General, Marine Hospital Service.
[3]Surgeon General, Marine Hospital Service, and Surgeon General, Public Health and Marine Hospital Service (after July 1, 1902).
[4]Surgeon General, Public Health and Marine Hospital Service, and Surgeon General, PHS (after Aug. 14, 1912).
[5]Surgeon General, PHS

DHHS Assistant Secretaries for Health*

Name	Dates of office	
	From	To
Philip R. Lee	Nov. 2, 1965	Feb. 16, 1969
Roger O. Egeberg	July 14, 1969	June 30, 1971
Merlin K. DuVal	July 1, 1971	Dec. 15, 1972
Charles C. Edwards	Apr. 18, 1973	Jan. 21, 1975
Theodore Cooper	July 1, 1975	Jan. 20, 1977
Julius B. Richmond	July 13, 1977	Jan. 20, 1981
Edward N. Brandt, Jr.	May 14, 1981	Dec. 1984
James Mason (Actg)	Dec. 1984	June 1986
Robert E. Windom	June 23, 1986	Mar. 5, 1989
James O. Mason	Apr. 21, 1989	Jan. 20, 1992
Philip R. Lee	July 2, 1992	Jan. 31, 1997

*Title was changed from assistant secretary for health and scientific affairs, November 1972.

University and her M.D. in 1951 from Tulane University School of Medicine. She interned in medicine and surgery at Kings County Hospital, Brooklyn, and did residencies in pathology at Providence Hospital, Detroit; Tulane University School of Medicine; and the Clinical Center, NIH.

From 1957 to 1972, Dr. Kirschstein performed research in experimental pathology at the Division of Biologics Standards (now the Center for Biologics Evaluation and Research, FDA). During that time, she helped develop and refine tests to assure the safety of viral vaccines for such diseases as polio, measles, and rubella. Her work on polio led to selection of the Sabin vaccine for public use. For her role, she received the DHEW Superior Service Award in 1971.

In 1972 she became assistant director of the Division of Biologics Standards. That same year, when the division was transferred to the FDA as a bureau, she was appointed deputy director. She subsequently served as deputy associate commissioner for science, FDA, before being named NIGMS director. From September 1990 to September 1991, she was also acting associate director of the NIH for research on women's health.

Dr. Kirschstein has twice taken part in World Health Organization deliberations in Geneva, Switzerland, in 1965 as a member of the WHO Expert Group on International Requirements for Biological Substances, and in 1967 as a consultant on problems related to the use of live poliovirus oral vaccine.

She has received many honors and awards, including the PHS Superior Service Award, 1978; the Presidential Meritorious Executive Rank Award, 1980; election to the Institute of Medicine, 1982; the PHS Equal Opportunity Achievement Award, 1983; a doctor of science, honoris causa, degree from Mt. Sinai School of Medicine, 1984; the PHS Special Recognition Award, 1985; the Presidential Distinguished Executive Rank Award, 1985; the Distinguished Executive Service Award of the Senior Executive Association, 1985; an honorary doctor of laws degree from Atlanta University, 1985; an honorary doctor of science degree from the Medical College of Ohio, 1986; the Harvey Wiley FDA Commissioner's Special Citation, 1987; selection by the Office of Personnel Management as 1 of 10 outstanding executives and organizations for its first group of "Profiles in Excellence," 1989; the Dr. Nathan Davis Award from the AMA, 1990; an honorary doctor of humane letters from Long Island University in 1991; election as a fellow of the American Academy of Arts and Sciences, 1992; and the Public Service Award from the Federation of American Societies for Experimental Biology in 1993.

She is the author of more than 70 scientific papers in the fields of viral pathology, viral oncology, and the pathogenesis of infectious diseases.

Michael Gottesman, M.D.

A well-known and respected basic cancer researcher who has focused on multidrug resistance in human cells, Dr. Michael Gottesman was appointed NIH deputy director for intramural research (DDIR) in November 1993. He had been acting DDIR for the previous year and was acting director of the National Center for Human Genome Research from 1992 to 1993. He continues as chief of NCI's Laboratory of Cell Biology, a post he has held since 1990.

Born on October 7, 1946, in Jersey City, NJ, he received his B.A. degree from Harvard College in 1966 and earned his M.D. degree at Harvard Medical School in 1970.

In 1971 Dr. Gottesman came to NIH as a research associate in the National Institute of Arthritis, Metabolism and Digestive Diseases (now NIDDK), where he worked for 3 years. He spent a year as an assistant professor at Harvard Medical School and, together with his wife, joined the permanent staff of NCI in 1976. He became chief of the molecular cell genetics section, Laboratory of Molecular Biology, NCI, in 1980 and chief of the Laboratory of Cell Biology, NCI, in 1990.

At NIH, his research interests have ranged from how DNA is replicated in bacteria to how cancer cells elude chemotherapy. In the past several years--collaborating with Dr. Ira Pastan, chief of NCI's Laboratory of Molecular Biology, he has identified the human gene responsible for resistance of cancer cells to many of the most common anticancer drugs and has shown that this gene encodes a protein which acts to pump anticancer drugs out of drug-resistant human cancers.

This evidence supports the proposal, now widely accepted, that gp170 is an energy-dependent pump, ferrying molecules of toxins or of drugs out of the cell. For several years, Dr. Gottesman has been examining clinical applications of his gp170 findings using gene therapy, monoclonal antibodies, and reversing agents to fight MDR. He recently observed that derivatives of verapamil and other gp170 inhibitors reverse MDR in human renal carcinoma cells in vitro, and in transgenic mice.

His research has earned him many awards, including the Milken Family Foundation Award for Cancer Research, 1990; C.E. Alken Prize, 1991; Samuel G. Taylor III Award for Excellence in Cancer Research, 1991; Jefferson Cancer Institute Prize, 1991; and the Rosenthal Foundation Award, 1992. He was elected a fellow in the American Association for the Advancement of Science in 1988.

Dr. Gottesman is also a member of the American Association for Cancer Research, the American Society for Biochemistry and Molecular Biology, and the American Society for Cell Biology. He has served on several editorial boards including the *Journal of Cell Biology*; the *Journal of Biological Chemistry, Cellular Physiology and Biochemistry; Molecular Pharmacology; Molecular Biology of the Cell; Cancer Research; Cell Growth and Differentiation; Human Gene Therapy*; and *GenoMethods*.

He has also been involved in initiating several training and mentoring initiatives at NIH. He has been the coordinator of the NIH-Howard Hughes Medical Institute summer scholar program for high school students and has organized a program under the Foundation for Advanced Education in the Sciences to bring high school teachers to NIH to work in laboratories. As DDIR, he has instituted training for minority and disadvantaged students and loan repayment programs for clinical researchers at NIH.

Wendy Baldwin, Ph.D.

Dr. Wendy Baldwin was appointed NIH deputy director for extramural research in February 1994, after serving in an acting capacity since June 1993. She will guide the NIH institutes and centers in the development of policies for their extramural research and research training programs. She will also oversee--for NIH and PHS--programs aimed at protection of human subjects in research and the proper care and use of laboratory animals in scientific studies.

She has made significant scientific contributions, primarily in adolescent fertility, contraceptive practice, childbearing patterns, AIDS risk behaviors, and infant mortality. She has published widely and has served on many NIH panels and committees, including the panel on NIH research on antisocial, aggressive, and violence-related behaviors, as well as the NIH advisory committee on women's health issues.

Dr. Baldwin joined NIH in 1973 as a health scientist administrator with NICHD. In 1979 she became chief of NICHD's Demographic and Behavioral Sciences Branch in the Center for Population Research. She was named deputy director of NICHD in 1991, a post she held until her appointment as NIH deputy director for extramural research.

She earned her Ph.D. in demography in 1973 and her M.A. in 1970 from the University of Kentucky. She received her B.A. from Stetson University in 1967.

Among her professional activities, she served as a temporary advisor to the WHO task force for social science research on reproductive health, on a National Academy of Sciences panel on adolescent pregnancy, and on a scientifice advisory committee for demographic and health sciences. She is a past member several editorial boards.

Dr. Baldwin has received many professional awards from PHS, NIH, and outside organizations.

Part 2
The Organization

Office of the Director

The director of NIH gives overall leadership to NIH activities and maintains close liaison with the DHHS assistant secretary for health in matters relating to medical research, research training, health professions education and training, manpower resources, and biomedical communications.

The NIH director also maintains close communications with other constituents of DHHS in order to provide more effective program relationships.

To fulfill these responsibilities and obligations, the director is assisted by a professional executive and administrative staff.

A deputy director shares in the overall direction of the activities of the National Institutes of Health.

A deputy director for intramural research deals with the scientific policy problems of the research institutes and divisions and represents them in the overall policy councils of NIH. An associate director for intramural affairs and an assistant director for intramural planning aid in maintaining overall direction of all intramural research.

A deputy director for extramural research--in collaboration with an associate director for extramural affairs--directs the development and coordination of NIH policies and procedures for awarding funds in support of medical research and provides policy guidance for the Division of Research Grants, which administers and processes grant applications.

An associate director for disease prevention supervises medical technology assessment and transfer from the laboratory to the clinical setting. This assessment is provided through the Consensus Development Conference, under the Office of Medical Applications of Research.

The associate director for AIDS research formulates scientific policy and recommends allocation of resources for AIDS research at NIH.

An associate director for clinical care is adviser to the director on matters and policies pertaining to clinical research conducted or supported by NIH.

An associate director for research services is responsible for the management of technical and selected administrative services to all NIH components and provides national leadership in research safety policy and methodology. Four primary units function under the associate director--the Divisions of Engineering Services; Safety; Space Management; and Technical Services.

An associate director for science policy and legislation assesses the growth of medical research nationally and applies these findings to future program planning; evaluating external factors and trends affecting NIH activities, and evaluating legislative development relevant to NIH programs and policies. The associate director functions through two Divisions--Program Analysis and Legislative Analysis.

An associate director for administration guides NIH management procedures and activities; advises on, develops and implements policies, procedures and methods for budget, contracts and grants management, financial analysis, accounting, auditing, and personnel management functions. The ADA functions through seven divisions: Financial Management; Management Policy; Management Survey and Review; Personnel Management; Procurement; Logistics; and Contracts and Grants.

An associate director for communications is primary policy adviser on communications activities, including scientific and public information. The office is also responsible for overall direction, planning, and coordination of NIH information activities, and directs information liaison with DHHS and constituent agencies.

The Office of Recombinant DNA Activities (ORDA) was established in 1974 as a result of nationwide concerns over the safety of research involving the manipulation of genetic material. First located in the National Institute of General Medical Sciences, ORDA was transferred to the National Institute of Allergy and Infectious Diseases in September 1979, and in 1988, to the Office of the Director, NIH. ORDA is responsible for administering the Recombinant DNA Advisory Committee, and for ensuring compliance with the "NIH Guidelines for Research Involving Recombinant DNA Molecules." To this end, ORDA serves as a national focal point for information and for providing advice to organizations including biosafety committees, Federal agencies, state and local governments, and the biotechnology industry.

An associate director for research on women's health is responsible for ensuring that NIH-supported research focuses on issues pertinent to women's health, assuring that women are included in biomedical and behavioral research, and enhancing opportunities for women in biomedical careers. The associate director serves as director of the Office of Research on Women's Health and as codirector of the Women's Health Initiative.

National Cancer Institute

Mission

NCI's overall mission is to conduct and support research, training, health information dissemination, and other programs with respect to the cause, diagnosis, prevention, and treatment of cancer and the continuing care of cancer patients and the families of cancer patients.

The National Cancer Program consists of 1) an expanded, intensified, and coordinated cancer research program encompassing the research programs conducted and supported by the institute, and the related research programs of the other national research institutes, including an expanded and intensified research program for the prevention of cancer caused by occupational or environmental exposure to carcinogens, and 2) the other programs and activities of the institute.

The National Cancer Institute also conducts control research for the prevention, detection, diagnosis, and treatment of cancer and for the rehabilitation and continuing care needs of patients respecting cancer. All cancer prevention and control activities focus on reducing cancer incidence, morbidity, and mortality through an orderly sequence of research on interventions and their impact in defined populations to the broad application of the research results through demonstration and education programs.

NCI also supports:

- information and education programs to collect, identify, analyze and disseminate to cancer patients and their families, physicians and other health professionals, and the general public, information on cancer research, diagnosis, prevention and treatment (including nutrition programs for cancer patients and the relationship between nutrition and cancer).
- national cancer research and demonstration centers which conduct basic and clinical research into, training in, and demonstration of advanced diagnostic prevention and treatment methods.

Other mission activities include:

- Collaboration with voluntary organizations and other institutions and societies engaged

in cancer research and cancer education activities. Encouraging and coordinating cancer research by industrial concerns showing particular capability for such research.

- Support of cancer research outside the United States to benefit the American people, and training of American scientists abroad and foreign scientists in the U.S.
- Operation of an International Cancer Research Data Bank to collect, catalog, store, and disseminate the results of cancer research undertaken in any country for the use of any person in cancer research worldwide.
- Support for appropriate programs of education and training (including continuing education and laboratory and clinical research training). Authority to acquire, construct, improve, repair, operate, and maintain laboratories, other research facilities, equipment, and such other real or personal property as is determined necessary.
- Authority to make grants for construction or renovation of facilities, in consultation with the advisory council for the institute.

Important Events in NCI History

August 5, 1937--President Franklin D. Roosevelt signed the National Cancer Institute Act.

November 9, 1937--The National Advisory Cancer Council held its first meeting.

November 27, 1937--The Surgeon General awarded first grants-in-aid on the recommendation of the National Advisory Cancer Council.

January 3, 1938--The National Advisory Cancer Council recommended approval of first awards for fellowships in cancer research.

August 1940--The *Journal of the National Cancer Institute* published its first issue.

July 1, 1946--The cancer control program was established with appropriations to the states for support of cancer control activities. Staff was organized into six sections: biology, biochemistry, biophysics, chemotherapy, epidemiology, and pathology.

July 1, 1947--NCI reorganized to provide an expanded program of intramural cancer research, cancer research grants, and cancer control activities.

November 13, 1947--The Research Grants and Fellowship Branch was established. It became the administrative arm of the Advisory Council.

October 1948--A grants program to medical, dental, and osteopathic schools was initiated for improvement of training in the field of cancer research, diagnosis, and treatment.

July 2, 1953--NCI inaugurated a full-scale clinical research program in the new Clinical Center.

April 1955--The Cancer Chemotherapy National Service Center was established in the institute to coordinate the first national, voluntary, cooperative cancer chemotherapy program.

1957--The first malignancy (choriocarcinoma) was cured with chemotherapy at NCI.

November 1959--The *Journal of the National Cancer Institute* inaugurated a series of occasional publications as *Monographs* to be used for longer scientific communications.

September 13, 1960--The NCI director appointed an associate director for grants and training, associate director for field studies, and associate director for collaborative research.

January 12, 1961--The Laboratory of Viral Oncology was established to investigate the relationship of viruses to human cancer.

April 2, 1962--An exhibit, "Man Against Cancer," opened in Washington, D.C., to commemorate the institute's 25th anniversary and inaugurate Cancer Progress Year.

May 7, 1962--The Acute Leukemia Task Force held its first meeting. It focused the combined efforts and resources of scientists on studies of therapy of the acute leukemia patient, and was the forerunner of other task forces on specific forms of cancer.

October 25, 1962--The Human Cancer Virus Task Force held its first meeting. The task force, of scientists from NCI and other institutions, stimulated the development of special programs in viral oncology.

1963--Studies were initiated at NCI in Hodgkin's disease with combination chemotherapy.

December 1964--The report of the President's Commission on Heart Disease, Cancer, and Stroke was published.

January 11, 1966--NCI reorganized to coordinate related activities. Areas of three scientific directors were established: etiology, chemotherapy, and a group of discipline-oriented laboratories and branches referred to as general laboratories and clinics. Two associate directors were named for program and for extramural activities.

February 13, 1967--A cancer research center was established by the institute in Baltimore USPHS Hospital to conduct an integrated program of laboratory and clinical research.

April 27, 1970--At the request of Senator Ralph W. Yarborough, chairman of the Committee on Labor and Public Welfare, the Senate approved the establishment of the National Panel of Consultants on the Conquest of Cancer.

November 25, 1970--The national panel of consultants submitted to the Senate committee a report entitled "National Program for the Conquest of Cancer."

October 18, 1971--President Nixon converted the Army's former biological warfare facilities at Fort Detrick, Md., to house research activities on the causes, treatment and prevention of cancer.

December 23, 1971--President Nixon signed the National Cancer Act of 1971.

July 27, 1972--A Bureau-level organization was established for the National Cancer Institute, giving the institute and its components organizational status commensurate with the responsibilities bestowed on it by the National Cancer Act of 1971. Under the reorganization, NCI was composed of the Office of the Director and four divisions: Cancer Biology and Diagnosis; Cancer Cause and Prevention; Cancer Treatment; and Cancer Grants (renamed successively the Division of Cancer Research, Resources and Centers, and later the Division of Extramural Activities).

June 20, 1973--NCI director Dr. Frank J. Rauscher, Jr., announced that eight institutions were recognized as Comprehensive Cancer Centers to bring results of research as rapidly as possible to a maximum number of people. Additional centers were announced on Nov. 2, 1973, June 13, 1974, Oct. 18, 1974, Apr. 8, 1976, Dec. 30, 1976, July 27, 1978, and Mar. 2, 1979. There are now 20.

September 5, 1973--The President transmitted to Congress the first annual report of the director of the National Cancer Program, a 5-year strategic plan for the program, and the report of the National Cancer Advisory Board. Preparation and transmittal of the documents were mandated by the National Cancer Act of 1971.

September 10, 1974--The Division of Cancer Control and Rehabilitation was established to plan, direct, and coordinate an integrated program of cancer control and rehabilitation activities with the goal of identifying, testing, evaluating, demonstrating, communicating, and promoting the widespread use of available and new methods for reducing cancer incidence, morbidity, and mortality.

September 12, 1974--NCI made its first cancer control awards to state health departments for a 3-year program to screen low-income women for cancer of the uterine cervix. At its peak in 1978, the program had grown to a total of 32 states and territories.

December 17, 1974--NCI and the National Library of Medicine established CANCERLINE, a jointly developed computerized service to provide scientists across the country with information on cancer research projects and published findings.

December 19, 1974--The Clinical Cancer Education Program was announced to develop more innovative teaching methods in cancer prevention, diagnosis, treatment, and rehabilitation in schools of medicine, dentistry, osteopathy, and public health; affiliated teaching hospitals; and specialized cancer institutions.

1975--The Cooperative Minority Biomedical Program, as approved by the National Cancer Advisory Board, represented a cofunding effort by NCI to implement and foster cancer research through the DRR Minority Biomedical Research Support Program and the

NIGMS Minority Access to Research Careers Program.

August 5, 1977--NCI celebrated its 40th anniversary with a ceremony on the NIH campus. Senator Warren G. Magnuson of Washington who, as a member of the House of Representatives, introduced a bill to establish the NCI in 1937, sent a message stating: "Those one and a half million Americans who are alive today--cured of cancer--are ample justification for all that we've appropriated over the last 40 years."

1979--The first human RNA virus (HTLV-I) was discovered by NCI's Dr. Robert C. Gallo.

July 18, 1979--NCI and the National Naval Medical Center, Bethesda, Md., signed an agreement to cooperate in a cancer treatment research program.

July 10, 1980--HHS Secretary Patricia Roberts Harris approved institute-wide reorganization. A newly created Division of Resources, Centers, and Community Activities incorporated functions of the former Division of Cancer Control and Rehabilitation and programs for education, training, construction, cancer centers, and organ site research of the former Division of Cancer Research, Resources, and Centers (DCRRC). Other activities of the DCRRC were incorporated into the new Division of Extramural Activities.

April 27, 1981--A new Biological Response Modifiers Program was established in the Division of Cancer Treatment to investigate, develop and bring to clinical trials potential therapeutic agents that may alter biological responses that are important in the biology of cancer growth and metastasis.

September 1982--PDQ, a computerized database on cancer treatment information, became available nationwide via the National Library of Medicine's MEDLARS system.

December 16, 1982--NCI purchased what is now the R. A. Bloch International Cancer Information Center through generous donations to the NCI Gift Fund. This building houses the *Journal of the National Cancer Institute*; the Scientific Information Branch, which publishes *Cancer Treatment Reports* and *Cancer Treatment Symposia*; the International Cancer Research Data Bank; and PDQ.

July 16, 1983--NCI launched the Community Clinical Oncology Program (CCOP) to establish a cancer control effort which combines the expertise of community oncologists and the NCI clinical research programs. The CCOP initiative is designed to bring the advantages of clinical research to cancer patients in their own communities.

September 1983--The Office of International Affairs was reorganized to add a Scientific Information Branch and a Computer Communications Branch. The Scientific Information Branch is composed of a literature research section, cancer treatment reports section, *Journal of the National Cancer Institute* section, and the international cancer research data bank section.

Community Clinical Oncology Program, an NCI resource that links community-based physicians with cooperative groups and cancer centers for participation in institute-approved clinical trials, was created.

December 5, 1983--The name of the Division of Cancer Cause and Prevention was changed to the Division of Cancer Etiology (DCE).

The Division of Resources, Centers and Community Activities was renamed the Division of Cancer Prevention and Control (DCPC) to emphasize the division's roles in cancer prevention and control research.

1984--A policy statement regarding the relationship of the NCI, the pharmaceutical industry, and NCI-supported cooperative groups was developed. The statement articulates the need for collaboration between the NCI and the pharmaceutical industry in pursuing the joint development of anticancer drugs of mutual interest. It also sets forth guidelines for the handling of issues such as the joint sponsorship of trials, the sharing of information between sponsors, maintaining the confidentiality of certain classes of data, the funding of cooperative groups by drug companies, the review of protocols and the publication of results.

The Comprehensive Minority Biomedical Program, DEA, was established to widen the focus of the minority effort along lines of the programmatic thrusts of the institute, thereby giving it trans-NCI responsibilities.

The Cancer Control Science program was established in DCPC to develop programs in health promotion research and to stimulate widespread application of existing cancer control knowledge. Branches include health promotion sciences, cancer control applications and cancer training.

March 6, 1984--DHHS Secretary Margaret M. Heckler launched a new cancer prevention awareness program by NCI to inform the public about cancer risks and steps individuals can take to reduce risk.

April 1984--An NCI scientist, Dr. Robert C. Gallo, reported the isolation of a new group of viruses found in the helper T-cells of patients with AIDS or pre-AIDS symptoms, as well as from healthy individuals at high risk for developing AIDS. These viruses were ultimately named human immunodeficiency virus or HIV. This discovery made the control of blood-product-transmitted AIDS feasible by enabling the development of a simple test for the detection of AIDS-infected blood by blood banks and diagnostic laboratories.

August 1985--The Cancer Prevention Fellowship Program, one of the first formal postdoctoral research training programs in cancer prevention, began.

November 10, 1986--The International Cancer Information Center was established in the Office of International Affairs, NCI Office of the Director.

May 1987--As part of NIH's centennial celebration year, NCI commemorated its 50th anniversary.

October 15, 1987--The DCPC established the Laboratory for Nutrition and Cancer Research with the basic nutrition science section and the clinical/metabolic human studies section.

October 24, 1987--The Office of Technology Development was established in the NCI Office of the Director as the institute's focal point for the implementation of pertinent legislation, rules and regulations, and the administration of activities relating to collaborative agreements, inventions, patents, royalties, and associated matters.

October 26, 1987--The DCT abolished the following branches and/or sections and laboratory: the chromosome structure and function section in the Laboratory of Molecular Pharmacology; the Drug Evaluation Branch and its sections; the drug synthesis section and the acquisition section in the Drug Synthesis and Chemistry Branch; the fermentation section and the plant and animal products section in the Natural Products Branch; the chemical resources section, the analytical and product development section and the clinical products section in the Pharmaceutical Resources Branch; the Extramural Research and Resources Branch; and the Animal Genetics and Production Branch; the sections of the Information Technology Branch; the Laboratory of Experimental Therapeutics and Metabolism and its sections; the sections of the Laboratory of Pharmacology and Experimental Therapeutics.

The DCT changed the name of the Laboratory of Pharmacology and Experimental Therapeutics to the Laboratory of Biochemical Pharmacology. The division also established the Laboratory of Medicinal Chemistry, Pharmacology Branch, Biological Testing Branch, and Grants and Contracts Operations Branch.

1988--In DCT's Clinical Oncology Program, the Clinical Pharmacology Branch merged with the Medicine Branch.

The International Cancer Information Center established as separate office in the NCI Office of the Director.

January 1988--NCI journals *Cancer Treatment Reports* and *Journal of the National Cancer Institute* were consolidated into a biweekly *Journal of the National Cancer Institute*.

September 30, 1988--The first Consortium Cancer Center was established, comprised of three historically black medical schools. Component universities supported by this core grant--Charles R. Drew University of Medicine and Science in Los Angeles, Meharry Medical College in Nashville, and

Morehouse School of Medicine in Atlanta--focus their efforts on cancer prevention, control, epidemiology, and clinical trials.
April 1989--The NCI-initiated mechanism of supplementing research grants to encourage recruitment of minority scientists and science students into extramural research laboratories is published as an NIH-wide extramural program announcement. This initiative will be expanded to cover science students and scientists who are women or persons with disabilities.
May 22, 1989--NCI scientist Dr. Steven A. Rosenberg conducted the first human gene transfer trial using human tumor-infiltrating lymphocytes to which a foreign gene has been added.
September 14, 1990--Scientists from NCI and NHLBI conducted the first trial in which a copy of a faulty gene was inserted into white blood cells to reverse the immune deficiency it causes. This was the first human gene therapy trial and adenosine deaminase deficiency was treated.
December 19, 1990--The institute began its year-long celebration of the 20th anniversary of the National Cancer Act by inaugurating a series of articles in the *Journal of the National Cancer Institute*. The series described the growth in knowledge that has occured in cancer research since 1971.
January 29, 1991--The first human gene therapy to treat cancer was started. Patients with melanoma were treated with tumor-infiltrating lymphocytes to which a gene for tumor necrosis factor has been added.
September 24, 1991--Congress held a special hearing to commemorate the 20th anniversary of the National Cancer Act. Dr. Samuel A. Broder, NCI director, thanked Congress for its "consistent vision, leadership, and commitment to the goal of alleviating the death and suffering caused by cancer in this country."
October 1991--NCI began its Five-a-Day program, in partnership with the nonprofit group, Produce for Better Health, to encourage Americans to eat at least five fruits and vegetables a day.
December 18, 1992--Taxol (paclitaxel), an anticancer drug extracted from the bark of the Pacific yew, received approval by the FDA for the treatment of ovarian cancer that has failed other therapy. NCI spearheaded the development of the drug through collaboration with the USDA's Forest Service, the Department of the Interior's Bureau of Land Management, and Bristol-Myers Squibb Company, made possible by the Federal Technology Transfer Act of 1986.
November 1993--The Prostate, Lung, Colorectal, and Ovarian trial, designed to determine whether certain screening tests will reduce the number of deaths from these cancers, began recruiting 148,000 men and women, ages 55-74.
February 1995--The results of the Community Intervention Trial for Smoking Cessation were completed and published.
1995/1996--NCI leadership initiated a major reorganization, based on recommendations of the Ad Hoc Working Group of the National Cancer Advisory Board and NCI streamlining work groups and quality improvement teams. Two extramural divisions were created--the Division of Cancer Treatment, Diagnosis and Centers and the Division of Cancer Biology. Two intramural divisions were also created--the Division of Basic Sciences and the Division of Clinical Sciences--and one combined intramural/extramural division--the Division of Cancer Epidemiology and Genetics. The Divisions of Cancer Prevention and Control and Extramural Activities remain a part of the NCI structure, but in the extramural program.
May 30, 1997--The Breast Cancer Prevention Trial, testing the effectiveness of tamoxifen to prevent the disease, ended its 5-year recruitment. Results are expected in 2-3 years.

NCI Legislative Chronology

February 4, 1927--Senator M. M. Neely, West Virginia, introduced S. 5589, "To authorize a reward for the discovery of a successful cure for cancer, and to create a commission to inquire into and ascertain the success of such cure." The reward was to be $5 million.
March 7, 1928--Senator M. M. Neely introduced S. 3554, "To authorize the National Academy of Sciences to investigate the means and methods for affording Federal aid in discovering a cure for cancer and for other purposes."
April 23, 1929--Senator W. J. Harris, Georgia, introduced S. 466, "To authorize the Public Health Service and the National Academy of Sciences jointly to investigate the means and methods for affording Federal aid in discovering a cure for cancer and for other purposes."
May 29, 1929--Senator W. J. Harris introduced S. 4531, authorizing a survey in connection with the control of cancer and providing "That the Surgeon General of the Public Health Service is authorized and directed to make a general survey in connection with the control of cancer and submit a report thereon to the Congress as soon as practicable, together with his recommendations for necessary Federal legislation."
April 2, 1937--Senator Homer T. Bone of Washington introduced S. 2067, "Authorizing the Surgeon General of the Public Health Service to control and prevent the spread of the disease of cancer." It authorized an annual appropriation of $1 million.
April 12, 1937--Congressman Warren G. Magnuson of Washington introduced H.R. 6100, an identical bill to S. 2067.
April 29, 1937--Congressman Maury Maverick of Texas introduced H.R. 6767, "To promote research in the cause, prevention, and methods of diagnosis and treatment of cancer, to provide better facilities for the diagnosis and treatment of cancer, to establish a National Cancer Center in the Public Health Service, and for other purposes.'' It authorized an appropriation of $2,400,000 for the first year and $1 million annually thereafter. The legal office of PHS had helped draft the bill on the basis of suggestions made by Dr. Dudley Jackson of San Antonio, Tex.
July 8, 1937--A joint hearing of the Senate and House committees was conducted before a subcommittee on cancer research and a revised bill was written.
July 23, 1937--The National Cancer Institute Act was passed by Congress.
August 5, 1937--The National Cancer Institute Act, P.L. 244, 75th Congress, was signed by President Franklin D. Roosevelt, "To provide for, foster, and aid in coordinating research relating to cancer; to establish the National Cancer Institute; and for other purposes." An appropriation of $700,000 for each fiscal year was authorized.
March 28, 1938--House Joint Resolution 468, 75th Congress, was passed, "To dedicate the month of April in each year to a voluntary national program for the control of cancer."
July 1, 1944--The Public Health Service Act, P.L. 410, 78th Congress, provided that "The National Cancer Institute shall be a division in the National Institute of Health." The act also revised and consolidated many revisions into a single law. The limit of $700,000 annual appropriation was removed.
August 15, 1950--Public Law 692, 81st Congress, increased the term of office of National Advisory Cancer Council members from 3 to 4 years and the size of the Council from 6 to 12 members, exclusive of the ex officio members.
December 23, 1971--President Nixon signed P.L. 92-218-the National Cancer Act of 1971--providing increased authorities and responsibilities for the NCI director; initiating a National Cancer Program; establishing a 3-member President's Cancer Panel and a 23-member National Cancer Advisory Board, the latter replacing the National Advisory Cancer Council; authorizing the establishment of 15 new research, training, and demonstration cancer centers; establishing cancer control programs as necessary for cooperation with state and other health agencies in the diagnosis, prevention, and treatment of cancer; and providing for the collection, analysis, and dissemination of all data useful in the diagnosis, prevention, and treatment of cancer, including the establishment of an international cancer data research bank.
July 23, 1974--The National Cancer Act Amendments of 1974 (P.L. 93-352) were

signed by the President to improve the National Cancer Program and to authorize appropriations for the next three fiscal years. P.L. 93-352 also included provisions for disseminating information on nutrition as related to the therapy or causation of cancer, for trials of cytology test programs for the diagnosis of uterine cancer, and for peer review of grant applications and contract projects. It also established a President's Biomedical Research Panel.

August 1, 1977--The NCI mandate was extended for 1 year when the President signed the Health Planning and Health Services Research and Statistics Extension Act (P.L. 95-83).

November 9, 1978--The President signed the Community Mental Health Centers Act (P.L. 95-622) amending the National Cancer Act to emphasize education and demonstration programs in cancer treatment and prevention, and stipulating that NCI devote more resources to prevention, focusing particularly on environmental, dietary and occupational cancer causes.

December 17, 1980--The Health Programs Extension Act of 1980 (P.L. 96-538) was signed into law, extending NCI authorization for 3 years.

November 20, 1985--The Health Research Extension Act of 1985 (P.L. 99-158) was signed into law. It affirmed the special authorities of NCI and emphasized the importance of information dissemination to the public.

November 4, 1988--The Health Research Extension Act of 1988 (P.L. 100-607) was signed into law. The 2-year extension reaffirmed the special authorities of NCI and added information dissemination mandates, as well as a requirement to assess the incorporation of cancer treatments into clinical practice and the extent to which cancer patients receive such treatments. A representative from the Department of Energy was added to the National Cancer Advisory Board as an ex officio member.

June 10, 1993--The NIH Revitalization Act of 1993, P.L. 103-43, was signed. The act encouraged NCI to expand and intensify its efforts in breast cancer and other women's cancers and authorized increased appropriations. Similar language is included for prostate cancer. The institute is also directed to collaborate with NIEHS, to undertake a case control study to assess biological markers of environmental and other potential risk factors contributing to the incidence of breast cancer in specific counties in the Northeast. In FY 1994 NCI is directed to allocate 7 percent of its appropriation to cancer control, in FY 1995, 9 percent, and in FY 1996, 10 percent.

Directors of NCI

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
Carl Voegtlin	July 28, 1879	Jan. 13, 1938	July 31, 1943
Roscoe Roy Spencer	July 28, 1888	Aug. 1, 1943	July 1, 1947
Leonard Andrew Scheele	July 25, 1907	July 1, 1947	Apr. 6, 1948
John Roderick Heller	Feb. 27, 1905	May 15, 1948	July 1, 1960
Kenneth Milo Endicott	June 6, 1916	July 1, 1960	Nov. 10, 1969
Carl Gwin Baker	Nov. 27, 1920	July 13, 1970	May 5, 1972
Frank Joseph Rauscher, Jr.	May 24, 1931	May 5, 1972	Nov. 1, 1976
Arthur Canfield Upton	Feb. 27, 1923	July 29, 1977	Dec. 31, 1980
Vincent T. DeVita, Jr.	Mar. 7, 1935	July 9, 1980	Sept. 1, 1988
Samuel Broder	Feb. 24, 1945	Dec. 22, 1988	Apr. 1, 1995
Richard D. Klausner	Dec. 22, 1951	Aug. 1, 1995	

Biographical Sketch of NCI Director

Richard D. Klausner, M.D.

Dr. Klausner was born in New York City on December 22, 1951. He became the 11th director of NCI on August 1, 1995. Trained as an internist, he combined patient care and basic research in the early days of his career. He earned his undergraduate degree from Yale University in 1973 and his M.D. degree from Duke Medical School in 1976. He was a fellow in internal medicine at Duke Medical Center in 1976-1977.

From 1979 to 1981, following additional training in internal medicine at Massachusetts General Hospital, Dr. Klausner began his research career at NIH in NCI's Laboratory of Mathematical Biology. He worked at NIADDK from 1981 to 1984, when he became chief of the Cell Biology and Metabolism Branch at NICHD.

He is one of the most frequently cited scientists in the world in cellular and molecular biology. His work elucidated general and novel mechanisms for the regulation of complex genetic networks in human cells. He is a renowned leader in the study of iron metabolism and hematochromatosis, a disease of impaired regulation of iron uptake by body tissues, which is associated with subsequent development of cirrhosis and liver cancer. He also illuminated the structure and function of the T-cell antigen receptor, the central molecule of the immune system.

Dr. Klausner is an expert on how certain cell surface receptors enable antigens to activate the immune response, and he has contributed to an understanding of the molecular basis for how the cell recognized abnormal or incompletely synthesized antigens, and retrieves and eliminates them. His studies illuminated novel pathways by which molecules traffic and speak to each other within the cell. Most recently, he has collaborated with NCI scientists to study the VHL gene, a member of a new class of tumor suppressor genes, which play a key role in the development of human kidney cancer.

His research has been recognized with numerous awards and honors, including the Outstanding Investigator Award from the American Federation of Clinical Research and the William Damashek Prize for major discoveries in hematology. He was elected to the National Academy of Sciences in 1993 and the American Academy of Arts and Sciences in 1995.

Dr. Klausner has served on the editorial boards of several scientific journals including *Chemistry and Biology*, *Analytical Chemistry*, *New Biologist*, *Cell*, the *Annual Review of Cell Biology*, and the *Journal of Cell Biology*. He is a past president of the American Society of Clinical Investigation and has been chairman of the National Science Education Standards Projects of the National Academy of Science, overseeing the first comprehensive process to provide a vision of scientific literacy in the American educational system and the criteria required to achieve it. He is the author of a textbook of medical immunology and of a widely use textbook of internal medicine.

Research Programs

The NCI research programs take place in three settings: the laboratory, the clinic, and the community. In the laboratory, research is pursued on the biology of cancer, the fundamental properties of cancer-causing agents and processes, and the body's defense against and response to cancer. In the clinic, patient-oriented research is carried out concerning prevention, detection, diagnosis, treatment, and rehabilitation. In the community, research is carried out on the causes, risks, predispositions, incidence, and behavioral aspects of cancer.

The components of this research triad interact. For example, population- or community-based research on the effects of exposure to a potential cancer-causing agent links to the laboratory where an understanding of the agent's effect on the cell can be explored. Through these linkages, NCI-funded research has identified a sexually transmitted papillomavirus as a primary cause of cervical cancer and subsequently explained why only certain viral subtypes are cancer-causing; and NCI-funded research has established the relationship between asbestos and mesotheliomas, between reproductive variables such as late menopause and breast cancer, and between dietary factors and a variety of cancers.

Likewise, community-based research on

family clusters of cancers can lead to the isolation of the specific genes responsible for inherited cancer syndromes. The identification of specific genetic pathways in cells studied in the laboratory then can be used to predict the course of a patient's disease and his or her response to therapeutic interventions, or to find ways to detect these cancers very early in their development.

Research Areas

There are four fundamental cancer research areas—in effect four basic goals of research: an understanding of cancer biology; identifying who is at risk for cancer and why; developing interventions to prevent, detect, diagnose, and treat cancer, and to enhance survivorship from cancer; and bringing research discoveries to the public and to practice.

Cancer Biology

The most remarkable progress in the last 25 years has been in knowledge of cancer biology. Researchers are finally beginning to understand what is required to turn a normal cell into a cancer cell. Cancer arises when a single cell changes so that it divides continuously, released from the controls that constrain the replication of normal cells. This transformation is due to changes in the function and activity of genes--segments of DNA containing the information that directs a cell to make a particular protein product.

Of the 100,000 genes found in the human genome, only the altered activities of a small number of genes are responsible for transforming a normal, well-behaved cell—be it in the breast, brain, blood, colon, prostate or other organ—into a cancer cell. Identifying these "cancer genes" defines the central scientific hunt in cancer biology. Their identification provides an unprecedented window into the nature of cancer. These genes normally function to instruct cells to produce accelerators that drive cells to proliferate, brakes that control proliferation, or mechanisms that underlie the repair of DNA damage or the elimination of damaged cells. Some individuals inherit an altered form of a cancer gene. These individuals carry a very high lifetime risk of developing cancer because fewer subsequent changes in DNA are required to take place in one of the trillions of cells in our bodies to transform that cell into a cancer cell.

DNA changes are the fundamental cause of all cancers. These changes can occur due to chemicals, viruses, radiation, and mistakes made each day in the course of duplicating the 3 billion units in our DNA when a cell divides. DNA, the molecule of life, is very vulnerable to damage, but each cell has the remarkable ability to recognize damage and correct it. The changes in DNA required to produce cancer result from the imbalance between damage and the cell's ability to repair the damage. When a normal cell recognizes damage to its DNA, it stops the process of growth and division called the cell cycle. A normal cell either repairs the damage or, if it fails, undergoes programmed cell death (apoptosis). In the development of cancer, checkpoint controls are lost and the cell continues to divide, transmitting its damaged DNA to its descendants. It is for this reason that cancer is beginning to be seen as a problem of genetic instability.

No one genetic alteration, however, is enough to make a normal, healthy cell a cancer cell. Rather, an accumulation of changes during the lifetime of a cell in a relatively small number of genes is required. This understanding allows us to begin to define the development and evolution of cancer from predisposition to precancer to cancer. Each cancer is ultimately defined by its particular pattern of altered and normal gene activity. This pattern determines the cancer's rate of growth, tendency to spread, responsiveness to hormones and therapies, and defines the ability of a person's immune system to recognize and respond to a cancer. These patterns will define what each cancer is and how many different cancers there are. By defining these molecular patterns, researchers are beginning to be able to describe what distinguishes each cancer from its normal counterpart. Advances in the ability to detect, diagnose, and treat each cancer will most likely be found in these differences.

Cancer Risk

Research on cancer risk quantifies the risk of developing cancer in various populations and strives to identify the factors responsible for these risks. Research in this area is critical to linking knowledge of biological processes to the detection, management, and ultimately, prevention of cancer. Studying people who are at high risk of cancer is particularly important, because it may be possible to identify more readily the factors influencing risk and to assess means for prevention and risk reduction. Behavioral scientists also contribute to understanding risk by studying how people perceive cancer-related risks and by learning how to motivate health professionals and high-risk persons to practice cancer risk reduction strategies.

Epidemiology is the principal discipline used to study cancer patterns in the population and the determinants of cancer risk. Epidemiologists have uncovered distinct cancer patterns among various population groups. For example, African American men have the highest prostate cancer risk of any group in the world, while men in Asian countries have a relatively low risk. Similarly, women in most Asian countries have the lowest rates of breast cancer, while those in the West have the highest. Interestingly, when Asian women migrate to the United States, their breast cancer risk rises over several generations until it matches that found in U.S. white women. These striking variations among populations have proven particularly useful in targeting further epidemiologic research into the causes of cancer. These studies underlie the commitment of the NCI to address the burden of cancer in all population groups in the United States to assure that all benefit from our research.

The epidemiologic approach has been successful in identifying many factors that increase cancer risk, some of which are environmental and lifestyle-related, while others are part of a person's genetic makeup. With the exception of a few genetic conditions, however, it is still not possible to predict with any degree of certainty that a person having one or more of these factors will develop cancer. This uncertainty is related to the need for a number of alterations to accumulate in the genetic material (DNA) of a single cell for that cell to be transformed into a malignant state.

The single most important exposure that increases cancer risk is the use of tobacco products, particularly cigarette smoking. Smoking is believed to contribute to more than 30 percent of all cancer deaths. In addition, certain aspects of the diet, particularly diets lacking in fruits and vegetables or high in fats, appear to be important contributors to cancer risk. An excess risk of cancer also has been linked to alcohol consumption, radiation (e.g., ultraviolet- and x-rays), certain occupational exposures (e.g., asbestos), environmental pollution (e.g., arsenic), some pharmaceutical agents (e.g., estrogenic drugs), certain viral infections (e.g., human immunodeficiency virus, and human papilloma virus [HPV]), and hormonal factors. In addition, epidemiology plays a key role in revealing inherited cancer predisposition syndromes, as are seen in women who inherit alterations in the BRCA1 gene.

With recent major advances in molecular biology, a strategy called molecular epidemiology has emerged, combining the strengths of epidemiology with sensitive laboratory probes and providing new insights into genetic susceptibility and gene-environment interactions. This kind of interdisciplinary approach promises to elucidate the risk profiles and biologic mechanisms involved in cancer etiology, making it possible to predict cancer risk with greater certainty.

Cancer Interventions

Ultimately, the purpose of understanding tumor biology and identifying cancer risk is to uncover effective ways to intervene in the cancer process. Important advances in both areas are leading to new strategies to prevent, detect, diagnose, and treat cancer.

Our ability to prevent cancer depends on

identifying and removing (or at least reversing the effects of) specific risk factors. Clearly, the most important of these is tobacco use. The NCI has strongly supported recent initiatives to avert the initiation of tobacco use among children and teenagers and continues to develop a variety of approaches to cessation among those already addicted. The effect of dietary modification and administration of preventive agents to forestall the occurrence of cancer in high-risk populations is under study. The testing of tamoxifen as a breast cancer preventive in women at high risk for breast cancer is one approach. It should be quite clear, however, that major improvements in chemoprevention will depend on a better understanding of the fundamental mechanisms of carcinogenesis--the process by which normal cells are induced to become malignant.

Researchers have learned to see inside the body of a living human being with a precision that could not have been anticipated by a previous generation of physicians. Computed tomography, magnetic resonance imaging, and ultrasonography simply did not exist as useful clinical tools 25 years ago. Their development depended on first learning how the body interacts with x-rays, magnetic fields, and sound waves, and then figuring out how to create images from these interactions. These technologies permit doctors to locate internal tumors with unprecedented accuracy and to biopsy internal organs without the need for major surgical procedures. There is every reason to believe that further improvement in their powers of resolution will enhance the ability to detect small tumors even earlier than is possible with currently available method such as x-ray mammography. Invasive procedures, such as colonoscopy and bronchoscopy, are on the verge of giving way to "virtual" procedures involving the imaging of these internal structures without any actual invasion of the body by tubes or scopes.

The diagnosis of cancer depends on the microscopic appearance of tissue samples taken from growths or other suspicious lesions in the body. Advances in biological knowledge have improved our ability to subclassify cancers into accurate categories. For example, a better understanding of normal immune system development and biology has led directly to molecular techniques for classifying, for the first time, immune system tumors (lymphomas). More precise classification of cancers is important because it will lead to more precise prediction of clinical outcome for patients and to the discovery of more effective therapies. The experience with lymphoma serves as a model for what will very likely occur in a variety of malignancies. Tumor diagnosis and classification will be revolutionized in the coming years by application of emerging knowledge in molecular genetics.

NCI Appropriations--Grants and Direct Operations

Fiscal year	Total grants	Direct operations	Total
	[Amounts in thousands of dollars]		
1950	$ 14,400	$ 4,500	$ 18,900
1951	15,217	4,869	20,086
1952	14,640	5,016	19,656
1953	12,220	5,667	17,887
1954	14,324	5,913	20,237
1955	15,096	6,641	21,737
1956	16,246	8,732	24,978
1957	32,672	15,760	48,432
1958	31,134	25,268	56,402
1959	39,941	35,327	75,268
1960	49,935	41,322	91,257
1961	68,183	42,817	111,000
1962	86,855	55,981	142,836
1963	89,796	65,946	155,742
1964	82,187	62,153	144,340
1965[1]	75,282	74,729	150,011
1966	83,406	80,362	163,768
1967	92,788	82,868	175,656
1968	98,993	84,363	183,356
1969	98,546	86,603	185,149
1970	99,810	90,676	190,486
1971	109,983	123,177	233,160
1972	142,733	236,061	378,794
1973	216,642	219,363	492,205
1974[2]	232,652	318,540	551,192
1975	337,613	354,053	691,666
1976	353,764	407,963	761,727
TQ[3]	.....	.....	152,901
1977	382,876	432,124	815,000
1978	408,832	463,556	872,388
1979	454,702	482,427	937,129
1980	475,372	524,497	999,869
1981	523,481	465,874	989,355
1982	520,247	466,370	986,617
1983	572,325	415,317	987,642
1984	643,876	437,705	1,081,581
1985	.....	.....	1,183,806
1986	.....	.....	1,264,159
1987[4]	.....	.....	1,402,837
1988[4]	.....	.....	1,469,327
1989	.....	.....	1,593,536
1990	.....	.....	1,664,000
1991	.....	.....	1,743,250
1992	.....	.....	1,989,278
1993	.....	.....	2,007,483
1994	.....	.....	2,082,267
1995	.....	.....	2,135,119
1996	.....	.....	2,251,084
1997	.....	.....	2,382,532

[1] AIncludes special appropriations for virus-leukemia development program.
[2] Does not reflect reduction authorized by P.L. 93-192.
[3] Transitional quarter.
[4] Authorized under omnibus continuing resolution.

The past quarter century has seen major progress in the ability to treat certain cancers. In addition to well-publicized improvements in the cure rates for many uncommon tumors, such as Hodgkin's disease, certain lymphomas, testicular cancer, and a variety of childhood cancers, adding chemotherapy to surgery and/or radiation has increased the cure rates for patients with breast and colorectal cancer. High-dose chemotherapy with stem-cell rescue is effective in the leukemias and is undergoing definitive testing in breast cancer.

The application of molecular biology to the drug discovery process has ushered in the era of biological therapy by permitting the large-scale production of so-called "recombinant" proteins. Following directly from this approach, the availability of interferon-alpha has markedly improved the outlook for patients with a rare form of leukemia. Both interferon and interleukin-2 provide improved tumor shrinkage for some patients with kidney cancer. The availability of bone-marrow stimulatory factors has enhanced the quality of supportive care by mitigating the toxicity of chemotherapy to the blood elements. Over the past 15 years, the formidable problem of treatment-related nausea and vomiting has been markedly lessened by the development of truly effective drugs that reduce this side effect.

NCI is committed to research to improve the quality of life for those who develop cancer. As treatment becomes increasingly effective in the coming years, the emergence of certain problems associated with surviving cancer will continue to be seen. These are of two general types. The first are the challenges to an optimal quality of life posed by the effects of cancer treatment itself.

Although most acute side effects of treatment are rapidly reversible, some, such as the loss of a body part, have a lasting impact. The widespread use of techniques such as breast reconstruction, conservative surgery, and customized limb prostheses have greatly improved the emotional and functional outlook for survivors of breast and bone cancer. The knowledge, gained in a landmark clinical trial, that chemotherapy followed by radiation treatment is as effective as total removal of the voicebox for cancer of the larynx has made preservation of natural speech possible for many patients with this condition. The recent FDA approval of effective drugs for protecting against the cardiac toxicity of the anthracycline antibiotics and the kidney toxicity of cisplatin can be expected to reduce the overall incidence of two particularly troublesome chronic effects of chemotherapy.

The second general problem is the propensity of many cancer survivors to develop second cancers at the same or other body sites. In some cases, this is a treatment effect; many current therapies that effectively treat the patient's primary cancer unfortunately also promote the development of second cancers in a small fraction of people who receive them. So, for example, women who have received radiation therapy to the chest for the treatment of Hodgkin's disease are at increased risk for developing breast cancer; and certain chemotherapy regimens are associated with the late appearance of acute leukemia in some patients who survive for years after the treatment. Sometimes, however, the development of a second cancer stems from influences having nothing to do with the therapy. Patients who survive a first cancer of the lung or oral cavity, for example, have a high incidence of subsequent tumors at those sites, probably because of the long-lasting carcinogenic influences of tobacco. Inherited risk may also play a role. Some

breast, ovarian, and colorectal cancer patients have a genetic predisposition to those cancers and are likely to develop other primary cancers. The solution to these persistent problems clearly is to discover more targeted and less toxic treatments and to develop better surveillance and prevention strategies for people whose risk is elevated for reasons unrelated to treatment.

Psychosocial and behavioral research has fundamental contributions to make to all aspects of cancer survivorship, both in improving the quality of life for cancer patients as well as those at increased risk of developing cancer. Psychosocial research investigates how cancer affects quality of life and finds ways to address survivors' needs so they can meet the everyday demands of life and return to a productive lifestyle. NCI is committed to such research to complement its cancer prevention, detection, and treatment research programs. This research will assume even greater importance as genetic advances pose difficult prevention and treatment choices.

Cancer Control

Cancer control research bridges the gap between laboratory, clinical and population-based research, and health care by focusing on how to bring our discoveries to the practice of cancer prevention, detection, treatment, and rehabilitation. Effective application is a challenge well-illustrated by the fact that significant smoking rate reductions have taken over 30 years to achieve since the first Surgeon General's report that showed conclusively the causal link between smoking and cancer.

The science of cancer control is necessarily multidisciplinary and involves behavioral research, epidemiology, health services research, and communication. A cross-cutting theme is to identify the environmental, genetic, physiological, and psychosocial determinants of health, in order to achieve the adoption of new behaviors that can reduce the risk of cancer or improve the prognosis for persons with cancer.

Behavioral research is central to cancer control. A large proportion of cancer is caused or linked to behaviors such as smoking or diet. Through behavioral research, the behavior of individuals and health care professionals can be modified to include the adoption or promotion of healthy practices, such as smoking cessation, adoption of a low-fat, high-fiber, balanced diet, and practicing cancer screening regimens. The development and rigorous evaluation of smoking cessation interventions is urgently needed to assist the 45 million Americans who currently smoke, particularly those who smoke heavily. Research is under way to integrate effective pharmacotherapies with self-help approaches that address both the addictive and behavioral aspects of smoking. Of equal concern is developing strategies to prevent smoking among adolescents. To this end, behavioral scientists are trying to understand why African American adolescents are avoiding tobacco while white youths have been more resistant to messages about the harms of tobacco.

An important aspect of cancer control research is finding those factors that facilitate adoption of recommended regimens. This requires understanding the population in need. Regimens must be sensitive to the economic, cultural, ethnic and social forces acting upon populations. For example, to increase the adoption of Pap smears, which can prevent needless deaths from cervical cancer, the practices and customs of individuals, their communities, and health care professionals must be understood, and interventions tailored appropriately.

Cancer control research often begins by studying the patterns of cancer in populations through epidemiological studies or through the NCI surveillance system that monitors cancer incidence, mortality, and survival. Evaluating cancer patterns provides insight into who is developing cancer and what factors may have contributed to their disease. Researchers examine not only the changing burden of cancer, but also the public's and health profession's knowledge, attitudes, and practices related to cancer prevention, early detection, treatment, and rehabilitation. All of this information is essential for designing and evaluating interventions that may reduce the cancer burden. For example, surveillance data have shown clearly that there are survival differences between African American and white populations. Research is under way to identify the factors underlying these differences.

Effective and widespread communication plays a critical part in applying the knowledge gained in biology, epidemiology, and intervention research. The NCI supports research on cancer communication as well as innovative programs to provide information on cancer to the public and to the Nation's health professionals. Our scientific journal, the *Journal of the National Cancer Institute*, is one of the premier cancer journals in the world. Although designed primarily to facilitate communication between scientists and clinicians, the journal is often cited in the popular press and therefore is an important channel for public information. The NCI also supports communications between scientists, physicians, and the public through its nationwide Cancer Information Service (1-800-4-CANCER) and the PDQ computer-based cancer and clinical trials information system. These communication systems provide Americans—patients, the public, and physicians—with the most current information possible on cancer treatments and on effective prevention, early detection, and supportive care technologies.

New challenges for cancer control research abound. The evolving health care system poses the challenge of how to introduce cancer discoveries in these settings, and especially important, to find ways that cancer research can be directly integrated into health care through clinical studies. Developing cost-effective cancer interventions is essential and is an important part of cancer-related health services research. Discoveries in genetics and clinical science pose special challenges for cancer control. For example, with the advent of more precise and individual-specific ways of assessing the risk of developing cancer, researchers are faced with an array of new challenges in living with and understanding risk, and with tailoring prevention, detection, and treatment to individual needs.

Indeed, each research advance brings its own challenges which must be met to realize the promise of research.

National Eye Institute

Mission

Conducts, fosters, and supports basic and applied research, including clinical trials, related to the cause, natural history, prevention, diagnosis, and treatment of disorders of the eye and visual system, and in related fields (including visual impairment and its rehabilitation) through:

- Research performed in its own laboratories and clinics;
- A program of research grants, individual and institutional research training awards, career development awards, core grants, and contracts to public and private research institutions and organizations;
- Cooperation and collaboration with professional, commercial, voluntary, and philanthropic organizations concerned with vision research and training, disease prevention and health promotion, and the special health problems of the visually impaired and disabled and blind;
- Collection and dissemination of information on ongoing research and findings in these areas;
- Cooperation and collaboration with domestic and international organizations in worldwide prevention of blindness programs and projects.

Important Events in NEI History

August 16, 1968--Public Law 90-489 authorized formation of the National Eye Institute.

December 26, 1968--The National Eye Institute was established.

April 3-4, 1969--The National Advisory Eye Council held its first meeting.

January 11, 1970--Dr. Carl Kupfer was appointed NEI director.

December 15, 1970--Reorganization of NEI resulted in the formation of an Office of Biometry and Epidemiology; an Office of the Director of Intramural Research; and a Laboratory of Vision Research and a Clinical Branch as the foci of intramural research.
April 1975--Publication of the National Advisory Eye Council's report, *Vision Research Program Planning*, was the first comprehensive assessment of major needs and opportunities in vision research in the United States.
April 1978--Publication of the National Advisory Eye Council's 5-year plan, *Vision Research: 1978-1982*, included review and analysis of vision research and research training in the U. S. and discussion of future priorities.
September 1978--A Laboratory of Sensorimotor Research was established within the intramural research program.
November 1978--Public Law 95-623, Health Services Research, Health Statistics, and Health Care Technology Act, authorized NEI to carry out a grants program for construction or renovation of public and nonprofit private vision research facilities.
June 1981--A Laboratory of Molecular and Developmental Biology was established within the intramural research program.
May 1983--Publication of the National Advisory Eye Council's second 5-year plan (1983-87) recommended future NEI programs.
March 1984--A Laboratory of Ophthalmic Pathology was established within the intramural program.
July 19, 1984--The Office of Biometry and Epidemiology was transferred out of the Office of the Director and established as the Biometry and Epidemiology Program.
August 1985--An Intramural Research Program reorganization abolished the Laboratory of Vision Research and created the Laboratories of Mechanisms of Ocular Diseases; Retinal Cell and Molecular Biology; and Immunology.
1987--The National Advisory Eye Council's, *Vision Research--A National Plan: 1983-1987, 1987 Evaluation and Update*, discussed accomplishments since the 1983-87 plan was published, evaluated the status of ongoing NEI-supported research activities, and revised program priorities for the next 2 years.
December 1987--The Collaborative Clinical Vision Research Branch was established to provide overall scientific management and administration for NEI grants, contracts, and cooperative agreements supporting clinical trials and epidemiologic studies.
1988--NEI's fiscal year appropriation included funds that enabled the institute to increase its commitment to the prevention of blindness through public and professional education programs and the encouragement of regular eye examinations. These education efforts are part of a National Eye Health Education Program.
February 1989--The Office of International Program Activities was created to enhance coordination of the NEI's international activities, particularly those relating to cooperation with nongovernmental organizations, international agencies, and the international components of other Federal agencies.
April 7, 1989--The Office of Planning and Reporting was renamed the Office of Science Policy and Legislation.
February 10, 1990--The Ophthalmic Genetics and Clinical Services Branch was established within the intramural research program.
June 1991--A Laboratory of Ocular Therapeutics was established.
December 1991--NEI launched the National Eye Health Education Program.
Spring 1993-Spring 1995--A "Celebration of Vision Research" commemorated the NEI's 25th anniversary.
June 1993--The NEI and its advisory body, the National Advisory Eye Council (NAEC), produced and distributed its sixth long-range plan, *Vision Research--A National Plan: 1994-1998*, that contained policy recommendations and scientific program priorities. This is the latest in a series of national vision research plans that began in 1975 and have been updated at 3- to 5-year intervals. Over the next 5 years, NEI will monitor how closely the Institute's actual program development matches the plan's recommendations.
October 17, 1995--The NEI launched, *Ojo con su vision*, a diabetic eye disease program for Hispanics.

Biographical Sketch of NEI Director Carl Kupfer, M.D.

Dr. Kupfer became the institute's first director January 11, 1970. He was formerly professor and chairman of the department of ophthalmology, University of Washington Medical School, Seattle.

Born on February 9, 1928, in New York City, Dr. Kupfer received his A.B. degree from Yale University in 1948 and his M.D. from Johns Hopkins University School of Medicine in 1952. He completed his internship and residency at the Wilmer Eye Institute, and Johns Hopkins Hospital, and was selected to train for 1 year as a research fellow in ophthalmology at the Wilmer Eye Institute and for a second year at Harvard Medical School.

His interest and accomplishments in ophthalmology are numerous. His research in glaucoma has included studies of the circulation of aqueous humor, histopathologic examination of eyes stressed by elevated eye pressures, and developmental anatomy of the eye. He has probed the problems of amblyopia exanopsia and has contributed important papers on the use of nitrogen mustard for treatment of retinoblastoma, transcorneal electrical potential, corneal fluid pressures and the developmental histology and histochemistry of the neuromuscular junction. He has also studied the neural pathways from the eye to the brain. More recently, he has played a leadership role in fostering the use of well-designed clinical trials in ophthalmology.

Dr. Kupfer was on the *American Journal of Ophthalmology* editorial board . He was a member of the NIH Vision Research Training Committee, and the Neurology Program Project B committee. He currently serves on the advisory committee on basic and clinical research of the National Society to Prevent Blindness and is a member of the scientific advisory committee of Fight for Sight, Inc. He is also active in several international organizations involved in blindness prevention. He is scientific adviser to the World Health Organization on its program advisory group for the prevention of blindness and he is on the WHO expert advisory panel on trachoma and prevention of blindness.

In 1977 he was given the Public Service Award in Ophthalmology by the American Academy of Ophthalmology. He was elected to the Society of Scholars at Johns Hopkins University in 1982. Presently, he is a member of the Institute of Medicine, NAS. Civil Service honors include the HEW secretary's Special Citation "in recognition of his outstanding performance in the development of the National Eye Institute" in 1972. The following year Dr. Kupfer received the HEW Superior Service Award for "... accomplishment in developing NEI into an effective program for improving the visual health of the American people."

In 1983 Dr. Kupfer was elected president of the International Agency for the Prevention of Blindness, a multinational consortium committed to reducing the worldwide toll of blinding eye disease. He completed his term in November 1990.

He received the Pisart Vision Award in 1984, given by the Lighthouse, the New York Association for the Blind, in recognition of his outstanding contributions to vision research as founding director of NEI.

In recognition of his leadership role in vision research, Fight For Sight, Inc., awarded Dr. Kupfer the Mildred Weisenfeld Award for Excellence in Ophthalmology in 1987. In 1988 he received the Health for All Medal from the World Health Organization for his prevention of blindness activities as president of the International Agency for the Prevention of Blindness. In 1990 he received the Presidential Distinguished Executive Rank Award.

From May 1991 to August 1992, he served as the acting NIH deputy director for intramural research. In addition, he was named the 1992 recipient of the Lions

NEI Appropriations--Grants and Direct Operations

Fiscal year	Total grants[1]	Direct operations[2]	Total
	[Amounts in thousands of dollars]		
1970	$ 22,141	$ 2,201	$ 24,342
1971	25,428	4,604	30,032
1972	29,939	7,194	37,133
1973	30,802	7,760	38,562
1974	32,746	8,885	41,631
1975	34,282	9,851	44,133
1976	40,150	10,062	50,212
1977	50,664	13,336	64,000
1978	69,373	16,027	85,400
1979	86,551	18,641	105,192
1980	93,329	19,660	[1]112,989
1981	97,852	20,131	117,983
1982	104,333	23,041	127,374
1983	115,723	26,178	141,901
1984	126,683	28,448	155,131
1985	150,210	31,468	181,678
1986	159,525	27,157	186,682
1987	184,815	31,822	216,637
1988	190,541	34,406	224,947
1989	193,890	37,340	231,230
1990	198,843	37,690	236,533
1991	211,932	41,306	253,238
1992	224,250	45,728	269,978
1993	229,961	45,407	275,368
1994	236,827	48,167	285,295
1995	249,769	49,614	299,383
1996	262,050	50,958	313,008
1997	277,721	53,885	331,606

[1] Includes construction funds.
[2] Includes contracts, intramural laboratory and clinical research, the Biometry and Epidemiology Program, program management, and the NIH Management Fund assessment.

Humanitarian Award, the highest honor presented by the Lions Club International.

He received the 1995 "Person of Vision" award by Prevent Blindness America, the Nation's oldest voluntary health organization dedicated to preserving sight and fighting vision loss.

Major Programs

The NEI's extramural research activities are organized into seven areas: retinal diseases; corneal diseases; lens and cataract; glaucoma; strabismus, amblyopia, and visual processing; low vision and its rehabilitation; and collaborative clinical research.

Retinal Diseases

NEI-supported investigations include studies of the development, molecular and cell biology, molecular genetics, and metabolism of the photoreceptor cells and their dependence on the underlying retinal pigment epithelium; the mechanism of the retina's response to light and the initial processing of information that is transmitted to the visual centers of the brain; the pathogenesis of diabetic retinopathy; the fundamental causes of and etiologicfactors responsible for uveitis; the molecular genetic mechanisms responsible for producing retinoblastoma and ocular melanoma; the characterization at the molecular level of the genes responsible for retinitis pigmentosa, age-related macular degeneration, and related disorders; and, the cellular and molecular events that accompany retinal detachment.

Corneal Diseases

NEI-supported projects include studies of the regulation of genes that express proteins unique to corneal tissue; the details of the macromolecular and supramolecular assembly of extracellular corneal matrices; the characterization of cytokines and cell surface receptors which interact with corneal cells, pathogens, and blood-borne cells; the creation and use of transgenic animals to study corneal diseases; the mechanisms that maintain corneal hydration and transparency; the physiologic basis for immune privilege in the cornea; corneal wound healing; the biomechanics of the cornea; the cellular and molecular mechanisms by which corneal transplants are rejected; and, the role of specific viral genes in the establishment, maintenance, and reactivation of corneal herpetic infections.

Lens and Cataract

NEI-supported research includes studies of the development and aging of the normal lens of the eye; the identification, at the cellular and molecular level, of those components that maintain the transparency and proper shape of the lens; the control of lens cell division; the delineation of the structural and regulatory sequences of crystallin and noncrystallin lens genes; the impact of oxidative insult on the lens; and, the role of aldose reductase in human cataractogenesis.

Glaucoma

NEI supports a range of research designed to better understand the basic pathology underlying glaucoma, the discovery of drugs and surgical techniques for its treatment, and the development of procedures for earlier diagnosis. Studies include the identification and characterization of genes involved in the development of glaucoma, elucidation of the role of aqueous humor outflow in the pathophysiology of the disease, the delineation of the basic mechanisms that control aqueous humor dynamics, the design of better drugs to modulate aqueous humor secretion and outflow, clarification of the relationship between pressure elevation and optic nerve damage, characterization of optic nerve damage and ganglion cell death at the anatomical and functional levels.

Strabismus, Amblyopia, & Visual Processing

The NEI supports a broad range of studies concerned with the function of the neural pathways from the eye to the brain, the central processing of visual information, visual perception, optical properties of the eye, functioning of the pupil, and control of the ocular muscles. A large number of congenital, developmental, and degenerative abnormalities affect the visual sensorimotor system, but two disorders are of primary concern: strabismus and amblyopia. These are frequent causes of visual impairment among children which may persist for life. Additional emphasis is placed on and support provided for research on optic neuropathies, eye movement disorders, and the development of myopia.

Low Vision

The NEI supports research in low vision and rehabilitation of people with visual impariments. Examples include projects aimed at improving the methods of specifying, measuring, and categorizing loss of visual function; devising strategies to help visually impaired people maximize the use of their residual vision; systematically evaluating new and existing visual aids; developing an adequate epidemiological base for blindness, partial loss of sight and visual anomalies; and studying the optical, electronic, and other rehabilatative needs of people with visual impairments.

Collaborative Clinical Research

The institute supports a number of randomized, single- and multicenter clinical trials and other epidemiologic research projects utilizing cross-sectional, case-control, and cohort methodologies. Several funded projects incorporate health services and genetic epidemiologic approaches to studying conditions affecting the visual system. The collective goal of these collaborative clinical research projects is to understand the natural history, pathogenesis, management, and prevention of visual system disorders.

National Heart, Lung, and Blood Institute*

Mission

The National Heart, Lung, and Blood Institute (NHLBI):

- Provides leadership for a national program in diseases of the heart, blood vessels, lungs, and blood; sleep disorders; and blood resources management.
- Plans, conducts, fosters, and supports an integrated and coordinated program of basic research, clinical investigations and trials, observational studies, demonstration and education projects related to the causes, prevention, diagnosis, and treatment of heart, blood vessel, lung, blood diseases, and sleep disorders conducted in its own laboratories and by scientific institutions and individuals supported by research grants and contracts.
- Plans and directs research in development, trial, and evaluation of interventions and devices related to prevention, treatment, and rehabilitation of patients suffering from such diseases and disorders.
- Conducts research on clinical use of blood

*Until November 10, 1969, the National Heart Institute; until June 25, 1976, the National Heart and Lung Institute.

and all aspects of the management of blood resources.

- 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 through individual and institutional research training awards and career development awards.
- Coordinates with other research institutes and all Federal health programs relevant activities in the above areas, including the related causes of stroke.
- Conducts educational activities, including development and dissemination of materials for health professionals and the public in the above areas, with emphasis on prevention.
- Maintains continuing relationships with institutions and professional associations, and with international, national, state, and local officials as well as voluntary agencies and organizations working in the above areas.

Important Events in NHLBI History

June 16, 1948--President Harry S Truman signed the National Heart Act, creating and establishing the National Heart Institute in PHS and the National Advisory Heart Council.

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

August 1, 1948--Surgeon General Leonard A. Scheele, by General Circular No. 36, Organization Order No. 14, established NHI as one of the National Institutes of Health to administer functions of heart research, training, and administration set forth in the National Heart Act. Intramural research projects in cardiovascular diseases and gerontology conducted elsewhere in NIH were transferred to NHI. The director of NHI was designated as the focal point of leadership and coordination for the total heart program of PHS.

August 29, 1948--Surgeon General Scheele announced the names of the 16 members appointed to the first National Advisory Heart Council.

September 8, 1948--The first meeting of the National Advisory Heart Council was held.

January 1949--Cooperative research units were established at the University of California, University of Minnesota, Tulane University, and Massachusetts General Hospital, jointly financed by the institutions and NIH, pending completion of NHI's own research organization and the availability of further research facilities.

July 1, 1949--A comprehensive plan for NHI's intramural research program was instituted, organized on three general research levels, with three laboratory sections, five laboratory-clinical sections, and four clinical sections.

The Heart Disease Epidemiology Study at Framingham, Mass., was transferred from the Bureau of State Services, PHS, to NHI.

January 18-20, 1950--The first National Conference on Cardiovascular Diseases, sponsored by NHI and the American Heart Association, was held in Washington, D.C.

July 6, 1953--The first patient was admitted to the Clinical Center for heart disease research.

July 1, 1957--The first members of NHI's Board of Scientific Counselors began their terms. It 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--A report to the Nation was presented by the American Heart Association and NHI on "A Decade of Progress Against Cardiovascular Disease," at Department of Commerce, Washington, D.C.

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, convened at the White House and submitted its report.

December 30, 1963--President Lyndon B. Johnson approved a joint resolution, unanimously passed by the Congress, to provide for designating the month of February in each year as "American Heart Month."

November 22-24, 1964--The Second National Conference on Cardiovascular Diseases was held at Washington, D.C., under cosponsorship of the American Heart Association, NHI and Heart Disease Control Program of PHS, to appraise developments since the first conference in 1950 and to determine needs and opportunities for continued and accelerated progress 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, March 7, 1964, to "recommend steps that can be taken to reduce the burden and incidence of these diseases," submitted its report.

October 16, 1968--A Nobel Prize in Physiology or Medicine was awarded to Dr. Marshall W. Nirenberg, chief of NHI's Laboratory of Biochemical Genetics, for discovering the key to deciphering the genetic code. Dr. Nirenberg was the first NIH Nobel laureate and the first Federal employee to receive a Nobel Prize.

October 26, 1968--NHI received 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 NHI was commemorated at the White House, with President Johnson and a notable array of prominent figures associated with NHI, past and resent, participating.

August 12, 1969--Major provisions of NHI reorganization plan established five program branches in extramural programs (arteriosclerotic disease, cardiac disease, pulmonary disease, hypertension and kidney diseases, and thrombosis 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--National Heart Institute was renamed the National Heart and Lung Institute, reflecting expansion of functions.

February 18, 1971--In his Health Message to the Congress, the President identified sickle cell anemia as a high-priority disease target and called for increased Federal expenditures. Subsequently, the DHEW assistant secretary for health and scientific affairs, assigned the lead-agencies responsibilities for coordinating a National Sickle Cell Disease Program to NIH and NHLI.

March 24, 1972--President Nixon named Dr. John S. Millis to head a 20-member panel "to determine why heart disease is so prevalent and so menacing and what can be done about it."

March 27-31, 1972--First meeting of U.S.-U.S.S.R. Joint Committee for Health Cooperation was held to develop and plan an approach to the health exchange program in several specific areas, including the cardiovascular field. The NHLI director is a member of the committee.

May 23, 1972--A 5-year agreement for a Cooperative Health Program was signed by W. P. Rogers, U.S. secretary of state, and B. V. Petrovsky, U.S.S.R. minister of health. The agreement calls for cooperative studies in pathogenesis of arteriosclerosis; management of ischemic heart disease; myocardial metabolism; congenital heart disease; sudden death; and blood transfusions, blood components, and the prevention of hepatitis.

June 12, 1972--HEW Secretary Richardson approved a nationwide program of hypertension information and education. The secretary appointed the Hypertension Information and Education Advisory Committee, chaired by the director, NIH; and the Interagency Working Group, chaired by the director, NHLI, to implement the national effort. A High Blood Pressure Information Center was established within the NHLI Office of Information to collect and disseminate public and professional information

about this disease.

July 1972--The NHLBI launched the National High Blood Pressure Education Program.

July 14, 1972--HEW Secretary Richardson approved a reorganization of NHLI, elevating the institute to bureau status within NIH, with seven division-level components: Office of 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.

July 24, 1973--The 5-volume *National Heart, Blood Vessel, Lung and Blood Program* was transmitted to Congress. The comprehensive, 5-year plan of attack against heart, blood vessel, lung and blood diseases and research and management of blood resources was developed by the director, NHLI, with the advice of the National Heart and Lung Advisory Council, in accordance with a provision of the National Heart, Blood Vessel, Lung and Blood Act of 1972 (P.L. 92-423).

April 5, 1974--The HEW assistant secretary for health released the *Report to the President by the President's Advisory Panel on Heart Disease*. The report surveys the problem of heart and blood vessel disorders and recommends how illness and death from these disorders may be reduced.

August 2, 1974--Regulations were approved governing the establishment, support, and operation of National Research and Demonstration Centers for heart, blood vessel, lung, and blood diseases. The regulations concern the implementation of section 415(b) of the PHS act, as amended by the National Heart, Blood Vessel, Lung and Blood Act of 1972, which authorized the establishment and support of National Research and Demonstration Centers.

June 25, 1976--NHLI was redesignated the National Heart, Lung, and Blood Institute by an amendment to Public Health Service Act (P.L. 94-278). This further enlarged institute authority to advance the national attack on heart, blood vessel, lung, and blood diseases and the conduct of research in the use of blood and blood products and in the management of blood resources.

July 1, 1976--The National High Blood Pressure Education Program releases the first Joint National Committee Report on the Detection, Evaluation, and Treatment of High Blood Pressure.

October 28, 1977--The U.S.-U.S.S.R. Cooperative Health Program was renewed for another 5 years with the signing of an agreement by Dr. Julius B. Richmond, HEW assistant secretary for health, and Dr. Dmitri D. Venedictov, U.S.S.R. deputy minister of health.

February 1978--The NHLBI and American Heart Association jointly celebrated their 30th anniversary.

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

November 1979--The results of the Hypertension Detection and Followup Program, a major clinical trial started in 1971, provided 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 institute for its Hypertension Detection and Followup Program, "which stands alone among clinical studies in its profound potential benefit to millions of people."

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

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

October 26, 1983--The Coronary Artery Surgery Study (CASS) results were released. They demonstrated that mildly symptomatic patients with coronary artery disease can safely defer coronary artery bypass surgery until symptoms worsen. Results of this clinical trial will help patients and their physicians decide whether and when bypass surgery should be undertaken. They can base their decisions on firmer scientific footing.

January 12, 1984--The Lipid Research Clinics Coronary Primary Prevention Trial established conclusively that reducing total blood cholesterol reduces the risk of coronary heart disease in men at increased risk because of raised 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, commemorated the 10th anniversary of the passage of the National Heart, Blood Vessel, Lung, and Blood Act. The 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 was created. The reorganization provides the institute with a focus on clinical trials; prevention, demonstration, and education programs; behavioral medicine; nutrition; epidemiology; and biometry. It also provides opportunities to examine the interrelationships of cardiovascular, respiratory, and blood diseases.

April 1985--Results of phase I of the thrombolysis in myocardial infarction (TIMI) trial comparing streptokinase (SK) with tissue plasminogen activator (rt-PA) produced by recombinant means were published. The new thrombolytic agent rt-PA is approximately twice as effective as SK in opening thrombosed coronary arteries.

October 1985--The NHLBI Smoking Education Program was initiated.

November 1985--The National Cholesterol Education Program was inaugurated.

June 1986--Results of the prophylactic penicillin trial were released. They demonstrate the efficacy of propylactic use of penicillin in reducing the morbidity and mortality associated with pneumococcal infections in children with sickle cell disease.

Major national efforts to prevent early death in the at-risk pediatric population are now possible.

October 1986-September 1987--The NHLBI celebrated its 40th anniversary and the NIH centennial with a year-long series of events. Activities included scientific symposia and conferences, commemorative publications and exhibits, and a reunion of former NHLBI directors.

October 1987--The NHLBI established the National Blood Resource Education Program.

March 1989--The NHLBI initiated the National Asthma Education Program.

September 1990--NHLBI and NCI scientists began the first gene therapy trial in a human patient, a 4-year-old girl with an inherited immune dysfunction.

January 1991--The NHLBI Obesity Education Initiative began to educate the public and health professionals about obesity as an independent risk factor for cardiovascular disease and its relationship to other risk factors such as high blood pressure and high blood cholesterol.

February 1991--Expert panel of the National Asthma Education Program released "Guidelines for Diagnosis and Management of Asthma" report to educate physicians and other health care providers in asthma management.

June 11, 1991--The NHLBI initiated a National Heart Attack Alert Program to reduce premature morbidity and mortality from acute myocardial infarction and sudden death. The program emphasizes rapid disease identification and treatment.

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

August 1991--Results of the Studies of Left

Ventricular Dysfunction were released. They demonstrated that the use of the angiotensin converting enzyme inhibitor enalapril causes significant reduction in mortality and hospitalization for congestive heart failure in patients with symptomatic heart failure.
October 30, 1992--The National High Blood Pressure Education Program celebrated is 20th anniversary. The fifth Joint National Committee Report on the Detection, Evaluation, and Treatment of High Blood Pressure and the first report on the Primary Prevention of Hypertension were released.
June 15, 1993--The Second Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults was released.
January 30, 1995--Results of the Multicenter Study of Hydroxyurea were 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 21, 1995--Results of the Bypass Angioplasty Revascularization Investigation were released through a clinical alert. They demonstrate tht patients on drug treatment for diabetes who had blockages in two or more conronary arteries and were treated with conronary artery bypass surgery (CABG) had, at 5 years, a markedly lower death rate than 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 was held to determine future opportunities and needs for research.
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 at the accompanying press conference.
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 that show lifestyle changes, such as modifying one's diet and losing weight, substantially reduce blood pressure in adults and can keep older patients off antihypertensive medication.

NHLBI Legislative Chronology

June 16, 1948--The National Heart Act (P.L. 80-655) authorized NHI. The purpose of the act was "To improve the health of the people of the United States through the conduct of researches, investigations, experiments, and demonstrations relating to the cause, prevention, and method of diagnosis and treatment of diseases of the heart and circulation; assist and foster such researches and other activities by public and private agencies, and promote the coordination of all such researches and activities and the useful application of their results; provide training in matters relating to heart diseases, including refresher courses for physicians; and develop, and assist States and other agencies in use of the most effective methods of prevention, diagnosis, and treatment of heart diseases."
June 25, 1948--The Second Deficiency Appropriation Act of 1948 (P.L. 80-785) appropriated "For an additional amount, Fiscal year 1949 for 'National Institute of Health, operating expenses,' $500,000: *Provided*, that appropriations under said head for the Fiscal year 1949 shall be available for carrying out the purposes of the National Heart Act, including erection of temporary structures for storage of equipment and supplies and housing of animals."
June 29, 1949--The Labor-Federal Security Appropriation Act 1950 (P.L. 141) appropriated $10,725,000 for expenses necessary to carry out the purposes of the National Heart Act, including grants-in-aid for drawing plans, erection of buildings, and acquisition of land therefor, and, in addition to the amount appropriated, authorized "the Surgeon General, upon recommendations of the National Advisory Heart Council, to approve applications for research and training grants, including grants for drawing plans, erection of buildings, and acquisition of land therefor, not to exceed a total of $5,350,000, for periods beyond the current Fiscal year, and such grants shall, if approved during the current Fiscal year, constitute a contractual obligation of the Federal Government."
August 15, 1950--The Omnibus Act of 1950 (P.L. 81-692) provided for the termination of all appointments to the heart and other councils on September 30, and for appointment of a full new membership on October 1, 1950. The act established uniformity in composition of membership and term of office for all councils.
December 30, 1963--House Joint Resolution 848 (P.L. 88-254) of the 88th Congress was approved, which authorized and requested the President to issue an annual proclamation designating February as American Heart Month, inviting governors of states and territories to issue similar proclamations.
October 6, 1965--P.L. 89-199 provided supplemental appropriations for FY 1966 to implement recommendations of the President's Commission on Heart Disease, Cancer, and Stroke that fall within existing legislative authorities. NHI received funds to expand training programs and plan research centers.
May 16, 1972--The National Sickle Cell Anemia Control Act (P.L. 92-294) established a national program for the diagnosis, control, and treatment of and research in sickle cell anemia. The act does not mention NHLI but has special pertinence because NHLI has been designated to coordinate the National Sickle Cell Disease Program.
September 19, 1972--The National Heart, Blood Vessel, Lung, and Blood Act of 1972 (P.L. 92-423) enlarged the authority of the institute to advance the national attack on heart, blood vessel, lung, and blood diseases. The act provides for expanded, intensified, and coordinated institute activities in accordance with a comprehensive, specified National Heart, Blood Vessel, Lung, and Blood Disease Program to be planned by the director and the National Heart and Lung Advisory Council.

Other provisions include the establishment of prevention and control programs; development of 15 new centers for basic and clinical research, training, demonstration, and prevention programs for heart, blood vessel, and blood diseases; and development of 15 such centers for chronic lung diseases.
June 25, 1976--Title I of the Health Research and Health Services Amendments of 1976 (P.L. 94-278) redesignated NHLI as National Heart, Lung, and Blood Institute to advance the national attack on heart, blood vessel, lung, and blood diseases, and to conduct research in the use of blood and blood products and in the management of blood resources. The NHLBI director and the institute Advisory Council continue to plan the national program under the basic P.L. 92-423 provisions with some refinements.
August 1, 1977--The Biomedical Research Extension Act of 1977 (P.L. 95-83) reauthorized NHLBI, with continued emphasis on both the national program and related prevention and dissemination activities.
December 17, 1980--The Health Programs Extension Act of 1980 (P.L. 96-538) reauthorized NHLBI, with continued emphasis on both the national program and related prevention programs.
September 20, and November 4, 1988--The National Bone Marrow Donor Registry (P.L. 100-436, P.L. 100-607) was established. With the enactment of these authorization

and appropriation measures, NHLBI is given the task of developing an implementation plan for the voluntary bone marrow registry.

November 4, 1988--The Health Omnibus Extension Act of 1988 (P.L. 100-607) reauthorized NHLBI, with $1.4 billion for programs other than control and $101 million for control programs for FY 1989. In addition, it allocated such sums as are necessary for FY 1990.

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

Directors of NHLBI

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
Cassius James Van Slyke	Dec. 1, 1900	Aug. 1, 1948	Nov. 30, 1952
James Watt	Apr. 28, 1911	Dec. 1, 1952	Sept. 10, 1961
Ralph E. Knutti	1901	Sept. 11, 1961	July 31, 1965
William H. Stewart	1921	Aug. 1, 1965	Sept. 24, 1965
Robert P. Grant	Sept. 17, 1915	Mar. 8, 1966	Aug. 15, 1966
Donald S. Fredrickson	Aug. 8, 1924	Nov. 6, 1966	March 1968
Theodore Cooper	Dec. 28, 1928	Mar. 15, 1968	Apr. 19, 1974
Robert L. Ringler (Acting)	Mar. 27, 1922	Apr. 19, 1974	July 14, 1975
Robert I. Levy	May 3, 1937	Sept. 16, 1975	September 1981
Claude Lenfant	Oct. 12, 1928	Sept. 6, 1982	

Biographical Sketch of NHLBI Director Claude Lenfant, M.D.

Dr. Lenfant was appointed NHLBI director on July 6, 1982. He was born on October 12, 1928, in Paris, France. He received his B.S. degree in 1948 from the University of Rennes, France, and his M.D. in 1956 from the University of Paris.

Upon completing his medical studies, he assumed the position of director of the Laboratory of Experimental Surgery, Centre Marie Lannelongue, in Paris. While there he directed research into extracorporeal oxygenation of blood and the use of deep hypothermia in cardiac surgery.

In 1957 Dr. Lenfant was appointed postdoctoral fellow at the University of Buffalo, and the following year continued that appointment at Columbia University in New York. His postdoctoral interests were directed to respiratory and circulatory physiology.

Returning to France, he assumed a teaching position as assistant professor of physiology at the University of Lille. He soon returned to the U.S., however, where he was appointed to a joint position in the departments of medicine and of physiology and biophysics at the University of Washington, Seattle. He rose to the rank of professor in both departments. He published extensively on the dynamics of blood-gas exchange in humans and various other species under normal conditions and under conditions of altitude and pressure. Respiratory adaptation to hypoxia, anemia, alkalosis and acidosis also were investigated.

In 1970 Dr. Lenfant was appointed the first associate director for lung programs of the then National Heart and Lung Institute, and also assumed the position of acting associate director for collaborative research and development programs. This program evolved into the Division of Lung Diseases, formed in 1972, with Dr. Lenfant as its director. For his accomplishments he was awarded the HEW Superior Service Honor Award in 1974. The Division of Lung Diseases continued to grow and to coordinate a strong and diverse program of research into the prevention, diagnosis and treatment of lung diseases.

He became NIH associate director for international research and director of the Fogarty International Center in 1981, positions he held until his appointment as director of NHLBI. In 1983 he was elected member of the Institute of Medicine, NAS. He was named Distinguished Executive of the Senior Executive Service in 1991 and Federal Executive of the year for 1992 by the institute alumni association.

Dr. Lenfant received the Surgeon General's Exemplary Award in 1993, the American Academy of Allergy and Immunology and the Giovanni Lorenzi Foundation Prize for the Advancement of Biomedical Science in 1994, the Laura Graves Award--National Marrow Donor Program and the Consortium of Southeastern Hypertension Centers' Excellence in Leadership Award in 1995, and the honorary fellowship award from the American College of Cardiology in 1997.

He holds honorary degrees from the universities in Taipei, Taiwan; Lima, Peru; and from the University of New York at Buffalo (D.Sc., 1988).

His memberships include the Soviet Union's Academy of Medical Sciences and of the National French Academy of Medicine. He is a fellow of the Royal College of Physicians (London), an honorary member of the Royal Society of Medicine, and an honorary fellow in the Polish Society of Hypertension.

Dr. Lenfant is a member of a number of professional societies including the American and French Physiological Societies, the American Society for Clinical Research, the American Society for Clinical Investigation, and the Association of American Physicians. He has served on the editorial board of *American Journal of Physiology, Journal of Applied Physiology, American Review of Respiratory Disease, Revue Francaise des Maladies Respiratories* and the *American Journal of Medicine*. He is the chief editor of a series of monographs, *Lung Biology in Health and Disease* that includes 102 volumes. He has published more than 225 papers in his areas of research interest.

NHLBI Programs

Heart and vascular diseases affect at least 57 million people and continue as the leading cause of death in the United States. Important progress in the reduction of morbidity and mortality from these diseases has been achieved since 1963, when coronary heart disease mortality was at its peak.

The NHLBI uses research grants, program project grants, specialized center grants, cooperative agreements, research contracts, research career development awards, and institutional and individual national research service awards to support research and research training. The four program divisions and one center of the NHLBI offer support in the following areas.

Division of Heart and Vascular Diseases

The Division of Heart and Vascular Diseases plans and directs a program of fundamental and clinical research in heart and vascular diseases. AIDS-associated cardiovascular disorders are also included. The division provides training and career development for research in these areas; specific programs foster career development for minority students and scientists. Among these programs are minority institutional research training awards, minority school faculty development award, research development award for minority faculty, and short-term training for minority students program.

The division is divided into two program areas: heart research and vascular research. The heart research program supports clinical and fundamental research in cardiology. Specific areas of interest include arrhythmias and cardiomyopathies, congenital heart disease, heart failure and shock, ischemic heart disease, interventional cardiology, infections of the heart, and relevant bioengineering. In addition, other investigations involve angiogenesis, gene-nutrient interactions in the pathogenesis of congenital heart defects, transition to overt heart failure, and development of innovative ventricular assist systems. The vascular research program oversees research in atherosclerosis, hypertension, vascular biology, vascular medicine, cardiovascular homeostasis and bionutrition, and molecular genetics and medicine. Research on the etiology, pathogenesis, and treatment of excess cardiovascular disease in diabetes mellitus is also supported by this program.

In 1996 the division implemented six new

initiatives, two of which specifically target women. One is a trial to assess the effects of hormone replacement therapy and/or antioxidant treatment on coronary plaques in women using angiographic changes as primary endpoints. The study will elucidate the mechanisms by which the treatments modify atherosclerosis. The other is a trial to investigate methods to improve the 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.

Other new initiatives involve research using either humans or human tissue or animal models. The studies will:

- Investigate the molecular, cellular, and physiological mechanisms involved in the processes of angiogenesis and remodeling in the microvasculature;
- Study cellular and molecular factors that may be implicated in the initiation and progression of atherosclerotic lesions in humans between 15 and 34 years of age;
- Investigate how the compensated, hypertrophied heart progresses to failure;
- Establish a collaborative network of centers to study the molecular genetics of hypertension.

In addition, the division renewed an initiative in 1996 that will examine how the presence of diabetes increases the risk of cardiovascular disease from both the basic and clinical research perspectives.

Division of Epidemiology and Clinical Applications

The Division of Epidemiology and Clinical Applications has the primary responsibility for epidemiologic studies, clinical trials, prevention studies, and demonstration and education research 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 the causes, prevention, diagnosis, and treatment; and assesses the need for technologic development in the acquisition and application of research findings. 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.

The division is divided into two programs: 1) clinical applications and prevention and 2) epidemiology and biometry. Clinical applications and prevention oversees research in prevention of heart and vascular, pulmonary, and blood diseases through activities such as clinical trials, health promotion-disease prevention community interventions, health education research, nutrition research, and behavioral medicine.

Clinical trials are used to test the efficacy of various drugs therapies in hypertensive patients and to study the effects of various medical treatments in cardiac patients. Among the issues being investigated are whether the combined incidence of fatal CHD and nonfatal myocardial infarction differs between diuretic-based and newer antihypertensive treatments (angiotensin-converting enzyme inhibitor, calcium channel blocker, alpha blocker) in high-risk hypertensive patients; whether an implantable cardiac defibrillator is more effective than conventional pharmacological therapy in reducing mortality in patients who have been resuscitated from sudden cardiac death; whether addition of a beta-blocker to standard therapy reduces mortality from chronic congestive heart failure; and which of two antiarrhythmic drug therapy strategies is more effective in reducing mortality in patients with atrial fibrillation.

The behavioral medicine area encourages basic and clinical collaborations between biomedical and behavior scientists. Targeted areas include risk factor modification (smoking prevention and cessation, physical activity, diet, weight loss, and blood pressure regulation); role of psychosocial factors in the development of cardiovascular disease (anger, hostility, anxiety, exhaustion, stress, and depression); role of social support in recovery; biobehavioral treatment of hypertension; factors affecting adherence to medical regimens; and treatment variables affecting quality of life. The prevention and education programs support research to test effectiveness and demonstrate capability of preventive interventions that are designed to reduce cardiovascular risk factors. Specific programs attempt to identify psychosocial and organizational factors that may facilitate or interfere with prevention of cardiovascular diseases.

Special population groups, e.g., minorities and children in social units such as the school and workplace, are often studied. Ongoing programs include: a study involving 20 U.S. communities that will examine the effect of community-wide education on reducing the time from onset of cardiac symptoms to receipt of medical care; a study that will evaluate the effectiveness of behavioral interventions, in primary health care settings, to encourage sedentary patients to increase their physical activity; and a study that investigates the effects of psychosocial support on morbidity and mortality in a clinical trial of patients recently hospitalized with acute MI.

The Epidemiology and Biometry Program supports and conducts epidemiological studies of heart and vascular, lung, and blood diseases in defined populations in the U.S. and other countries. It focuses on development and progression of cardiovascular disease risk factors in children and young adults; development and progression of atherosclerosis measured noninvasively or at autopsy in middle-age or older adults; and development and progression of overt cardiovascular and pulmonary disease in older adults. Other areas include genetic and environmental influences on cardiovascular disease and its risk factors; trends in incidence, prevalence, and mortality from cardiovascular disease, stroke, peripheral vascular disease, congestive heart failure, and cardiomyopathy; and relationships between insulin, insulin resistance, and overt diabetes and cardiovascular disease and its risk factors.

In 1996, two new initiatives and one renewal were supported by the division. One initiative will determine whether the addition of angiotensin converting enzyme inhibitor to standard therapy in patients with known coronary artery disease and preserved left ventricular function will prevent CVD mortality and reduce the risk of experiencing a myocardial infarction. The other initiative will assess the effectiveness of school-based intervention in the primary prevention of obesity among American Indian elementary school children. The division will continue the large, multicenter, standardized survey of CVD and CVD risk in American Indians begun in 1988. In phase III, atherosclerosis assessed by ultrasonography will be evaluated in relation to cardiac structure and function, renal dysfunction, and traditional CVD risk factors.

Office of Prevention, Education, and Control

OPEC, located in the NHLBI Office of the Director, is the institute's technology transfer arm, relaying the results of heart, lung, and blood research to health care professionals, their patients, and the public. Its function is to disseminate and translate up-to-date research findings that will help practitioners be more effective, and provide scientific knowledge to patients and the public that will enable them to make "healthy decisions."

The institute has targetted six areas for educational emphasis with OPEC. They include: high blood pressure; cholesterol; asthma; heart attack alert; sleep disorders; and obesity. Three of these (high blood pressure, cholesterol, and obesity) address major modifiable risk factors for CVD.

The National High Blood Pressure Education Program (NHBPEP) was established in 1972 with a goal of reducing death and disability related to high blood pressure through professional, patient, and public education. Strategies to achieve this goal

include stimulating education and information programs to increase public awareness about the disease, promoting activities encouraging detection of the disease especially for underserved groups, encouraging hypertensive patients to seek medical care and follow their doctor's advice, providing education programs and materials for health professionals, and providing technical support to community health programs so they may carry these activities to their geographic areas.

Dissemination of national guidelines on the prevention of high blood pressure is a major priority of the NHBPEP. Recently two new guidelines, *Hypertension in Children and Adolescents* and *Hypertension and Renal Disease*, have become available. The guidelines for children provide new criteria for classification of high blood pressure in young age groups. A statement on high blood pressure and the need to reduce salt consumption was released by the Program and was accepted by the U.S. Dietary Guidelines Committee.

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 coronary heart disease and about the benefits of lowering cholesterol levels to reduce illness and death from CHD. In its 10 years of existence, the NCEP has made significant strides toward its goal of reducing the prevalence of high blood cholesterol as shown by the results from the latest Cholesterol Awareness Survey of physicians and the public.

From 1983 to 1995, the percentage of the public who ever had their cholesterol level checked rose from 35 to 75 percent. In other words, 70 to 80 million Americans who were unaware of their cholesterol level in 1983 have now taken steps to have it measured. In addition, physicians are currently initiating diet and drug treatment at much lower cholesterol levels than in 1983 and are adopting major elements of the NCEP guidelines for detection and treatment into their practice. Moreover, results from the third National Health and Nutrition Examination Survey support these findings. They show that, from 1978 to 1990, the public's intake of fat and saturated fat decreased significantly resulting in impressive declines in average blood cholesterol levels (from 213 mg/dL to 205 mg/dL) with the accompanying prevalence of high blood cholesterol in the U.S. population reduced from 36 to 29 percent.

The NCEP pursues a dual strategy for educating the American people on the importance of blood cholesterol reduction. One strategy is directed toward individuals whose high blood cholesterol places them at increased risk for CHD and emphasizes the need for detection and treatment. The other strategy is directed at the general public and encourages heart-healthy eating patterns to lower average cholesterol levels.

The National Asthma Education and Prevention Program (NAEPP) was initiated in March 1989 to raise awareness of asthma as a serious, chronic disease and to promote more effective management of asthma through professional, patient, and public education. Its role is to provide up-to-date information on asthma care. Presently it is revising the expert panel's report on the diagnosis and management of asthma which provides the science base for the program. It is also assisting in the implementation of the panel's recommendations by providing materials developed for this purpose.

The NAEPP convened a task rorce to examine the cost-effectiveness, quality, and financing of asthma care; its report was recently published in a professional journal.

The National Heart Attack Alert Program (NHAAP) was initiated in June 1991 to reduce morbidity and mortality from acute myocardial infarction (AMI) and sudden death through education of health professionals (e.g., physicians, nurses, and emergency medical services personnel) and patients 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 signs of AMI. It has developed recommendations for health care providers in emergency departments concerning current and new tests/technologies for detecting AMI (including acute cardiac ischemia) and has prepared a paper for providers of high-risk patients about educational strategies to reduce prehospital delay in patients at high risk for an AMI. In addition, the NHAAP has prepared background papers on 911 emergency telephone systems; staffing and equipment requirements for emergency medical services systems; emergency medical dispatching processes and procedures; and factors associated with patient/bystander delay in seeking care for AMI manifestations.

NHLBI Appropriations--Grants and Direct Operations

Fiscal year	Total grants[1]	Direct operations	Total
	[Amounts in thousands of dollars]		
1950	$ 8,634	$ 2,091	$ 10,725
1951	11,676	2,523	14,200
1952	7,515	2,567	10,082
1953	8,706	3,294	12,000
1954	11,576	3,592	15,168
1955	12,510	4,158	16,668
1956	13,690	5,208	18,898
1957	26,755	6,641	33,396
1958	28,224	7,712	35,936
1959	36,056	9,557	45,613
1960	50,935	11,302	62,237
1961	74,140	2,760	86,900
1962	114,182	18,730	132,912
1963	127,464	19,934	147,398
1964	117,541	14,863	132,404
1965	108,303	16,521	124,824
1966	120,075	21,387	141,462
1967	130,874	33,896	164,770
1968	131,763	36,191	167,954
1969	128,840	38,087	166,927
1970	130,206	41,171	171,377
1971	141,280	53,637	194,925
1972	158,808	73,880	232,688
1973	177,709	122,291	300,000
1974	187,215	115,700	302,915
1975	201,844	122,786	324,630
1976	242,054	127,959	370,013
1977	262,673	133,988	396,661
1978	294,085	153,824	447,909
1979	337,725	172,409	510,134
1980	370,016	157,472	527,488
1981	404,978	144,715	549,693
1982	420,545	139,092	559,637
1983	476,107	148,152	624,259
1984	551,293	153,646	704,939
1985	640,616	163,194	803,810
1986	660,539	161,362	821,901
1987	742,953	187,028	929,981
1988	771,313	193,970	965,283
1989	825,686	219,822	1,045,508
1990	833,388	237,295	1,070,683
1991	870,662	255,253	1,125,915
1992	927,131	262,939	1,090,070
1993	939,536	275,157	1,214,693
1994	951,203	326,649	1,277,852
1995	982,628	332,341	1,314,969
1996	1,020,972	330,341	1,351,422

[1]Since 1973 includes research grants and research manpower development awards; and excludes contracts.

The NHLBI Obesity Education Initiative (OEI) was started in January 1991 to inform the public and health professionals on the health risks associated with overweight and obesity. Obesity is not only an independent risk factor for CVD but also a contributor to high blood pressure and high blood cholesterol and is related to sleep apnea. In an effort to educate health care professionals on treatment for this condition, the OEI, as part of its high-risk strategy, convened an expert panel to consider the scientific evidence related to the identification, evaluation, and treatment of obesity in adults, especially those with other risk factors for CVD. Together with the NIDDK's National Task Force on the Prevention and Treatment of Obesity, the panel will develop clinical practice guidelines for use by physicians and other health care providers. The report is expected to be released at the National Conference on Cardiovascular Health: Coming Together for the 21st Century, February 19-21, 1998, in San Francisco.

The NHLBI Ad Hoc Committee on Minority Populations, established in 1975, facilitates communication between minority communities and the NHBPEP. As the NHLBI developed new programs, the role of the ad hoc committee was expanded. Today, the committee provides direct input to the NHLBI regarding the development and implementation of all outreach and education projects specifically designed to improve the health status of minority populations.

The NHLBI and the Office of Research on Minority Health (ORMH), NIH are currently collaborating on several projects associated with improving the cardiovascular health of

blacks and Latinos. The National Physicians' Network, one such project, tries to get physicians who provide care to blacks to become more involved in prevention and education activities in black communities.

Results from the *NHLBI Report of the Working Group on Research in Coronary Heart Disease in Blacks*, indicated that, even when controlling for socioeconomic, demographic, and medical care factors, blacks are less knowledgeable about CHD symptoms, risk factors, and methods of prevention than whites. To address these issues, the NHLBI and the ORMH are collaborating with historically black colleges and universities, particularly those with medical schools and allied health programs, to conduct forums to share the latest research and treatment information to prevent and control CVD risk factors.

The Latino CVD Prevention and Outreach Initiative, "Salud para su Corazon," (Health for Your Heart), is a comprehensive community-based health promotion project designed to raise awareness of CVD prevention and promote heart-healthy lifestyles among Latinos in the Washington, D.C., area. This model project will provide the foundation for similar health campaigns in Latino communities across the Nation.

Division of Lung Diseases

Lung diseases are among the leading causes of death and disability in the United States. Excluding cancer, it accounts for 224,000 deaths annually, and is a contributing cause to perhaps an equal number of additional deaths.

More than 25 million persons suffer from chronic bronchitis, emphysema, asthma, or other obstructive or interstitial lung diseases. In 1994, pulmonary diseases accounted for 26 percent of all hospitalizations of children under 15 years of age.

The division plans and directs research in lung diseases, encompassing basic and targeted research, clinical trials and demonstration trials, national pulmonary SCORs, technological development, and application of findings. It assesses the national need for research in the causes, prevention, diagnosis, and treatment of lung diseases; in technological development; and for manpower training in these areas.

The division comprises two program areas, airway biology and disease and lung biology and disease. Asthma, chronic obstructive pulmonary disease and environment, cystic fibrosis, and neurobiology and sleep are under the purview of the airway biology and disease program. Targeted research programs include delineation of the genetic and metabolic defects underlying pulmonary complications associated with cystic fibrosis, ion channels in pulmonary cells, alpha-1-proteinase inhibitor deficiency, pathogenesis of smoking- and environmentally related airway diseases, genetics and treatment of asthma, gene therapy, and neurochemical in control of breathing.

The lung biology and disease program oversees research related to AIDS and tuberculosis, critical care and acute lung injury, developmental biology and pediatrics, immunology and fibrosis, and lung cell and vascular biology. Projects representative of the areas of concern for the program include: a clinical network for treatment of acute respiratory distress syndrome, an epidemiologic study of sarcoidosis, an investigation of lung injury following bone marrow transplantation, a clinical study of the cardiopulmonary complications of HIV infection in infants and children, several programs to address pathobiology of TB and *Pneumocystis carinii* and basic cell biology of pulmonary manifestations of AIDS, a program to develop lung specific drug delivery systems for enhanced TB treatment, and a program to design behavioral interventions for control of TB.

Five new initiatives and one renewed study were funded by the division in 1996. Two new initiatives are specialized centers of research (SCORs). One will foster multidisciplinary research to enable basic science findings to be applied more rapidly to clinical problems related to lung development. The program will focus on identifying molecular variables involved in lung development and assessment of the impact of injury during critical periods. The other SCOR will 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.

Other initiatives involve research to:

- Explore the etiology and pathogenesis of pulmonary LAM using cellular and molecular approaches;
- Develop new therapies for CF through support of basic research on the pathogenesis of CF and its complications;
- Examine possible mechanisms that lead to activation of HIV-1 in the lung and mechanisms by which cofactors may lead to increased HIV-associated pulmonary disease;
- Seek to improve the quality of medical school curricula; physician, patient, and community education; and clinical practice related to the recognition, prevention, and management of mycobacterial tuberculosis in the U.S.

Division of Blood Diseases and Resources

Blood diseases, including both acute and chronic disorders, resulted in 268,000 deaths in 1995; 259,000 of them due to thrombotic disorders and 9,000 due to diseases of the red blood cells and bleeding disorders.

The Division of Blood Diseases and Resources plans, directs, and evaluates the institute programs in hematology, hematologic diseases (except malignancies of the blood and immunologic and other disorders of white blood cells), transfusion medicine, blood resources, and marrow and stem cell transplantation. The programs include basic research; prevention; applied research and development; clinical trials; and education, demonstration, and control activities. Research on the use of blood and blood components in the treatment and prevention of disease and the management of the nation's blood resources and transplantable tissue are also supported. A variety of support mechanisms are used, including research grants, contracts, cooperative agreements, centers, grants, career development awards, fellowships, and research training grants.

The division is divided into two programs, blood diseases and blood resources. The blood diseases area supports research in sickle cell disease and cellular hematology. Targeted programs include disorders of the red blood cell, disorders of hematopoiesis, thalassemia, and sickle cell disease. Investigators studying thalassemia focus their attention on genetics, pathophysiology, prevention, diagnosis, treatment, iron chelation, development of pharmacologic agents that enhance fetal hemoglobin production or rehydrate red blood cells, and development of animal models for the disease.

In the area of hematopoiesis disorders, research is supported on growth factors and cytokines, hematopoietic stem cell biology, stem cell purification, stem cell transplantation research, aplastic anemias and other nonneoplastic disorders of the bone marrow, and pathophysiology of bone marrow in AIDS and related hematologic disorders. Hereditary and acquired anemias resulting from disorders of hemoglobin, the red blood cell membrane, or enzyme systems are additional targeted programs. Sickle cell disease research is directed towards membrane function, red cell rheology, and adherence of red cells to vascular endothelium. A multidisciplinary approach to sickle cell disease is supported through comprehensive sickle cell centers.

The blood resources area oversees studies in transfusion medicine, bone marrow transplantation, and thrombosis and hemostasis. It supports basic, clinical, and applied research on unrelated-donor marrow transplantation and pathogenesis, prevention, diagnosis, and treatment of major complications of transplantation. Studies of transplantation of stem cells from marrow, peripheral, and cord blood are emphasized.

The program is also supporting research on thromboembolic disorders, platelet disorders, megakaryocytes, and hemorrhagic disorders. Other targeted areas include blood component and blood derivative therapy, safety of blood therapy, immunohematology, develop-

ment of blood substitutes, and blood resource management. Research to develop and test methods to reduce the risk of HIV-infection by transfusion of blood, blood components, and blood derivatives is emphasized.

In 1996, five new initiatives, including two SCORs, and one renewal were supported by the division. The objectives of the initiatives are to:

- Ascertain the long-term effects, if any, of hydroxyurea usage in patients who participated in the initial Multicenter Study of Hydroxyurea in Sickle Cell Disease;
- Evaluate human umbilical cord blood as an alternative to bone marrow as a source of hematopoietic stem cells for recipients with a variety of genetic and hematologic diseases;
- Stimulate research leading to the development of therapeutic approaches for the treatment of sickle cell disease;
- Refine one or more nucleic acid-based techniques for the direct detection of blood-borne viruses in donors of blood for transfusion and organs for transplantation;
- Stimulate basic research and clinical investigations in hemostatic and thrombotic diseases; and
- Improve safety and efficacy of transfused blood and blood components, determine the indications for their use, and evaluate and possibly modify immunological responsiveness following their administration.

National Center on Sleep Disorders

The National Center on Sleep Disorders Research (NCSDR) plans, directs, and supports a program of basic, clinical, and applied research; health education; and prevention-related research in sleep and sleep disorders. It maintains surveillance over developments in its program areas; assesses the national need for research on the causes, diagnosis, treatment, and prevention of sleep disorders; and coordinates sleep research activities across the Federal Government.

In 1996, the center supported three new initiatives. One of them is a SCOR program in the neurobiology of sleep and sleep apnea. Another is a program supported jointly by the NIMH, the NICHD, and NIAMS, to examine the molecular biology and genetics of sleep and sleep disorders. The Sleep Academic Award will enable development of a program to improve the quality of medical school curricula; physician, patient, and community education; and clinical practice for the prevention, management, and control of sleep disorders, while also promoting high-quality clinical research in sleep.

Division of Intramural Research

The 16 Bethesda-based laboratories and branches conduct clinical research on the normal and pathophysiologic functioning of the cardiac, pulmonary, blood and endocrine systems and basic research on normal and abnormal cell behavior at the molecular level.

The Cardiology Branch conducts basic and clinical investigations in hypertrophic cardiomyopathy (HCM). The branch is exploring the genetic causes of HCM and the phenotypic variation in its clinical presentation. By studying the possible mechanisms that trigger sudden death in persons with HCM, investigators hope to find an effective treatment. Other areas include: vascular biology associated with endothelial dysfunction, molecular mechanisms involved in restenosis following angioplasty, interventions to facilitate collateral growth in ischemic heart disease, and application of nuclear cardiology techniques to study abnormalities in performance and metabolism in cardiac patients.

The Hematology Branch performs research on the pathogenesis of hematological diseases at the molecular and cellular levels and seeks to develop strategies for treatment. Individual, investigator-led units focus on bone marrow failure and its mechanism, especially immune suppression of hematopoiesis and the interaction of viruses with hematopoietic cells. Bone marrow transplantation, both autologous and allogeneic, with emphases on stem cell isolation and mechanisms of graft-versus-host and graft-versus-leukemia effects is another area of concern. Other activities include research on the pathogenesis and treatment of aplastic anemia and B19 parvovirus-induced disease.

Vasoactive substances regulating blood pressure and hypertension, molecular events leading to vascular hypertrophy and hyperplasia, and studies of pheochromocytoma are principal interests of the Hypertension-Endocrine Branch.

The Molecular Disease Branch is concerned with elucidating the molecular mechanisms involved in lipid transport and metabolism in normal individuals and patients with disorders of lipid metabolism and atherosclerosis. The branch also conducts clinical studies on the effects of drugs and diet.

The principal goal of the Molecular Hematology Branch is to develop the understanding and technology necessary to carry out human gene therapy. Targeted diseases include genetic and cardiovascular diseases and cancer. Mechanisms and regulation of gene expression are also studied.

The Pulmonary/Critical Care Medicine Branch focuses its efforts toward understanding basic mechanisms in inflammatory and immune processes in health and disease, with emphasis on the pathogenesis of disorders of the human lung. A broad range of laboratory approaches, particularly those of molecular biology, are used to study proteases and antiproteases. Emphasis is given to defining mutations in the relevant genes and how they cause human disease.

The Laboratory of Biochemistry is involve in research concerned with the elucidation of various mechanisms of metabolic regulation. Special interests include the physiologic and pathologic effects of oxidation, signal transduction, and protein chemistry.

The Laboratory of Biophysical Chemistry investigates the physical and chemical properties of molecules in order to relate their structures to biochemical functions. Techniques used include nuclear magnetic resonance, mass spectrometry, x-ray crystallography, scanning tunneling/force field microscopy, chromatography, and laboratory computer applications.

The Laboratory of Biochemical Genetics studies molecular mechanisms that regulate gene expression during embryonic development. Interests include homeobox genes and neuron-specific enhancer sequences.

The Laboratory of Animal Medicine and Surgery studies intracardiac flow dynamics with digital acquisition and analysis of color Doppler ultrasound imaging techniques.

The Laboratory of Cell Biology investigates diverse biomedical problems using multiple approaches. It directs attention towards biophysical studies of bioenergetics in eukaryotic and prokaryotic cells; biochemical and genetic studies of heat-shock proteins; the molecular mechanisms of cell motility; and the development and application of laser-based, time-resolved fluorescence spectroscopy to understand the structure of macromolecules.

The goal of the Laboratory of Cardiac Energetics is to develop a better understanding of the cellular processes involved in the performance of work by the heart in vivo. Strategies are under development for prevention and treatment of heart disease. State-of-the-art noninvasive magnetic resonance (MR) and optical spectroscopy are used, as well as conventional microspectrophotometric imaging techniques, to study cardiac biochemistry and function in vivo.

The Laboratory of Cell Signaling studies the mechanisms by which signal activated phospolipases like phospho-inositide-specific phospholipase C and phosphocholine-specific phospholipase D are modulated and the role of these enzymes in human disease.

The goal of the Laboratory of Kidney and Electrolyte Metabolism is to understand kidney function. Major objectives are to elucidate the basic processes at molecular and cellular levels, determine how they are controlled, and analyze how they are integrated to result in overall renal function.

The Laboratory of Molecular Cardiology investigates the regulation, expression, and function of contractile proteins in vertebrate muscle and nonmuscle cells. Studies use the techniques of molecular genetics, protein biochemistry, and video-enhanced microscopy. Areas of particular interest include mechanisms responsible for regulating the

contractile activity of smooth muscle and nonmuscle cells and factors that regulate the expression of the genes encoding the contractile proteins.

The Laboratory of Molecular Immunology focuses its attention on the T-cell activation process in normal and pathological states. Scientific findings derived from this research will lead to a better understanding of immunodeficiency, cancer, and autoimmune diseases. Scientific studies to elucidate the mast cells activation process will provide information on its role in asthma and other allergic diseases.

National Institute of Allergy and Infectious Diseases

Mission

The National Institute of Allergy and Infectious Diseases conducts and supports research to study the causes of allergic, immunologic, and infectious diseases, and to develop better means of preventing, diagnosing, and treating these illnesses.

Encompassed in the institute mission are studies on the following:

- The immune system, its genetic control, maturation, characteristics, and manipulation.
- Disorders of the immune system including asthma and allergic diseases, immune deficiencies, and autoimmunity.
- The etiology, epidemiology, and pathogenesis of all types of infections (including those caused by viruses, mycoplasma, bacteria, fungi, and parasites) involving a variety of organ systems.
- The diagnosis, treatment, and prevention of all types of infections including research on antimicrobial, antifungal and antiviral therapy; and development of new and improved vaccines.

Important Events in NIAID History

1948--The National Microbiological Institute was established November 1. The Rocky Mountain Laboratory and the Biologics Control Laboratory, both dating to 1902, were incorporated into the new institute, together with the Division of Infectious Diseases and the Division of Tropical Diseases of NIH.

1951--An institute-supported grants program was initiated, and a branch was established to administer research, training, and fellowship grants. Grant applications were reviewed by the National Advisory Health Council until 1956.

1953--The Clinical Research Branch was renamed the Laboratory of Clinical Investigation.

1955--The National Microbiological Institute became the National Institute of Allergy and Infectious Diseases on December 29. The Biologics Control Laboratory was detached from the institute and expanded to division status within NIH.

1956--The first meeting of the National Advisory Allergy and Infectious Diseases Council was held March 7-8.

1957--The Laboratory of Immunology was established in January to meet the growing need for research on the mechanisms of allergy and immunology.

The Middle America Research Unit was established in the Canal Zone jointly by NIAID and the Walter Reed Army Institute of Research as a temporary field station, made permanent in 1961. Important tropical diseases studies were done there for 15 years. NIAID transferred its part of the program to the Gorgas Memorial Institute in 1972.

1959--The Laboratory of Parasitic Diseases was established, formerly a part of the Division of Tropical Diseases.

1962--A collaborative research program funded mainly by contracts was established within the institute to plan, coordinate, and direct nationwide projects on infectious diseases, vaccine development, transplantation immunology, research reagents, and antiviral substances.

1967--The Laboratory of Viral Diseases was established.

1968--With the dissolution of NIH's Office of International Research and creation of the Fogarty International Center on July 1, 1968, programs formerly managed by OIR were transferred to NIAID to be administered by the Geographic Medicine Branch. These included 1) the U.S.-Japan Cooperative Medical Science Program, initiated in 1965 by the President and the Japanese Prime Minister to explore the health problems of Asia, and 2) the International Centers for Medical Research and Training, a 1960 congressional initiative to advance the status of U.S. health sciences through international research.

1971--The first seven Allergic Disease Centers were established to translate basic concepts of the biomedical sciences into clinical investigations.

1974--The first centers for the study of sexually transmitted diseases and of influenza were established.

1977--The NIAID Extramural Research Program was reorganized into three areas: Microbiology and Infectious Diseases; Immunology, Allergic and Immunologic Diseases; and Extramural Activities. An intramural Laboratory of Immunogenetics was formed.

1978--The first maximum containment facility (P4) for recombinant DNA research was opened in Frederick, Md. International program project grants and international exploratory/development research grants programs were established. Centers were created for interdisciplinary research on immunologic diseases.

1979--The Office of Recombinant DNA Activities was transferred from the NIGMS to NIAID. The International Collaboration in Infectious Diseases Research Program superseded the International Centers for Medical Research and Training established in 1960.

The Rocky Mountain Laboratory was reorganized into the Laboratory of Persistent Viral Diseases to deal with both host and viral mechanisms leading to slow or persistent viral infections; the Laboratory of Microbial Structure and Function, directed at bacterial diseases, particularly sexually transmitted diseases; and an Epidemiology Branch.

1980--The Laboratory of Immunoregulation was established to provide a means for applying new knowledge in immunology to the clinical diagnosis and treatment of patients with immunological disorders.

1981--The Laboratory of Molecular Microbiology was created to exploit new techniques in recombinant DNA methodology and other molecular studies to expand the institute's interests in both bacterial and viral pathogenesis and virulence.

1984--The Office of Tropical Medicine and International Research (OTMIR) was established to coordinate NIAID's intramural and extramural research activities in tropical medicine and other international research. OTMIR works with other Federal agencies and international organizations active in these areas.

1985--The Laboratory of Immunopathology was established. At Rocky Mountain Laboratories, the Epidemiology Branch was renamed the Laboratory of Pathology.

1986--Acquired Immunodeficiency Syndrome (AIDS) Program was established in January to coordinate the institute's extramural research efforts in HIV/AIDS.

1987--The Laboratory of Cellular and Molecular Immunology was established.

1988--The Immunology, Allergic and Immunologic Diseases Program was reorganized and renamed the Allergy, Immunology, and Transplantation Program.

The Office of Recombinant DNA Activities transferred from NIAID to the NIH Office of the Director.

1989--NIAID's programs became divisions: Intramural Research; Microbiology and Infectious Diseases; Allergy, Immunology, and Transplantation; Acquired Immunodeficiency Syndrome; and Extramural Activities.

1990--At Rocky Mountain Laboratories, a section of the Laboratory of Microbial Structure and Function became the Laboratory of Intracellular Parasites. The name of the Laboratory of Pathobiology was changed to the Laboratory of Vectors and Pathogens.

1991--The Laboratory of Host Defenses was established.

1994--The Laboratory of Allergic Diseases was established.

The Office of Research on Minority and

Women's Health was created.

At Rocky Mountain Laboratories, the Laboratory of Vectors and Pathogens was renamed the Microscopy Branch.

NIAID Legislative Chronology

November 1, 1948--The National Microbiological Institute was established under authority of section 202 of the Public Health Service Act, as implemented by General Circular No. 55, Organization Order No. 20, dated October 8, 1948.

December 29, 1955--NIAID was established (replacing the National Microbiological Institute) under authority of the Omnibus Medical Research Act (P.L. 81-692, 64 Stat. L. 443) as implemented by PHS Briefing Memorandum of November 4, 1955, from the Surgeon General to the Secretary of Health, Education, and Welfare.

November 4, 1988--NIAID was provided with additional authorities under title II of the Health Omnibus Programs Extension Act of 1988 (P.L. 100-607), the first major law to address AIDS research, information, education, and prevention.

August 14, 1991--The PHS act (P.L. 102-96), the "Terry Beirn Community Based AIDS Research Initiative Act of 1991" reauthorized NIAID's Community Programs for Clinical Research on AIDS (CPCRA) for another 5 years.

June 10, 1993--The PHS act was amended by P.L. 103-43, the National Institutes of Health Revitalization Act of 1993. This comprehensive legislation required NIAID to include research on tropical diseases in its mission statement and directed the Secretary, DHHS, to ensure that individuals with expertise in chronic fatigue syndrome or neuromuscular diseases are appointed to appropriate NIH advisory committees.

Biographical Sketch of NIAID Director

Anthony S. Fauci, M.D.

Dr. Fauci was born in Brooklyn, New York, in 1940. A graduate of the College of the Holy Cross, he received his M.D. degree from Cornell University Medical College in 1966. After completing an internship and residency at Cornell Medical Center in 1968, he came to the NIH as a clinical associate in the Laboratory of Clinical Investigation, NIAID. In 1977 he was appointed deputy clinical director of the institute.

In 1980 he was appointed chief of the Laboratory of Immunoregulation, a position he still holds. He became NIAID director in November 1984.

He has made many contributions in basic and clinical research in the area of the pathogenesis and treatment of immune-mediated diseases. He pioneered the field of human immunoregulation by making a number of basic scientific observations that serve as the basis for the current understanding of the regulation of the human immune response. In addition, he is widely recognized for delineating the precise mechanisms whereby immunosuppressive agents modulate the human immune response. He has developed effective therapies for several formerly fatal diseases such as polyarteritis nodosa, Wegener's granulomatosis, and lymphomatoid granulomatosis.

Dr. Fauci has made seminal contributions to the understanding of how the AIDS virus destroys the body's defenses. He has also delineated the mechanisms of induction of HIV expression by endogenous cytokines. He has been instrumental in developing strategies for the therapy and immune reconstitution of patients with HIV disease.

He continues to devote much of his time to identifying the nature of the immunopathogenic mechanisms of HIV infection and the scope of the body's immune responses to the AIDS retrovirus.

During his career at NIH, Dr. Fauci has received numerous honors and awards. Notable are the National Medical Research Award of the National Health Council, the Maxwell Finland Award in Infectious Diseases presented by the National Foundation for Infectious Diseases, the Chiron International Prize for Biomedical Research, the Presidential Award of the New York Academy of Sciences, and the AMA's William Beaumont Award and Dr. Nathan Davis Award for Outstanding Public Service.

In addition, the *Science Citation Index* ranked Dr. Fauci as the most-cited author among scientists publishing in AIDS research in the time period 1993-1995.

He is a member of the National Academy of Sciences and the Institute of Medicine, American Federation for Clinical Research, American Society for Clinical Investigation, Association of American Physicians, Infectious Diseases Society of America, American Academy of Allergy, Asthma and Immunology, American Association of Immunologists, American Academy of Arts and Sciences, and American Academy of Microbiology, among others.

He is on the editorial boards of the *New England Journal of Medicine*, as well as numerous others. He is associate editor of *Current Therapy in Internal Medicine*, an editor of *Harrison's Principles of Internal Medicine*, and author or coauthor of more than 900 scientific publications, including several textbooks.

Directors of NIAID

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
Victor H. Haas	January 6, 1909	November 1, 1948	April 1957
Justin M. Andrews	August 28, 1902	April 1957	October 1, 1964
Dorland J. Davis	July 2, 1911	October 1, 1964	August 1975
Richard M. Krause	January 4, 1925	August 1975	July 1984
Anthony S. Fauci	December 24, 1940	November 1984	

NIAID Research Program

Investigators at universities, hospitals, and private research institutions throughout the country receive support through grants and contracts administered by the Division of Microbiology and Infectious Diseases; Division of Allergy, Immunology, and Transplantation; and Division of Acquired Immunodeficiency Syndrome.

Division of Microbiology and Infectious Diseases

Viral Diseases. Viruses are the major cause of infectious diseases requiring medical care in the United States. The cost in dollars or in days lost from work is estimated to be in the billions each year. Following an initial infection, which may occur without symptoms, many viruses persist in the body for life and may lead to serious medical problems, including immune complex diseases, degenerative diseases, cancer, heart disease, and ulcers.

NIAID supports basic studies of virus structure, replication, gene regulation and evolution as well as studies in animals and humans that investigate the viral epidemiology, pathogenesis, and host immune response. This research program provides the foundation for the development of vaccines and antiviral therapies.

Respiratory infections are the major cause of acute illness in the U.S. NIAID supports the development and testing of new vaccines against virus-caused respiratory diseases such as influenza and respiratory syncytial and parainfluenza, which cause the majority of croup, bronchitis, and pneumonia in infants and children.

Viral hepatitis caused by hepatitis A, B, C, D, and E is another group of diseases with a major impact on health worldwide. In some parts of the world, hepatitis is the primary cause of liver cancer. Each year in the U.S., more than 600,000 new viral hepatitis infections occur which, when acute, can be debilitating and costly. Chronic disease resulting from infection with hepatitis B, C, and D is an even greater problem. Medical costs for chronic hepatitis are between $1 and $2 billion a year. NIAID-sponsored studies focus on virology, molecular biology, immunology, pathogenesis, development of antivirals, animal model development, natural history, vaccine development and clinical trials. Vaccines have now been licensed for hepatitis A and B.

Diarrheal diseases caused by viruses are particularly a problem among infants in developing countries. Experimental vaccines against rotaviruses--a major cause of infant diarrhea worldwide--have been extensively tested in children and infants. One vaccine developed in NIAID intramural laboratories is expected to be licensed for use in the U.S.

Although there have been reports of possible viral associations in chronic fatigue syndrome (CFS), no specific causative role for any virus has been demonstrated. In order to explore the possible causes of CFS, the institute has funded CFS Cooperative Research Centers to provide a multidisciplinary approach to CFS research by conducting basic science and clinical investigations on CFS. NIAID also supports scientists who are studying the possible immune system dysfunction, reactivation of latent virus infections, exercise-induced fatigue in CFS patients, as well as other aspects of CFS pathophysiology, and its epidemiology.

Development of Antiviral Drugs. Because many drug sponsors do not have access to comprehensive antiviral screening facilities, NIAID has established screening facilities for the in vitro evaluation of an experimental compound's activity against the human herpes viruses--herpes simplex virus (HSV) 1 and 2, varicella zoster virus, cytomegalovirus (CMV), and Epstein-Barr virus--and the respiratory viruses--influenza types A and B, respiratory syncytial virus, parainfluenza, measles, and adenovirus. This service is available to any scientist with a potential antiviral compound and an inability to test it. NIAID supports drug evaluation studies, preclinically in animal models of human viral infections and in human clinical trials. Institute-supported investigators participating in the Collaborative Antiviral Study Group are testing drugs for treating herpes encephalitis, neonatal herpes, hantavirus pulmonary syndrome, symptomatic congenital CMV infection, chronic hepatitis B virus infection, flu, and respiratory syncytial virus infection. Other investigators have evaluated interferons for human papilloma infections such as genital warts.

Bacterial Diseases. In the last decade, several bacterial diseases have emerged as new or recurring threats to the health of people in the U.S. and elsewhere, including Lyme disease and tuberculosis (TB).

Lyme disease, first recognized in the early 1980's in this country, is caused by a bacterium transmitted to humans by certain ticks. It has emerged as a significant problem in the northeast coastal areas, among others. NIAID spearheads NIH studies on Lyme disease, supporting research focusing on pathogenesis, improved therapies, better diagnostic tests, and vaccines.

Tuberculosis, a serious disease once thought to have been conquered in the U.S., is reemerging in certain American cities. TB has a staggering impact worldwide, since one-third of the world's population is infected with the TB bacterium. Although most people who are infected never develop active TB, those with weakened immune systems--especially those infected with HIV--are particularly vulnerable to active TB disease. Each year 8 million people worldwide develop active TB, and 3 million die.

With appropriate antibiotic therapy, TB usually can be cured. In recent years, however, drug-resistant cases of TB have increased dramatically. Particularly alarming is the increase in the number of persons with multidrug-resistant TB caused by bacterial strains resistant to two or more drugs. Even with treatment, the death rate for multidrug-resistant TB patients is 40 to 60 percent.

As the lead institute responsible for research on TB, NIAID supports basic research into the biology of TB, the development of new tools to diagnose TB, the development of new drugs or ways to deliver standard drugs, clinical trials of anti-TB therapies, and the development of vaccines to prevent it.

NIAID also funds research on leprosy, or Hansen's disease, which is caused by a mycobacterium. Although treatable today, there are about 1.3 million leprosy patients requiring treatment worldwide, largely in subtropical climates. More than half a million cases are diagnosed each year. Research on atypical mycobacteria, which constitute a diverse and heterogeneous group of acid-fast bacilli that are widespread throughout the environment, is of increasing importance in light of the AIDS epidemic. These organisms rarely cause disease in healthy adults, however, they can cause serious opportunistic infections in people with impaired immune systems.

Cholera is a disease caused by the bacterium *Vibrio cholerae*. Infection results in severe, dehydrating diarrhea that is particularly dangerous to infants and small children. In 1991 cholera reappeared in the Western hemisphere for the first time in 100 years. The epidemic has spread as far north as Mexico and is a threat to travelers to Central and South America.

In 1992 a new strain of *V. cholerae* appeared in Asia and in the area of the Bay of Bengal. NIAID supports research aimed at understanding the pathogenesis of the disease, what constitutes protective immunity, and the development of effective vaccines.

Effective antimicrobial agents have significantly reduced the burden of bacterial infections, even though their usefulness is limited by increasing bacterial resistance to antibiotics and in those diseases with an onset and progression so rapid that effective treatment is difficult. NIAID supports the development and testing of bacterial vaccines for *Hemophilus influenzae* type b, *Streptococcus pneumoniae*, all causes of meningitis; pertussis (whooping cough); cholera; shigella; and typhoid fever.

Hospital-associated, or nosocomial, infections have emerged in recent years as a significant health problem and cause of increased morbidity and mortality. They directly contribute to rising health care costs. An estimated 2 million hospital-associated infections occur in the U.S. each year, at a cost of more than $3 billion.

Gram-negative sepsis following surgery or trauma remains the most serious threat to patients, with mortality rates ranging from 25 to 40 percent if sepsis occurs. NIAID supports studies on immune mechanisms--cellular and humoral--that protect healthy people against normal microbial flora commonly encountered every day. Another focus is the study of disturbances in resistance mechanisms in hospitalized or immunocompromised patients. Gram-negative bacteria from the gastrointestinal tract are the primary etiologic agents and many have become resistant to antibiotics.

Hospital acquisition and transmission of methicillin-resistant staphylococci, Candida,

NIAID Appropriations--Grants and Direct Operations

Fiscal year	Total grants	Direct operations	Total
	Amounts in thousands of dollars]		
1954	$ 2,067	$ 3,671	$ 5,738
1955	2,227	3,953	6,180
1956	2,227	5,548	7,775
1957	8,182	5,117	13,299
1958	11,591	5,809	17,400
1959	17,091	6,980	24,071
1960	26,280	7,774	34,054
1961	35,141	8,859	44,000
1962	43,900	12,191	56,091
1963	49,256	16,886	66,142
1964	51,175	17,548	68,723
1965	51,288	18,559	69,847
1966	56,062	21,925	77,987
1967	64,809	25,861	90,670
1968	66,454	27,968	94,422
1969	66,086	28,754	96,840
1970	74,248	29,446	103,694
1971	70,285	32,083	102,368
1972	75,486	33,689	109,175
1973	78,557	34,857	113,414
1974	76,908	39,092	114,000
1975	78,093	41,359	119,452
1976	82,390	44,462	126,852
1977	90,928	50,272	141,200
1978	106,318	56,023	162,341
1979	130,340	60,988	191,328
1980	153,010	62,354	215,364
1981	168,154	63,923	232,077
1982	169,690	66,205	235,895
1983	199,289	79,840	279,129
1984	226,407	93,189	319,596
1985	267,940	102,107	370,047
1986	266,928	100,214	367,142
1987	367,076	178,357	545,433
1988	458,445	180,076	638,521
1989	517,159	226,993	744,152
1990	568,986	263,991	832,977
1991	606,138	300,113	906,251
1992	643,115	316,799	959,914
1993	685,661	298,566	984,227
1994	716,336	347,360	1,063,696
1995	733,935	358,572	1,092,507
1996	781,340	365,127	1,171,160

enterococci, and antibiotic-resistant gram-negative bacteria are important areas of investigation.

The interplay of bacterial toxins such as lipopolysaccharide and staphylococcal toxic shock toxin with host serum and cell components can result in fever, shock, and death. NIAID is investigating the underlying mechanisms of shock and its control and prevention.

Fungal Diseases. Severe, sometimes life-threatening systemic infections caused by fungal organisms have long been recognized in all age groups and in all parts of the U.S. Treatment requires prolonged administration of relatively toxic drugs and is sometimes ineffective, even in the otherwise healthy patient. Fungal infections are increasingly recognized as a major cause of morbidity and mortality in patients with impaired immune defenses. NIAID supports research on medically important fungi such as *Coccidioides immitis, Histoplasma capsulatum, Blastomyces dermatitidis, Cryptococcus neoformans, Candida albicans*, and *Aspergillus fumigatus*.

Antimicrobial Drug Development. As promising new antibacterial and antifungal agents are developed, they must be critically evaluated for safety and efficacy in humans. NIAID selects for trial licensed and unlicensed drugs that the pharmaceutical industry is unlikely to test further in humans, even though the drugs may show considerable clinical promise. Controlled, prospective, and multicentered studies are designed to compare efficacy, safety, duration, and costs with standard chemotherapeutic agents. Currently, the institute supports trials of new systemic antifungal agents, an improved treatment regimen for urinary tract infections in women, antibiotic prophylaxis of respiratory infections in children with cystic fibrosis, and together with NICHD, an antibiotic trial for vaginal infections in pregnant women.

Sexually Transmitted Diseases (STD). A dramatic increase in the number of new cases of STDs has occurred over the past 50 years in the United States. Gonorrhea, syphilis, genital herpes, genital warts, chlamydial infections, and pelvic inflammatory disease (PID) take an increasingly large toll emotionally, physically, and economically. Each year in the U.S. there are approximately 4 million new cases of chlamydia, 1 million new cases of gonorrhea and 1 million new cases of PID. Thirty million Americans are estimated to have genital herpes, and 24-40 million are thought to be infected with human papillomavirus (HPV), several types of which are associated with development of cervical cancer.

STDs often have long-term, devastating consequences--particularly for women and children. Infertility, ectopic pregnancy, cervical cancer, increased risk of infection with HIV, fetal death, low birth weight, and congenital infections resulting in permanent physical and mental damage to infants, can result from STDs. In 1995 economic costs associated with PID alone were estimated to exceed $6 billion.

Current research priorities and initiatives focus on vaccine development, the sequelae of STDs in women, behavioral research, HPV, genital ulcer disease, the development of rapid, inexpensive diagnostics, and the development of topical microbicides.

NIAID conducts and supports basic research necessary to develop vaccines against gonorrhea, chlamydial infections, and syphilis.

Because of the severe and disproportionate impact of STDs on health of women and infants, NIAID seeks to develop and evaluate interventions to reduce the incidence and severity of complications of PID, such as infertility, ectopic (tubal) pregnancy, and chronic pelvic pain syndromes. Furthermore, because STDs are preventable causes of adverse outcomes of pregnancy such as fetal wastage, low birth weight, and congenital infections, this area is also a priority.

In recognition of the critical interplay between behavioral and biomedical risk factors for STDs, NIAID is developing a program in integrated, intervention-oriented behavioral research for the prevention and control of STDs.

Studies of the pathogenesis and natural history of HPV are important areas of research. The role of HPV in development of cervical dysplasia and malignancy, HPV's role in transmission of HIV, development of animal models of genital HPV infection, and improved methods for detection and management of HPV infection are among the research areas of interest to NIAID.

The expansion of research on the pathogenesis and natural history of genital ulcer disease and on the interrelationship between these diseases and HIV is of high priority. Research on chancroid, syphilis, and genital herpes is being emphasized.

Parasitic Diseases. Parasitic diseases, a world health problem, affect billions of people and are responsible for millions of deaths annually. While their principal health and economic impact is felt primarily in poor and developing countries, many parasitic infections remain endemic within the United States and can present a threat to individuals with immature or compromised immune systems or in situations where normal sanitation procedures break down. In addition, increased foreign travel by U.S. citizens as well as immigration to the United States allows importation of so-called "exotic" parasites from other countries.

Several unicellular protozoa and multicellular helminths cause parasitic disease. Goals of NIAID-sponsored studies on the immunology of parasitic diseases include development of effective vaccines against malaria, schistosomiasis, leishmaniasis, and others; the intervention in the host response to prevent immunologically mediated disease processes; and the development or improvement of immunodiagnostic procedures. NIAID also supports basic research on the biochemistry and molecular biology of parasites to develop new chemotherapeutic agents or improve the efficacy of existing drugs. Development of drug resistance is a rapidly increasing problem, particularly in malaria. Application of modern biochemical and molecular technology to determine how resistance develops may reveal ways to reverse the phenomenon.

NIAID supports Tropical Disease Research Units at domestic institutions to provide a stable environment for research on parasitic diseases. These programs apply relevant and innovative biomedical technology to develop new approaches to control parasitic diseases.

Vaccine Development. Vaccines have virtually eliminated once common killers such as diphtheria, tetanus, and polio in the U.S. Nearly 25 major human diseases caused by infectious agents are preventable or controllable through vaccine use. Despite this success, both new and old infectious diseases continue to threaten the health of people around the world.

The aim of the NIAID vaccine program is to capitalize on the extraordinary advances in molecular biology and immunology in order to improve the safety, effectiveness, and efficiency of existing vaccines and enhance the development of new vaccines. This is also the goal of the Children's Vaccine Initiative, a global project of which NIAID is an integral part.

As the lead PHS agency for vaccine research, NIAID coordinates a comprehensive program among scientists in government, industry, and academic settings. Vaccine research is conducted by NIAID scientists as well as by institute-supported investigators at research institutions, including six Vaccine Treatment and Evaluation Units. The units conduct clinical trials of candidate vaccines to determine whether they are safe, immunogenic (capable of stimulating an immune response), and effective.

Research on HIV vaccines is supported by NIAID's Division of AIDS.

International Research

The institute's international research activities involve grants, contracts and intramural projects to promote scientific research on tropical and other diseases of great importance to the health of people in developing and developed countries of the world.

Immediate aims are to improve means for diagnosing, treating, and controlling these diseases with the ultimate goal of disease

prevention. For example, the U.S.-Japan Cooperative Medical Science Program, organized in 1965, provides an opportunity for American and Japanese scientists to cooperate in studying 10 disease-related areas of importance to the health of Asian people.

In September 1979, the International Collaboration in Infectious Diseases Research Program replaced the International Centers for Medical Research and Training which had been operational since 1960. Under the new program, research centers are established in tropical countries through multidisciplinary program project grants awarded to U.S. institutions. The program is designed to promote true collaboration and scientific exchange between U.S. scientists and their overseas counterparts. The program addresses infectious diseases of health importance to the host country. In 1991 NIAID established Tropical Medicine Research Centers to provide overseas facilities for the study of tropical diseases within endemic areas.

Other international activities include the NIAID-USAID Middle East Regional Cooperation Program, carried out through Jordan, Morocco, Lebanon, Tunisia, and Israel, to study leishmaniasis and hydatid disease. NIAID also coordinates studies on the immunology of infectious diseases as part of the Indo-U.S. Science and Technology Initiative.

Division of Allergy, Immunology and Transplantation

This division focuses on the immune system as it functions in the maintenance of health and as it malfunctions in the production of disease. It encompasses basic and clinical research.

Basic research is supported in 1) immunobiology and immunochemistry and 2) immunogenetics and transplantation immunology. Clinical research is supported in asthma and allergic diseases, and immunologic diseases and immunopathology. NIAID's approach integrates the basic science disciplines with relevant clinical specialties.

Basic Immunology. The biology and chemistry of the immune system and its products are the concerns of this program area. Immunobiologic studies focus on the origin, maturation, and interactions of the immune system's major cells, lymphokines, and other substances produced by theses and other cells that mediate immune reactions. Studies include the mechanisms responsible for the induction and regulation of the immune response. Immunochemical research encompasses the delineation of the chemical structure and function of antigens and antibodies; the chemical basis of immunologic specificity; the regulation of immunoglobulin synthesis; and the mechanisms of antigen-antibody reaction.

Research projects in this area are designed to:

- Elucidate the critical immunologic functions of T cell receptors, cell-adhesion molecules, and cytokines and their receptors in various systems in the human body and in laboratory animals.
- Isolate and characterize human stem cells;
- Participate in the formulation of a repository of cell lines and gene probes for use in the study of mucosal immunity and digestive diseases;
- Elucidate the chemical nature and structure of small organic molecules that generate allergic and hypersensitive responses; and
- Investigate the interactions of selected immunotoxicants with the secretory immune subsystems of the gut and respiratory tract.

Genetics and Transplantation. The primary goals of genetics and transplantation research are to:

- Clarify the organization and mechanisms of expression of the genes on which immune function depends;
- Characterize protein products of genes, including histocompatibility antigens;
- Determine how these gene products condition the response to foreign antigens; and
- Develop regimens to modulate the immune response and facilitate engraftment of transplanted organs and tissues.

By supporting the acquisition, characterization and distribution of tissue typing reagents and the evaluation and improvement of tissue typing methodologies, the program facilitates the matching of donors and recipients for transplants. It also supports studies on the relationship of the human major histocompatibility complex (MHC) HLA antigens to disease susceptibility.

Research projects in this area are designed to:

- Investigate the mechanisms and innovative use of immunosuppressive drugs;
- Develop new monoclonal antibodies directed against specific cells to prevent graft rejection;
- Further develop reagents for precise typing of MHC or tissue matching; and
- Delineate the development of the fetal and adult immune response, using in vitro systems.

Identification and Acquisition of Reagents. NIAID contracts serve as sources of standard reagents to identify cell surface antigens both within and outside of the major histocompatibility complex that play a role in immune response.

Some of these reagents are available for use in workshops or similar large-scale studies.

The institute also is a primary source of standard reagents for distribution and analyses for basic immunogenetic studies of murine transplantation antigens.

Transplantation. Program projects in transplantation immunology, located at major transplant centers, are currently funded by NIAID to facilitate the rapid translation of basic immunologic discoveries into clinical use. The centers carry out basic and clinical research pertinent to mechanisms of rejection, organ availability and preservation, and management of rejection.

National Cooperative Clinical Trial in Transplantation. NIAID established this trial to expedite the evaluation of new treatment modalities to prevent kidney graft rejection. Multicenter clinical trials to assess thepotential efficacy of various therapies are conducted at eight kidney transplant units throughout the U.S.

Asthma, Allergy and Inflammation. More than 50 million Americans suffer from allergic diseases including asthma. NIAID supports studies encompassing the cause, pathogenesis, diagnosis, prevention, and treatment of allergic diseases. Various types of allergic problems under investigation include: immediate type hypersensitivity and its disorders, including asthma, allergic rhinitis, atopic dermatitis, urticaria and angioedema; allergic reactions and disorders caused by insect bites and stings, foods, airborne allergens, and infectious agents; manifestations of delayed hypersensitivity and contact dermatitis; and the mechanisms of drug reactions and chemical sensitization. Studies also include structure of the antibodies, particularly IgE, and the chemical mediators released by the interaction of antigen and antibody with target cells; the isolation and chemical characterization of the active fractions of allergenic agents; and the therapy and prevention of allergic disorders and hypersensitivity reactions by immunotherapy with specific antigens or drugs.

Asthma, Allergic and Immunologic Disease Cooperative Research Centers. A network of cooperative research centers represents an effort to integrate the basic concepts of immunology, genetics, biochemistry, and pharmacology into clinical investigations of patients with asthma, allergic and immunologic diseases. The program encourages collaboration between basic and clinical scientists, provides a research environment for such interactions, and implements clinical application of adequately tested research findings and procedures. It is believed that this will lead to an understanding of the pathophysiologic, biochemical, and immunologic mechanisms of these disorders.

National Cooperative Inner-City Asthma Study. NIAID established this study to assess the factors contributing to the increased morbidity and mortality from asthma among children residing in urban environments, and to develop and evaluate a comprehensive therapeutic, educational, and environmental intervention program designed around those contributing factors. Seven sites in six cities

nationwide are participating in this cooperative study.

Clinical Immunology. Investigations of underlying mechanisms of disease and applications of basic knowledge to the cause, prevention, and management of immunologic disorders are approached from either of two disciplines--clinical immunology or immunopathology. Studies of clinical immunology involve acquired and inherited diseases associated with dysfunctions of the immune system, whereas the immunopathology studies encompass genetics, cytology, biochemistry, pathology, and pharmacology of the immune system.

Areas under investigation include:

- Immune deficiency diseases arising from primary defects in development or maturation of the immune responses;
- acquired immune deficiency disorders excluding AIDS;
- clinical manifestations mediated by products of lymphocytes;
- diseases associated with immune complexes and autoimmune phenomena; and
- immunotherapy of disease process, including the use of immunopotentiating and immunoregulatory substances.

DAIT supports program projects in mechanisms of immunologic diseases and autoimmunity aimed at increasing the understanding of pathophysiologic processes of immune-mediated diseases and the development of improved methods of diagnosis, treatment and prevention of disorders of the immune system.

Division of AIDS

The mission of the Division of AIDS is to increase basic knowledge of the pathogenesis, natural history, and transmission of HIV disease, and to promote progress in its detection, treatment, and prevention. DAIDS accomplishes this mission by planning, implementing, and evaluating programs in:

- fundamental basic and clinical research,
- discovery and development of therapies for HIV infection and its complications,
- discovery and development of vaccines and other preventive interventions, and
- training of researchers in these activities.

In accord with this mission, the division's efforts are organized around five broad scientific areas: 1) pathogenesis, 2) epidemiology and natural history, 3) therapeutics research and development, 4) vaccine and prevention research and development, and 5) pediatric disease.

HIV Pathogenesis. Research on the pathogenesis of HIV infection will advance the understanding of the biological causes of HIV-related disease and serve as a foundation for advancing treatment and prevention. Investigator-initiated research and the traditional research grant are the foundation of the division's activity in this area. Important research gaps are identified by division staff in concert with investigators and advisory committees.

Other key NIAID resources for the study of pathogenesis include:

- longitudinal epidemiological studies of cohorts of individuals infected with, or at risk of infection with, HIV, and serially collected specimens stored in an DAIDS-supported repository;
- animal model research and development projects;
- the NIAID AIDS Reference and Reagent Repository, through which DAIDS acquires and distributes essential research reagents to scientists around the world; and
- the Centers For AIDS Research (CFARS), designed to support coordinated scientific and administrative activities that enhance the capacity for collaboration between basic and clinical research.

Epidemiology and Natural History. The division's goals in the area of epidemiology and natural history are to foster population-based research that will advance the understanding of the biology and clinical course of HIV infection and serve as a foundation for advancing treatment and prevention.

The division oversees several large longitudinal cohort studies that conduct multidisciplinary research involving specific populations of individuals infected with or at significant risk of infection with HIV. These include:

- Multicenter AIDS Cohort Study,
- San Francisco Men's Health Study, and
- Women's Inter-Agency HIV Study.

In addition to collecting clinical data obtained at serial examinations and interviews, all of these studies are linked to a DAIDS-supported repository that stores a variety of serially collected biological specimens from participants and subsequently retrieves them for use in experiments conducted by investigators around the world. These studies therefore represent a powerful investigative tool for basic and applied research in pathogenesis, diagnosis, behavior, treatment, and prevention.

Vaccine and Prevention Research and Development. Development and testing of vaccines and other biomedical interventions such as drugs and microbicides to prevent HIV disease is a key role of DAIDS-funded research.

NIAID's efforts in vaccine research and development are built on a strong foundation of investigator-initiated research in basic virology, immunology, and microbiology. In addition, the division uses a number of specific applied resources to advance its objectives. These include:

- National Cooperative Vaccine Development Groups (NCVDGs), in which research teams from industry, academia, and government collaborate to develop and test novel experimental HIV vaccine concepts;
- SIV Vaccine Evaluation Units, which conduct standardized and directly comparable evaluations of various SIV vaccine candidates;
- Chimpanzee Unit, which is used to prepare stocks of virus for use in chimpanzees and to evaluate candidate vaccine concepts and products in chimpanzees;
- the AIDS Vaccine Evaluation Group (AVEG), which conducts phase I and II clinical trials of candidate HIV vaccines;
- central immunology laboratory facilities in support of the activities of the NCVDGs, the SIV-VEUs, the Chimpanzee Unit, and the AVEG;
- HIV Variation Project, which investigates the rate and magnitude of genetic variation in HIV and related retroviruses and explores the impact of this variation on strategies to develop HIV vaccines;
- Cooperative Group for Investigations of AIDS Vaccine Adjuvants, which supports investigator-initiated research into the mechanisms of adjuvant action, develops new adjuvant formulations to stimulate immune responses and generate long-lasting immunity and immunological memory, and evaluates vaccine-adjuvant combinations in relevant animal models;
- HIV Network for Prevention Trials (HIVNET), which consists of both domestic and international sites that conduct trials of HIV vaccines and other prevention strategies.

Researchers at HIVNET sites also study cohorts of individuals at high risk for HIV infection to prepare conducting vaccine efficacy trials within these populations.

- Collaborative Mucosal Immunity Groups (CMIG), which characterize the immune response to HIV in both infected individuals and uninfected vaccinated people and primates.

Therapeutics Research and Development. The division's goal in therapeutics is to foster the discovery and development of interventions that will improve the quality and duration of life of HIV-infected individuals.

NIAID devotes substantial resources to the discovery stage of therapeutics research, attempting to focus resources on areas of promise that are receiving insufficient attention from the private sector. The effort begins with a strong commitment to basic research in microbiology and pathogenesis. Upon this are built programs of targeted drug discovery with the National Cooperative Drug Discovery Groups (NCDDGs) for HIV and opportunistic infections (OIs) at the center. These consortia of academia, industry, and government investigators work collaboratively on focused "gap" areas of targeted drug discovery. Small portfolios of highly applied traditional investigator-initiated research round out this effort.

NIAID's preclinical development resources are limited in scope to those necessary to ensure that the national effort

has the capability to carry out specific rate-limiting developmental steps involving selected highly promising candidate agents that lack a private sponsor with sufficient resources or commitment. These "gap-filling" resources include capabilities for 1) chemical resynthesis; 2) analytical chemistry and quality control; 3) dosage form development and manufacturing; 4) small and large animal toxicology; and 5) in vitro screening and animal model efficacy studies.

In addition, the Special Program for Innovative Research on AIDS Treatment (SPIRAT) fosters coordinated and interdependent basic and clinical research between current HIV pathobiology and clinical evaluation of novel therapeutic strategies.

NIAID conducts clinical trials of new therapeutics in adults in three networks:

- Adult AIDS Clinical Trials Group--a large, multicenter clinical trials network;
- Terry Beirn Community Programs for Clinical Research on AIDS--designed to address questions of importance to primary care clinicians and extend opportunity for participation in trials to persons underrepresented in HIV research; and
- Division of AIDS Treatment Research Initiative--a program designed to rapidly address critical questions or innovative treatment approaches.

Pediatric Disease. DAIDS is working to identify and support the development of improved interventions to prevent and treat HIV infection and its sequelae in infants, children, and adolescents. DAIDS' goals in pediatric disease include: 1) preventing perinatal HIV transmission to infants and HIV transmission to adolescents and children; 2) developing technology for the early identification and diagnosis of HIV-infected infants; and 3) developing and optimizing therapies for HIV and its sequelae in infants, children, and adolescents.

Specific resources related to pediatric disease include:

- Women and Infants Transmission Study, a longitudinal cohort study of infected women and their children;
- Pediatric AIDS Clinical Trials Group; and
- investigator-initiated research, both solicited and unsolicited, addressing issues of pediatric disease.

Division of Intramural Research

The institute's Division of Intramural Research (DIR) consists of 16 laboratories, of which 13 are on the Bethesda campus and at off-campus sites in Frederick and Rockville, Md., and 3 are located at the Rocky Mountain Laboratories in Hamilton, Mont. Scientists in these laboratories conduct basic and applied research in immunologic, allergic, and infectious diseases and related clinical disorders. Considerable effort is devoted toward vaccine development and the understanding of the immune system's ability to react to certain antigens.

The scope of laboratory investigations includes the disciplines of virology, parasitology, mycology, microbiology, biochemistry, immunology, immunopathology and immunogenetics. Additionally, the DIR supports a 52-bed inpatient service and an outpatient facility located in the Clinical Center on the NIH campus. Patients with a variety of diseases under study, including AIDS, vasculitis, immunodeficiencies, host defense defects, unusual fungal infections, asthma, allergies, various parasitic diseases and disorders of inflammation, are seen. Frequently these patients participate in new and exciting treatment or diagnostic procedures derived from ongoing laboratory research efforts.

Successful vaccines or therapies for infectious diseases derive from a myriad of research activities on the disease agent as well as interactions of the agent with the host. The human immunodeficiency virus associated with AIDS is a major challenge to DIR scientists and physicians. The development of suitable laboratory animal models is critical to developing therapeutic strategies and vaccines for AIDS.

DIR scientists are studying the immunopathogenesis of HIV infection as well as the immune response to the virus. Cytokines have been shown to induce the expression of HIV in latently or chronically infected cell lines,thus providing tools for understanding the mechanisms of the insidious progression of immunosuppression in HIV-infected individuals.

In addition, NIAID researchers are exploring the many components of HIV disease, including phases of immune system activation and suppression. In studying the dissemination of HIV to lymphoid tissues in the body such as the lymph nodes and spleen, the investigators have found that HIV is active within these tissues from the earliest stages of HIV infection. This finding provides a scientific rationale for early treatment when safer and more effective antiretroviral drugs become available. DIR investigators have conducted intensive studies of antiretroviral and immunomodulator therapies. Clinical trials of a number of therapies, including use of IL-2 to maintain CD4 levels, are under way.

NIAID intramural scientists are working to develop and test vaccines against a number of infectious agents such as viruses causing AIDS, dengue fever, diarrhea in infants, and pneumonia and croup in infants and young children. Bacterial agents that cause sexually transmitted diseases such as chlamydia and gonorrhea, and Lyme disease are under active investigation. Approaches to the development of a vaccine against malaria are being explored. Promising new vaccine candidates are tested in the clinical setting for safety, immunogenicity, and if warranted, efficacy.

Basic immunologic studies are aimed at defining the components and mechanisms of action of the humoral and cellular responses. Receptors on T lymphocytes and peptides linked to the surface of antigen presenting cells are being defined. Information derived from these studies may allow the design of peptides that can inhibit specific immune responses and may have great importance in controlling the rejection associated with transplantation.

DIR researchers are carrying out intensive studies of the role of newly discovered cytokines in T-cell differentiation. Researchers have found that interleukin 12 (IL-12) plays a pivotal role in the induction of T-cell responses, which are important for the control of intracellular infections.

B lymphocytes, critical components of the immune response and responsible for antibody responses, are being dissected for studies of structure and function. Among the studies being conducted are those related to the control of B-cell immunoglobulin class switching. It has been shown, for instance, that IL-4 and INF-gamma reciprocally regulate IgG1 and IgE responses in mouse systems. In addition, the role of TGF-beta in IgA class-switching has been clarified. These studies are important in the design of future vaccines that can enhance the production of certain forms of antibody.

Inflammation is an important aspect of immunity. One of the important mediators of inflammation is a series of nine proteins called the complement system. NIAID scientists identified a new protein present in large concentrations in plasma of humans. The new protein binds to the fourth protein of the complement cascade where it acts as an inhibitor of this important inflammation-producing system. The inhibitor also interacts with the kinin-generating and coagulation systems. Certain patients with unusual swelling disorders have an abnormality in the degradation of this protein, and thus the protein may be very important in certain swelling disorders.

The first evidence that an immunodeficiency can be treated with a naturally occurring product of lymphocytes was recently demonstrated by DIR scientists. Chronic granulomatous disease of childhood (CGD), a disease in which there is a defect in the ability of the scavenger cells of the immune system to produce hydrogen peroxide, renders the patient susceptible to certain infectious agents. A multicenter clinical trial of interferon gammain patients with CGD followed in vitro studies which demonstrated the effectiveness of interferon gamma in correcting the defect in phagocytes from these patients. Interferon gamma was shown to significantly reduce the number of serious infections in CGD patients. These studies led to FDA approval of this drug for use in CGD.

Studies of the immune response to the causative agent of leishmaniasis have demonstrated that immunity to the parasite is not only to a specific antigen, but also to a certain immune cell. DIR scientists have shown that the outcome of leishmaniasis depends on whether the animal develops a TH1 response with T cells that produce IL-2 and IFN-gamma, or a TH2 response with T cells that produce IL-4 and IL-5. In the former case, granulomas develop that wall off and kill leishmania in the latter case, the infection is disseminated.

Studies of allergy are carried out by investigators working in basic immunology laboratories as well as by clinical and laboratory investigators working within the Asthma and Allergic Diseases Center. One effort has been the study of IgE antibody which mediates allergic responses by causing mast cells to release mediators of allergic responses. IL-4, produced by T cells, is essential for production of IgE in mice. Administration of IL-4 to mice prevented increases in IgE antibodies normally observed in immune responses to certain antigens. In other studies, DIR scientists have developed a "knockout" mouse that lacks receptors for IgE antibodies on the surface of mast cells. These mice will facilitate a better understanding of the role of IgE responses in the production of allergic symptoms.

Studies of the mechanisms of allergies have emphasized work on mast cells. Mast cells are the central cells of allergic responses because when activated by an allergen and IgE they release the mediators of allergy. New techniques have been developed in order to grow human mast cells in culture, an advancement that will enable more detailed investigations into their biology. An improved approach to the treatment of asthma has been devised by DIR researchers. The concept is based upon separating bronchodilators from agents that act to reverse specific processes in the pathogenesis of asthma. Specifically, patients are placed on symptomatic therapy in order to permit the more specific therapy to act. Inhaled cromolyn, systemic corticosteroids and immunotherapy are employed as specific agents while beta adrenergic agonists, theophylline, and atropine are symptomatic agents. This approach is gaining increased acceptance and should improve long-term treatment of asthma.

National Institute of Arthritis and Musculoskeletal and Skin Diseases*

Mission

The National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) was established in 1986. It conducts and supports basic, clinical, and epidemiological research and research training, and disseminates information on many of the most debilitating diseases affecting the Nation's health. Many of these diseases are chronic. They afflict millions of Americans causing tremendous human suffering and costing the U.S. billions of dollars in health care and lost productivity. These diseases include the many forms of arthritis and numerous diseases of the musculoskeletal system and of the skin.

The institute also conducts and supports basic research on the normal structure and function of joints, muscles, bones, and skin. Basic research involves a wide variety of scientific disciplines, including immunology, genetics, molecular biology, structural biology, biochemistry, physiology, virology, and pharmacology. Clinical research addresses rheumatology, orthopedics, dermatology, metabolic bone diseases, heritable disorders of bone and cartilage, inherited and inflammatory muscle diseases, and sports medicine.

Directors of NIAMS

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
Lawrence E. Schulman	Jul. 25, 1919	April 1986	Octover 1994
Michael D. Lockshin	Dec. 9, 1937	November 1994	July 1995
Stephen I. Katz	Jan. 26, 1941	August 1995	.....

Important Events in NIAMS History

November 20, 1985--The Health Research Extension Act of 1985 (P.L. 99-158) authorized the establishment of the National Institute of Arthritis and Musculoskeletal and Skin Diseases.

April 8, 1986--NIAMS was established.

February 18, 1987--The first meeting of the National Arthritis and Musculoskeletal and Skin Diseases Advisory Council was held.

April 15, 1996--NIAMS held a 10th anniversary symposium: "Progress and Promise in Chronic Disease."

NIAMS Legislative Chronology

August 1950--An arthritis program was established within the National Institute of Arthritis and Metabolic Diseases under P.L. 81-692.

May 1972--The institute was renamed the National Institute of Arthritis, Metabolism and Digestive Diseases, P.L. 92-305.

1973--Senator Alan Cranston introduced legislation which would eventually lead to the National Arthritis Act. Companion legislation was introduced in the House by Congressman Paul Rogers.

January 1975--The National Arthritis Act (P.L. 93-640) established the National Commission on Arthritis and Related Musculoskeletal Diseases to study the problem of arthritis in depth and to develop an arthritis plan. The act also established the position of associate director for arthritis and related musculoskeletal diseases and authorized an Interagency Arthritis Coordinating Committee, community demonstration project grants, an arthritis data bank, an information clearinghouse, and comprehensive centers for research diagnosis, treatment, rehabilitation, and education.

April 1976--After a year of study and public hearings, the commission issued a comprehensive plan aimed at diminishing the physical, economic, and psychosocial effects of arthritis and musculoskeletal diseases. It laid the groundwork for a national program encompassing research, research training, education and patient care.

October 1976--P.L. 94-562, the Arthritis, Diabetes, and Digestive Diseases Amendments of 1976 established the National Arthritis Advisory Board to review and evaluate the implementation of the Arthritis Plan, prepared in response to the National Arthritis Act (P.L. 93-640).

December 1980--P.L. 96-538 changed the name of the institute to the National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases.

1982--The Department conferred bureau status on the institute, resulting in creation of the Division of Arthritis, Musculoskeletal, and Skin Diseases and the appointment of a division director.

November 1985--The Health Research Extension Act of 1985, P.L. 99-158, established the National Institute of Arthritis and Musculoskeletal and Skin Diseases, to bring increased emphasis to research on these disorders. The legislation provided for the development of a plan for a national arthritis and musculoskeletal diseases program, establishment of two interagency coordinating committees, one on arthritis and musculoskeletal diseases and one on skin diseases, and expanded the activities of the National Arthritis Advisory Board to include musculoskeletal and skin diseases.

Biographical Sketch of NIAMS Director Stephen I. Katz, M.D, Ph.D.

Dr. Katz was born in New York City in 1941 and grew up in the Washington, D.C., and Bethesda, Md., areas. He earned a B.A. degree cum laude in history from the University of Maryland, College Park; an M.D. degree cum laude from Tulane

* Until May 19, 1972, the National Institute of Arthritis and Metabolic Diseases until June 23, 1981, the National Institute of Arthritis, Metabolism, and Digestive Diseases until April 8, 1986, the National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases.

University Medical School, New Orleans; and a Ph.D. degree in immunology from the University of London, England. He completed a medical internship at Los Angeles County Hospital, a residency in dermatology at the University of Miami School of Medicine, Florida, military service at Walter Reed General Hospital in Washington, D.C., and postdoctoral work at the Royal College of Surgeons of England.

In 1974 he joined NIH as a senior investigator in the Dermatology Branch of NCI, becoming acting chief in 1977 and chief in 1980. From 1989 to 1995, he also served a Marion B. Sulzberger professor of dermatology at the Uniformed Services University of the Health Sciences in Bethesda. On August 1, 1995, he was appointed director of NIAMS. He continues to serve as chief of the NCI Dermatology Branch.

Dr. Katz' stuides of Langerhans cells and epidermally derived cytokines have demonstrated that skin is a critical component of the immune system both in its normal function and as a target in immunologically mediated diseases. He has also made seminal discoveries in the field of inherited and acquired blistering skin diseases.

At NCI, he has led a program of investigations in fundamental biological and clinical problems in neoplastic and inflammatory diseases of the skin. He has trained a large number of immunodermatologists from the U.S. and abroad. These individuals are now leading thie own independent research programs.

Dr. Katz has received many government and private sector honors and awards, including the Presidential Executive Meritorious Rank Award, the PHS Superior Service Award, the NIH Director's Award, the Sulzberger Lecture Award, the D. Martin Carter Mentor Award from the American Skin Association, the Outstanding Alumnus Award of Tulane University Medical School, honorary membership in many international dermatologic societies, and 1992 election into the National Academy of Sciences Institute of Medicine.

He has served many scientific organizations in leadership positions such as president of the Society for Investigative Dermatology (SID), membership on the board of directors of SID and of the Association of Professors of Dermatology, secretary-general of the 18th World Congress of Dermatology in New York in 1992, and secretary-treasurer of the Clinical Immunology Society. He has also served on the editorial boards of most clinical and investigative dermatology journals and many immunology journals. He has authored or coauthored more than 180 scientific articles and 50 book chapters and edited several conference proceedings.

NIAMS Programs

The NIAMS supports a multidisciplinary program of basic and clinical investigations, epidemiologic research, research centers, and research training for scientists within its own facilities as well as supporting grantees at universities and medical schools nationwide. It also supports the dissemination of research results and information through the National Arthritis and Musculoskeletal and Skin Diseases Information Clearinghouse and through the Osteoporosis and Related Bone Diseases National Resource Center.

The NIAMS Intramural Research Program conducts basic research in structural biology, biology of the immune system, biology of the skin, muscle biophysics, and development of bone and cartilage. It does clinical research on lupus, rheumatoid arthritis, genetic skin diseases, and inflammatory muscle diseases.

The Extramural Program supports research via grants and contracts in four branches: Arthritis; Musculoskeletal Diseases; Skin Diseases; and Muscle Biology. Support also is provided for the Epidemiology/Data Systems Program and the Centers Program. A wide array of basic and clinical research and research training in the fields of rheumatology, muscle biology, orthopedics, bone and mineral metabolism, and dermatology are being pursued through these programs.

Arthritis Branch. This program supports basic and clinical research on the normal function and components of connective tissue and the immune system and their dysregulation in rheumatic, genetic, and inherited diseases of connective tissue. The goals are increased understanding of the mechanisms involved in the initiation and development of rheumatic and degenerative diseases of the joints and the translation of these basic research findings to prevention, diagnosis, and treatment of disease.

The research supported by the program uses approaches emanating from immunology, pathology, physiology, behavioral medicine, and epidemiology. Some of the specific diseases being studied include rhematoid arthritis, osteoarthritis, systemic lupus erythmatosus, scleroderma, fibromyalgia, juvenile rheumatic diseases, gout, ankylosing spondylitis and other spondyloarthropathies, and many other inherited and acquired connective tissue disorders.

Specific areas under investigation include:

- Biochemistry, physical chemistry, and metabolism of normal cartilage and extracellular matrix components.
- Mechanisms of dysregulation of immune function in rheumatic diseases, including development of new immunotherapies,
- Basic and clinical research in rheumatic diseases, including fibromyalgia, with emphasis on the development of therapies to prevent disease onset,
- Basic and clinical studies in osteoarthritis,
- Research in arthritic manifestations of chronic Lyme disease, and
- Inherited connective tissue disorders, including the application of gene therapy approaches.

Epidemiology and Data Systems Programs. The epidemiology program provides an administrative core for efforts to encourage epidemiologic research in the fields of rheumatic, musculoskeletal and skin diseases. Epidemiologic studies of these diseases contribute knowledge related to the prevalence and economic and social burdens from these diseases, studying their natural history, identifying risk factors, and investigating disease etiologies.

The data systems program fosters systematic acquisition, storage, retrieval, and analysis of information concerning arthritis and skin diseases. Program effort is focused on assuring validity and comparability of data collected in separate institutions and integrating data resources with data needs.

Musculoskeletal Diseases Branch. This program supports studies of the skeleton and associated connective tissues. Broad areas of interest include skeletal development, metabolism, mechanical properties, and responses to injury. Research on osteoporosis, a disease afflicting many of the Nation's growing population of older people, is a major area of emphasis. Some other diseases and skeletal disorders under investigation are osteogenesis imperfecta, a genetic disorder that leads to fragile, easily fractured bones; Paget's disease of bone, which results in irregular bone formation and subsequent deformity; genetic disorders of bone growth and development, such as osteomalacia.

Other studies focus on the causes and treatment of acute and chronic injuries, including carpal tunnel syndrome, repetitive stress injury, and low back pain. The program supports development of technologies with the potential to improve treatment of skeletal disorders and facilitate the repair of trauma in the normal skeleton. These include drugs and nutritional interventions, joint replacement, bone and cartilage transplantation, and gene therapy. Sports medicine and musculoskeletal fitness are also areas of special research emphasis.

Research areas support through this branch include:

- Bone diseases
  Epidemiology and development of disease
  Environmental and genetic risk factors
  Treatment, prevention, and diagnosis.
- Bone biology
  Mechanisms of bone resorption
  Hormone, growth factor, and cytokine effects on bone-resorbing and bone-forming cells
  Regulation of bone growth and development
  Interactions among proteins, minerals, and cells in bone
  Mechanisms of mineralization.
- Orthopedic research

NIAMS Appropriations--Grants and Direct Operations

Fiscal year	Total grants	Direct operations	Total
	[Amounts in thousands of dollars]		
1986[1]	$ 100,573	$ 12,693	$ 113,266
1987	125,175	14,482	140,417
1988	130,542	17,001	147,543
1989	141,564	18,322	159,886
1990	145,701	22,837	168,538
1991	166,918	26,531	193,449
1992	173,817	29,699	203,516
1993	181,163	31,045	212,208
1994	190,254	32,906	223,160
1995	196,069	34,747	230,816

[1] Comparable amount. Appropriations for arthritis and musculoskeletal and skin diseases are included in the NIDDK appropriation for FY 1986.

Skeletal architecture and mechanical properties

Mechanisms of fracture repair

Biomaterials, orthopedic devices, joint replacement and repair

Rehabilitation

Muscle Biology Branch. This program supports researchs on skeletal muscle, its diseases and disorders, and its central role in human physiology and exercise. Topics include the molecular structure of muscle and the molecular mechanisms that produce force and motion. An aim is understanding the alterations in muscle resulting from increased exercise and, conversely, the atrophy that follows immobilization during injury or illness. Specific aims include understanding the molecular structure and assembly of muscle components, including those responsible for contraction and regulation of muscle action; the molecular basis of genetic muscle diseases, such as Duchenne/Becker muscular dystrophy, myotonic dystrophy, myotonias, and malignant hyperthermia; genetic processes of muscle development and assembly; musculoskeletal fitness, metabolism, and adaptive mechanisms; the role of growth factors and hormones; altered metabolism during aging; the effects of therapeutic drugs and abused substances on basic muscle processes; the cellular basis for impaired muscle function in disease; inflammatory muscle diseases and inflammation resulting from exercise or injury; molecular mechanisms of muscle repair and regeneration; and development of more satisfactory methods of treatment and recovery.

Specific research covered by the branch include:

- Muscle physiology
- Structure and function of muscle and of individual muscle proteins
- Mechanisms of muscle contraction and force generation
- Muscle development and specialization
- Musculoskeletal fitness and adaptive biology, including exercise physiology
- Muscle diseases and disorders
- Sports medicine, muscle injury and repair.

Skin Diseases Branch. Research studies supported by this program are increasing understanding of the mechanisms underlying normal and abnormal skin function and development. Research investigations are conducted on the molecular structures of various skin cells, the immunologic functions of the skin in normal and disease conditions, and the development of diagnostic tests and effective therapies for an array of skin diseases that can cause discomfort, disfigurement, and/or chronic disability. The range of skin diseases include keratinizing disorders such as psoriasis and ichthyosis atopic dermatitis and other chronic inflammatory skin disorders blistering diseases such as epidermolysis bullosa and pemphigus and disorders of pigmentation such as vitiligo and disorders of the hair and nails.

Basic science and disease areas in skin research include:

- Metabolic studies of skin
- Immunologically mediated skin disorders
- Disorders or keratinization, pigmentation, and hair growth
- Photobiology, photoallery, and phototoxic reactions
- Bullous diseases and the basement membrane of skin
- Acne and physiologic activity of sebaceous glands
- Skin manifestations of diffuse connective tissue disorders
- Heritable connective tissue diseases
- Skin manifestations of HIV infection and AIDS.

Centers Program. The NIAMS currently supports three types of research centers programs: Multipurpose Arthritis and Musculoskeletal Diseases Centers, Specialized Centers of Research, and Skin Diseases Research Centers.

The Multipurpose Arthritis and Musculoskeletal Diseases Centers were established in the National Arthritis Act of 1974. The purpose of these centers, located at 14 medical institutions and hospitals around the country, is to foster a multidisciplinary approach to the many problems or arthritis and musculoskeletal diseases and to develop capabilities for research in these areas. To this end, centers develop and carry out basic and/or clinical research studies, research in professional and patient education, and epidemiology and health services research.

Existing Specialized Centers of Research (SCORs) are targeted for rheumatoid arthritis, systemic lupus erythematosus, osteoarthritis, and osteoporosis. These centers aim to accelerate the pace of basic research on the causes of disease and to expedite transfer of advances in basic science into clinical applications and improved patient care.

NIAMS has six Skin Diseases Research Centers (SDRC), which promote collaborative efforts among scientists engaged in high-quality research related to a common theme. By providing funding for core facilities, pilot and feasibilty studies, and program enrichment activities at the SDRC, the institute reinforces and amplifies investigations already ongoing.

Information and Education Efforts. The focus of most NIAMS information and education efforts is in the Office of Scientific and Health Communications. The efforts include the National Arthritis and Musculoskeletal and Skin Diseases Information Clearinghouse, which helps lay and professional audiences locate materials and information, and a campaign entitled "What Black Women Should Know About Lupus." A National Resource Center on Osteoporosis and Related Bone Diseases provides public information and develops educational efforts on prevention, diagnosis, and treatment.

Intramural Research Program

The NIAMS intramural program has six main components--the Arthritis and Rheumatism Branch, Laboratory of Physical Biology, Laboratory of Skin Biology, Laboratory of Structural Biology, Protein Expression Laboratory, and craniofacial development section--the first section within a planned Bone and Connective Tissue Biology Branch.

The Arthritis and Rheumatism Branch (ARB) conducts a variety of investigations--basic and clinical. The historical focus of the ARB has been the study of the autoimmune rheumatic diseases--particularly rheumatoid arthritis, systemic lupus erythematosus, and myositis. At present, studies in the laboratories and clinics also focus on genetic diseases affecting inflammation and the musculoskeletal system, the basic mechanisms of signaling in the cells of inflammation, animal models of disease, genetic-epidemiologic studies, the role of neuroendocrine-immune system interactions in disease, and a variety of novel approaches to the interruption of inflammation.

In the Laboratory of Physical Biology leading-edge physical and biological techniques are used to study biological systems. Efforts are devoted to studying the structure of muscle cells, the molecular structure and function of various muscle components, and the mechanism of muscle contraction. Significant effort also is directed at the study of target sizes of macromolecules by radiation inactivation. The mechanism of cell membrane assembly is being investigated by means of calorimetry.

The Laboratory of Skin Biology conducts basic and clinical research on the skin and skin diseases, with particular emphasis on the epidermis--the outermost layer of skin. Basic research includes study of the various structural proteins and enzymes, and their genes, that are specifically expressed in the epidermis; the processes by which these

molecules are assembled to form a normal epidermis; and the processes of abnormal cornification (keratinization) that occur in a variety of genetic skin diseases. One section within the lab uses direct and indirect genetic approaches to identify the molecular bases of disorders of cornification and malignant skin diseases. This section also assists in genetic analysis of a variety of hereditary diseases under study by other NIH investigators, including complex hereditary disorders such as arthritis.

The Laboratory of Structural Biology conducts research into the structural basis of the assembly and functioning of macromolecules (large biological molecules) and their complexes such as viruses, cell membrane and cytoskeletal proteins, and proteins in the skin. There is particular interest in the mechanisms that control these processes. These investigations make extensive use of cryoelectron microscopy and three-dimensional image processing. The newest group in this laboratory, established in 1991, is devoted to x-ray crystallographic study of the high-resolution structure and function of biolgical macromolecules and multienzyme complexes, including the replication complex of bacteriophage T4, retroviral proteins, and host factors involved in HIV expression.

The Protein Expression Laboratory, formerly under the NIH Office of the Director, joined the NIAMS in 1996. This lab plans and conducts research on the expression, purification, and structural characterization of HIV and HIV-related proteins. Laboratory scientists also collaborate with NIH intramural researchers studying the structure and function of HIV and HIV-related proteins. The lab serves as a support and resource group for the expression and purification of these proteins.

The craniofacial development section, established in 1996, conducts basic investigations at the molecular and cellular levels on the mechanisms of bone and cartilage formation as they relate to human genetic diseases such as achondroplasia, craniosynostosis, craniofacial dysostosis, and various other forms of skeletal dysplasias. Signal transduction pathways that determine and maintain cartilage and bone formation are of particular interest. Members of the lab will use relevant animal models combined with the power of molecular genetics to address fundamental questions in bone and cartilage development and extrapolate their findings to shed light on the cause and development of human skeletal diseases.

National Institute of Child Health and Human Development

Mission

The National Institute of Child Health and Human Development (NICHD) seeks to assure that every individual is born healthy, is born wanted, and has the opportunity to fulfill his or her potential for a healthy and productive life unhampered by disease or disability. In pursuit of this mission, the NICHD conducts and supports laboratory, clinical, and epidemiological research on the reproductive, neurobiologic, developmental, and behavioral processes that determine and maintain the health of children, adults, families, and populations. The institute administers a multidisciplinary program of research, research training, and public information, nationally and within its own facilities, on reproductive biology and population issues on embryonic development as well as maternal, child and family health and on medical rehabilitation.

NICHD programs are based on the concepts that adult health and well-being are determined in large part by episodes early in life, that human development is continuous throughout life, and that the reproductive processes and the management of fertility are of major concern, not only to the individual, but to society. The institute holds the tenet that when disease, injury, or a chronic disorder intervenes in the developmental process, it is incumbent to restore or maximize individual potential and functional capacity.

The institute supports and conducts basic, clinical, and epidemiological research in the reproductive sciences to develop knowledge enabling men and women to regulate their fertility in ways that are safe, effective, and acceptable to various population groups, and to overcome problems of infertility. The purposes of institute-sponsored behavioral and social science research in the population field are to understand the causes and consequences of reproductive behavior and population change.

Research for mothers, children and families is designed to advance knowledge of pregnancy, fetal development, and birth to develop strategies to prevent infant and childhood mortality to identify and promote the prerequisites of optimal physical, mental and behavioral growth and development through infancy, childhood, and adolescence and to contribute to the prevention and amelioration of mental retardation and developmental disabilities. Much of this research focuses on the disciplines of cellular, molecular, and developmental biology to elucidate the mechanisms and interactions that guide a single fertilized egg cell through it development into a multicellular, highly organized adult organism.

Medical rehabilitation research is designed to develop improved techniques and technologies with respect to the rehabilitation of individuals with physical disabilities resulting from diseases, disorders, injuries, or birth defects. Research training is an area supported across all NICHD research programs, with the intent of adding to the cadre of trained professionals available to conduct research in areas of critical public health concern.

An overarching responsibility of the NICHD is to disseminate information emanating from institute research programs to researchers, practitioners and other health professionals, and to the general public.

Important Events in NICHD History

January 12, 1961--The report of the Task Force on Health and Social Security called for establishing, by administrative action of the Surgeon General, a National Institute of Child Health within the NIH.

January 30, 1961--The DHEW general counsel declared that existing legislation (enacted in 1950) limited the creation of new institutes to those focusing on a disease or group of diseases, and that new legislation would be required to establish the institute called for in the task force report.

February 17, 1961--A Center for Research in Child Health was established by the Surgeon General in the Division of General Medical Sciences.

October 17, 1962--Public Law 87-838 authorized establishment of the NICHD.

January 30, 1963--Secretary of HEW Anthony J. Celebrezze approved establishment of the NICHD, with provision that the Center for Research in Child Health and the Center for Research in Aging (established in 1956) be transferred from the Division of General Medical Sciences to the new institute.

May 14, 1963--Members of the National Advisory Child Health and Human Development Council were appointed by the Surgeon General.

November 14, 1963--The first meeting of the National Advisory Child Health and Human Development Council was held November 14Ç0916.

December 2, 1965--A major NICHD reorganization, approved by the Surgeon General, gave emphasis to four program areas: reproduction, growth and development, aging, and mental retardation. At the same time, significant additions were made to the intramural program with the transfer to the NICHD of the National Heart Institute"s Gerontology Branch in Baltimore and the major part of the National Cancer Institute"s Endocrinology Branch located in the Clinical Center.

April 18, 1967--A second reorganization of the NICHD approved by the Surgeon General acknowledged the institute's intramural research programs by separating responsibility for intramural and extramural research and creating seven intramural laboratories: Gerontology Research Center (Baltimore) Developmental Biology Branch Social and Behavioral Sciences Branch Reproduction

Research Branch Laboratory of Biomedical Sciences Behavioral Biology Branch and Children's Diagnostic and Study Branch. The reorganization also brought the NICHD administrative structure into line with that of the other institutes.

June 15, 1968--The $7.5 million, four-story Gerontology Research Center building located at and operated in cooperation with the Baltimore City Hospitals, Baltimore, Md., was officially opened.

August 9, 1968--The Center for Population Research was established by the DHEW secretary within the NICHD. The center is responsible for a contract and grant program in population and reproduction research and has been designated by the President as the Federal agency primarily responsible for population research and training.

May 27, 1975--The Center for Research for Mothers and Children was established. It is the Federal Government's focal point for research and research training on the special health problems of mothers and children, with responsibility for increasing knowledge about pregnancy, infancy, childhood, adolescence and adulthood, and for administering grant and contract programs related to these areas.

June 30, 1975--The Adult Development and Aging Branch and the Gerontology Research Center, with their programs for support and conduct of research in the field of aging, were transferred from the NICHD to the new National Institute on Aging.

July 1, 1975--Congress endorsed the major research programs of the Center for Research for Mothers and Children, a mechanism initiated by Dr. Kretchmer to promote and support research in perinatal medicine in areas not sufficiently addressed. Such areas include maternal diabetes, premature labor, low birth weight infants, and developmental conditions contributing to sudden infant death syndrome.

September 20, 1982--NICHD celebrated its 20th anniversary at the 58th meeting of the National Child Health Advisory Council. Dr. Aldrich, the first NICHD director, was a featured speaker.

Four former patients and their families who have benefitted from medical advances resulting from NICHD-supported research also attended. Their case histories illustrated two decades of research progress in: prevention of mental retardation by early identification of certain metabolic disorders through routine screening of newborns; diagnosis and treatment of male infertility; diagnosis, treatment and reversal of precocious puberty; and management of multiple medical problems of infants born prematurely or of low birth weight.

1985--NICHD formed research networks of Neonatal Intensive Care Unites and Maternal-Fetal Medicine Units. The centers, which perform large clinical trials, provide NICHD with a faster, more effective system of evaluating neonatal intensive care and maternal-fetal treatments.

September 21, 1987--NICHD celebrated its 25th anniversary at the 73rd meeting of the National Advisory Child Health and Human Development Council meeting. Dr. Alexander presented the institute's past directors--Drs. Aldrich, Harting, LaVeck and Kretchmer--who spoke about research highlights and anecdotes of their tenure at NICHD.

Dr. Robert E. Cooke, who was the prime mover behind the creation of NICHD, reflected on the "Conceptualization, Gestation, and Birth of a New Institute." Dr. Alexander presented plaques of appreciation to three of NICHD's long-term grantees: Nobelist Dr. Stanley Cohen, a biochemist at Vanderbilt University; Dr. Maria New of Cornell University Medical Center, a pioneer researcher in congenital adrenal hyperplasia; and Dr. John Money of Johns Hopkins University, a specialist in psychosexual development.

December 1989--NICHD announced establishment of the country's first research centers to combine the biomedical and behavioral sciences to focus specifically on learning disabilities.

September 1990--The institute began a congressionally initiated national program of Child Health Research Centers. Their goal is to expedite the application of findings from basic research to the care of sick children.

September 1991--NICHD funded four new centers, two to foster the development of new contraceptive technology and two to develop improved treatments for infertility.

September 1992--The National Center for Medical Rehabilitation Research funded its first research grants. These were in the areas of improving mobility, the study and enhancement of reproductive function of persons with physical disabilities, and the development of technological devices to improve the quality of the lives of people with disabilities. These grants join the portfolio of research training grants previously funded by the center.

NICHD Legislative Chronology

October 17, 1962--Public Law 87-838 authorized the Surgeon General, with approval of the secretary, to "establish in the Public Health Service an institute for the conduct and support of research and training relating to maternal health, child health and human development, including research and training in the special health problems and requirements of mothers and children and in the basic sciences relating to the processes of human growth and development, including prenatal development."

October 31, 1963--Public Law 88-164 provided grants to help pay for constructing research centers on mental retardation and related disability. The NICHD remains closely associated with some 12 centers installed prior to June 30, 1967, when the authority expired.

December 24, 1970--Public Law 91-572 added Title X to the Public Health Service Act authorizing grants and contracts for research and research training in family planning and population problems. The authority was delegated by the secretary of health, education and welfare to the NICHD where the program is administered by the Center for Population Research.

April 22, 1974--Public Law 93-270 assigned to the HEW secretary and ultimately to the NICHD the task of conducting research on sudden infant death syndrome and reporting on it to the Congress.

July 29, 1975--Title II of P.L. 94-63, the Family Planning and Population Research Act of 1975, amended Title X of the Public Health Service Act. Thereafter the PHS could conduct as well as support population research, and Title X became the sole authority for population research appropriations.

August 13, 1981--The Budget Reconciliation Act of 1981, P.L. 97-35, repealed sections 1004(b)(1) and 1004(b)(2) of the Public Health Service Act. Authority for supporting research in human reproduction and the population sciences now derives from the broad provisions of section 301 and 441 of the PHS act.

November 20, 1985--The Health Extension Act of 1985 directed NICHD to appoint an associate director for prevention "to coordinate and promote the programs in the Institute concerning the prevention of health problems of mothers and children."

November 16, 1990--Section 3 of the NIH Amendments of 1990, P.L. 101-613, established the National Center for Medical Rehabilitation Research. The center will conduct and support programs with respect to the rehabilitation of individuals with physical disabilities resulting from congenital defects, diseases or disorders of the neurological, musculoskeletal, cardiovascular, pulmonary or any other physiological system.

Biographical Sketch of NICHD Director Duane Alexander, M.D.

Dr. Alexander was named NICHD director on February 5, 1986, after serving as acting director when Dr. Lipsett left the institute.

Dr. Alexander, a pediatrician, had been NICHD deputy director for 3 years and an assistant to the director since 1978.

Much of his career has been centered at the NICHD. With the exception of several special assignments, he has been with the NICHD since 1968, following his residency in the department of pediatrics at the Johns Hopkins Hospital. He came to NICHD as a clinical associate in the Children's Diagnostic and Study Branch.

Directors of NICHD

Name	Date of Birth	Dates of Office	
		From	To
Robert A. Aldrich	Dec. 13, 1917	Mar. 1, 1963	October 1964
Donald Harting	1922	July 8, 1965	1966
Gerald D. LaVeck	Apr. 19, 1927	Oct. 9, 1966	Sept. 1, 1973
Gilbert L. Woodside (Acting)		Sept. 1, 1973	Sept. 1, 1974
Norman Kretchmer	Jan. 20, 1923	Sept. 1, 1974	Sept. 30, 1981
Betty H. Pickett (Acting)		Sept. 30, 1981	June 30, 1982
Mortimer B. Lipsett		July 1, 1982	Jan. 7, 1985
Duane Alexander		Feb. 5, 1986	

Following Dr. Alexander's assignment in that branch, he returned to Hopkins as a fellow in pediatrics (developmental disabilities) at the John F. Kennedy Institute for Habilitation of the Mentally and Physically Handicapped Child.

He returned to the NICHD in 1971 as assistant to the scientific director. In that capacity, he directed the NICHD National Amniocentesis Study that established the safety and accuracy of amniocentesis for prenatal diagnosis. That test is now widely used to detect numerous genetic defects and inborn errors of metabolism.

From 1974 to 1978, Dr. Alexander served as medical officer in the Office of the Assistant Secretary for Health in what is now the Department of Health and Human Services. He also was the physician on the staff of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. The commission's recommendations are the basis for current DHHS regulations for the protection of human subjects in research.

An officer in the PHS, he has received several PHS awards. These include a Commendation Medal in 1970, a Meritorious Service Medal and a Special Recognition Award in 1985, and the Surgeon General's Exemplary Service Medal in 1990.

Dr. Alexander received his undergraduate degree from Pennsylvania State University in 1962 and his medical degree from the Johns Hopkins University School of Medicine in 1966. He also served his internship at Hopkins.

A diplomate of the American Board of Pediatrics and a member of the American Academy of Pediatrics, the American Pediatric Society, the Society for Developmental Pediatrics and the Association for Retarded Citizens, he has authored numerous papers and book chapters, most relating to his research in developmental disabilities.

Organization

The NICHD has six major components--the Center for Research for Mothers and Children, the Center for Population Research, and the National Center for Medical Rehabilitation Research, all extramural programs supporting research through grants and contracts the Division of Intramural Research the Division of Epidemiology, Statistics, and Preventive Research and the Division of Scientific Review.

Center for Researchfor Mothers and Children

The Center for Research for Mothers and Children (CRMC) supports research and research training in the biomedical and behavioral sciences. The work is designed to foster pregnancies and births that produce sound infants--infants who can grow to adulthood free of disease and disability. The CRMC has six branches.

The Endocrinology, Nutrition and Growth Branch supports research on the nutritional needs of pregnant women, fetuses, and children and on the interrelationships of nutrition, endocrinology, and growth and development. The branch also focuses on nutritional and hormonal aspects of growth and development, both the normal and abnormal biological development of the fetus and infant, and on the effects of perinatal conditions and events on development.

The Human Learning and Behavior Branch is concerned with the development of human behavior, from infancy, through childhood and adolescence, into early maturity. Studies are supported in developmental psychobiology, behavioral pediatrics, cognitive and communicative processes, social and affective development and health-related behaviors, as well as learning disabilities, dyslexia, language disorders, day care and unintentional injuries.

The Mental Retardation and Developmental Disabilities Branch focuses on the etiology, pathogenesis, epidemiology, diagnosis, treatment and prevention of mental retardation and related disabilities, examining the biomedical, behavioral and social processes involved. The branch also supports 14 Mental Retardation Research Centers where research is conducted on mental retardation and related aspects of human development.

The Developmental Biology, Genetics and Teratology Branch develops and supports research and research training in the etiology of congenital malformations. The branch also examines gene transfer, the genetic basis of human development, and the development of the immune system.

The Pregnancy and Perinatology Branch studies research related to pregnancy and maternal health, embryonic development, fetal growth, and infant well-being. The branch also supports research on high-risk pregnancies, low birth weight, premature birth, perinatal pharmacology and toxicology, sudden infant death syndrome, exercise during pregnancy, and the impact of conditions and/or treatments during pregnancy such as antibiotics, analgesics, anesthetics, drug use and addiction, cigarette smoking, obesity and infections on the outcome of pregnancy.

The Pediatric, Adolescent and Maternal AIDS Branch develops and supports research on HIV infection and disease as it affects women of childbearing age, pregnant women, mothers, fetuses, infants, children, adolescents and families. Research efforts focus on the epidemiology, natural history, pathogenesis, behavioral aspects, treatment and prevention of HIV infection and disease.

Center for Population Research

The Center for Population Research (CPR) conducts the Federal Government's central effort in population research. Through grants and contracts, the center supports:

- Fundamental biomedical research on reproductive processes influencing human fertility and infertility;
- Development of better methods for regulating fertility;
- Evaluation of the safety and effectiveness of contraceptive methods now in use; and
- Behavioral and social science research on the reproductive behavior of individuals, and the causes and consequences of population change.

There are four branches in the CPR. The Reproductive Sciences Branch supports fundamental biomedical research and research training in reproductive biology and medicine relevant to problems of human fertility and infertility.

The Contraceptive Development Branch supports projects aimed at developing safe and effective methods for regulating fertility in both men and women. The Contraceptive and Reproductive Evaluation Branch funds a national research program focusing on the epidemiology of reproductive health including studies of contraceptive and noncontraceptive gynecological products, medical devices, and surgical procedures.

The Demographic and Behavioral Sciences Branch supports studies on the social, psychological, economic and environmental factors governing population change, relationship between individual, household, and social behavior and population change.

National Center for Medical Rehabilitation Research

The NCMRR funds research training and projects on restoring, replacing or enhancing the function of individuals with physical disabilities. Medical rehabilitation research is directed towards restoration or improvement of functional capability lost as a consequence of injury, disease, or congenital disorder.

NICHD Appropriations--Grants and Direct Operations

Fiscal year	Total grants	Direct operations	Total
	[Amounts in thousands of dollars]		
1964	$ 32,800	$ 1,200	$ 34,000
1965	38,906	3,790	42,695
1966	49,725	5,299	55,024
1967	55,710	9,212	64,922
1968	56,795	11,826	68,621
1969	57,363	15,763	73,126
1970	59,135	18,057	77,192
1971	64,151	30,609	94,760
1972	78,356	38,477	116,833
1973	89,114	41,315	130,429
1974	87,955	42,309	130,254
1975	97,848	44,587	142,435
1976	95,518	40,886	136,404
1977	100,717	44,826	145,543
1978	115,471	50,919	166,390
1979	143,951	54,039	197,630
1980	149,052	59,901	208,953
1981	164,233	56,395	220,628
1982	167,221	59,088	226,309
1983	188,948	65,376	254,324
1984	208,511	67,535	276,046
1985	236,547	76,211	312,758
1986	237,299	70,912	308,211
1987	281,413	85,238	366,651
1988	295,537	101,047	396,584
1989	318,567	106,701	425,628
1990	323,156	118,799	441,995
1991	351,031	127,916	478,947
1992	375,522	144,055	518,577
1993	380,059	147,708	527,767
1994	385,700	172,136	554,836
1995	397,494	172,815	570,309
1996	422,865	170,286	592,791

The Applied Rehabilitation Medicine Research Branch supports research to develop and evaluate new physical medicine/rehabilitation techniques and methods in prosthetics, orthotics, bioengineering, and technology transfer.

The Basic Rehabilitation Medicine Research Branch supports research and training in the physical medicine/rehabilitation areas of replacement, recovery, and restoration of function in neural, muscular, cardiac, pulmonary, urinary, and other physiological systems.

Division of Intramural Research

The intramural research program conducts fundamental and clinical research at the Clinical Center and laboratories at NIH.

A limited number of research patients are admitted to the program's clinical research projects under guidelines established by the director of the Clinical Center. Patients must be referred by a physician. The DIR is broadly concerned with the biological and neurobiological, medical and behavioral aspects of normal and abnormal human development. In addition to four major clinical research and training programs in the areas of genetics, endocrinology, and maternal-fetal medicine, a diversity of developmental models are under study in 11 fundamental research laboratories and branches.

Fundamental Research

In the laboratories of the scientific director, the section on viruses and cellular biology studies the molecular events which influence the fidelity of the genome, facilitating both evolution and species stability. A major objective is to elucidate the mechanisms which determine whether DNA repair is error-free or -prone in bacteria and in primate cells. The dynamics of mutagenesis are also of interest.

The section on growth factors studies the biochemical and physiological actions of nerve growth factor, a peptide required for the development of the sympathetic and sensory nervous systems.

The Laboratory of Developmental Neurobiology studies cellular, membrane and molecular mechanisms that determine nervous system functions and that figure importantly in brain development and mental retardation.

The Laboratory of Molecular Genetics examines how genetic information is transferred and expressed during development in a variety of organisms from yeast to mammals.

The Laboratory of Developmental and Molecular Immunity conducts research into developmental and molecular biology of "natural" and immunization-induced immunity to bacterial and other antigens. Emphasis has been placed on the study of pathogenic mechanisms, immunoregulatory mechanisms of the host, and the development of vaccines directed against serious bacterial infections.

The Laboratory of Theoretical and Physical Biology applies mathematical, statistical, and computer-based techniques to the analysis of complex clinical, biological, and pharmacological problems.

The Laboratory of Mammalian Genes and Development studies fundamental questions of development, differentiation and oncogenesis. Gene regulation at specific stages of mouse development is studied.

The Laboratory of Molecular Growth Regulation focuses on the control of mammalian cell growth, gene regulations and immune system function. Its goal is to understand normal control mechanisms and disorders of growth control that are manifested as cellular immortalization, transformation, or senescence.

The Laboratory of Molecular Embryology investigates the mechanisms by which gene expression is stabilized in embryogenesis. The laboratory is concerned with understanding the molecular mechanisms by which stable states of gene activity are established and maintained. Attention has been focused on germ cell-specific class II and class III genes.

The Laboratory of Cellular and Molecular Neurophysiology studies how neurotransmitter receptors and ion channels regulate information processing in the central nervous system.

The Endocrinology and Reproduction Research Branch studies the secretion and cellular actions of peptide and protein hormones, with particular reference to hypothalamic-pituitary hormones and their receptor-mediated responses in endocrine and neural cells.

The Cell Biology and Metabolism Branch carries out research in the areas of cell, molecular, and receptor biology. The molecular mechanisms of iron metabolism, the biology of intracellular organelles and membrane traffic, the mechanisms which regulate the fate of newly synthesized membrane proteins, the genetic response to environmental stress, and the biology of receptors central to the immune system are of interest.

Clinical Research

The Laboratory of Comparative Ethology investigates cognitive, social and motivational development in humans and in nonhuman primates. Research focuses on early environmental influences onbehavior development, and on the complex relationships between the organism and its environment. Research undertaken with primates seeks to relate brain function to behavioral states.

The Developmental Endocrinology Branch conducts basic and clinical studies of endocrine disease with emphasis on adult and pediatric reproductive endocrinology. Fundamental research focuses on endocrine and reproductive processes and gynecologic disorders. A major objective is to translate research findings into practical bedside application.

Human Genetics Branch interests range from studies on the etiology, diagnosis and treatment of genetic and developmental disorders of young people to very basic studies on eukaryotic gene expression utilizing recombinant DNA methodology. Current research projects concern lipid and carbohydrate metabolism, the mucopolysaccharidoses, heritable disorders of the bone and connective tissue, lysosomal storage diseases (e.g., cystinosis), temperature-sensitive models of cellular differentiation, and heritable disorders of bone and connective tissue.

The Perinatal Research Branch conducts clinical investigations of obstetric and neonatal conditions contributing to infant mortality. Emphasis is placed on antenatal diagnostic techniques, premature labor, and other causes of low birth weight.

Division of Epidemiology, Statistics, and Prevention Research

The division provides the institute with the skills of four disciplines: biostatistics, behavioral sciences, computer sciences, and epidemiology. The Biometry and Mathematical Statistics Branch provides statistical

consulting and data analyses to support intramural and extramural investigators and conducts its own methodological research in biostatistics. It also participates as a statistical unit in studies and projects of NICHD.

The Epidemiology Branch studies determinants of high risk pregnancies and of infant mortality and childhood mortality including congenital malformations. Particular attention is give to determinants which lend themselves to interventions and prevention.

The Computer Sciences Branch serves as the division's central resource for systems analysis, design and programming expertise with emphasis on the development and implementation of analysis, statistical procedures, and data processing procedures in epidemiology and biometry. It also houses the data coordinating center for the NICHD study of early child care.

The Prevention Research Branch conducts biobehavioral research to promote healthful behaviors and to prevent or ameliorate disease during pregnancy, infancy, and childhood through adolescence. The focus is the development and evaluation of interventions in health care setting and school-based programs for children and adolescents.

Division of Scientific Review

The Division of Scientific Review is responsible for a broad range of functions related to the review of research and training grant applications and research contract proposals.

The division provides policy direction and coordination for the planning and conduct of initial scientific and technical merit review of applications for various types of grants, including program projects, centers, institutional training, career development and conferences. The division serves the same function for NICHD research and development contracts in the biomedical, clinical, and behavioral sciences.

National Institute of Dental Research

Mission

The mission of the National Institute of Dental Research is to improve and promote craniofacial, oral and dental health through research. The legislation that Congress enacted in 1948 to create NIDR entrusted it with national leadership in dental research, granting authority to conduct and support research and training, and promote science transfer and dissemination of information.

The goal is to minimize inherited, infectious, neoplastic and chronic craniofacial-oral-dental diseases and disorders. To that end, scientists are keen to use biomimetics to discover new biomaterials to repair and regenerate craniofacial tissues; to discover better analgesics for control of chronic pain; and to meet the challenges of changing patterns of disease, new and reemerging infections, and other challenges that threaten or compromise oral health across the life span. The NIDR is also committed to the timely dissemination of research findings to the communities it serves.

NIDR has organized its efforts into two components: the Division of Extramural Research, which provides grant and contract funds to the scientific community for research and research training and the Division of Intramural Research, which conducts NIDR-funded research projects on the Bethesda, Md., campus.

Together, NIDR's organizational divisions conduct and support basic research in biochemistry, microbiology, immunology, developmental biology, physiology, virology, cell and molecular biology, genetics, pathology, biomimetics, and the social and behavioral sciences. The institute also sponsors clinical, epidemiological and applied studies in the oral health sciences.

The NIDR promotes the timely transfer and adoption of research findings by the public, health professionals, and researchers. Institute scientists collaborate with other U.S. Government organizations within and outside the NIH, with health professional and voluntary organizations and industry, and with investigators internationally in developing and implementing research programs of mutal interest.

Important Events in NIDR History

1931--PHS created a Dental Hygiene Unit at NIH and designated Dr. H. Trendley Dean as the first dental research worker. His primary function was to apply principles of epidemiology to a series of community studies on the oral disease known as mottled enamel. His research on fluoride showed not only its relation to mottled enamel, but also its influence on tooth decay.

1945--Following fluoridation of the water supply in Grand Rapids, Mich., annual examinations of children were begun to study the effects of fluoride on the development of dental caries.

1948--On June 24, P.L. 80-755, the National Dental Research Act, created NIDR and the National Advisory Dental Research Council. On September 16, the institute was established.

1949--The first meeting of the National Advisory Dental Research Council was held on January 10. The institute-supported grants program was initiated, and the first grants and fellowships were awarded.

1954--Results of the first 10 years of the Grand Rapids study firmly established water fluoridation as a safe, effective, and economical procedure for the control of dental caries.

On October 30 the first meeting of the Board of Scientific Counselors was held. This board was established to provide advice to NIDR on matters of general policy, particularly from a long-range viewpoint, as they relate to the intramural program.

1958--The Laboratory of Biochemistry was established to conduct research studies on the chemistry and structure of collagen, elastin and other proteins. President Eisenhower signed the appropriations bill which included provisions to finance the construction of a building for the dental institute.

1960--On September 21 the cornerstone was laid for the dental institute building (Building 30) at NIH.

1961--On May 26, DHEW Secretary Abraham A. Ribicoff dedicated the new NIDR building.

1962--The first grant for a multidisciplinary study of cleft palate was awarded to the University of Pittsburgh Health Center.

1963--Fifteen years of scientific accomplishment by NIDR were cited by scientists, administrators and health educators June 14 in a special anniversary observance.

1966--A reorganization of the institute's extramural programs was implemented to more adequately plan and support research and training programs designed to attack the major dental diseases and disorders--dental caries, periodontal disease, oral-facial anomalies, and biomaterials.

1967--An NIDR program of grant support was initiated for the development of several dental research institutes/centers in university environments.

This program was designed to utilize all of the appropriate resources of the parent universities to create ideal research and training environments, fostering interdisciplinary approaches to the complex problems of oral diseases and disorders.

1969--The Laboratory of Histology and Pathology was reorganized and named the Laboratory of Biological Structure. This laboratory conducts basic research on the structural and chemical organization of the hard and soft tissues of the oral cavity.

1971--The National Caries Program was launched utilizing funds specifically earmarked to accelerate development of preventive methods to reduce tooth decay.

1973--The Laboratory of Oral Medicine was established to conduct both clinical and laboratory research on the cause, prevention, and treatment of diseases of the soft tissue of the oral cavity.

On June 28-29, a scientific conference commemorating the Silver Anniversary of NIDR was convened in Washington, D.C.

1974--To encompass the expanded research studies conducted by the Laboratory of Microbiology, the Laboratory of Microbiology and Immunology was established. Laboratory programs involve the role of host

factors in periodontal diseases, autoimmune diseases and allergic disorders.

To emphasize anesthesia-analgesia dental problems, the NIDR reorganized its intramural program to form a Neurobiology and Anesthesiology Branch composed of the neural mechanism section and the anesthesiology section. The branch collaborates closely with the extramural programs concerned with pain control and behavioral studies.

1975--Having already established the safety and efficacy of several caries preventive measures, the NIDR initiated selected school demonstration projects through its National Caries Program.

1977--The institute established its first two specialized clinical research centers in periodontal diseases.

In June Dr. Marie U. Nylen was named director of intramural research, the first woman to hold such a position at NIH.

1978--NIDR sponsored its first consensus development conference, Dental Implants--Benefit and Risk, to examine available data, suggest future research, and draft guidelines for implant therapy.

1980--The Diagnostic Systems Branch was created to pursue research and development of noninvasive diagnostic techniques, and analysis of the functional development of the oral and pharyngeal region.

A Clinical Investigations and Patient Care Branch was established to emphasize the intimate association between the institute's patient treatment and clinical dental research programs.

1982--The Laboratory of Biological Structure and the Laboratory of Biochemistry were replaced by the Laboratory of Oral Biology and Physiology and a Mineralized Tissue Research Branch. The Laboratory of Oral Biology and Physiology conducts research on the cell biology of secretory tissues and the chemical modification of proteins. Skeletal development, regulation, and disorders are under investigation in the Mineralized Tissue Research Branch.

1983--On March 21 the NIDR opened the first multidisciplinary pain clinic in the U.S. devoted exclusively to research. The clinic provides an opportunity for all NIH researchers and clinicians to pool their knowledge and exchange ideas about the pathophysiology and treatment of pain.

The institute initiated an annual honorary lecture to recognize outstanding scientific accomplishment in basic and clinical research and to honor distinguished scientists who have made important contributions in areas of research directly related to the interests of the dental institute.

1984--NIDR inaugurated the Dentist Scientist Award Program designed to provide opportunities for dentists to develop into independent biomedical investigators in the oral health research field.

The institute completed its Long-Range Research Plan FY 1985-89 entitled *Challenges for the Eighties*. Under the direction of NIDR director Dr. Löe, a coordinating committee prepared this 5-year plan and summary of progress in the oral sciences and in disease prevention, diagnosis and treatment. The document pinpoints 14 emphasis areas for NIDR's oral health research.

NIDR established three new specialized caries research centers in university environments to continue research investigations into the cause, treatment, and prevention of dental decay.

An NIDR reorganization disbanded the National Caries Program and created the Epidemiology and Oral Disease Prevention Program (EODPP). The EODPP is devoted to research on the etiology, incidence and prevalence of dental caries, periodontal diseases, and other oral diseases and disorders.

Also, a realignment of the administrative offices within the Office of the Director was completed. This realignment established the Office of Planning, Evaluation and Communications (OPEC).

An NIDR annual lecture series was named for a former institute director. Given each September at NIH, it is known as the Seymour J. Kreshover Lecture Award.

1985--NIDR convened a meeting at NIH of over 160 deans and senior officials from almost every dental school in the U.S. and Canada to explore key issues in dental research and education. The conference, first of its kind in NIDR history, was designed to strengthen the relationship between the institute and universities.

1986--NIDR completed its first nationwide survey on the dental health of American adults--the most comprehensive survey of its kind ever done, and the first to look at the prevalence of root caries and periodontal disease in detail.

1988--NIDR celebrated its 40th anniversary with a year-long agenda of commemorative activities.

NIDR funded four new oral biology research centers.

The institute released findings of its second National Caries Prevalence Study. Data show half of all American schoolchildren now have no tooth decay.

NIDR held its second consensus development conference on dental implants. According to the summary statement, the use of dental implants has increased fourfold from 1983 to 1987.

NIDR and the Fogarty International Center launched an international oral health research study to identify oral health issues that would benefit most from international collaborative research.

On May 25, NIDR named the conference room in Building 30 the "H. Trendley Dean Conference Room," commemorating the memory of the first NIDR director.

The institute launched the "Research and Action Program to Improve the Oral Health of Older Americans and Other Adults at High Risk." The goal is to eliminate toothlessness and prevent further deterioration of oral health in individuals who have compromised dentition.

1990--The institute completed the *NIDR Long-Range Research Plan for the Nineties: Broadening the Scope*, the blueprint for research in this decade. The plan establishes major initiatives geared to "special care patients" whose oral health is affected by systemic diseases or treatments and to older Americans, with the ultimate goal of eliminating toothlessness among future generations and the prevention of further deterioration of the oral health of individuals with compromised dentition.

1991--NIDR hosted a symposium for dental practitioners, "Scientific Frontiers in Clinical Dentistry: An Update at the National Institutes of Health."

The institute sponsored a technology assessment conference on the effects and side effects of dental restorative materials.

The Laboratory of Developmental Biology and Anomalies was renamed the Laboratory of Developmental Biology (LDB). LDB research aims to gain a better understanding of normal human development.

1992--The Epidemiology and Oral Disease Prevention Program reorganized to expand the scope of EODPP activities. The program now consists of four branches: Molecular Epidemiology and Disease Indicators; Disease Prevention and Health Promotion; Analytical Studies and Decision Systems; and Health Assessment. EODPP is the federal focus for research in orofacial epidemiology and disease prevention.

A reorganization of the Extramural Program established the Program Development Branch, consisting of seven categorical programs and an Office of Policy and Coordination, which contains the manpower development and training activities and the Program Operations Unit, which includes the Scientific Review Office, the Grants Management Office, and the Contracts Management Office. EP provides grant and contract funds for research and research training.

NIDR hosted a second meeting of the leadership form the Nation's dental schools, dental professional organizations, and industry to explore ways to enhance the research capacity of dental schools.

1993--The National Oral Health Information Clearinghouse was established as a centralized resource for patients, health professionals, and the public seeking information on the oral health of special care patients.

1994--The intramural, extramural, and epidemiology organizational components of

NIDR were redefined from programs to divisions, establishing the Divisions of: Intramural Research; Extramural Research; and Epidemiology and Oral Disease Prevention (DEODP).

The DEODP was streamlined from four to three branches: Analytical Studies and Health Assessment; Disease Prevention and Health Promotion; and Molecular Epidemiology and Disease Indicators.

1995--NIDR sponsored "Partnerships in Communication: A Meeting of Dental Editors," which brought together for the first time at NIH more than 30 editors and executive directors of dental organizations to enhance communications among the group.

The institute met with a diverse group of representatives form pharmaceutical, biotechnology, manufacturing and other industries to develop ways to accelerate the transfer of research findings into application.

1996--The first community conference in the institute's history was held in May for employees to review the NIDR strategic planning process to date and to discuss the NIDR mission, vision, situation audit, strategic initiatives, management principles and plans for the future.

The NIDR sponsored a technology assessment conference on the management of temporomandibular disorders.

The institute's intramural, extramural and epidemiology organizational components were reorganized into the Division of Intramural Research and the Division of Extramural Research.

NIDR launched its World Wide Web page on the Internet making all pertinent information available to the public and the research community.

1997--The NIDR's first strategic plan, *Shaping the Future,* was released in July. Focusing on the areas of research opportunities, research capacity, and health promotion, the document will serve as a critical structure within which multiple institute initiatives will be undertaken.

NIDR Legislative Chronology

June 24, 1948--Public Law 80-755 established NIDR to conduct, support, and foster research investigations on the causes, treatment, and prevention of dental diseases and conditions.

August 1, 1958--The President signed a DHEW appropriation bill which included provisions to finance construction of laboratory facilities to house NIDR.

Biographical Sketch of NIDR Director

Harold C. Slavkin, D.D.S.

In July 1995 Dr. Slavkin, former director of the Center for Craniofacial Molecular Biology at the University of Southern California School of Dentistry, was sworn in as the sixth NIDR director.

Born in Chicago, Ill., on March 20, 1938, he received his B.A. in 1961 and his D.D.S. in 1965 from the University of Southern California. After completing postdoctoral training at USC, he was named chairman of the department of biochemistry and nutrition at the university's school of dentistry in 1969. He served in various capacities at USC over the next 26 years, including chief of the laboratory for developmental biology in the Gerontology Center, chairman and program director of the graduate program in craniofacial biology, and director of the Center for Cranifacial Biology, a position he held for 6 years prior to his appointment as NIDR director.

In his last position Dr. Slavkin directed a team of scientists investigating the genetics of normal and abnormal craniofacial, oral, and dental development. His own studies focused on the developmental processes underlying a number of congenital and acquired craniofacial and oral defects. He was also responsible for creating the first Ph.D. program in the U.S. in craniofacial biology, a program he chaired for 10 years.

He has been active in programs to promote science appreciation and literacy at the elementary, middle, and high school levels. He helped initiate a program sponsored by the National Science Foundation that gives high school students an opportunity to work on a research project at a university. He served as executive producer and writer for a Public Broadcasting Service film called *A Lifetime of Change*, shown at the 10th annual conference of the International Society of Developmental Biology and the Academy of Motion Pictures, Arts and Sciences in Beverly Hills. He also collaborated with PBS on the production of *Genetic Engineering, Why in the World?* and with other educational film companies in the making of *Development and Differentiation* and *Intercellular Communication.*

A grantee since 1966, Dr. Slavkin has been a member and chair of NIDR's Board of Scientific Counselors and served as acting chief of NIDR's Laboratory for Developmental Biology and Anomalies. He also served on the NIDR Blue Ribbon Panel that formulated recommendations to shape the future of the institute's Division of Intramural Research.

He serves on the editorial boards of the *International Journal of Developmental Biology*, *Differentiation*, *Oral Diseases*, and *Current Opinion in Dentistry*. A member of numerous professional organizations, he has authored more than 90 book chapters and over 180 publications in the field of developmental and craniofacial molecular biology.

Directors of NIDR

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
H. Trendley Dean	Aug. 25, 1893	Sept. 17, 1948	Mar. 31, 1953
Francis A. Arnold, Jr.	Dec. 30, 1910	Apr. 1, 1953	February 1966
Seymour J. Kreshover	.....	February 1966	June 30, 1975
Clair L. Gardner (Actg)	.....	July 1, 1975	Dec. 31, 1975
David B. Scott	May 8, 1919	Jan. 1, 1976	Dec. 31, 1981
John F. Goggins (Actg)	.....	Jan. 1, 1982	Dec. 31, 1982
Harald Löe	.....	January 1983	June 1, 1994
Harold C. Slavkin	March 20, 1938	July 1995	.....

Division of Extramural Research

NIDR is the primary sponsor of dental, oral, craniofacial research and research training. Through its Divison of Extramural Research, the institute provides funds outside its intramural laboratories and clinics in Bethesda. Funds are made available in the form of grants, cooperative agreements and contracts which support scientists working in institutions throughout the U.S. and in foreign countries. These scientists conduct basic, translational, patient-oriented and demonstration research to increase understanding of the fundamental processes in health and disease, to promote the timely transfer and community adoption of research findings. The Institute also supports research training and career development to ensure an adequate pool of research personnel.

In addition to the Office of the Director, which incorporates the Research Training and Career Development, the division consists of the Program Development Branch, which includes inherited diseases and disorders; infectious diseases; neoplastic diseases; chronic disabling diseases; biomaterials, biomimetics and tissue engineering; and behavior, health promotion and environment--as well as clinical trials and clinical core centers; diversity initiatives; comprehensive centers of discovery; and technology transfer. The Program Operations Branch includes the scientific review, grants management, and contracts offices.

Program Development Branch

The *Inherited Diseases and Disorders Program* supports research from molecular biology to clinical investigations on normal dental-oral-craniofacial development and on the etiology, pathogenesis, epidemiology, prevention, diagnosis and treatment of inherited diseases and disorders such as ectodermal dysplasia, cleft lip and palate, amelogenesis imperfecta, dentinogenesis imperfecta, osteogenesis imperfecta, and other inherited diseases that have oral manifestations. Research on developmentally related disorders such as occlusion defects and those acquired through trauma are included.

NIDR Appropriations--Grants and Direct Operations

Fiscal year	Total grants	Direct operations*	Total
	[Amounts in thousands of dollars]		
1950	$ 235	$ 1,545	$ 1,780
1951	271	1,684	1,955
1952	271	1,347	1,618
1953	271	1,379	1,650
1954	271	1,469	1,740
1955	521	1,469	1,990
1956	521	1,655	2,176
1957	3,715	2,311	6,026
1958	3,825	2,605	6,430
1959	4,500	2,920	7,420
1960	6,226	3,793	10,019
1961	10,088	5,412	15,500
1962	13,984	3,356	17,340
1963	17,525	3,674	21,199
1964	15,252	3,914	19,166
1965	15,303	4,780	20,083
1966	18,002	5,675	23,677
1967	22,215	6,093	28,308
1968	23,349	6,958	30,307
1969	22,859	7,124	29,983
1970	21,259	7,495	28,754
1971	22,932	12,508	35,440
1972	28,375	5,013	43,388
1973	31,599	15,392	46,991
1974	29,169	16,396	45,565
1975	32,017	18,016	50,033
1976	32,881	18,410	51,291
1977	33,834	21,739	55,573
1978	37,043	24,685	61,728
1979	40,774	24,439	65,213
1980	42,815	25,488	68,303
1981	46,186	24,928	71,114
1982	47,137	24,846	71,983
1983	52,417	26,875	79,292
1984	58,982	29,692	88,674
1985	69,271	31,417	100,688
1986	71,038	32,244	103,282
1987	80,879	37,066	117,945
1988	89,422	36,875	126,297
1989	92,454	38,298	130,752
1990	94,882	40,867	135,749
1991	105,122	43,580	148,702
1992	112,603	46,314	158,917
1993	113,737	47,405	161,142
1994	121,689	47,801	169,490
1995	124,186	48,835	174,021
1996	132,212	51,266	183,478

* Includes the intramural research program, R&D contracts, and research management and support.

The *Infectious Diseases Program* supports research on the etiology, pathogenesis, epidemiology, prevention, diagnosis and treatment of oral infectious diseases such as dental caries, periodontitis, oral candidiasis, herpes, hepatitis, and HIV/AIDS. Research on immunity is included with special emphasis on mucosal and salivary immunity, and on the oral manifestations of systemic infectious diseases and the development of new diagnostics and therapeutics.

The *Neoplastic Diseases Program* funds basic, translational, patient-oriented, and community-based research on the etiology, pathogenesis and metastasis, epidemiology, prevention, diagnosis and treatment of oral and pharyngeal neoplastic diseases.

The *Chronic Disabling Diseases Program* supports the full range of research involving chronic diseases associated with the dental-oral-craniofacial complex. These include nonheritable and postnatally acquired diseases and conditions; temporomandibular joint disorders; neuropathies and neurodegenerative diseases, including those involving oral sensory and motor functions; and autoimmune diseases. Included is research elucidating the relationships between chronic diseases of the dental-oral-craniofacial complex and systemic diseases.

The *Biomaterials, Biomimetics and Tissue Engineering Program* supports basic, translational, and patient-oriented research to enhance the development of natural and synthetic therapeutics and biomaterials used for the repair, regeneration, restoration, and reconstruction of dental-oral-craniofacial molecules, cells, tissues, and organs.

The *Behavior, Health Promotion and Environment Program* supports basic, patient-oriented, and community-based research aimed at assessing the interactive roles of sociological, behavioral, economic, environmental, genetic, and biomedical factors in dental-oral-craniofacial diseases and disorders. These include examining the impact of oral health care delivery systems, clinical decisionmaking, and health promotion on health outcomes.

The Diversity in Research Portfolio enhances research on minority dental-oral-craniofacial health issues, expands the diversity of the scientific work force, and increases the research capacity of minority institutions and of those serving primarily minority populations. These objectives are achieved through the Regional Research Centers for Minority Oral Health and the Collaborative Opportunities for Research Minority Oral Health grants; through supplements to research grants supporting minority individuals at the high school, undergraduate, graduate, postdoctoral and career investigators levels; and through collaborative funding through the NIGMS's MARC (Minority Access to Research Careers) and the MBRS (Minority Biomedical Research Support) grants.

The Clinical Trials and Clinical Core Centers Portfolio recognizes the increasing need to establish a strong foundation for the support of meritorious clinical research. The Clinical Core Centers provide the administrative, scientific and technical core resources to support clinical dental-oral-craniofacial research, including clinical trials. Short-term training is provided in the design and conduct of single- and multicenter clinical trials through the Research Training and Career Development Program.

The Technology Transfer Portfolio responds to the institute's increasing partnering with industry in the identification, development, translation and commercialization of new technologies resulting from dental-oral-craniofacial research. It expands on the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) grant programs, which seek to increase the role of the private sector in cooperative research and development as well as commercialization of innovations from federally sponsored research.

The *Research Training and Career Development Program* ensures the future of dental-oral-craniofacial research by developing an outstanding and diverse scientific workforce through programs designed for undergraduate, graduate, and postdoctoral stages of education and for continued career development of scientists and retraining of midcareer scientists.

Comprehensive Oral Research Centers of Discovery are each organized around a scientific theme pertinent to diseases and disorders of the dental-oral-craniofacial complex. Each integrates basic, translational, applied biomedical and behavioral research, accelerates science-technology transfer, provides a vehicle for cross-disciplinary and collaborative research, and provides health professionals and the public with the latest information about dental-oral-craniofacial health.

The NIDR also funded 31 center grants for just over $21 million, which was approximately 16 percent of the DER grant budget. These awards supported five Research Centers in Oral Biology, two Oral Health in Aging Centers, three Periodontal Diseases Research Centers, three Caries Research Centers, three Craniofacial Anomalies Research Centers, three Materials Science Research Centers, four clinical Dental Research Core Centers, four Regional Research Centers for Minority Oral Health, and four Oral Cancer Research Centers.

Program Operations Branch

The *Scientific Review Office* coordinates initial scientific peer review of a variety of large research grant applications such as centers and program projects, training and career development applications, and small grants and conference grant applications, and coordinates and conducts project site visits and other review procedures.

The *Grants Management Office* is responsible for all fiscal management activities associated with the review, negotiation, award, administration and termination of grants. The Contracts Management Office has responsibility for all matters relating to solicitation, negotiation, award and administration of research and development contracts.

Contracted Research Studies

NIDR's contracted research activities of the extramural and intramural research programs fund studies to readily translate advances in the basic sciences to disease-oriented applied research as well as to provide support complementary to basic science investigations. Interagency agreements with other Federal agencies have also been utilized to provide support toward these NIDR goals.

Division of Intramural Research

NIDR's Division of Intramural Research conducts basic, translational, clinical and epidemiological research directed toward increasing fundamental knowledge of oral diseases and related disorders. Areas investigated include biochemistry, structure, function and development of bone, teeth, salivary glands and connective tissues; the role of bacteria and viruses in oral disease; genetic disorders and tumors of the oral cavity; cause and treatment of acute and chronic pain; development of new and improved diagnostic methods; epidemiology of dental, oral and craniofacial diseases; and oral health promotion. The division has approximately 300 employees and guest researchers in seven branches, and a series of clinical or laboratory core facilities.

The *Gene Therapy and Therapeutics Branch* conducts research related to the diagnosis, prevention and management of oral and dental diseases. Primary efforts are directed at salivary gland gene transfer based on a detailed understanding of salivary secretion and function. These studies include investigations of xerostomia (dry mouth) and establishing criteria for evaluating salivary gland status.

The *Craniofacial and Skeletal Diseases Branch* studies the development and structure of mineralized tissues (bones, teeth and cartilage). Emphasis is placed on acquired heritable disorders of the skeleton through research in bone and cartilage cell biology, skeletal tissue metabolism and matrix molecules—major components of most tissues and critical factors in oral tissue development, function and health.

The *Pain and Neurosensory Mechanisms Branch* has as its primary interests clinical and basic research on pain mechanisms, the development of new methods of assessing pain, and evaluating new approaches to pain control. Collaborative studies, including research on pain associated with cancer and diabetes, have been initiated with other institutes.

Scientists in the *Oral Infection and Immunity Branch* conduct basic research on mechanisms of human infectious diseases including bacterial and viral infections (including AIDS) and their role in governing the interplay between oral and systemic health. Other studies focus on acute and chronic inflammatory responses, including mucosal immunity and vaccine design and development.

The *Craniofacial Developmental Biology and Regeneration Branch* investigates the roles and gene regulation of the extracellular matrix, a key component of connective tissue, and other cell interaction systems in embryonic development and related processes. Research focuses on such areas as normal and abnormal embryonic development of craniofacial and other tissues, cancer metastasis and wound healing.

Research in the *Oral and Pharyngeal Cancer Branch* is directed toward understanding the role of growth and regulatory factors in oncogenesis. Studies focus on molecular mechanisms responsible for conversion of normal cells to a malignant state.

The *Oral Health Promotion, Risk Factors, and Molecular Epidemiology Branch* conducts research on the epidemiology of a broad range of oral conditions and facilitates the rapid transfer and adoption of disease prevention and oral health promotion measures by the public and the profession. Branch scientists investigate patterns of and genetic basis for a number of oral, craniofacial and systemic diseases and disorders. In addition, branch scientists are involved in analytical, experimental, and community intervention research to identify, develop, and evaluate methods for the control and prevention of orofacial diseases and conditions, especially in high-risk populations and among special care groups.

In addition to its branches, the division operates research core facilities or single standing programs in clinical research, gene targeting, cellular imaging, molecular structural biology, matrix metalloproteinase biology, and immunopathology.

National Institute of Diabetes and Digestive and Kidney Diseases*

Mission

The National Institute of Diabetes and Digestive and Kidney Diseases conducts and supports research on many of the most serious diseases affecting the public health. The institute supports much of the clinical research on the diseases of internal medicine and related subspecialty fields as well as many basic science disciplines.

The institute's Division of Intramural Research encompasses the broad spectrum of metabolic diseases such as diabetes, inborn errors of metabolism, endocrine disorders, mineral metabolism, digestive diseases, nutrition, urology and renal disease, and hematology. Basic research studies include biochemistry nutrition pathology histochemistry chemistry physical, chemical, and molecular biology pharmacology and toxicology.

NIDDK extramural research is organized into four divisions: Diabetes, Endocrinology and Metabolic Diseases; Digestive Diseases and Nutrition; Kidney, Urologic and Hematologic Diseases; and Extramural Activities.

The institute supports basic and clinical research through investigator-initiated grants, program project and center grants, and career development and training awards. The institute also supports research and development projects and large-scale clinical trials through contracts.

Important Events in NIDDK History

August 15, 1950--President Harry S. Truman signed into law the Omnibus Medical Research Act establishing the National Institute of Arthritis and Metabolic Diseases in PHS. The new institute incorporated the laboratories of the Experimental Biology and Medicine Institute and initiated plans for an expansion to include clinical investigation in the rheumatic diseases, diabetes, and a number of metabolic, endocrine and gastrointestinal diseases.

November 15, 1950--The National Advisory Arthritis and Metabolic Diseases Council held its first meeting and recommended approval of NIAMD's first grants.

November 22, 1950--NIAMD was established by Surgeon General Scheele.

1959--Dr. Arthur Kornberg, former chief of the institute's enzyme and metabolism section, won the Nobel Prize for synthesizing nucleic acid.

The institute initiated an intramural research program in gastroenterology and launched an intramural research program in cystic fibrosis with the establishment of the Pediatric Metabolism Branch.

1961--Laboratory-equipped, mobile trailer units began an epidemiological study of arthritis among the Blackfeet and Pima Indians in Montana and Arizona, respectively.

October 16, 1969--The Nobel Prize was awarded to Dr. Marshall W. Nirenberg of the National Heart Institute who reported his celebrated partial cracking of the genetic code while an NIAMD scientist (1957-1962).

November 1970--The institute celebrated its 20th anniversary. Leaders in the department, representatives from voluntary health agencies and professional biomedical associations, as well as past and present institute National Advisory Council members, heard an address by Secretary of Defense Melvin R. Laird.

May 19, 1972--The institute name was changed to the National Institute of Arthritis, Metabolism, and Digestive Diseases.

October 1972--Christian B. Anfinsen, chief of the institute's Laboratory of Chemical Biology, shared a Nobel Prize with two other American scientists for his demonstration of one of the most important simplifying concepts of molecular biology, that the three-dimensional conformation of a native protein is determined by the chemistry of its amino

*Until May 19, 1972, the National Institute of Arthritis and Metabolic Diseases; until June 23, 1981, the National Institute of Arthritis, Metabolism, and Digestive Diseases; until April 8, 1986, the National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases.

acid sequence. A significant part of this research cited by the award was performed while with NIH.

September 1973--The institute's diabetes centers program was initiated with the establishment of the first Diabetes-Endocrinology Research Centers.

November 1975--After 9 months of investigation into the epidemiology and nature of diabetes mellitus and public hearings throughout the U.S., the National Commission on Diabetes delivered its report, the Long-Range Plan to Combat Diabetes, to Congress. Recommendations encompassed expansion and coordination of diabetes and related research programs the creation of a diabetes research and training centers program acceleration of efforts in diabetes health care, education, and control programs and the establishment of a National Diabetes Advisory Board.

April 1976--After a year of study and public hearings, the National Commission on Arthritis and Related Musculoskeletal Diseases issued the *Arthritis Plan*--its report to Congress which called for increasing current arthritis research and training programs conducted by NIH the creation of multipurpose arthritis centers throughout the country the initiation of epidemiologic studies and data systems in arthritis a National Arthritis Information Service and establishment of a National Arthritis Advisory Board.

October 1976--The National Diabetes Advisory Board was established to review and evaluate the long-range plan recommended by the National Commission on Diabetes.

The National Arthritis Advisory Board was established to review and evaluate the *Arthritis Plan*--formulated by the National Commission on Arthritis and Related Musculoskeletal Diseases.

Dr. Baruch Blumberg was awarded the Nobel Prize in Physiology or Medicine for research on the hepatitis B virus protein--the "Australia antigen"--which he discovered in 1963 while at the institute. This advance has proven to be a scientific and clinical landmark in detection and control of viral hepatitis and led to the development of preventive measures against hepatitis and liver cancer.

April 19, 1977--The director, NIH, established a trans-NIH program for diabetes, with lead responsibility in NIAMDD.

September 1977--Over $5 million in grants was awarded to five institutions to establish Diabetes Research and Training Centers.

October 1977--In response to the recommendation of the National Commission on Diabetes, the National Diabetes Data Group was established within the institute to collect, analyze, and disseminate data on this disorder to scientific and public health policy and planning associations.

December 1977--Three scientists won the Nobel Prize for work supported partly by NIAMDD grants. Drs. Roger C. L. Guillemin and Andrew V. Schally were recognized for discoveries concerning peptide hormone production in the brain, and Dr. Rosalyn S. Yalow shared the prize for her work in the development of radioimmunoassays of peptide hormones.

December 1978--A study of cystic fibrosis focused on the need for future research activities, including increased support for clinical and basic research, expansion of specialized CF research resources, emphasis on training of scientific personnel, and coordination of public and private cystic fibrosis research activities. Prepared by the Cystic Fibrosis Foundation, *Cystic Fibrosis--State of the Art and Directions for Future Research Efforts*, was commissioned by the NIAMDD and the National Heart, Lung, and Blood Institute.

January 1979--Following 2 years of study and public hearings, the National Commission on Digestive Diseases issued its report, *The National Long-Range Plan To Combat Digestive Diseases*. Recommendations to Congress included the establishment of a National Digestive Diseases Advisory Board, an information clearinghouse, and increased emphasis on educational programs in digestive diseases in medical schools.

November 1979--Dr. Jesse Roth, chief of the Diabetes Branch of NIAMDD intramural research, was named the first winner of the Lita Annenberg Hazen Award for achievement in medical research and teaching.

December 1979--A task force completed its study and submitted the report, *An Evaluation of Research Needs in Endocrinology and Metabolic Diseases*.

September 1980--Dr. Joseph E. Rall, director of NIAMDD intramural research, became the first person at NIH to be named to the distinguished executive rank in the Senior Executive Service. The award was presented by President Carter in ceremonies at the White House on September 9.

October 15, 1980--NIAMDD celebrated its 30th anniversary with a symposium, "DNA, the Cell Nucleus, and Genetic Disease," and a dinner at the National Naval Medical Center. Dr. Donald W. Seldin, chairman of the department of internal medicine, University of Texas Southwestern Medical School, Dallas, was guest speaker.

June 23, 1981--The institute was renamed National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases.

April 1982--HHS Secretary Richard S. Schweiker elevated NIADDK's program clusters to division status, creating five extramural divisions and the Division of Intramural Research.

November 1982--Dr. Elizabeth Neufeld received a Lasker Foundation Award. She is cited, along with Dr. Roscoe E. Brady of NINCDS, for "significant and unique contributions to the fundamental understanding and diagnosis of a group of inherited diseases called mucopolysaccharide storage disorders (MPS)."

November 1984--Grants totaling more than $4 million were awarded to six institutions to establish Silvio O. Conte Digestive Disease Research Centers. The research centers investigate the underlying causes, diagnoses, treatments, and prevention of digestive diseases.

April 8, 1986--The institute's Division of Arthritis, Musculoskeletal and Skin Diseases became the core of the new National Institute of Arthritis and Musculoskeletal and Skin Diseases. The NIADDK was renamed the National Institute of Diabetes and Digestive and Kidney Diseases.

June 3, 1986--The National Kidney and Urologic Diseases Advisory Board was established to formulate the long-range plan to combat kidney and urologic diseases.

August 1, 1987--Six institutions were funded to establish the George M. O'Brien Kidney and Urological Research Centers. The research centers study diseases of the kidney and urinary tract, which are among the Nation's most critical health problems.

December 25, 1987--In response to congressional language on the FY 1988 appropriation for the NIDDK, the institute established a program of cystic fibrosis research centers.

September 16, 1990--NIDDK celebrated its 40th anniversary. Dr. Daniel E. Koshland, Jr., editor of *Science*, was guest speaker.

September 30, 1992--Three Obesity/Nutrition Research Centers and an animal models core to breed genetically obese rats for obesity and diabetes research were established.

October 12, 1992--Drs. Edwin G. Krebs and Edmond H. Fischer were awarded the Nobel Prize in Physiology or Medicine for their work on "reversible protein phosphorylation." They have received grant support from NIDDK since 1955 and 1956, respectively.

October 30, 1992--In response to congressional language on the institute's FY 1993 appropriation, the NIDDK initiated a program to establish gene therapy research centers with emphasis on cystic fibrosis.

November 1, 1993--The functions of the NIH Division of Nutrition Research Coordination, including those of the NIH Nutrition Coordinating Committee, were transferred to NIDDK.

NIDDK Legislative Chronology

December 11, 1947--Under section 202 of P.L. 78-410 the Experimental Biology and Medicine Institute was established.

August 15, 1950--Public Law 81-692, the Omnibus Medical Research Act, authorized establishment of NIAMDD to "... conduct researches relating to the cause, prevention, and methods of diagnosis and treatment of

arthritis and rheumatism and other metabolic diseases, to assist and foster such researches and other activities by public and private agencies, and promote the coordination of all such researches, and to provide training in matters relating to such diseases... ." Section 431 also authorized the Surgeon General to establish a national advisory council.

May 19, 1972--President Nixon signed P.L. 92-305 to bring renewed emphasis to research in digestive diseases by changing the name of the institute to the National Institute of Arthritis, Metabolism, and Digestive Diseases (NIAMDD) and by designating a digestive diseases committee within the institute's National Advisory Council.

July 23, 1974--Public Law 93-354, the National Diabetes Mellitus Research and Education Act, was signed. The National Commission on Diabetes, called for by this act, was chartered on September 17, 1974, members were appointed by the HEW secretary. The act called for centers for research and training in diabetes and establishment of an intergovernmental diabetes coordinating committee, including NIAMDD and six other NIH institutes.

January 1975--The National Arthritis Act of 1974 (P.L. 93-640) was signed into law to further research, education and training in the field of the connective tissue diseases. The mandated National Commission on Arthritis and Related Musculoskeletal Diseases, was appointed by the HEW secretary June 2. The act required centers for research and training in arthritis and rheumatic diseases and the establishment of a data bank, as well as an overall plan to investigate the epidemiology, etiology, control and prevention of these disorders.

October 1976--P.L. 94-562, the Arthritis, Diabetes, and Digestive Diseases Amendments of 1976, established the National Diabetes Advisory Board charged with advising the Congress and the HEW secretary on implementation of the "Long-Range Plan to Combat Diabetes" developed by the National Commission on Diabetes. The law also established the National Commission on Digestive Diseases to deal with many problems, including investigation into the incidence, duration, mortality rates, and social and economic impact of digestive diseases.

The National Arthritis Advisory Board, established by the same law, reviews and evaluates the implementation of the *Arthritis Plan*, formulated by the Arthritis Act of 1974. The board advises Congress, the HHS secretary, and heads of Federal agencies with respect to the plan and other Federal programs relating to arthritis.

December 1980--Title II of the Health Programs Extension Act of 1980, P.L. 96-538, changed the institute's name to the National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases. The act also established the National Digestive Diseases Advisory Board. The law authorized the National Diabetes Information Clearinghouse, the Diabetes Data Group, and the National Digestive Diseases Information and Education Clearinghouse. In addition, it reauthorized advisory boards for arthritis and diabetes research.

December 5, 1980--The Omnibus Reconciliation Act of 1980 (P.L. 96-499) directed the Secretary to carry out a demonstration project to determine whether nutritional therapy can retard the progression of early renal disease and thus delay the onset of dialysis.

November 20, 1985--The Health Research Extension Act of 1985, P.L. 99-158, changed the institute's name to the National Institute of Diabetes and Digestive and Kidney Diseases. The act also established the National Kidney and Urologic Diseases Advisory Board. The law gave parallel special authorities to all of the institute's operating divisions, including authorization of the National Kidney and Urologic Diseases Information Clearinghouse; the National Kidney, Urologic, and Hematologic Diseases Coordinating Committee; the National Kidney and Urologic Diseases Data System; the National Digestive Diseases Data System; kidney and urologic diseases research centers and digestive diseases research centers.

November 4, 1988--The Health Omnibus Programs Extension Act of 1988 (P.L. 100-607) gave permanent authority to the NIDDK Advisory Boards by deleting their date of expiration.

June 10, 1993--The NIH Revitalization Act of 1993, P.L. 103-43, established NIDDK as the lead institute in nutritional disorders and obesity, including the formation of a research and training centers program on nutrtional disorders and obesity.

It also provided for the directors of NIAMS, NIA, NIDR, and the NIDDK to expand and intesify programs with respect to research and related activities concerning osteoporosis, Paget's disease, and related bone disorders.

Directors of NIDDK

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
William Henry Sebrell, Jr.	1901	August 15, 1950	October 1, 1950
Russell M. Wilder	1885	March 6, 1951	June 30, 1953
Floyd S. Daft	May 19, 1900	October 1, 1953	May 3, 1962
G. Donald Whedon	July 4, 1915	November 23, 1962	September 30, 1981
Lester B. Salans	January 25, 1936	June 17, 1982	June 30, 1984
Mortimer B. Lipsett	February 20, 1921	January 7, 1985	September 4, 1986
Phillip Gorden	December 22, 1934	September 5, 1986	

Biographical Sketch of NIDDK Director Phillip Gorden, M.D.

Born December 22, 1934, in Baldwyn, Miss., Dr. Gorden received his B.A. from Vanderbilt University in 1957 and his M.D. from Vanderbilt University School of Medicine in 1961. He completed his internship and residency at Yale University and began his research career as a PHS clinical fellow and research fellow in metabolism there in 1964.

He joined NIDDK in 1966 as senior investigator in the Clinical Endocrinology Branch, and, in 1974, he became senior investigator in the Diabetes Branch. From 1976 to 1978, he was a visiting professor at the Institute of Histology and Embryology at the University of Geneva School of Medicine in Switzerland. From 1974 to 1976 and from 1980 to 1986, he served as institute clinical director.

In 1983 Dr. Gorden was appointed chief of the Diabetes Branch. He has held the position of chief, section on clinical and cellular biology of the Diabetes Branch since 1978. For several years, Dr. Gorden has held appointments as clinical professor of medicine, Uniformed Services Medical School in Bethesda, Md., and clinical associate professor, Howard University School of Medicine, Washington, D.C.

He was appointed director, NIDDK, on September 5, 1986, to succeed Dr. Lipsett. He was sworn in as an assistant surgeon general (rear admiral) of the USPHS on June 15, 1989.

An internationally recognized expert in diabetes, endocrinology, and metabolism, Dr. Gorden's research interests include disorders of insulin secretion, heterogeneity of circulating polypeptide hormones, hypoglycemic states, and disorders of growth hormone secretion. In collaboration with leading scientists in the diabetes field, he has extensively studied insulin-resistant states in man, especially those characterized by disorders of the insulin receptor, and has pioneered work on receptor mediated endocytosis of polypeptide hormones.

He is the author of more than 250 scientific papers and has received many honors and awards for his work. In 1986 he was presented an honorary doctorate by the University of Geneva in Switzerland for collaborative research relating to diabetes and the mechanisms of insulin action, which has been conducted with the university over the past 10 years. Also in 1986, he was awarded the PHS Distinguished Service Medal.

In 1988 Dr. Gorden received the PHS Commendation Medal. In 1990 he received the Distinguished Alumnus Award and Medal from Vanderbilt University School of Medicine in Nashville, Tenn. He was honored "for his high achievement through

NIDDK Appropriations--Grants and Direct Operations

Fiscal year	Total grants	Direct operations	Total
	[Amounts in thousands of dollars]		
1954	$ 3,621	$ 3,379	$ 7,000
1955	4,390	3,880	8,270
1956	5,910	4,930	10,840
1957	10,290	5,595	15,885
1958	13,837	6,548	20,385
1959	23,421	7,794	31,215
1960	38,553	8,309	46,862
1961	50,882	10,318	61,200
1962	69,809	12,022	81,831
1963	90,011	13,377	103,388
1964	99,914	13,765	113,679
1965	97,905	15,145	113,050
1966	104,393	18,810	123,203
1967	113,621	22,066	135,687
1968	116,160	22,738	138,898
1969	117,953	25,934	143,887
1970	118,959	27,660	146,619
1971	109,670	28,669	138,339
1972	122,309	31,016	153,325
1973	134,522	32,794	167,316
1974	125,622	33,825	159,447
1975	136,011	37,503	173,514
1976	138,612	40,904	179,516
1977	170,944	48,656	219,600
1978	202,719	57,534	260,253
1979	238,199	64,568	302,767
1980	274,088	67,118	341,206
1981	300,943	68,519	369,462
1982	296,898	71,293	368,191
1983	335,566	77,926	413,492
1984	384,080	79,946	464,026
1985	453,458	86,041	539,499
1986	461,890	85,483	547,373
1987	425,062	85,818	510,880
1988	442,618	91,741	534,359
1989	462,697	96,617	559,274
1990	474,455	105,529	579,984
1991	500,127	115,135	615,262
1992	539,913	121,533	661,446
1993	553,838	126,676	680,514
1994	598,885	125,737	715,622
1995	614,292	122,751	737,043
1996	636,295	132,058	768,353

outstanding leadership and contributions to the profession as distinguished physician, clinical scientist, and progressive leader supporting the profession and reflecting high honor on his alma mater through his actions as physician, researcher, alumnus director at NIH and national and international contributor to the profession of medicine."

He received the Instituto Rotariano per l'Italia Meridonale Award of the Rotary International in Naples, Italy, and the Public Information Award of the Juvenile Diabetes Foundation International in 1992. In 1993 he received the National Scientific Leadership Award of the Crohn's and Colitis Foundation of America, and the PHS Surgeon General's Exemplary Service Medal.

Dr. Gorden in 1994 received the David Rumbough Award for Research from the Juvenile Diabetes Foundation, International, and the John K. Lattimer Award from the American Urological Association in 1996.

NIDDK Programs

Division of Intramural Research

The Division of Intramural Research conducts research and training within the institute's laboratories and clinical facilities in Bethesda, Md., and at the Phoenix Epidemiology and Clinical Research Branch in Arizona.

The division has 7 branches and 10 laboratories, which cover a wide range of research areas. In addition, there is a section on veterinary sciences and an interinstitute training program with NICHD in clinical endocrinology.

Five branches are engaged primarily in basic and clinical research on diabetes, bone metabolism, endocrinology, hematology, digestive diseases, and genetics. The Phoenix Epidemiology and Clinical Research Branch develops and applies epidemiologic and genetic methods in field studies throughout the world on selected populations at risk of developing specific diseases, especially diabetes and its complications. The seventh branch addresses mathematical modeling of biological problems.

The laboratories are engaged in fundamental research related to the institute's mission (e.g., molecular biology, chemistry, cell biology, toxicology, pharmacology, physics, biochemistry, neuroscience, and developmental biology). The laboratory animal science section provides research animal support and collaboration to the research programs of the institute.

Division of Diabetes, Endocrinology and Metabolic Diseases

The DEMD supports research and research training related to diabetes mellitus, endocrinology, and metabolic diseases including cystic fibrosis. In addition, DEMD leads the administration of the Trans-NIH Diabetes Program and coordinates federally supported diabetes-related activities. The division also administers the Trans-NIH Cystic Fibrosis Program.

Diabetes Programs Branch

Diabetes Research Program. This program supports basic and clinical studies related to the etiology, pathogenesis, prevention, diagnosis, treatment, and cure of diabetes mellitus and its complications. The program also supports investigations related to pancreas and islet transplantation, automated insulin delivery systems, glucose sensors, the epidemiology of diabetes and its complications, and behavioral research related to diabetes.

Diabetes Centers Program. Two types of awards are made: Diabetes/Endocrinology Research Centers, exclusively oriented toward biomedical research goals, and the Diabetes Research and Training Centers (DRTC), which include training and information transfer components in addition to research. The DERCs and DRTCs integrate, coordinate, and foster interdisciplinary cooperation of investigators in diabetes and related endocrine and metabolic disorders. Both programs also provide limited funds for pilot and feasibility studies to encourage young investigators and new initiatives.

Clinical Trials Program. This program supports a multicenter randomized clinical trials on the treatment and prevention of insulin-dependent and noninsulin-dependent diabetes mellitus.

National Diabetes Data Group. The NDDG serves as the major Federal focus for the collection, analysis, and dissemination of data on diabetes and its complications.

WHO Collaborating Center for Diabetes. This center, sponsored by the Division of Diabetes, Endocrinology, and Metabolic Diseases, solicits and provides guidance in developing international research about diabetes through NIH research grants and contracts; promotes interchange of scientific and health information among WHO member countries; and provides expert advice and consultation to WHO and other international committees and agencies.

Endocrinology and Metabolic Diseases Programs Branch

Endocrinology Research Program. Basic and clinical studies on the mechanism of hormone action and hormonal regulation of gene expression is supported. Principal areas include nuclear and orphan hormones and their receptors; signal transduction through cell surface, cytoplasmic and nuclear receptors; regulation of the expression, processing, and secretion of hormones; dysfunctional hormonal regulation which causes or is the result of diseases such as osteoporosis, breast cancer and AIDS.

Also investigated are the effects of peptide hormones on gene expression; endocrine regulation of bone metabolism; basic research on the hypothalamic-pituitary axis; the identification and characterization of novel hypothalamic or pituitary hormones or receptors; and basic and clinical research on the effects of growth factors and related hormon-like substances.

Hormone Distribution Program. This program makes available to the research community human and animal pituitary hormones, antisera against the hormones, and selected other hormonal and biological products. An important research resource for the scientific community, this program gives scientists access to hormones and antisera of known composition and potency, most of which are unavailable commercially.

Metabolic Diseases Research. This consists of the Metabolic Deseases and Gene Therapy Research Program and the Metabolism and Structural Biology Research Program.

The first supports investigator-initiated research on intermediary metabolism and its regulation in health and disease. Particular areas include studies of etiology, pathogen-

esis, prevention, diagnosis, pathophysiology, and treatment of genetic metabolic diseases; characterization of the genes, gene defects and regulatory alterations characterizing the underlying causes of these diseases; development of enzyme replacement therapy; creation of animal models; and characterization of normal and abnormal metabolic biochemical processing in specialized tissues.

The second funds studies that examine structure-function relationships of peptides, proteins and polynucleotides relevant to normal and disease states. These include investigations on elucidating mechanisms of the fundamental processes of endocytosis, exocytosis, intracellular protein trafficking and membrane transport; evaluations of relationships of cellular membranes; elucidation of three-dimensional structures of proteins/enzymes; and clarification of the biolgical activities of organelle-derived peptides.

Cystic Fibrosis Research Program. This program supports initiated research projects and center grants encompassing fundamental and clinical studies of the etiology, molecular pathogenesis, pathophysiology, diagnosis and treatment of CF and its complications.

Division of Digestive Diseases and Nutrition

This division supports research related to liver and biliary diseases, pancreatic diseases, gastrointestinal diseases, including neuroendocrinology, motility, immunology, and digestion in the GI tract, nutrient metabolism, obesity, eating disorders, and energy regulation. The division provides leadership in coordinating activities related to digestive diseases and nutrition throughout the NIH and with various other Federal agencies.

Digestive Diseases Branch

Liver and Biliary Program. This program supports basic and clinical research into the normal function and the diseases of the liver and biliary tract. Areas of study include hepatic regeneration, gene therapy, liver cell injury, fibrosis, and apoptosis; liver transplantation; metabolism of bile acids and bilirubin; physiology of bile formation; factors controlling cholesterol levels in bile; gallbladder and bile duct function; cholesterol and pigment gallstones; inborn errors in bile acid metabolism; chronic hepatitis that evolves from autoimmune, viral, or alcoholic disease; and other liver diseases.

Pancreas Program. This program encourages research into the structure, function, and diseases (excluding cancer and cystic fibrosis) of the exocrine pancreas. Research efforts focus on hormonal and neural regulation of electrolyte, fluid, and enzyme secretion; receptors for secretagogues; stimulus-secretion coupling mechanisms; gut-islet-acinar interrelations; organization and expression of pancreatic genes; protein synthesis and export; tissue injury, repair, and regeneration; physiology and pathology of trophic responses; neural innervation; transcapillary solute and fluid exchange; pancreatic transplantation, storage, and preservation; imaging of the pancreas; pancreatic insufficiency; and acute and chronic pancreatitis and relevant experimental models.

Gastrointestinal Neuroendocrinology Program. This program supports both basic and clinical studies on normal and abnormal function of the enteric nervous system and the central nervous system elements that control the enteric nervous system. Research focuses on gastrointestinal hormones and peptides and studies on disease conditions associated with excessive or deficient secretions of neuropeptides.

Gastrointestinal Transport and Absorption Program. This program supports research on the process of food digestion in the gastrointestinal tract (GIT). Areas of research focus on the regulation of gene expression in the GIT; the structure and function of the gut mucosa; the cytoskeletal structure and contractility in brush border; the growth and differentiation of gastrointestinal cells in normal and disease states; intestinal transplantation, storage, and preservation; and gastrointestinal tissue injury, repair, and regeneration.

Also supported are studies on gastrointestinal diseases such as maldigestion and malabsorption syndromes.

Gastrointestinal Motility Program. This program supports research on the structure and function of gastrointestinal muscles, the biochemistry of contractile processes and mechanochemical energy conversion relations between metabolism and contractility in smooth muscle, extrinsic control of digestive tract motility, and the fluid mechanics of gastrointestinal flow. Areas of interest include the actions of drugs on gastrointestinal motility, intestinal obstruction, and diseases such as irritable bowel syndrome, colonic diverticular disease, swallowing disorders, and gastroesophageal reflux.

Gastrointestinal, Mucosal and Immunology Program. Research of this program focuses on intestinal immunity and inflammation. Areas include: ontogeny and differentiation of gut-associated lymphoid tissue; migratory pathways of intestinal lymphoid cells; humoral antibody responses; cell-mediated cytotoxic reactions; genetic control of the immune response at mucosal surfaces; immune response to enteric antigens in both intestinal/extraintestinal sites; granulomatous inflammation; lymphokines and cellular immune regulation; leukotrienes/prostaglandin effects on intestinal immune responses; T-cell mediated intestinal injury; intestinal mast cells and their role in inflammation; approaches to optimal mucosal immunoprophylaxis, including viral, bacterial, and parasitic diseases; and diseases such as gluten sensitive enteropathy, inflammatory bowel disease, and gastritis.

Acquired Immunodeficiency Syndrome Program. This program encourages research into the characterization of intestinal injury, mechanism of maldigestion, and intestinal mucosal functions, as well as hepatic and biliary dysfunction in AIDS. In addition, studies are supported on mechanisms of nutrient dysfunction, nutritional management in the wasting syndrome and other aspects of malnutrition related to AIDS.

Digestive Diseases Centers Program. This program currently administers research core center grant awards. These awards provide a mechanism for integrating, coordinating, and fostering interdisciplinary cooperation between groups of established investigators who conduct programs of high-quality research that relate to a common theme in digestive disease research.

Nutritional Sciences Branch

Nutrient Metabolism Program. This program supports basic and clinical studies related to the requirement, bioavailability, and metabolism of nutrients and other dietary components. Specific areas of research interest include the understanding of the physiological function and mechanism of action/interaction of nutrients within the body; the effects of environment, heredity, stress, drug use, toxicants, and physical activity on problems of nutrient imbalance and nutrient requirements in health and disease; and specific metabolic considerations relating to alternative forms of nutrient delivery and use such as total parenteral nutrition.

The program also supports research to improve methods of assessing nutritional status in health and disease.

Obesity, Eating Disorders, and Energy Regulation Program. This program funds research on the biomedical and behavioral aspects of obesity, anorexia nervosa, bulimia, and other eating disorders.

The goals are to establish a clear understanding of the etiology, prevention, and treatment of these multifaceted conditions. Areas of research interest focus on the factors that affect food choices, food intake, eating behavior, appetite, and satiety; the effects of taste, smell, and gastric and humoral (including neurotransmitters) responses associated with dietary intake and subsequent behavior; the physiological and metabolic consequences of weight loss or gain; the effect of mild exercise on appetite and weight control; and the individual variability in energy utilization and thermogenesis.

The program encourages investigations on dietary determinants of the growth and control of adipocyte size and number; the responsiveness of the adipocyte to metabolic and pharmacologic stimuli; the prevention of

obesity and other eating disorders; improved methods of assessing body composition; examination of health risk factors associated with specific degrees of obesity or body composition; and determining the effect of exercise on body composition.

Clinical Nutrition Research Units. The CNRU is an integrated array of research, educational, and service activities focused on human nutrition in health and disease. It serves as the focal point for an interdisciplinary approach to clinical nutrition research and for the stimulation of research in improved nutritional support of acutely and chronically ill persons, assessment of nutritional status, effects of disease states on nutrient needs, and effects of changes in nutritional status on disease.

Obesity/Nutrition Research Centers. The ONRCs encourage collaboration among researchers and a multidisciplinary approach to the treatment and prevention of obesity. They will help to capitalize on emerging research opportunities in obesity and to enhance the translation of research findings to the public.

U.S.-Japan Malnutrition Panel. In 1965 President Lyndon B. Johnson and Japanese Prime Minister Eisaku Sato issued a joint communique recognizing their mutual concern for the health and well-being of all the peoples of Asia. This led to the formation of the U.S.-Japan Cooperative Medical Science Program, which operates within a bilateral government framework. The malnutrition panel was established in 1966 to foster and support investigator-initiated research to help alleviate the serious problem of malnutrition.

Current topics of importance to the U.S. and Japan focus on consequences of changing dietary patterns on health, development of disease, and disease prevention. Specific research includes the nutritional significance of varying the amount of polyunsaturated fatty acids in the diet, nutritional aspects of bone disease, endogenous mediators of nutritional metabolism, and improved methodologies applicable to nutritional assessment.

Epidemiological Clinical Trials Branch

Clinical Trials Program. This program includes all prospective studies in digestive diseases and nutrition. Using 10 or more patients, studies compare two forms of treatment, one of which could be placebo or "standard" care.

Epidemiology and Data Systems Program. P.L. 99-158 authorized the establishment of this program for the collection, storage, analysis, retrieval, and dissemination of data derived from patient populations with digestive diseases and, where possible, data involving general populations to detect individuals with a risk of developing digestive diseases.

Liver Transplantation Database. The purpose of the 7-year project is to establish a liver transplantation database with data gathered from patients and donors from transplant centers in the U.S. To answer questions about transplantation, data are being collected from patients undergoing liver transplantation for various acute and chronic liver diseases and malignancies. Data relate to patients' conditions prior to operation, in early and late postoperative periods, and to donor livers and malignancies. The data will be evaluated and made available to investigators and clinicians.

Division of Kidney, Urologic and Hematologic Diseases

The division supports research on the physiology, pathophysiology, and diseases of the kidney, genitourinary tract, and the blood and blood-forming organs to improve or develop preventive, diagnostic, and treatment methods.

Kidney Research

Chronic Renal Diseases Program. This program supports basic and clinical studies related to the etiology, pathogenesis, prevention, diagnosis, and treatment of renal diseases that affect adults and children.

Areas of research focus on the primary and nonprimary glomerulopathies and renal disease resulting from various systemic diseases kidney disease of diabetes mellitus kidney disease of hypertension congenital and inherited renal diseases immune-related renal disease IgA nephropathy and tubulointerstitial nephritis.

End-Stage Renal Disease Program. This program focuses on the causes and physiology of uremia, and on hemo-dialysis, peritoneal dialysis, and renal transplantation. The program seeks to improve organ availability by supporting research on transplants across the ABO blood barrier, better cross-matching of donors with recipients, and innovative approaches to making organs available in all areas of the country.

Pediatric Nephrology Program. This program supports basic and clinical research on the causes, treatments, and prevention of kidney diseases of children. Research efforts focus on inherited and congenital renal diseases kidney disease of diabetes mellitus IgA nephropathy and kidney disease and hypertension, which starts in early childhood.

Renal Physiology/Cell Biology Program. This program supports research on the normal structure and function of the kidney including its biochemistry, metabolism, transport, and fluid-electrolyte dynamics. Research is targeted toward the metabolic and physiologic transport processes that regulate solute and water excretion, as are studies on the adverse effects of drugs, nephrotoxins, and environmental toxins in the kidney.

Applying molecular and cellular techniques, the structure of genes and their regulations, growth factors and their signal transduction systems, transport and their genes are studied

The program also has an interest in studies on analgesic abuse and heavy metal nephropathy, as well as studies on certain causes of acute renal failure such as hypoxic renal cell injury.

Urology Research

Urology Program. This program supports basic and clinical research studies of the normal and abnormal development, structure, and function of the genitourinary tract and the affect of diseases and disorders such as diabetes mellitus, spinal cord injury, and multiple sclerosis on these organs.

An area of emphasis is research that will increase the knowledge of the etiology, diagnosis, pathophysiology, therapy, and prevention of the major pediatric and adult urological diseases and disorders.

Also emphasized is basic research and clinical applications of diagnostic and therapeutic modalities such as 1) shock-wave and laser lithotripsy, 2) urolithiasis inhibitors, 3) bladder substitution procedures and devices, and 4) prostate growth inhibitor and reduction therapies.

Hematology Research

Hematology Program. This program supports basic and clinical studies of normal and disease states of the hematopoietic system, including sickle cell anemia, thalassemia, aplastic anemia, iron deficiency anemia, thrombocytopenia, hemolytic anemia, and purpura. Areas of interest include morphologic, physiologic, and biochemical aspects of the formation, mobilization, and release of blood cells erythrocyte metabolism and physiology, globin synthesis, ion transport, and enzymatic pathways iron metabolism and absorption erythropoietin and other hematopoietic growth factors hemoglobin metabolism, structure, function, and genetic control porphyrins and prophyrias and metabolism and function of white blood cells and plasma serum proteins.

Division-wide Research

HIV Program. The HIV program supports basic and clinical studies on renal and genitourinary tract structure and function and hematopoietic function in individuals with HIV infection. Studies on HIV infection focus on the effect of HIV therapies on marrow function and clinical course of dialysis and transplant patients, potential interactions of HIV infection and the immunosuppressive therapy used to prevent transplant rejection and effect on organ function.

Centers Program. The George M. O'Brien Kidney and Urologic Research Centers conduct interdisciplinary investigations that address the basic, clinical, and applied aspects of biomedical research in renal and genitourinary physiology and pathophysiology, nephrology, and urology.

The goal of the centers is to reduce mortality and morbidity of kidney and urologic diseases by providing a focus and means for clinical and basic science disciplines to develop the knowledge needed to improve diagnosis, treatment, and prevention.

Clinical Trials Program. This program develops cooperative clinical trials to prevent major chronic kidney, genitourinary, and hematologic diseases.

Epidemiology Program. This program supports the development of epidemiologic data and research related to major kidney, genitourinary, and hematologic diseases. Coordinated under this program are the U.S. Renal Data System the kidney and urologic disease interview and examination component of the third National Health and Nutrition Examination Survey, 1988-94 and management of the epidemiology grants portfolio.

Women's Health Program. This program encourages and supports basic and clinical research on urological problems that disproportionately affect women. Areas include urinary incontinence, urinary tract infections, and interstitial cystitis.

Office of the Director

Advisory Boards

National Diabetes Advisory Board. The NDAB was established to review and evaluate the progress of the long-range plan to combat diabetes designed to accelerate research and to expand programs in diabetes control, health care, and education. The board is composed of members representing a variety of scientific, educational, health care, and public service disciplines. The board provides advice and recommendations to the Congress, the secretary of Health and Human Services, the directors of the NIDDK and the NIH, and the heads of other appropriate Federal agencies and maintains liaison with governmental and nongovernmental entities concerned with diabetes.

National Kidney and Urologic Diseases Advisory Board. The NKUDAB was established to formulate a long-range plan to combat kidney and urologic diseases. The plan has been designed to develop national programs in kidney and urologic diseases research, control, health care, and education. The board is composed of members representing a variety of scientific, educational, health care, and public service disciplines. The board reviews and evaluates the implementation of the plan provides advice and recommendations to the Congress, the secretary of HHS, the directors of the NIDDK and the NIH, and heads of other appropriate Federal agencies and maintains liaison with governmental and nongovernmental entities concerned with kidney and urologic diseases research and control.

National Digestive Diseases Advisory Board. The NDDAB is authorized to review and evaluate the research, training, prevention, and control programs within the area of digestive diseases. The board is composed of members representing a variety of scientific, educational, health care, and public service disciplines.

The primary function of the board is to review and evaluate progress of the long-range plan developed for digestive diseases update the plan to assure its continuing relevance provide advice and recommendations on plan implementation to the Congress, the secretary of HHS, the directors of the NIDDK and the NIH, and the heads of other Federal agencies and maintain liaison with advisory bodies of other Federal agencies involved in implementing the plan.

Information Clearinghouses

National Kidney and Urologic Diseases Information Clearinghouse. The clearinghouse serves as an information resource for professional and patient education in kidney and urologic diseases through direct response and referral. The clearinghouse collects patient and professional educational materials for the NKUDIC subfile of the Combined Health Information Database and works with educators and health professionals to develop and exchange educational material.

National Digestive Diseases Information Clearinghouse. The clearinghouse is a central point for the collection and dissemination of information and education materials about digestive diseases. The clearinghouse works closely with local and national digestive disease organizations, and professional groups, in developing fact sheets and establishing priority areas of disease information emphasis through the strategic long-range plan. The overall goal of the NDDIC is to increase knowledge and understanding about digestive diseases among patients, health professionals, and the public through the effective dissemination of information.

National Diabetes Information Clearinghouse. The NDIC functions as the central point for the collection and dissemination of information about educational materials, programs, and resources relevant to diabetes. The clearinghouse works closely with the Diabetes Research and Training Centers, local and national diabetes organizations, professional groups, state departments of health, and other Federal and state agencies. The overall goals of the NDIC are to increase knowledge and understanding about diabetes among patients, health professionals, and the public through the effective dissemination of information, and to function as a catalyst in assisting and enhancing the efforts of these various groups in the development and exchange of educational materials and diabetes information.

National Institute of Environmental Health Sciences

Research Triangle Park, N.C.

Mission

Human health and disease result from three interactive elements: environmental exposures, individual susceptibility, and time. The NIEHS mission is to reduce the burden of human illness and dysfunction from environmental exposures by understanding each element and how they interrelate. NIEHS achieves its mission through multidisciplinary biomedical research programs, prevention and intervention efforts, and communication strategies that encompasses training, education, technology transfer, and community outreach.

The institute has initiated clinical programs that bring the results from the laboratory more quickly to the bedside, and has strengthened its programs in prevention to address the problems associated with environmental equity. NIEHS supports training in environmental toxicology, pathology, mutagenesis, epidemiology and biostatistics, with emphasis on attracting women and minorities. The institute also funds basic and applied research on the health effects of human exposure to potentially toxic or harmful environmental agents. In its research, NIEHS attempts to learn:

- The identification and characterization of potentially harmful environmental agents, particularly toxic chemicals
- How the substances affect human health, by studying their impact on a variety of biological systems
- What happens in these systems after exposure to hazardous agents
- What diseases are caused or aggravated by environmental factors
- The extent of exposure of various population groups, especially sensitive populations, to these agents and
- What effects these agents cause, by themselves and in combination with other environmental factors.

In rounding out these activities, NIEHS supports efforts to identify hazardous environmental agents before they are released into the environment. These include developing, testing, and validating biological assay systems to ascertain animal toxicity and to predict toxic effects which might occur in humans.

Program output is intended to aid those agencies and organizations, public and private, responsible for developing and instituting regulations, policies, and proce-

dures to prevent and reduce the incidence of environmentally induced diseases.

Important Events in NIEHS History

June 27, 1958--"The advancement of Medical Research and Education," the Bayne-Jones Report, recommended the extension of research related to numerous environmental factors.

June 7, 1960--The study group on the PHS Mission and Organization final report stated that environmental health problems would require increased public and private effort, and predicted that a central laboratory facility would be needed.

January 1961--A proposal prepared by PHS recommended the establishment of an environmental health center.

November 1, 1961--The Committee on Environmental Health Problems recommended to PHS that a national center be established to undertake integrated research and other activities related to environmental health.

September 1964--Congress authorized planning funds for a central environmental health research facility.

January 7, 1965--The Surgeon General announced, following a site selection committee's recommendation, that Research Triangle Park in North Carolina would be the location of the National Environmental Health Sciences Center.

NIEHS Appropriations--Grants and Direct Operations

Fiscal year	Total grants	Direct operations	Total
	[Amounts in thousands of dollars]		
1967	$ 10,389	$ 2,841	[1]$ 24,298
1968	13,166	4,123	17,289
1969	12,498	6,322	17,820
1970	12,232	6,096	18,328
1971	13,099	7,521	20,620
1972	16,131	10,305	26,436
1973	19,728	11,228	[2]30,956
1974	17,613	11,266	28,879
1975	20,877	14,072	34,949
1976	20,908	16,752	37,660
1977	28,878	21,263	51,141
1978	37,120	27,121	64,241
1979	43,415	34,665	78,080
1980	45,751	38,142	83,893
1981	49,990	43,501	93,491
1982	50,035	56,235	106,270
1983	60,747	104,120	164,867
1984	68,883	111,714	180,597
1985	78,523	115,963	194,486
1986	79,238	109,748	188,986
1987	89,803	119,491	209,294
1988	90,198	125,468	215,666
1989	92,929	130,757	223,686
1990	97,006	131,733	228,739
1991	103,998	136,637	240,635
1992	113,231	138,800	252,031
1993	115,708	135,479	251,187
1994	129,239	135,010	264,249
1995	130,212	141,870	272,082
1996	139,670	147,944	287,614

[1]Includes transfer of $11,068,000 to Bureau of Disease Prevention and Environmental Control.
[2]No appropriation available. This figure is the amount authorized.

Directors of NIEHS

Name	Date of Birth	Dates of Office	
		From	To
Paul Kotin		Nov. 1, 1966	Feb. 28, 1971
David P. Rall		Mar. 1, 1971	Oct. 1, 1990
David G. Hoel (Acting)		October 1990	June 1991
Kenneth Olden		June 18, 1991	

April 13, 1965--A National Environmental Health Advisory Committee group recommended to the Surgeon General that the proposed center be operated by PHS.

November 1, 1966--The Surgeon General announced the establishment of the Division of Environmental Health Sciences as a part of NIH.

September 26, 1967--The deed for 509.25 acres within Research Triangle Park, N.C., to serve as a permanent site for the Division of Environmental Health Sciences was presented to the Surgeon General.

January 12, 1969--The DHEW secretary elevated the division to the National Institute of Environmental Health Sciences.

April 1972--The first edition of *Environmental Health Perspectives*, an NIEHS scientific journal, was issued.

February 1977--First construction contracts were let to begin the south campus facility of NIEHS in Research Triangle Park.

April 1977--Construction was begun on NIEHS' $65.7 million facility.

November 15, 1978--HEW Secretary Joseph A. Califano announced the establishment of the National Toxicology Program.

October 4, 1979--First group of NIEHS employees moved to the support services center on the south campus.

April 4, 1981--Administrative offices in modules A and B of Building 101 were occupied.

July 14, 1981--HHS Secretary Schweiker approved the reorganization of NIEHS. The NCI Division of Cancer Cause and Prevention bioassay program transferred to NIEHS, and four program areas were established: intramural research; extramural research; biometry and risk assessment; and toxicology research and testing.

October 5, 1981--The National Toxicology Program was made a permanent activity of DHHS.

November 15, 1982--The NIEHS permanent facility in Research Triangle Park was dedicated.

November 20, 1985--NIEHS was established in law by the Health Research Extension Act of 1985 (P.L. 99-158).

December 3-5, 1986--NIEHS observed its 20th anniversary with a 2-day science seminar and commemorative program.

April 9, 1987--Part H, Chapter HN (NIH): Statement of Organization, Functions, and Delegations of Authority for DHHS, as amended, revises the titles of NIEHS programs as divisions: Intramural Research; Extramural Research and Training; Toxicology Research and Testing; and Biometry and Risk Assessment.

July 6, 1993--A notice of NIEHS reorganization appeared in the *Federal Register*. The structure lists the Division of Intramural Research (made up of the Environmental Biology Program, the Environmental Carcinogenesis Program, and the Environmental Toxicology Program) and the Division of Extramural Research and Training.

October 10, 1994--Dr. Martin Rodbell, NIEHS scientist emeritus and former scientific director, was named corecipient of the 1994 Nobel Prize in Physiology or Medicine for his work in discovering G-proteins, which transmit signals between cells.

September 14, 1994--NIEHS and collaborators at the University of Utah announced identification of the first breast cancer gene, BRCA1.

May 12, 1995--NIEHS announced isolation and cloning of a gene that suppresses the spread of prostate cancer.

December 6, 1995--Experiments conducted by NIEHS researchers show that phenolphthalein, a widely used laxative, cause ovarian and other cancers in laboratory rats and mice.

February 6, 1996--NIEHS scientists report that people who are missing the gene GST11 are more likely to get myelodysplastic syndrome, or MDS--a serious, often fatal, bone marrow disease.

July 2, 1996--NIEHS researchers find that women who douche more than once a week are about 30 percent less likely to conceive in a given month than those who do not.

Biographical Sketch of NIEHS Director

Kenneth Olden, Ph.D.

Dr. Olden was appointed NIEHS director on June 18, 1991. He came to the institute from Howard University College of Medicine in Washington, D.C., where he had been director of the university's cancer center, and professor and chairman of the medical school department of oncology since 1985.

Prior to his appointment at Howard, he was a research scientist from 1974 to 1979 in the NCI Division of Cancer Biology and Diagnosis. Before coming to NIH, Dr. Olden spent 4 years as a research fellow and instructor of physiology at Harvard Medical School.

Dr. Olden received his B.S. in biology in 1960 from Knoxville College, his M.S. in 1964 from the University of Michigan, and

his Ph.D., in 1970 from Temple University in Philadelphia.

Born in Parrottsville, Tenn., he has written many basic science articles, and while at Howard medical center, held a number of grants from NIH. He published two of the "One Hundred Most Cited" papers in 1978-79, one of which--on the subject of cancer cell biology--is now a "Citation Classic."

In addition to being NIEHS director, Dr. Olden is also director of the NTP, a cooperative effort within HHS to strengthen the federal science base in toxicology and to coordinate the toxicological research and testing activities of the four PHS agencies.

In 1996 he was presented the City of Medicine Award for being "instrumental in expanding scientific inquiry into environmental factors that cause disease," and in 1997 the National Association of Physicians for the Environment gave him its inaugural Award for Public Policy Leadership for his "remarkable leadership" of NIEHS.

Major Programs

Protecting the general health of Americans and preventing environmentally related diseases are recognized government responsibilities. The NIEHS through its research programs is providing a health science base for prevention and control activities. In doing this, the institute focuses not on specific body organs or diseases but on agents and processes--the ways and means through which man's health can be adversely affected by chemical and physical agents in the environment.

Population expansion and growth of technology have increased environmental contamination problems. New forms of energy production, expanded uses of plastics and aerosols, and greater development of the chemical industry pose the problem of releasing toxic chemicals into the environment. Recent experiences with asbestos, mercury, vinyl chloride, bischloromethyl ether, methyl butyl ketone, sulfuric acid mist, polychlorinated and polybrominated biphenyls, kepone, dioxins, methylisocyanate, and chlorophenol indicate these compounds are not theoretical threats but real causes of illness and death.

The institute consists of the Divisions of Intramural Research; Extramural Research and Training; and Toxicology Research and Testing.

The *Division of Extramural Research and Training* supports investigators at colleges, universities, and research foundations through individual research grants, program project grants and other support mechanisms. These research activities provide information essential to an understanding of the way in which human health is adversely affected by chemical, physical and other environmental factors. The breadth of the institute's mission dictates a multidisciplinary approach to problem solving which involves major biological, chemical, and physical science disciplines.

The division develops priorities and funding levels to assure maximum utilization of available resources. It maintains an awareness of national research efforts and assesses the need for research and research training in environmental health and provides advisory support to the institute in the development of the research grant policy. Through this division, the institute supports basic and applied research on the consequences of the exposure of humans to potentially toxic or harmful agents in the environment.

For administrative purposes, the research is divided into: 1) biological response to environmental agents 2) applied toxicological research and testing 3) biometry and risk estimation and 4) resource and manpower development. Research and training may span one, several, or all program areas.

Environmental Health Sciences Centers. These centers provide core support to facilitate multidisciplinary research in environmental health problems. They fill critical needs in the national environmental health program that cannot be met by individual research grants or program project grants. Each center has a different thrust and problem orientation. Overall, they serve as national focal points and resources for research and manpower development in health problems related to air, water and food pollution occupational and industrial health and safety heavy metal toxicity agricultural chemical hazards and the relationships of environment to cancer, birth defects, behavioral anomalies, respiratory and cardiovascular diseases, and diseases of other organs.

Much of the research conducted by the centers, in addition to substantive contributions to preventive medicine, has served to clarify the scope of environmental health problems and future needs in this field.

Marine and Freshwater Biomedical Sciences Centers. MFBS centers foster multidisciplinary research on marine and freshwater organisms in the study of mechanisms of toxicity of environmental agents, as models for human diseases and disorders resulting from exposure to environmental toxicants.

Research Manpower Development Programs. Research manpower development programs support pre- and postdoctoral training in toxicology, pathology, mutagenesis, and epidemiology and biostatistics as they pertain to the environment. Three mechanisms are used to fund training: 1) institutional awards for pre- and postdoctoral trainees (training programs), 2) individual awards for postdoctoral fellows only (fellowship awards), and 3) senior fellowship awards to support training for new research oriented physician-researchers to enhance the teaching of environmental and occupational medicine. The division uses the environmental/occupational medicine academic award for curriculum and institutional resource development.

The Superfund Basic Research Program is university-based basic research supported by NIEHS as part of the 1986 Superfund Amendments and Reauthorization Act. It combines basic research in the fields of ecology, engineering, and hydrogeology into a core program of biomedical research to provide a broader and more detailed body of scientific information to be used in decisionmaking related to the management of hazardous substances.

The *Division of Intramural Research* (DIR) plans and conducts basic, applied, and clinical research directed toward increasing fundamental knowledge of environmentally related diseases and disorders. Broad multidisciplinary research approaches are used including basic mechanistic studies at the cellular and molecular level, applied toxicology testing, and clinical and epidemiology studies. Intramural scientists address such complex research issues as genetic susceptibility, receptor mediated pathobiology, differentiation and development, signal transduction, environmental regulation of cell proliferation and cell death, environmental carcinogenesis and mutagenesis, and environmental epidemiology.

These research endeavors, in turn, support specific biomedical and clinical program interests of the institute such as environmental contributions to aging and age-related diseases and conditions (e.g., neurodegenerative diseases like Alzheimer's and Parkinson's, osteoporosis, cancer of the breast, prostate, endometrium and lung), environmental factors and respiratory disease (e.g., asthma and respiratory fibrosis), environmental contribution to reproductive and developmental disorders (e.g., infertility, abnormal growth and development, reproductive senescence), and environmental factors and integrated organ systems (e.g., abnormal sexual development, hypersensitivity, and immune suppression).

The DIR pursues its scientific goals principally through its laboratories and branches in three scientific programs: the Environmental Biology and Medicine Program, the Environmental Carcinogenesis Program, and the Environmental Toxicology Program. In addition, a number of interdisciplinary program projects, clinical studies and international collaborative research projects have been established to address high priority research areas.

National Institute of General

Medical Sciences

Mission

NIGMS primarily supports basic biomedical research that is not targeted to specific diseases or disorders. Because scientific breakthroughs often originate from such untargeted studies, NIGMS-funded work has contributed substantially to the tremendous progress that biomedical research has made in recent years. The institute's training programs help provide the most critical element of good research: well-prepared scientists.

Each year, NIGMS-supported scientists make major advances in understanding fundamental life processes. In the course of answering basic research questions, these investigators also increase our knowledge about the mechanisms involved in certain diseases. Other grantees develop important new tools and techniques, many of which have applications in the biotechnology industry. In recognition of the significance of their work, a number of NIGMS grantees have received the Nobel Prize and other high scientific honors.

NIGMS has three divisions that support research and research training in basic biomedical science fields: Cell Biology and Biophysics; Genetics and Developmental Biology; and Pharmacology, Physiology, and Biological Chemistry. The institute also has a Division of Minority Opportunities in Research, which administers programs that are designed to increase the number of minority biomedical scientists. Finally, NIGMS has a Division of Extramural Activities, which handles the grant-related functions.

NIGMS was established in 1962. In fiscal year 1997, its budget was $998 million. The vast majority of this money funds grants to scientists at universities, medical schools, hospitals, and research institutions throughout the country. At any given time, NIGMS supports over 3,500 research grants--about 14 percent of the grants funded by NIH as a whole. NIGMS also supports nearly half of the predoctoral trainees and about 30 percent of all the trainees who receive assistance from NIH.

The institute places great emphasis on the support of individual, investigator-initiated research grants. It funds a limited number of research center grants in selected fields, such as trauma and burn research and the pharmacological sciences (including anesthesiology), in which the interaction of basic and clinical researchers is critical for rapid scientific progress. In addition, NIGMS funds several research contracts that provide important resources for basic scientists.

NIGMS research training programs recognize the interdisciplinary nature of biomedical research today, and stress approaches to biological problems that cut across disciplinary and departmental lines. Such experience prepares trainees to pursue creative research careers in a wide variety of areas. Among the fields in which NIGMS has long offered institutional predoctoral training programs are the cellular, biochemical, and molecular sciences; genetics; the pharmacological sciences and systems; and integrative biology. Another longstanding training activity, the Medical Scientist Training Program, provides investigators who can bridge the gap between basic and clinical research by supporting research training leading to the combined M.D.-Ph.D. degree. Several newer training programs were designed to capitalize on rapidly developing areas of science, including biotechnology, molecular biophysics, and the interface between the fields of chemistry and biology.

The institute supports postdoctoral research through individual fellowships in areas related to its scientific programs and institutional postdoctoral training in the fields of anesthesiology, clinical pharmacology, medical genetics, and trauma and burn injury.

NIGMS also has a Pharmacology Research Associate Program, in which postdoctoral scientists pursue research in NIH or Food and Drug Administration laboratories. It is intended for individuals with backgrounds in the basic or clinical sciences who wish to obtain advanced experience in an area of pharmacology, or for those who are already pharmacologists to gain experience in new fields.

Directors of NIGMS

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
G. Halsey Hunt	.....	July 16, 1958	April 1962
Clinton C. Powell	.....	July 1962	July 1964
Frederick L. Stone	March 31, 1915	Aug. 1, 1964	June 1965
DeWitt Stetten, Jr.	May 31, 1909	Oct. 1, 1970	August 1974
Ruth L. Kirschstein	October 12, 1926	Sept. 1, 1974	Nov. 23, 1993
Marvin Cassman	April 4, 1936	August 18, 1996	

Important Events in NIGMS History

July 16, 1958--The secretary, DHEW, approved establishment of the Division of General Medical Sciences.

October 17, 1962--Congress authorized establishment of the National Institute of General Medical Sciences.

January 30, 1963--The DHEW Secretary approved establishment of NIGMS.

October 8, 1963--The National Advisory General Medical Sciences Council held its first meeting.

October 13, 1982--NIGMS celebrated its 20th anniversary by establishing the DeWitt Stetten, Jr., Lecture. Dr. David S. Hogness, Stanford University, gave the first lecture.

October 1, 1989--Administration of the Minority Biomedical Research Support Program was transferred to NIGMS from the NIH Division of Research Resources.

NIGMS Legislative Chronology

October 17, 1962--Public Law 87-838 authorized the Surgeon General to establish an institute to conduct and support research and research training in the general or basic medical sciences and in related natural or behavioral sciences that have significance for two or more other institutes of NIH, or that lie outside the general areas of responsibility of any other institute.

Biographical Sketch of NIGMS Director Marvin Cassman, Ph.D.

Dr. Cassman was named NIGMS director on August 18, 1996. Prior to his appointment as the permanent director, he had served the institute as deputy director since 1989 and acting director since 1993

His other positions within the institute included director, Biophysics and Physiological Sciences Program Branch (1985-1989) and chief, molecular basis of disease section of the Cellular and Molecular Basis of Disease Program Branch (1978-1984). He has also worked in the Office of Science and Technology Policy, Executive Office of the President, as a senior policy analyst.

After receiving his undergraduate degree from the University of Chicago, Dr. Cassman earned a Ph.D. in biochemistry in 1965 at the Albert Einstein College of Medicine. Following a postdoctoral fellowship in the laboratory of Dr. Howard Schachman at the University of California, Berkeley, he joined the faculty of the University of California, Santa Barbara. He came to NIGMS in 1975 as a health scientist administrator in the Cellular and Molecular Basis of Disease Program Branch.

He has received many honors and awards for his work at NIGMS, including the 1991 Presidential Meritorious Executive Rank Award and the 1983 NIH Director's Award.

Major NIGMS Programs

Division of Cell Biology and Biophysics

The Division of Cell Biology and Biophysics seeks greater understanding of the structure and function of cells, cellular components, and the biological macromolecules that make up these components. The long-range goal of the division is to find ways to prevent, treat, and cure diseases that result from disturbed or abnormal cellular activity.

The division has two components: the

Biophysics Branch and the Cell Biology Branch.

Biophysics Branch
This branch supports studies in the areas of biophysics and bioengineering, disciplines that use techniques derived from the physical sciences to examine the structures and properties of biological substances.

Areas of emphasis in biophysical research include the determination of the structures of proteins and nucleic acids; studies of the structural features that determine macromolecular conformation; the structural analysis of macromolecular interactions and of ligand-macromolecular interactions; the development of physical methodology for the analysis of molecular structure; and the development and use of theoretical methods to investigate biological systems.

Bioengineering research interests include the development and refinement of instruments needed to conduct research in the areas described above. These include nuclear magnetic resonance spectroscopy, mass spectroscopy, and other forms of spectroscopy x-ray and other scattering techniques microscopy and cell separation techniques. This area of research also includes the development of new bioanalytical methods and biomaterials.

Cell Biology Branch
This branch supports general studies on the molecular and biochemical activities of cells and subcellular components, as well as on the role of cellular dysfunction in disease. Emphasis is placed on research with applications to more than one cell type, model system, or disease state, as well as research that does not fall within the disease-oriented mission of another NIH component.

Representative studies include those on plasma and intracellular membranes, receptors, and signal transduction mechanisms; the structure and function of the cytoskeleton; cell motility; the regulation of protein and membrane synthesis; and the activation of cell growth; subcellular organelles; cell division; and lipid biochemistry.

NIGMS Appropriations--Grants and Direct Operations

Fiscal year	Total grants	Direct operations	Total
	[Amounts in thousands of dollars]		
1967	$ 138,314	$ 6,799	$ 45,113
1968	151,902	8,382	160,284
1969	154,938	8,575	163,513
1970	155,229	9,425	164,654
1971	147,521	12,673	160,194
1972	163,031	10,484	173,515
1973	171,883	11,288	183,171
1974	164,757	12,021	176,778
1975	176,926	10,476	187,400
1976	176,617	10,695	187,312
1977	195,331	9,669	205,000
1978	219,332	11,464	230,796
1979	266,308	11,320	277,628
1980	303,030	9,438	312,468
1981	322,484	11,280	333,764
1982	327,392	12,470	339,862
1983	356,155	13,658	369,813
1984	402,194	13,743	415,937
1985	466,732	14,243	480,975
1986	478,485	15,050	493,535
1987	552,428	18,439	570,867
1988	610,330	22,294	632,624
1989	655,620	26,514	682,134
1990	652,495	27,810	680,305
1991	732,259	28,974	761,231
1992	786,708	31,589	818,297
1993	803,494	28,741	832,235
1994	845,390	30,105	875,495
1995	872,634	32,104	904,738
1996	913,444	30,868	944,312
1997	966,967	31,420	998,387

* Includes R&D contracts.

Division of Genetics and Developmental Biology

The Division of Genetics and Developmental Biology supports studies directed toward gaining a better understanding of the fundamental mechanisms of inheritance and development. These studies underlie the more targeted research projects supported by other NIH components. Most of the projects supported by the division make use of nonhuman model systems. It is expected that the results of these studies will lead to the eventual diagnosis, prevention, therapy, and cure of human genetic and developmental disorders.

Among the areas under active investigation are the replication, repair, and recombination of DNA; the regulation of gene expression; RNA processing; protein synthesis; extrachromosomal inheritance; population genetics and evolution; developmental genetics; cell growth and differentiation; cell cycle control; rearrangement of genetic elements; neurogenetics and the genetics of behavior; and chromosome organization and mechanics.

Along with its research and research training activities, the Division of Genetics and Developmental Biology supports the Human Genetic Mutant Cell Repository, a unique resource for scientists studying medical and human genetics. The repository establishes and stores well-characterized cultured cell lines representing metabolic and chromosomal disorders collected from patients and their families. These cells and DNA extracted from them, as well as somatic cell hybrids, are provided to qualified investigators at modest charge, thus permitting the researchers to study the molecular and cellular aspects of many rare genetic conditions using material that would otherwise be difficult to obtain.

Division of Minority Opportunities in Research

The Division of Minority Opportunities in Research administers research and research training programs aimed at increasing the number of minority biomedical scientists. Support is available at the undergraduate, graduate, postdoctoral, and faculty levels.

The division has three components: the Minority Access to Research Careers (MARC) Branch; Minority Biomedical Research Support (MBRS) Branch; and Special Initiatives.

MARC Branch
The MARC branch supports research training at 4-year colleges, universities, and health professional schools with substantial enrollments of such minorities as African Americans, Hispanic-Americans, Native Americans, and natives of the U.S. Pacific Islands.

The branch's goals are to increase the number and capabilities of minorities engaged in biomedical research and to strengthen science curricula and student research opportunities at minority institutions. MARC funds research training for honors undergraduates, predoctoral fellowships, faculty fellowships, and visiting scientist fellowships.

MBRS Branch
To increase the number of researchers who are members of minority groups that are underrepresented in the biomedical sciences, the MBRS branch awards grants to 2- or 4-year colleges, universities, and health professional schools with substantial enrollments of minorities. These grants support research by faculty members, strengthen the institutions' biomedical research capabilities, and provide opportunities for students to work as part of a research team.

Special Initiatives

The division develops and launches new research and research training programs and other initiatives for minority scientists. These include the Bridges to the Future Program (Bridges to the Baccalaureate Degree and Bridges to the Doctoral Degree), which is cosponsored by the NIH Office of Research on Minority Health.

The division is also responsible for organizing meetings and other activities that build networks among individuals and educational institutions to promote minority participation in sponsored research.

Division of Pharmacology, Physiology, and Biological Chemistry

The Division of Pharmacology, Physiology, and Biological Chemistry supports a broad spectrum of research and research training aimed at improving the molecular-level understanding of fundamental biological processes and discovering approaches to their control. Research supported by the division takes a multifaceted approach to problems in pharmacology, physiology, biochemistry, and biorelated chemistry that are either very basic in nature or that have implications for more

than one disease area.

The goals of supported research include an improved understanding of drug action and mechanisms of anesthesia; new methods and targets for drug discovery; advances in natural products synthesis; an enhanced understanding of biological catalysis; a greater knowledge of metabolic regulation and fundamental physiological processes; and the integration and application of basic physiological, pharmacological, and biochemical research to clinical issues in pharmacology, anesthesia, and trauma and burn injury.

Biochemistry and Biorelated Chemistry Branch

This branch supports basic research in areas of biochemistry, such as enzyme catalysis and regulation, bioenergetics and redox biochemistry, and glycoconjugates. It also supports research in areas of biorelated chemistry, such as organic synthesis and methodology, as well as bioinorganic and medicinal chemistry.

Examples of biochemical investigations include studies of the chemical basis of the regulation and catalytic properties of enzymes, intermediary metabolism, the chemical and physical properties of the cellular systems for electron transport and energy transduction, and the biosynthesis and structure of carbohydrate-containing macromolecules.

Chemical investigation examples include the development of strategies for natural products synthesis, studies of the structure and function of small molecules, the chemistry of metal ions in biological systems, the development of novel medicinal agents or mimics of macromolecular function, and the creation of new synthetic methodologies.

The branch also supports studies in biotechnology and metabolic engineering. This work focuses on the development of biological catalysts, including living organisms, for the production of useful chemical compounds, medicinal or diagnostic agents, or probes of biological phenomena.

Pharmacological and Physiological Sciences Branch

This branch supports research in pharmacology, anesthesiology, and the physiological sciences. Studies range from the molecular to the organismal level, and can be clinical in nature.

Important areas being studied in pharmacological sciences and anesthesiology, are the effects of drugs on the body and the body's effects on drugs. This includes investigations of the absorption, transport, distribution, metabolism, biotransformation, and excretion of drugs, as well as drug delivery strategies and determinants of bioavailability.

Understanding the mechanisms of drug interactions with receptors and signal transduction mechanisms is another major focus of this section. This includes studies of soluble and membrane-bound receptors and channels, secondary and tertiary messenger systems, mediator molecules, and their regulation and pharmacological manipulation.

Examples of studies in the physiological sciences include basic and clinical investigations directed toward improving understanding of the total body response to injury, including biochemical and physiological changes induced by trauma. Research supported in this section includes studies on the etiology of post-traumatic sepsis and the mechanisms of immunosuppression, wound healing, and hypermetabolism following injury. This section also supports research in basic molecular immunobiology, which focuses on using cells of the immune system to study fundamental cellular and molecular mechanisms.

Division of Extramural Activities

The Division of Extramural Activities is responsible for the grant-related activities of the institute, including the receipt, referral, and advisory council review of applications as well as grant funding and management. It maintains an overview of the institute's scientific and financial status and advises the NIGMS director and other key staff on policy matters and on the planning, development, and scientific administration of institute research and training programs. The division recommends budget allocations for the various NIGMS programs. It also acts as a liaison with other NIH components for activities relating to grant application assignments and foreign grants.

National Institute of Mental Health

Mission

Provides leadership at a national level on brain research, mental illness, and mental health. It plans, conducts, fosters, and supports an integrated and coordinated program of research, investigations, research training, and services research relating to the causes, prevention, diagnosis, and treatment of mental illnesses, and supports basic research in related scientific areas.

Provides grants-in-aid to public and private institutions and individuals in fields related to its areas of interest, including research project, program project, and research center grants.

Conducts a diversified program of intramural and collaborative research in its own laboratories and clinics.

Provides contracts for the funding of research and research support projects in areas related to the brain, mental illness, and mental health.

In many years of work with animals as well as human subjects, NIMH researchers have advanced understanding of the brain and vastly expanded the capability of mental health professionals to diagnose, treat, and prevent mental and brain disorders.

The institute also conducts information and educational activities, including the dissemination of information and educational materials on mental illness, for health professionals and the lay public, and maintains relationships with professional associations international, national, and state and local officials and voluntary agencies and organizations working in the areas of mental health and mental illness.

Important Events in NIMH History

1773--Three years before the Declaration of Independence was written, the first hospital for the mentally ill in the U.S. opened in Williamsburg, Va.

1775--In the late 18th century, mental illness in this country finally received scientific attention, from Dr. Benjamin Rush. As part of his program to improve the care given mental patients admitted to the Pennsylvania Hospital in Philadelphia, Dr. Rush struck at the hearsay, superstition, and ignorance surrounding mental illness. He introduced occupational therapy, amusements, and exercise for patients and saw to it that they had decent, clean quarters. For his accomplishments, Dr. Rush is known as the "Father of American Psychiatry."

1840--In 1840 there were only eight asylums for the insane in the U.S. Dorothea Dix's crusading led to establishment or enlargement of 32 mental hospitals, and transfer of the mentally ill from poorhouses and jails. The first attempt to measure the extent of mental illness and mental retardation in the United states occurred with the U.S. Census of 1840. The census included the category "insane and idiotic."

1855--The Government Hospital for the Insane opened in Washington, D.C. It was renamed St. Elizabeths Hospital in 1916.

1900--Early in the 20th century, the "mental hygiene" movement came into being, due largely to the efforts of Clifford Beers in New England. A former mental patient, Beers shocked readers with a graphic account of hospital conditions depicted in his famous book, *The Mind that Found Itself*.

The inspection of immigrants at Ellis Island included screening to detect the mentally disturbed and retarded among the thousands of men, women, and children arriving daily. The high incidence of mental disorders found among the immigrants prompted public recognition of mental illness as a national health problem.

1929--The establishment of two Federal Narcotics farms was authorized within the PHS. The Lexington Hospital opened in

1935 and the Fort Worth Hospital in 1938. Both facilities participated in pioneering research on drug abuse, carried forward by the Addiction Research Center at Lexington, which later moved to Baltimore.

1930--The PHS established the Narcotics Division, later named Division of Mental Hygiene. The division brought together for the first time the threads of the mental health movement--from research and treatment programs to combat drug addiction to the study of the causes, prevalence, and means of preventing and treating nervous and mental disease. Dr. Walter Treadway headed the division. He was succeeded by Dr. Lawrence Kolb who retained the post until his retirement in 1944 when Dr. Robert H. Felix took over.

1940--The concept of a "National Psychiatric Institute" was born, but World War II intervened and the plan was not introduced before the Congress. The war demonstrated the tremendous toll taken by mental illness. More men received medical discharges from the Armed Forces for neuropsychiatric disorders than for any other reason more than 1 million Americans were rejected for military service for that reason.

1944--It was soon evident that there were severe shortages of professional mental health personnel and that understanding of the causes, treatment, and prevention of mental illness lagged far behind other fields of medical science and public health. Dr. William Menninger, chief of Army neuropsychiatry and an outstanding leader of the profession, called for Federal action.

The new director of the PHS Division of Mental Hygiene, Dr. Robert H. Felix, presented a proposal for a national mental health program to the Surgeon General of the U.S. This proposal was to form the basis of the National Mental Health Act of 1946.

1946--On July 3 President Truman signed the National Mental Health Act which called for the establishment of a National Institute of Mental Health.

The first meeting of the National Advisory Mental Health Council was held on August 15. Since no Federal funds were available, the Greentree Foundation awarded a grant of $15,000 to finance the meeting.

1947--On July 1 the first mental health research grant (MH-1) was awarded to Dr. Winthrop N. Kellogg of Indiana University by the Division of Mental Hygiene. It was titled "Basic Nature of the Learning Process."

The National Reporting Program on Patients in Mental Institutions was transferred from the U.S. Census Bureau to the Division of Mental Hygiene.

1948--Congress did not appropriate funds to implement the National Mental Health Act until fiscal year 1948.

1949--On April 15 the NIMH was established with the abolishment of the Division of Mental Hygiene. NIMH was one of the first four NIH institutes.

1955--The Mental Health Study Act of 1955 called for "an objective, thorough, nationwide analysis and reevaluation of the human and economic problems of mental health." The act furnished the basis for the historic study conducted by the Joint Commission on Mental Illness and Health. The commission's final report, *Action for Mental Health*, provided the background for President John F. Kennedy's special message to Congress on mental health.

The number of patients in mental hospitals began to decline reflecting the introduction of psychopharmacology in the treatment of mental illness.

1956--Congress appropriated $12 million for research in the clinical and basic aspects of psychopharmacology and the Psychopharmacology Service Center was established.

The Health Amendments Act authorized the support of community services for the mentally ill, such as halfway houses, daycare, and aftercare under Title V.

1961--*Action for Mental Health*, the final report of the Joint Commission on Mental Health and Illness, was transmitted to Congress. A 10-volume series, it assessed mental health conditions and resources throughout the U.S. "to arrive at a national program that would approach adequacy in meeting the individual needs of the mentally ill people of America."

1963--President Kennedy submitted a special message to Congress on mental health issues. Passage of the Mental Retardation Facilities and Community Mental Health Centers Construction Act, an outgrowth of President Kennedy"s message, began a new era in Federal support for mental health services.

1965--During the mid-1960's NIMH launched an extensive attack on special mental health problems. Established were centers for child and family mental health, crime and delinquency, minority group mental health problems, schizophrenia, urban problems, and later, rape, aging, and technical assistance to victims of natural disasters.

The mental health centers staffing amendments authorized grants to help pay the salaries of professional and technical personnel in Community Mental Health Centers.

The Joint Commission on Mental Health of Children was established by Congress to recommend national action for child mental health.

1966--Despite the large population directly affected, alcohol abuse and alcoholism did not receive full recognition as a major public health problem until the mid-1960's. The National Center for Prevention and Control of Alcoholism was established as part of NIMH. Four years later it became a division on its way to institute status.

A research program on drug abuse was inaugurated with the establishment of the Center for Studies of Narcotic and Drug Abuse within NIMH. Division status followed in 1968, with institute status in 1972.

1967--NIMH was separated from NIH and raised to bureau status in PHS by a reorganization that became effective January 1. NIMH's Division of Clinical, Behavioral and Biological Research, within the Mental Health Intramural Research Program, comprising activities conducted in the Clinical Center and other NIH facilities, continued at NIH under an agreement for joint administration between NIH and NIMH. On August 13 DHEW Secretary John W. Gardner transferred St. Elizabeths Hospital, the Federal Government's only civilian psychiatric hospital, to NIMH.

1968--NIMH became a component of PHS's Health Services and Mental Health Administration (HSMHA).

1969--*Crisis in Child Mental Health*, the report of the Joint Commission on Mental Health of Children, was made public.

1970--Dr. Julius Axelrod, an NIMH researcher, won the Nobel Prize in Physiology or Medicine for research into the chemistry of nerve transmission for "discoveries concerning the humoral transmitters in the nerve terminals and the mechanisms for their storage, release and inactivation." He found an enzyme that terminates the action of the nerve transmitter, noradrenaline.

FDA approved the use of lithium as an anti-manic based upon NIMH research. This led to a savings of approximately $40 billion over the next couple of decades and a sharp drop of inpatient days and suicides.

The Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment, and Rehabilitation Act established the National Institute of Alcohol Abuse and Alcoholism within NIMH.

1971--A group of 17 national health and mental health organizations sponsored a 2-day conference honoring the 25th anniversary of the enactment of the National Mental Health Act.

1972--The Drug Abuse Office and Treatment Act established a National Institute on Drug Abuse within NIMH.

1973--NIMH temporarily rejoined NIH on July 1 with the abolishment of HSMHA.

On September 25 the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA)--composed of the National Institute on Alcohol Abuse and Alcoholism, the National Institute on Drug Abuse, and NIMH--was established administratively by the DHEW secretary as the successor organization to HSMHA.

A task force consisting of over 300 consultants, was established to review and analyze the 25-year history of federally sponsored research programs in mental health. Their report, *Research in the Service*

of Mental Health, was issued in 1975.
1974--ADAMHA was officially established on May 4 when President Nixon signed P.L. 93-282.
1975--The community mental health centers program was given added impetus with the passage of the CMHC amendments of 1975.
1977--President Carter established the President's Commission on Mental Health on February 17 by Executive Order No. 11973. The commission was to review the mental health needs of the Nation and to make recommendations to the President as to how the Nation might best meet these needs.
1978--Dr. Solomon H. Snyder, an NIMH grantee, was awarded the Albert Lasker Award in Basic Medical Research for his pioneering work in identifying the opiate receptors, and the demonstration of their relation to the enkephalins, natural chemicals released by the brain which have the effect of relieving pain and influencing emotional behavior.

The Report to the President from the President's Commission on Mental Health was submitted.
1980--The Epidemiologic Catchment Area (ECA) study, a unique and massive research effort in which more than 20,000 persons were interviewed, began. The field interviews and first wave analysis were completed in 1985. Data from the ECA provide an accurate picture of rates of mental and addictive disorders and services usage.
The Mental Health Systems Act, which was based on the Report to the President from the President's Commission on Mental Health and was designed to provide improved services for the mentally ill, was passed.
1981--President Reagan signed the Omnibus Budget Reconciliation Act of 1981. This act repealed the Mental Health Systems Act and consolidated ADAMHA's treatment and rehabilitation service programs into a single block grant that enabled each State to administer its allocated funds. With the repeal of the community mental health legislation and the establishment of block grants the Federal role in services to the mentally ill became one of providing technical assistance to increase the capacity of State and local providers of mental health services.

Dr. Louis Sokoloff, an NIMH researcher, was given the Albert Lasker Award in Clinical Medical Research for developing a new method of measuring brain function that contributes to basic understanding and diagnosis of brain diseases. His technique involving measuring the brain's utilization of glucose led to the development of the PET scanner, which produces color images showing glucose utilization in the living, functional brain.

Dr. Roger W. Sperry, an NIMH grantee, shared the Nobel Prize for Physiology or Medicine with Drs. David Hubel and Torsten N. Wiesel. It was awarded for his discoveries concerning functional specialization of the cerebral hemispheres.
1983--Dr. Eric R. Kandel, an NIMH grantee, was awarded the Albert Lasker Award in Medical Research for application of cell biology techniques to the study of behavior, revealing the mechanisms underlying learning and memory.
1985--A major reorganization to align the extramural structure to emphasize the institute's primary mission of research was accomplished. This provided for an increased focus on understanding the biological and behavioral underpinnings of mental illness and mental health and for improving the treatment/prevention of mental and emotional disorders.
1986--A 2-day scientific seminar, which was held to honor the 40th anniversary of the National Mental Health Act, took place in Washington, D.C. It was sponsored by the organizing committee for the 40th anniversary commemoration and the MacArthur Foundation.
1987--On October 1 administrative control of St. Elizabeths Hospital was transferred from the NIMH to the District of Columbia. NIMH retained research facilities on the grounds of the hospital.
1988--*Approaching the 21st Century: Opportunities for NIMH Neuroscience Research*, a report to Congress from the National Advisory Mental Health Council (NAMHC), was issued.

The second of NAMHC's reports to Congress, *National Plan for Schizophrenia Research*, was published.
1989--Congress passed a resolution and President Bush signed a proclamation establishing the 1990's as the "Decade of the Brain." NIMH continued its strong emphasis on its research into the basic functions of the brain and their relationship to mental illness.

The NIMH Neuroscience Center and the NIMH Neuropsychiatric Research Hospital, located on the grounds of St. Elizabeths Hospital, were dedicated on September 25.
1990--The third NAMHC report to Congress, *National Plan for Research on Child and Adolescent Mental Disorders*, was submitted.

The first of three hearings on Mental Health in America, sponsored by NAMHC, was held on April 12. It explored mental illness and mental health services in rural America.

A hearing on child and adolescent mental disorders, the second of the Mental Health in America series, was held on October 9.
1991--The fourth NAMHC report to Congress, *Caring for People with Severe Mental Disorders: A National Plan of Research to Improve Services*, was presented. The last of the Mental Health in America hearings was held on September 5. It addressed issues concerning severe mental illness and homelessness.

The report, *Mental Health in America: A Series of Public Hearings*, was submitted to Congress by NAMHC in December.
1992--On October 1, ADAMHA was abolished and the research components of NIAAA, NIDA, NIMH rejoined NIH. The services components of the institutes became part of a new PHS agency, Substance Abuse and Mental Health Services Administration (SAMHSA). The establishment of the Center for Mental Health Services within SAMHSA provided opportunities for improved advocacy for and linkage of research and services.

The return to NIH and the loss of services functions to SAMHSA brought about a realignment of NIMH headquarters. New offices were created for research on AIDS, Prevention, Special Populations, and Rural Mental Health.

NIMH Legislative Chronology

1929--P.L. 70-672 established two Federal "narcotics farms" and authorized a Narcotics Division within PHS.
1930--P.L. 71-357 redesignated the PHS Narcotics Division to the Division of Mental Hygiene.
1939--P.L. 76-19 transferred PHS from the Treasury Department to the Federal Security Agency.
1946--P.L. 79-487, the National Mental Health Act, authorized the Surgeon General to improve the mental health of U.S. citizens through research into the causes, diagnosis, and treatment of psychiatric disorders.
1949--NIMH was established April 15.
1953--Reorganization plan #1 assigned PHS to the newly created Department of Health, Education and Welfare.
1955--P.L. 84-182, the Mental Health Study Act, authorized NIMH to study and make recommendations on mental health and mental illness in the U.S. The act also authorized the creation of the Joint Commission on Mental Illness and Health.
1956--P.L. 84-830, the Alaska Mental Health Enabling Act, provided for territorial treatment facilities for mentally ill individuals in Alaska.
1963--P.L. 88-164, the Mental Retardation Facilities and Community Mental Health Centers Construction Act, provided for grants for assistance in the construction of community mental health centers nationwide.
1965--P.L. 89-105, amendments to P.L. 88-164, provided for grants for the staffing of community mental health centers.
1966--P.L. 89-793, Narcotic Addict Rehabilitation Act of 1966, launched a national program for long-term treatment and rehabilitation of narcotic addicts.
1967--NIMH was separated from NIH and raised to bureau status in PHS--P.L. 90-31, Mental Health Amendments of 1967.
1968--NIMH became a component of the newly created Health Services and Mental

Health Administration.

P.L. 90-574, Alcoholic and Narcotic Addict Rehabilitation Amendments of 1968, authorized funds for the construction and staffing of new facilities for the prevention of alcoholism and the treatment and rehabilitation of alcoholics.

1970--P.L. 92-211, Community Mental Health Centers Amendments of 1970, authorized construction and staffing of centers for 3 more years, with priority on poverty areas.

P.L. 91-513, Comprehensive Drug Abuse Prevention and Control Act of 1970, expanded the national drug abuse program by extending the services of federally funded community treatment centers to nonnarcotic drug abusers as well as addicts.

P.L. 91-616, Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment, and Rehabilitation Act, provided the resources needed to launch a comprehensive, all-out attack. Authorized the establishment of a National Institute on Alcohol Abuse and Alcoholism within NIMH.

1972--P.L. 92-255, Drug Abuse Office and Treatment Act of 1972, provided that a National Institute on Drug Abuse be established within NIMH.

1973--NIMH rejoined the NIH.

NIMH later became a component of the Alcohol Drug Abuse and Mental Health Administration (ADAMHA).

1974--P.L. 93-282 authorized the establishment of ADAMHA.

1978--P.L. 95-622, the Community Mental Health Centers Extension Act of 1978.

1979--P.L. 96-88, the Department of Education Organization Act, created the Department of Education and renamed DHEW the Department of Health and Human Services.

1980--P.L. 96-398, the Mental Health Systems Act, reauthorized the community mental health centers program.

1981--P.L. 97-35, the Omnibus Reconciliation Act, repealed P.L. 96-398 and consolidated ADAMHA's treatment and rehabilitation programs into a single block grant that enabled each State to administer allocated funds.

1983--P.L. 98-24, Alcohol Abuse Amendments of 1983, consolidated the current authorization for ADAMHA and the institutes into a new title V of the Public Health Service Act.

1984--P.L. 98-509, Alcohol Abuse, Drug Abuse, and Mental Health Amendments, authorized funding for block grants for fiscal years 1985 through 1987, as well as extending the authorizations for Federal activities in the areas of alcohol and drug abuse research, information dissemination, and development of new treatment methods.

1991--P.L. 99-550, Public Health Services Act, contained the requirement for State Comprehensive Mental Health Services Plan.

Directors of NIMH

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
Robert H. Felix	1904	1949	1964
Stanley F. Yolles	1919	1964	1970
Bertram S. Brown	1931	1970	1977
Herbert Pardes	1934	1978	1984
Shervert H. Frazier	1921	1984	1986
Lewis L. Judd	1930	1988	1992
Frederick K. Goodwin	1936	1992	1994
Rex William Cowdry (Actg)	1947	1994	1996
Steven E. Hyman	1952	1996	.....

1992--P.L. 102-321, the ADAMHA Reorganization Act, abolished ADAMHA, created the Substance Abuse and Mental Health Services Administration, and transferred NIMH research activities to NIH.

Biographical Sketch of NIMH Director

Steven E. Hyman, M.D.

Dr. Hyman was appointed NIMH director in April 1996. Born on July 25, 1952, in New York City, he received a B.A. from Yale in 1974, an M.A. from the University of Cambridge in 1976, and an M.D. from Harvard Medical School in 1980. He was a medical intern at Massachusetts General Hospital (MGH), a psychiatric resident at McLean Hospital, and a clinical fellow in medicine and neurology at MGH. He also had 4 years of postdoctoral training in molecular biology at MGH.

Prior to his NIMH appointment, he was associate professor of psychiatry and neuroscience at Harvard Medical School and director of psychiatry research at MGH. He also served as director of Harvard University's interfaculty initiative in mind/brain/behavior. This program represents an attempt to bring together faculty from Harvard's diverse schools to focus on pressing problems related to behavior in the light of modern brain research.

Dr. Hyman's research has focused on how drugs of abuse, neurotransmitters, and cytokines produce long-term changes in brain function by activating or suppressing the expression of genes within nerve cells. In recent years his main focus has been on brain regions involved in the control of motivated behavior.

He has published numerous scientific papers and a textbook on molecular biology, and has authored and edited several clinical textbooks. He serves on the editorial boards of several scientific journals.

NIMH Programs

Division of Basic and Clinical Neuroscience Research

This division explores and exploits the enormous potential of neuroscience research in combatting brain disorders. To this end, it supports basic and clinical research on neuroscience, genetics and therapeutics, training, and resource development to further understand the causes, treatment, and prevention of brain disorders. The focus is on behavioral and integrative and molecular and cellular neuroscience; genetics; and preclinical and clinical therapeutics.

Behavioral and Integrative Neuroscience Branch. This branch plans, supports, and conducts programs of research and resource development in fundamental and clinical behavioral neuroscience. Emphasis is placed on theoretical and computational, cognitive, and basic behavioral and systems neuroscience, and on the integrative neuroscience of schizophrenia, mood and other brain disorders.

Molecular and Cellular Neuroscience Branch. This branch supports research and resource development in molecular and cellular neuroscience with emphasis on signal transduction; developmental neuroscience, neuroendocrinology and neuroimmunology; and the molecular and cellular basis of mental disorders such as schizophrenia, mood disorders, and other mental illnesses.

Genetics Research Branch. This branch fosters research and research on the genetic basis of neural functioning, quantitative behavioral traits, and complex mental disorders such as schizophrenia and bipolar disorder. Emphasis is on the genetic basis of neural function, behavior, and schizophrenia, mood and other brain disorders.

Preclinical and Clinical Therapeutics Research Branch. This branch conducts programs in neuropharmacology and drug discovery, psychopharmacology, and clinical pharmacology. Also supported are phase I and II trials of compounds that offer promise of benefiting people with mental illness.

Division of Services and Intervention Research

This division fosters programs in prevention and treatment interventions, services research, clinical epidemiology, and diagnostic and disability assessment. Programs encompass research, research demonstrations, training, and resource development. The division also provides biostatistical analysis and data management reporting for research studies and analyzes and evaluates national needs and research opportunities.

Services Research and Clinical Epidemiology Branch. The branch supports research on services organization and delivery and health economics at the clinical, program and system levels in specialty mental health, general health, and other health care delivery

NIMH Appropriations--Grants and Direct Operations

Fiscal year	Total grants	Direct operations	Total
	[Amounts in thousands of dollars]		
1948	$ 750	$ 369	$ 1,119
1949	1,050	289	1,339
1950	1,999	458	2,457
1951	1,195	776	1,971
1952	2,384	1,008	3,392
1953	2,629	1,243	3,872
1954	3,727	1,785	5,512
1955	4,785	2,933	7,718
1956	5,686	3,764	9,450
1957	10,576	4,966	15,542
1958	6,213	5,865	22,078
1959	22,066	6,722	28,788
1960	30,690	7,385	38,075
1961	41,912	8,214	50,126
1962	54,316	9,779	64,095
1963	69,753	10,602	80,355
1964	84,884	11,141	96,025
1965	96,788	12,020	108,808
1966	107,797	12,827	120,624
1967	110,983	15,358	126,341
1968	106,299	22,442	128,741
1969	104,179	29,466	133,645
1970	96,688	32,212	128,900
1971	99,271	33,619	132,890
1972	100,080	37,994	138,074
1973	81,491	35,133	116,624
1974	102,268	41,544	143,812
1975	89,202	43,438	132,640
1976	12,986	56,805	169,791
1977	97,316	49,060	146,376
1978	99,585	57,148	156,733
1979	115,844	62,223	178,067
1980	128,052	59,688	187,740
1981	120,328	70,075	190,403
1982	112,445	64,289	176,734
1983	116,338	75,206	191,544
1984	132,936	75,343	208,279
1985	152,110	80,624	232,734
1986	162,147	79,919	242,066
1987	199,132	88,672	287,804
1988	230,580	96,934	327,514
1989	282,195	102,733	384,928
1990	335,325	104,897	440,222
1991	397,070	114,897	511,967
1992	434,061	126,224	560,285
1993	451,649	131,202	582,851
1994	484,627	128,725	613,352
1995	502,606	128,454	631,060
1996	531,428	128,513	659,941

Includes research programs only for all years.

FY 1980-present amounts are comparable, i.e., exclude amounts transferred to SAMHSA.

settings. Also encompassed are interventions to improve the quality of outcomes care, including diagnosis, treatment, and rehabilitation services. Other areas include enhanced capacity for conducting services research and on the epidemiology of brain disorders in clinical settings, including the classification, asssessment, etiology, clinical course, and outcome of brain disorders.

Adult and Geriatric Treatment and Preventive Intervention Research Branch. Research supported by this branch centers on the pharmacologic, somatic, and psychosocial treatment of brain disorders in adults and the elderly, the rehabilitation of persons with these disorders, and the prevention of the disorders and their consequences.

Child and Adolescent Treatment and Preventive Intervention Research Branch. Activities of this branch include programs of research, research training, therapeutic medications, and resource development in the pharmacologic, somatic, and psychosocial treatment and rehabilitation of brain disorders in children and adolescents, and their prevention.

Division of Mental Disorders, Behavioral Research and AIDS

This division fosters programs in behavioral science, developmental psychopathology, prevention and early intervention, and in research on the causes of HIV (AIDS virus) infection.

Office on AIDS. This office directs, consults and advises on the development of research policy designed to promote a better understanding of the biological and behavioral causes of HIV infection. The office analyzes and evaluates research opportunities to identify areas warranting either increased or decreased program emphasis, and consults and cooperates with voluntary and professional health organizations, Federal agencies, and other NIH components.

Behavioral Science Research Branch. This branch fosters research on basic biobehavioral, psychological and social processes that underlie behavioral functioning, focusing on the understanding of normal behavior and on how these processes are involved in brain disorders and their treatment, prevention and services.

Developmental Psychopathology Research Branch. The branch supports programs of research in children, adolescents and young adults. The focus includes identification of risk factors for mental disorders; prevention and early intervention; diagnosis of psychopathology; and mental illnesses in relation to the occurence of aggression, violence, and traumatic stress.

Prevention, Early Intervention and Epidemiology Research Branch. This branch supports research on risk factors for the development of psychopathology and brain disorders over the course of adult life, with an emphasis on prevention and early interventions. Other areas include diagnosis of psychopathology; intrapersonal, cognitive, and traumatic-event-related factors; and gender-related psychobiology.

Division of Intramural Research Programs

NIMH Division of Intramural Research Programs (DIRP) plans and administers a comprehensive, long-term, multidisciplinary brain and behavioral research program dealing with the causes, diagnosis, treatment, and prevention of mental disorders, as well as the biological and psychosocial factors that determine normal and pathological human behavior. DIRP provides a national and international focus for mental health research.

Participating in DIRP activities are over 1,000 staff members, 50 percent of whom are investigators. Many foreign and domestic guest scientists also contribute to the research effort of DIRP. Work is conducted in laboratories at three main facilities located on the main campus of NIH in Bethesda, Md.,at the Neuroscience Center at St. Elizabeths Hospital (NSCSE) in the District of Columbia, and at the NIH Animal Center (NIHAC) in Poolesville, Md. Broad spectra of adult and childhood psychiatric disorders including schizophrenia and manic-depressive illness, are studied in patients at both the NIH and St. Elizabeths facilities. In addition, hundreds of basic neuroscience projects examining many aspects of central nervous system structure and function are carried out at all three facilities.

Behavior, both normal and pathological, is studied through an interdisciplinary approach. A variety of methods is used to correlate changes in neuronal function with behavior and to identify and measure the neurochemical and neurophysiological substrates of behavior.

The regulation of central nervous system metabolism is examined at various levels to determine its role in relationship to health and disease. Relatively noninvasive brain imaging techniques such as positron emission tomography (PET), single photon emission tomography (SPECT), and functional magnetic resonance are used to study living subjects in various physiologic and pathologic states. Molecular studies focus on many aspects of synaptic neurotransmission, including the biosynthesis, release, reuptake, and metabolism of neurotransmitters. The effects of disease, dietary changes, hormones, and drugs on synaptic events constitute a major area of investigation within DIRP.

Clinical pharmacological studies designed to improve treatment of the mentally ill center on work with psychoactive and psychotherapeutic drugs. Included in these studies are efforts to identify biological events and clinical measures that can serve as predictors of therapeutic response to these drugs. Other work includes characterization of receptors for neurotransmitters and psychoactive substances whose mechanisms of action are unknown. Studies of the regulation and action of receptors at the cellular level constitute a major area of investigation.

Genetic studies include molecular genetic analyses of psychiatric and neurologic disorders, pharmacogenetic as well as epidemiologic and family studies. Data from these projects will aid in sorting out the important and complex interactions between biological systems (i.e., the central nervous system) and the environment that determine behavior.

In the Office of the Director, DIRP, are five research sections: socio-environmental stuides; genetics; pharmacology; preclinical neuroscience; and cognitive neuroscience.

Other branches and laboratories are devoted to: Research Services; Neuropsychiatry*; Clinical and Research Services*; Experimental Therapeutics; Biological Psychiatry; Clinical Psychobiology; Clinical Neuroscience; Clinical Neurogenetics; Veterinary Medicine and Resources; Child Psychiatry; Clinical Brain Disorders*; Neurophysiology; Clinical Science; Brain and Cognition; Cellular and Molecular Regulation; Neurochemistry; Cerebral Metabolism; Systems Neuroscience**; Biochemical Genetics; Behavioral Endocrinology; Neurotoxicology; Geriatric Psychiatry; and Developmental Neurobiology. (** *Located at St. Elizabeths; *located at the NIH Animal Center*.)

Division of Extramural Activities

The most important responsibility of the DEA is to oversee the review of grant applications. Its aim is to provide every applicant with expert and fair review of his or her application and thereby ensure that NIMH supports the research and other activities that offer the greatest promise of furthering knowledge relevant to mental health and mental illness. DEA also provides committee management services and oversees activities of the National Advisory Mental Health Council, the advisory body to NIMH. In these and other ways, DEA exercises leadership in developing, implementing, and coordinating NIMH extramural programs and policies.

DEA consists of the Office of the Director, Office of Grant Referral and three branches: Clinical Review; Neuroscience Review; and Behavioral and Applied Review. Each branch administers the initial review groups (IRGs) which provide scientific and technical review of applications for research and training grants, fellowships, and cooperative agreements, as well as concept review for research and development contracts. The branches of DEA monitor the review process to ensure quality and conformity to policy. They also interpret the IRGs' recommendations to the National Advisory Mental Health Council. DEA is responsible for management and logistics of the meetings of the council grant review. A member of DEA staff serves as executive secretary to the council grant review.

The division takes steps to ensure that grant applications reviewed by the institute adhere to guidelines on ethical conduct of research and provide for the inclusion of women and minorities in studies on human populations. The division also promotes adherence to safeguards for human and animal research.

DEA also oversees the issuance of program announcements and requests for applications (RFAs) that let the research community know what kinds of studies NIMH is most interested in supporting. Ensuring that these announcements and RFAs are clearly written, programmatically accurate, and faithfully conform to relevant criteria is DEA's responsibility.

Office of the Associate Director for Prevention

This office provides leadership in the coordination of institute programs concerning the prevention of mental disorders and the promotion of mental health. This is done by setting institute goals and priorities, as well as by assessing, developing planning and executing internal and external strategies to implement the institute's prevention research policy. For example, the office sponsors national conferences, convenes groups of prevention experts to increase the quality of prevention science and facilitates the preparation of scientific reports on prevention science.

In addition the office collaborates with Federal agencies, national organizations and coalitions, state, local, and consumer groups with interests in prevention. It also collaborates with the Office of Disease Prevention, the NIH prevention research coordinating committee, and other private and public organizations.

Office of Rural Mental Health Research

The ORMHR directs, plans, coordinates, and supports research activities and information dissemination on conditions unique to those living in rural areas, including research on the delivery of mental health services to such areas. Also coordinates related departmental research activities and related activities of public and nonprofit entities.

Office of the Associate Director for Special Populations

The associate director for special populations provides leadership, advice, and coordination in developing, and fostering implementation of NIMH programmatic and administrative policies to promote mental health concerns of racial/ethnic minorities and women initiates and advances plans, policies, and activities to improve health and mental health of the Nation's women and racial/ethnic minorities.

The office uses program planning, research, research training and public educational activities to promote mental health and prevent mental illness among women and racial/ethnic minorities; provides leadership in establishment and maintenance of organizational linkages and collaborates on mental health concerns of women and racial/ethnic minorities with components of HHS, other Federal agencies, professional organizations, and other health organizations and institutions; monitors progress of division-level goals and programs which bear on racial/ethnic minority and women's issues; and provides leadership and program guidance for the Career Opportunities in Research Education and Training Program (COR), the Minority Research Infrastructure Support Program (M-RISP), and the Supplements for Underrepresented Minorities in Biomedical and Behavioral Research Program.

The COR Honors Undergraduate Program assists institutions with substantial enrollment of racial/ethnic minority students in training of greater numbers of scientists as teachers and researchers in disciplines related to research in mental health.

The M-RISP provides grants to institutions with a substantial enrollment of racial/ethnic minority students for support of research projects, enhancement of existing research infrastructure, and for advanced training of faculty. These grants also provide support for graduate and undergraduate students to serve as research associates on M-RISP projects.

The Supplements for Underrepresented Minorities in Biomedical and Behavioral Research are administrative supplements to existing research grants for research and salary support for high school students, undergraduate students, graduate research assistants, and junior level investigators. The proposed research must be an integral part of the ongoing research of the parent grant supported by NIMH. The purpose of the supplemental awards is to enhance the research capability of the minority student or faculty member, and to provide opportunites for minority individuals to develop as independent, competitive researchers.

Also, supplements exist to promote reentry into biomedical and biobehavioral research careers. This program offers administrative supplements to currently funded NIMH research grants to support individuals with high potential to reenter an active research career after taking time to care for children or parents or to attend to other family responsibilities.

National Institute of Neurological Disorders and Stroke*

Mission

Conducts, fosters, coordinates, and guides research on the causes, prevention, diagnosis, and treatment of the neurological disorders, and stroke, and supports basic research in related scientific areas.

Provides grants-in-aid to public and private institutions and individuals in fields related to its areas of interest, including research project, program project, and

*Originally National Institute of Neurological Diseases and Blindness. Name changed August 16, 1968, to National Institute of Neurological Diseases; October 24, 1968, to National Institute of Neurological Diseases and Stroke; March 14, 1975, to National Institute of Neurological and Communicative Disorders and Stroke; October 28, 1988, to present name.

research center grants.

Operates a program of contracts for the funding of research and research support efforts in selected areas of institute need.

Provides individual and institutional fellowships to increase scientific expertise in neurological fields.

Conducts a diversified program of intramural and collaborative research in its own laboratories, branches, and clinics. Collects and disseminates research information related to neurological disorders.

Important Events in NINDS History

1950--On August 15 President Truman signed P.L. 81-692, establishing the National Institute of Neurological Diseases and Blindness.
1951--NINDB received its first budget of $1,232,253.
1953--The NINDB budget became a line item in the NIH budget.
1953-54--An intramural program of clinical investigation was initiated, including medical neurology, surgical neurology, and electroencephalography. Training programs in neurology and ophthalmology were initiated.
1955--Basic science training grants were initiated.
1956--The intramural clinical investigations program was expanded to include work in ophthalmology.
1957--Training programs in otolaryngology and pediatric neurology were begun.
Field investigations involving collaborative and cooperative clinical studies were begun and the initial phase of the Collaborative Perinatal Project was started.
1960--The joint intramural basic research program of NINDB and NIMH was divided and organized into two basic research laboratory programs.
1961--First program projects and clinical research centers in stroke and communicative disorders were supported.
1962--Funds were appropriated for professional and technical information assistance. Training grants in neurosurgery and neuroradiology were initiated.
1963--Developmental graduate training grants were initiated.
1965--A head injury research program was established.
1966--The stroke research program was expanded additional grants for clinical research centers were awarded. An antiepileptic drug testing program was begun.
1967--Vision outpatient research centers were established. A program of research in neural control mechanisms and prostheses was initiated.
1968--The NINDS blindness program became the nucleus of the National Eye Institute. The institute was renamed the National Institute of Neurological Diseases and Stroke.
1969--Research Building 36, dedicated by DHEW Secretary Robert H. Finch, was occupied by NINDS and NIMH research laboratories.
1971--Programs in applied neurological research (epilepsy, head injury), infectious diseases, and biometry were added to the Collaborative and Field Research Division.
1973--Two new communicative disorders programs were begun with establishment of a section on communicative disorders in the Collaborative and Field Research Division, and an intramural Laboratory of Neuro-Otolaryngology.
1974--Laboratories for neuroimmunology and neuropharmacology were established.
1975--NINDS was renamed the National Institute of Neurological and Communicative Disorders and Stroke.
The institute reorganized into six units for intramural research, fundamental neurosciences, communicative disorders, neurological disorders, stroke and trauma, and extramural activities.
1976--Dr. D. Carleton Gajdusek, chief, Laboratory of Central Nervous System Studies, was awarded the Nobel Prize in Physiology or Medicine for work on atypical slow viruses.
1979--A neuroepidemiology section and a section of neurotoxicology were established within the Intramural Research Program. NINCDS substantially expanded extramural support of research studies using positron emission tomography.
1982--The institute's Neurological Disorders Program was replaced by two new program units: convulsive, developmental, and neuromuscular disorders and demyelinating, atrophic, and dementing disorders.
1984--NINCDS established the Senator Jacob Javits Neuroscience Awards, which provide research grant support for up to 7 years in the basic and clinical neurosciences and communicative sciences.

A Laboratory of Neurobiology and a Laboratory of Experimental Neuropathology were established within the Intramural Research Program.
1986--A Laboratory of Neural Regeneration and Implantation was established within the Intramural Research Program.
1987--NINCDS programs were renamed divisions, reflecting major areas of research interest: communicative and neurosensory disorders; convulsive, developmental, and neuromuscular disorders; demyelinating, atrophic, and dementing disorders; fundamental neurosciences; stroke and trauma; extramural activities; and intramural research.

A Clinical Neuroscience Branch was established within the Division of Intramural Research.
1988--The communicative disorders program became the nucleus of the National Institute of Deafness and Other Communication Disorders. NINCDS was renamed the National Institute of Neurological Disorders and Stroke.
1989--On July 25 President Bush signed P.L. 101-58, declaring the 1990's the "Decade of the Brain."
1990--A Stroke Branch was established within the Division of Intramural Research.

NINDS Legislative Chronology

August 15, 1950--Public Law 81-692 established NINDB "for research on neurological diseases (including epilepsy, cerebral palsy, and multiple sclerosis) and blindness."
August 16, 1968--Public Law 90-489 renamed the NINDB the National Institute of Neurological Diseases.
October 24, 1968--Public Law 90-636 changed the name of the NIND to the National Institute of Neurological Diseases and Stroke.
October 25, 1972--Public Law 92-564 established a temporary National Commission on Multiple Sclerosis supported by NINDS.
March 14, 1975--Part 8 of a DHEW Statement of Organization, Functions, and Delegations of Authority was amended to change the title of NINDS to the National Institute of Neurological and Communicative Disorders and Stroke.
July 29, 1975--Public Law 94-63 established two temporary commissions to be supported by NINCDS: Commission for the Control of Epilepsy and Its Consequences, and Commission for the Control of Huntington's Disease and Its Consequences.
October 28, 1988--P.L. 100-553 changed the name of NINCDS to the National Institute of Neurological Disorders and Stroke.

Biographical Sketch of NINDS Director Zach W. Hall, Ph.D.

Dr. Hall was appointed NINDS director on September 1, 1994. He came to the institute from the University of California, where he was Lange professor and chair of the department of physiology and head of the biomedical sciences training program.

Within his own area of interest, he has made fundamental contributions to the investigation of the neuromuscular junction. He is the author and editor of *An Introduction to Molecular Neurobiology*, a widely used textbook, and has published more than 100 original papers and reviews in scientific journals. He is also a founding editor of *Neuron*, a leading journal of cellular and molecular neurobiology.

Dr. Hall's numerous professional activities include membership on the medical advisory board of the Howard Hughes Medical Institute and participation in the Dana Alliance for Brain Initiatives. He is a member of the Society for Neuroscience and the American Association for the Advancement of Science, among other professional groups.

He was elected a fellow of the American Academy of Arts and Sciences in 1994 and has received many honors in his field, including being named the 1994 Alexander Forbes lecturer at the Marine Biological Laboratory in Woods Hole, Mass. He has twice won the prestigious Jacob Javits Neuroscience Investigator Award, a 7-year grant awarded by the NINDS to distinguished investigators who have a record of substantial contributions at the cutting edge of neurological science.

Dr. Hall received his undergraduate degree in English from Yale University in 1958 and his Ph.D. in biochemistry (medical sciences) from Harvard University in 1966. From 1966 to 1968 he was a fellow in biochemistry at Stanford University School of Medicine. From 1968 until moving to UCSF in 1976 as professor of physiology and head of the new neuroscience program, he was on the faculty of the Harvard Medical School department of neurobiology.

Major Divisions

The institute is organized as six divisions: convulsive, developmental, and neuromuscular disorders; demyelinating, atrophic, and dementing disorders; fundamental neurosciences; stroke and trauma and a division of extramural activities for support and coordination. A division of intramural research conducts laboratory and clinical research in NIH laboratories.

Division of Convulsive, Developmental, and Neuro muscular Disorders

The division stimulates and supports wide-ranging research on neurological illnesses, including disorders of early and adult life, epilepsy, neuromuscular disorders, and sleep.

The *Developmental Neurology Branch* supports research on the neurobiology of developmental disorders of children, including cerebral palsy and other motor disorders, mental retardation and learning disorders, autism and behavioral disorders, and birth defects and genetic disorders affecting the central nervous system. In addition, the branch supports research on neuromuscular disorders including the muscular dystrophies, myasthenia gravis, and the peripheral neuropathies.

The *Epilepsy Branch* encourages research to prevent epilepsy and improve its diagnosis and treatment. Research is supported on convulsive and other paroxysmal disorders of the nervous system, including narcolepsy and other disorders of sleep. The branch administers an extensive antiepileptic drug development and monitoring program.

Division of Demyelinating, Atrophic, and Dementing Disorders

The division supports basic and clinical research relating to the understanding, diagnosis, treatment, and prevention of a broad scope of neurological disorders of adults and the aged. Alzheimer's disease and other dementias, Parkinson's disease, Huntington's disease, and amyotrophic lateral sclerosis are division responsibilities, as are demyelinating disorders such as multiple sclerosis.

In addition, research is funded on infectious diseases, including "slow virus" diseases, encephalitis, meningitis, and neurological aspects of AIDS. Biological research emphasizing neuroendocrinology and the neurological basis of pain is also supported.

Research activities include studies of the physiology, biochemistry, pharmacology, anatomy, pathology, genetics, and epidemiology of these diseases and related conditions in humans and in animal models.

Division of Fundamental Neurosciences

This division places special emphasis on studies of the neurophysiology of cognitive processes, particularly those that can be studied at the neuronal level. Another area involves investigation of somatic-autonomic mechanisms of neuronal interaction. Research on nerve receptors, especially their isolation and purification, has made possible many important experimental and clinical studies. An area of increasing research activity involves the interrelationships between the nervous system and the immune system, neuroimmunomodulation.

Another major area of research interest is central nervous system plasticity--its ability to drop or modify old connections, form new ones, and reshape neural networks. Local circuits served by short-axon or axonless neurons have been thought of as comprising a "second" nervous system which might some day be made to modulate central nervous system activity.

An activity supported largely by research contracts is the development of neural prostheses--devices that use electrical stimulation to replace, modify, or extend function in neurologically impaired people. This research has yielded motor prostheses to restore hand and arm function in paralyzed individuals. Potential new prostheses presently being investigated include urinary bladder control implants based on microstimulation of the sacral spinal cord and a visual prosthesis for the blind, which utilizes microelectrodes in the visual cortex.

Division of Stroke and Trauma

The division supports basic and clinical research on stroke, injury to the head and spinal cord, and cerebral ischemia. The division also funds studies of chronic pain, tumors of the central nervous system, and nerve regeneration. Attention is given to new imaging techniques--positron emission tomography, magnetic resonance imaging, near-infrared spectroscopy, ultrasound, and computerized axial tomography--that allow precise, noninvasive anatomic and metabolic imaging of the brain, a major tool for studying the consequences of stroke and nervous system trauma.

Stroke research encompasses all aspects of cerebrovascular disorders. Of high priority are investigations into the causes and neurological consequences of stroke, cerebral edema, cerebral aneurysms, and arteriovenous malformations and the significance of the timing of treatment after a stroke has occurred. The division supports clinical trials that evaluate the efficacy of surgical and medical therapy in symptomatic as well as asymptomatic patients. Pilot studies are being conducted on procedures for stroke treatment and evaluation.

The division encourages research on injury to the head, spinal cord, and peripheral nerves. Major goals are to find ways to promote regeneration of damaged nerve tissue and to restore function after injury. Toward that end, the division supports studies of neural plasticity, trophic factors that promote nerve growth, control of mitogenesis, therapeutic drugs, and nerve tissue implants.

Tumor research focuses on how neoplasms of nervous and supporting tissue affect the structure and function of the nervous system. Treatment of tumors depends on understanding certain physiological processes, which are particular subjects of research. A key area under investigation is blood flow and its effect on delivery of therapeutic agents to the tumor.

Division-supported studies of pain emphasize the clinical aspects of headache, neck and back pain, and other chronic problems. Some studies focus on neurosurgical procedures for relieving pain. Others evaluate alternative pain treatments: acupuncture, electroanalgesia, spinal manipulation, psychotherapy, biofeedback, and hypnosis. Drugs currently being tested include narcotic drugs, nonsteroidal anti-

Directors of NINDS

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
Pearce Bailey	1902	1951	1959
Richard L. Masland	Mar. 24, 1910	1959	1968
Edward F. MacNichol, Jr.	1918	Sept. 1, 1968	1973
Donald B. Tower	.....	May 31, 1974	Feb. 1, 1981
Murray Goldstein	.....	Dec. 23, 1982	Oct. 1, 1993
Patricia A. Grady (Acting)	.....	September 1993	Aug. 31, 1994
Zach W. Hall	.....	September 1, 1994	.....

inflammatory analgesics, and polypeptide analgesics such as the enkephalins and endorphins. The division also encourages research on better ways to measure and assess clinical pain.

Division of Extramural Activities

The division provides administrative support and coordination for the institute's research grant, research training, and research contract activities. The division directs and carries out scientific and technical merit review of proposals for research contracts, program projects, clinical research centers, special research grants such as multi-institutional clinical trials, and career development and research training. Management services for research grants and contracts are provided.

The division coordinates training and career development of young investigators. Opportunities include institutional and individual training awards as well as support through research career development awards, awards for reentry into the neurological sciences, and an integrated clinical and research career development program for physicians that begins during residency.

Division of Intramural Research

The division conducts basic and clinical research in neurological and related disciplines. Notable achievements have included drug therapies for debilitating neurological diseases such as parkinsonism and new techniques to help scientists better understand how the brain and nervous system function. Major research advances in neurovirology, neurochemistry and neuroimmunology have also come from the division.

NINDS scientists continue to explore central nervous system disorders such as Creutzfeldt-Jakob disease that appear to be slow infections caused by transmissible viruslike agents. These agents are unique in some respects, but in others exhibit classical viral properties. Research focuses on delineating the agents' chemical, biological and genetic nature, and on learning the nature of disease pathogenesis.

Inherited disorders of lipid metabolism such as Gaucher's, Niemann-Pick, Fabry's, Krabbe's, and Tay-Sachs are studied. This work includes biochemical and diagnostic studies, carrier identification, and genetic counseling. Studies on the molecular basis of the diseases have reached a new frontier enzyme replacement therapy has been successfully developed for patients with Gaucher's. Gene replacement is also being explored for patients with this and other metabolic disorders.

Many research projects in computed tomography advance the clinical applications of the technique as well as provide scientists with a wealth of valuable research data. In other imaging work, studies with the PET scanner have shown a relationship between glucose uptake and brain tumor growth. This scanning technique allows scientists to obtain axial transverse or coronal images of the brain. It also provides dynamic functional data such as rates of glucose consumption in different parts of the brain measurements of the storage, degradation, and turnover of radioactively tagged metabolites. Functional magnetic resonance imaging is a new technique being used to study brain activity.

In the *Neuroimmunology Branch*, the role of immunological mechanisms as they may relate to the cause of diseases such as multiple sclerosis is being studied. Immunological and genetic factors are being examined in families with multiple affected members or in twins in which either one or both twins have multiple sclerosis. The role of HTLV-I and other retroviruses as the cause of demyelinating disease is being assessed. Finally, new approaches to the treatment of multiple sclerosis are being examined and MRI is being used as a tool to study the natural history of the disease and to assess the efficacy of experimental treatments.

In the *Surgical Neurology Branch*, NINDS scientists have undertaken intensive studies of brain tumors, pituitary tumors, neuronal implantation, gene therapy and immunotoxins for brain tumors, and selected aspects of cerebrovascular disease and epilepsy.

The *Medical Neurology Branch*'s human motor control section focuses on how the brain controls voluntary movement and how these processes become deranged with different movement disorders. Recent advances have been made in understanding of focal dystonia and brain plasticity. The neuromuscular diseases section has made recent important observations on postpolio syndrome, neuromuscular disorders in AIDS, polymyositis, and neuropathies associated with paraproteinemia. The cognitive neuroscience section conducts innovative research on human cognitive processes such as planning, memory, and object recognition and investigates how these processes become impaired in the presence of neurological disease or trauma. A clinical neurogenetics unit has been formed.

The *Epilepsy Research Branch* investigates the pathophysiology of seizure disorders and cognitive function in individuals with epilepsy, as well as the organization of language and memory function in normal controls, using positron emission tomography studies of cerebral blood flow, metabolism, and neurotransmitters intracerebral electrode recordings and magnetic resonance imaging. Animal and cellular models are used to study excitatory and inhibitory mechanisms, the neuropharmacology of antiepileptic drugs, and potential novel therapeutic compounds.

The *Stroke Branch* explores the mechanisms by which stroke risk factors operate and analyzes mechanisms of neuronal ischemic damage at physiologic and molecular levels. The goal of these studies is to improve the prevention and treatment of human cerebrovascular disease. A clinical stroke research program is integrated with the basic stroke research program.

A major goal of research in the *Neuroepidemiology Branch* is to understand factors influencing the occurrence of neurological disorders in population groups. Using epidemiological methods, the branch carries out research that may resolve clinical problems related to the cause, prevention, and treatment of nervous system diseases. The branch is currently involved in research on cerebral palsy, pediatric migraine, and progressive supranuclear palsy.

Clinical Neuroscience Branch research focuses on amine neurotransmitter mechanisms in the brain and peripheral autonomic nervous system, and on neurotransmitter function and metabolism in various neurological disorders. In addition, the section studies how neurotransmitters and other factors regulate the synthesis of neurotrophic factors, as well as systems in which neu-

NINDS Appropriations--Grants and Direct Operations

Fiscal year	Total grants	Direct operations	Total
	[Amounts in thousands of dollars]		
1954	$ 3,354	$ 1,146	$ 4,500
1955	5,054	2,546	7,600
1956	6,300	3,561	9,861
1957	14,280	4,370	18,650
1958	16,250	5,137	21,387
1959	23,166	6,237	29,403
1960	33,908	7,579	41,487
1961	47,867	8,733	56,600
1962	56,240	14,572	70,812
1963	67,022	16,484	83,506
1964	74,241	13,434	87,675
1965	73,147	14,674	87,821
1966	84,800	16,353	101,153
1967	96,130	20,166	116,296
1968	107,001	21,632	128,633
1969	78,006	25,259	[1]103,265
1970	81,186	26,179	107,365
1971	75,884	27,618	103,502
1972	86,542	30,048	116,590
1973	99,640	31,032	130,672
1974	91,874	33,126	125,000
11975	101,893	40,605	142,498
1976	102,935	41,511	144,446
1977	109,561	45,939	155,500
1978	125,199	53,239	178,438
1979	146,946	65,419	212,365
1980	175,841	66,125	241,966
1981	188,907	63,646	252,553
1982	198,176	67,725	265,901
1983	223,056	74,008	297,064
1984	255,912	79,971	335,883
1985	314,008	82,415	396,423
1986	337,865	76,594	414,459
1987	404,290	85,937	490,227
1988	442,074	92,618	534,692
1989	383,079	89,016	472,095
1990	392,155	97,198	489,353
1991	429,026	113,298	542,325
1992	462,145	118,65	580,798
1993	478,368	120,620	599,488
1994	511,255	119,329	630,584
1995	526,619	122,502	649,121

[1]Excludes funds for blindness, established as a separate appropriation "National Eye Institute" in 1970.

rotransmitters, in particular neuropeptides, can function as neurotrophic factors.

Exploring the design, conduct, and analysis of experimental or observational studies of the nervous system is the work of the *Biometry and Field Studies Branch*. Branch scientists develop new methods to meet the institute's needs for designing experiments and field studies, analyzing data, and devising statistical models of biological processes. The branch also acts as statistical coordinating center for several continuing or planned clinical trials and for longitudinal field studies involving U.S. and foreign scientists. In one cooperative international project, the goal is to determine whether electroencephalography can predict if a child who has had one seizure associated with fever will have another.

The *Experimental Therapeutics Branch* seeks to develop improved pharmacotherapies for neurologic diseases. At the molecular level, scientists are working to characterize central transmitter receptors and information transduction processes as well as to develop pharmaceutical approaches to the selective regulation of gene expression within the central nervous system. At the systems level, studies focus on basal ganglia function especially in relation to dopamine receptor mechanisms and the effect of drugs that influence motor behavior. At the clinical level, investigators attempt to elucidate pathophysiologic mechanisms and develop novel pharmaceutical interventions for neurodegenerative disorders that impair motor and cognitive function.

The *Developmental and Metabolic Neurology Branch* is concerned with inherited disorders of metabolism such as Gaucher's disease, Niemann-Pick disease, Fabry's disease, and Tay-Sachs disease. Investigations include the identification of enzymatic and molecular defects, devising diagnostic and carrier detection methods for genetic counseling, and development of enzyme and gene replacement therapy for patients with these disorders. The branch is also involved in the development of transgenic animals that mimic human metabolic disorders. The pathogenesis of heritable disorders for which the metabolic basis is unknown such as type C Niemann-Pick disease, is also under investigation through "reverse genetics" including chromosomal mapping and identification of the mutated genes and the normal gene products.

The *Neuroimaging Branch* focuses it research on brain tumors, movement disorders, and stroke. The research tools used are: 1) positron emission tomography to assess the rate of glucose utilization in brain tumors and cerebral blood flow in ischemia and 2) magnetic resonance imaging (MRI) and spectroscopy (MRS) to assess diffusion and perfusion (MRI) and levels of various metabolites (MRS) in brain tumors and cerebral ischemia, and brain iron distribution in normal controls, as well as in patients affected by movement disorders (primarily Parkinson's disease and parkinsonism).

National Institute of Nursing Research

Mission

The National Institute of Nursing Research (NINR) supports basic and clinical research to establish a scientific basis for the care of individuals across the life span—from management of patients during illness and recovery to the reduction of risks for disease and disability and the promotion of healthy lifestyles. According to its broad mandate, the NINR implements programs of research to understand and ease the symptoms of acute and chronic illness, to prevent or delay the onset of disease or slow its progression, to find effective approaches to achieving and sustaining good health, and to improve the clinical settings in which care is provided. This research extends to problems encountered by patients' families and caregivers. It also emphasizes the special needs of at-risk and underserved populations. These efforts are crucial in translating scientific advances into cost-effective health care that does not compromise quality.

NINR programs are conducted primarily through grants to investigators across the country. The NINR intramural program will be revitalized in 1997, with an initial focus on the factors that contribute to wound healing.

NINR fosters collaborations with many other disciplines in areas of mutual interest such as long-term care for older people, the special needs of women across the life span, bioethical issues associated with genetic testing and counseling, biobehavioral aspects of the prevention and treatment of infectious diseases, and the impact of environmental influences on risk factors for chronic illnesses.

Important Events in NINR History

November 10, 1985--P.L. 99-158, the Health Research Extension Act of 1985 became law, overriding a presidential veto. Among other provisions, the law authorized the National Center for Nursing Research at NIH.
April 18, 1986--Health and Human Services Secretary Otis R. Bowen, M.D., announced the establishment of NCNR at NIH.
December 3, 1986--Members of the NCNR Advisory Council were appointed by the HHS secretary.
February 17, 1987--The first meeting of the NCNR Advisory Council was held.
May 30, 1988--The NCNR Advisory Council was renamed the National Advisory Council for Nursing Research.
June 10, 1993--P.L. 103-43, the NIH Revitalization Act of 1993, became law. Among other provision, it changed the center to an NIH institute.
June 14, 1993--DHHS Secretary Donna Shalala signed the *Federal Register* notice establishing the National Institute of Nursing Research.

NINR Legislative Chronology

November 10, 1985--P.L. 99-158, the Health and Research Extension Act of 1985 became law. Its provisions included the establishment of NCNR to support research and research training related to patient care.
1986--A series of continuing resolutions (P.L. 99-500, P.L. 99-599) established NCNR as a separate NIH appropriation.
June 10, 1993--NCNR was redesignated as an NIH institute under a provision in P.L. 103-43, the NIH Revitalization Act of 1993.

Biographical Sketch of NINR Director

Patricia A. Grady, Ph.D, R.N.

Dr. Grady became the institute's second director on April 3, 1995. She earned her undergraduate degreee in nursing from Georgetown University in Washington, D.C. She continued her graduate education at the University of Maryland receiving a master's degree in nursing from the School of Nursing and a doctorate in physiology from the School of Medicine. She held several academic positions and served concurrently on the faculties of the University of Maryland Schools of Nursing and Medicine.

An internationally recognized stroke researcher, her scientific focus has primarily been in stroke, with emphasis on arterial stenosis and cerebral ischemia. She has authored or coauthored numerous articles and papers on hypertension, cerebrovascular permeability, vascular stress, and cerebral edema. She is a member of the editorial board of *Stroke*, and has served as a reviewer for the journal, *Science*.

In 1988, Dr. Grady joined NINDS as an extramural research program administrator in the areas of stroke and brain imaging. Two years later, she served on the NIH Task Force for Medical Rehabilitation Research,

Directors of NINR

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
Doris H. Merritt (Actg)	1923	April 18, 1986	June 1987
Ada Sue Hinshaw	1939	June 6, 1987	June 30, 1994
Suzanne S. Hurd (Actg)	.....	July 1, 1994	Apr. 2, 1995
Patricia A. Grady	.....	Apr. 3, 1995	.....

which established the first long-range agenda for the field of medical rehabilitation research. In 1992, she assumed the responsibilities of NINDS assistant director. From 1993 to 1995, she was deputy director and acting director of NINDS. Recently Dr. Grady was appointed to the Clinical Center Board of Governors.

Dr. Grady is a member of several scientific organizations, including the Society for Neuroscience, the American Academy of Neurology, and the American Neurological Association. She is also a fellow of the American Heart Association Stroke Council.

She has been recognized with several prestigious honors and awards for her leadership and scientific accomplishments. She was elected a fellow of the American Academy of Nursing in 1996. That same year she received the honorary degree of doctor of public service from the University of Maryland.

Dr. Grady also presented the first Rozella M. Schlotfeld distinguished lecture in 1996 at the Frances Payne Bolton School of Nursing at Case Western Reserve University. The Council on Cardiovascular Nurses of the American Heart Association selected her their 1995 Excellence in Nursing Lecturer. In 1995 she received a PHS Superior Service Award for her exceptional leadership as NINDS acting director.

Major Programs

Extramural Research Programs

The NINR extramural program invites investigator-initiated applications containing innovative ideas and sound methodology in all aspects of nursing research consistent with the institute mission. A program priority is the integration of biological and behavioral research. Three dimensions--promoting health and preventing disease, managing the symptoms and disability of illness, and improving the environments in which care is delivered--cut across the following six areas.

- Research in chronic conditions, including arthritis, diabetes, and urinary incontinence, and in long-term care and caregiving.
- Research in health and risk behaviors, including studies of women's health; developmental transitions such as adolescence and menopause; and health and behavior research such as studies of smoking cessation.
- Research in cardiopulmonary health, including prevention of cardiovascular disease and care of individuals with cardiac or respiratory conditions. This area also includes research in critical care, trauma, wound healing, and organ transplantation.
- Research in neurofunction and brain disorders, including pain management, sleep disorders, symptom management in persons with brain disorders such as Alzheimer's disease, and rehabilitation following brain and spinal cord injury. This area includes research on patient care in acute care settings.

Research in immune and neoplastic diseases, including symptoms primarily associated with cancer and AIDS such as fatigue, nausea and vomiting, and cachexia. Prevention research on specific risk factors is also included.

- Research in reproductive and infant health, including prevention of premature labor, reduction of health-risk factors during pregnancy, delivery of prenatal care, care of neonates, infant growth and development, and fertility issues.

The following areas of opportunity have been identified for fiscal year 1998:

- Extending advances in cardiovascular risk management to special populations, which include high-risk and underserved populations such as older people, children, and subgroups of minorities.
- Managing symptoms of chronic neurological conditions, such as problems with diet, mobility, pain, and physical activity.
- Managing traumatic brain injury through discovery of therapies that protect viable brain tissue in patients with head trauma.
- Improving quality of life for transplantation patients, including those who have been on long-term pharmacological regimens.
- End-of-life care, with emphasis on the transition to palliative care, management of pain and other symptoms in the context of terminal illness, and measurement of intervention outcomes.

NINR Appropriations--Grants and Direct Operations

Fiscal year	Total grants	Direct operations[1]	Total
[Amounts in thousands of dollars]			
1986	$ 15,503	$ 690	$ 16,193
1987	18,114	1,886	20,000
1988	21,317	2,063	23,380
1989	25,922	3,217	29,139
1990	30,161	3,352	33,513
1991	35,434	4,288	39,722
1992	39,878	5,092	44,970
1993	42,396	6,100	48,496
1994	44,381	6,637	51,018
1995	45,887	6,870	52,757
1996	49,292	6,539	55,831
1997	53,221	6,522	59,743

[1] Includes the Intramural Research Program, R&D contracts, and research management support

Research Training and Career Development

This activity assures that there will be an adequate pool of well-trained nurse scientists to meet future research needs. This is accomplished through national research service awards for pre- and postdoctoral individual and institutional support, as well as senior fellowships for experienced investigators.

For career development, NINR offers a "Mentored Research Scientist Development Award--Nursing," which is available to doctorally prepared students who need a mentored research experience with an expert sponsor to gain expertise in an area new to the candidate or to demonstrably enhance the candidate's scientific career.

Intramural Division

As noted above, the NINR intramural program will be revitalized in 1997, with an initial focus on factors that contribute to wound healing.

National Institute on Aging

Mission

In 1974 Congress authorized the establishment of the National Institute on Aging. The NIA is responsible for "conduct and support of biomedical, social, and behavioral research, training, health information dissemination, and other programs with respect to the aging process and diseases and other special problems and needs of the aged."

Important Events in NIA History

December 2, 1971--The White House Conference on Aging recommended the creation of a separate National Institute on Aging.

May 31, 1974--Public Law 93-296 authorized the establishment of a National Institute on Aging and required that the institute develop a national comprehensive plan to coordinate the HEW agencies involved in aging research.

October 7, 1974--The National Institute on Aging was established.

April 23, 1975--First meeting of the National Advisory Council on Aging was held.

July 1, 1975--The Adult Development and Aging Branch and Gerontology Research Center were separated from their parent institute to become the core of the National Institute on Aging.

December 8, 1976--The research plan required by P.L. 93-296 was transmitted to the Congress.

September 20, 1982--NIA Laboratory of Neurosciences Clinical Program admitted the first inpatient to a new unit at the NIH Clinical Center.

September 9-11, 1983--The institute marked the 25th anniversary of the Baltimore Longitudinal Study of Aging. The first volunteers joined this unique study in 1958.

1984--NIA funded Alzheimer's Disease Centers around the country where researchers at medical institutions work to cure and prevent this disorder, while improving care and diagnosis.

November 14, 1986--P.L. 99-660, section 951-952, authorized the NIA's Alzheimer's Disease Education and Referral (ADEAR) Center as a part of a broad program to conduct research and distribute information about Alzheimer's disease to health professionals, patients and their families, and the

general public.

September 6, 1988--Dr. Gene Cohen assumed the permanent position of NIA deputy director.

November 4, 1988--P.L. 100-607 established the Geriatric Research and Training Centers (GRTC).

1988--Congress authorized NIA to make LEAD awards to researchers who had made significant contributions to Alzheimer's disease research.

1990--The GRTCs were expanded and renamed the Claude D. Pepper Older American Independence Centers and charged with conducting research in diseases that threaten independent living.

1993--Six Edward Roybal Centers for Research on Applied Gerontology were authorized to convert research findings into programs that improve the lives of older people and their families.

NIA funded six Exploratory Centers for Minority Aging and Health Promotion in collaboration with the NIH Office of Research on Minority Health.

1994--Nine demography of aging centers were funded to provide research on health, economics, and aging to make more effective use of data from several national surveys of health, retirement, and long-term care.

1995--Three Nathan Shock Centers of Excellence in Basic Biology of Aging were established to further the study of the basic processes of aging.

Biographical Sketch of NIA Director

Richard J. Hodes, M.D.

Dr. Hodes was appointed NIA director on May 27, 1993. He was born on December 31, 1943, in New York City. He received his B.A. from Yale University (summa cum laude) in 1965 and his M.D. from Harvard Medical School (magna cum laude) in 1971. His postgraduate training included an internship and residency at Massachusetts General Hospital department of medicine. Before attending medical school, he was a research fellow at the Karolinska Institute in Stockholm, Sweden.

Prior to joining NIA, Dr. Hodes was senior investigator and chief of the immune regulation section at NCI's Experimental Immunology Branch.

He is program coordinator for the U.S.-Japan Cooperative Cancer Research Program and serves in editorial capacities at the *Journal of Experimental Medicine*, the *Journal of Immunology*, and *Therapeutic Immunology*. He received the PHS Commendation Medal in 1977 and the PHS Outstanding Service Medal in 1988.

Intramural Research

The bulk of the NIA intramural research program is conducted at the Gerontology Research Center in Baltimore, Md. The *Laboratory of Neurosciences* operates basic and clinical research programs from the Clinical Center at NIH. Via the NIH medical staff fellow, staff fellowship, a cooperative geriatric medicine fellowship with Johns Hopkins, intramural research training awards, and visiting programs, scientists at various stages of their careers gain sophisticated gerontology experience at the center. Over 300 postdoctoral investigators have been trained at the GRC since 1940.

The *Longitudinal Studies Branch* is responsible for the management and operation of the Baltimore Longitudinal Study of Aging (BLSA) and scientists in the branch conduct research using both historical and currently collected data. First, historical datasets in many areas are used to model group and individual patterns of aging. Second, new BLSA research is planned and implemented on the most promising findings. Examples include new research in prostate aging and disease, hearing, strength, cerebrovascular aging, and age-associated changes in functional ability.

The BLSA is a primary and unique resource of the intramural program. Nearly 600 volunteer men, ranging in age from 20 to 96 years, come to the center every 2 years and undergo 2½ days of extensive clinical, biochemical, and psychological tests. A women's program, initiated in 1978, has over 550 participants, helping scientists make important comparisons of sex differences across the life span.

Recently a cohort of women 45 to 55 years of age has been added to allow analysis of the perimenopausal period. A minority cohort is being added for studies relevant to hypertension, prostate cancer, heart disease, and other factors affecting health and survival.

Scientists in the *Laboratory of Clinical Physiology* conduct research emphasizing the physiological changes that occur throughout the entire adult life span. Studies include quantification of age changes, elucidation of mechanisms underlying these changes, and the relation between aging processes and specific disease states. There are specific programs to study endocrine and metabolic systems, especially growth and sex hormones, glucose and insulin homeostasis, bone and the immune system.

The *Laboratory of Behavioral Sciences*, applies behavior analysis methodology to investigate mechanisms mediating the development of selected disorders of aging and to facilitate their prevention and remediation. Studies in the behavioral medicine section are concerned with interactions of stress and salt intake in blood pressure regulation and the development of hypertension. The focus is on effects of hypercapnic breathing on mechanisms of cell sodium regulation. In addition, behavioral nursing research is concerned with prevention of falls and hip fracture, and with relationships between incontinence, urinary tract infection, and hypertension. Studies in the behavioral physiology section are concerned with the effects of low and high ambient temperature on plasma volume, blood pressure, and other cardiovascular measures, and with the diurnal variation in cardiovascular response to thermoregulatory behavior.

The *Laboratory of Personality and Cognition* (LPC) conducts research on individual differences in psychosocial and intellectual functioning with aging and their influence on health and adaptation. LPC researchers are actively engaged in dispelling myths on aging, personality, and health, and have contributed new insights about the stresses faced by aging adults, the methods and strategies used by them to cope, and the effectiveness of their coping efforts. The LPC also conducts research on early markers of Alzheimer's disease as well as cognitive performance and aging, emphasizing the psychological mechanisms underlying age-related changes in memory, learning, and reasoning.

Researchers in the *Laboratory of Cellular and Molecular Biology* conduct studies at the cellular and molecular levels to assess basic mechanisms of aging that affect physiologic function. Included are studies on signal transduction, structural biology, stress responses, gene expression, oxygen radicals and mechanisms of neurodegener-ation. Manipulations, such as diet, exercise, pharmacological/endocrinological and genetic interventions, are examined.

Laboratory of Biological Chemistry investigators conduct research in neurobiology in such areas as molecular neuropathology, mechanisms of cell death, neurotrophic factors, and molecular biomarkers of Alzheimer's disease. Other researchers focus on cell biology, including development of models to measure capacity of bone to regenerate, the study of aging cartilage and bone, mitochondrial defects, and the relation between cancer and aging.

Directors of NIA

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
Norman Kretchmer (Actg)	.....	October 1974	July 1975
Richard C. Greulich (Actg)	.....	July 1975	April 1976
Robert N. Butler	January 21, 1927	May 1, 1976	July 1982
Robert L. Ringler (Actg)	Mar. 27, 1922	July 26, 1982	June 30, 1983
T. Franklin Williams	Nov. 26, 1921	July 1, 1983	July 31, 1991
Gene D. Cohen (Actg)	Sept. 28, 1944	July 1, 1991	May 31, 1993
Richard J. Hodes	Dec. 31, 1943	June 1, 1993	.....

The *Laboratory of Molecular Genetics* (LMG) is investigating the molecular basis for aging and age-dependent diseases, notably cancer. Studies are focused on DNA-related mechanisms such as genomic instability, DNA repair, DNA replication and transcription. The increased levels of DNA damage that have been observed with aging may be due to changes in DNA repair. A special interest is in the fine structure of DNA repair and the DNA repair processes in individual genes. Molecular mechanisms are being investigated and changes in the mechanisms with aging are studied.

The overall goals of the *Laboratory of Cardiovascular Science* are 1) to identify age-associated changes that occur within the cardiovascular system and to determine the mechanisms for these changes; 2) to study myocardial structure and function and to determine how age interacts with chronic disease states to alter function; 3) to study basic mechanisms in excitation-contraction coupling and how these are modulated by surface receptor signaling pathways in cardiac muscle; 4) to determine the chemical nature and sequence of intermediate reactions controlling movement of ions through ionic channels and pumps in myocardium; 5) to determine behavioral aspects of hypertension; 6) to determine normal and abnormal function of vascular smooth muscle and endothelial cells; and 7) to establish potentials and limitations of new therapies such as gene transfer.

In meeting these objectives, studies are performed in human volunteers, intact animals, isolated heart and vascular tissues, isolated cardiac and vascular cells, and subcellular organelles.

Investigators in the *Laboratory of Neurosciences* (LNS) study the function and structure of the central nervous system in relation to neurodegenerative and developmental disorders. Basic studies involve brain phospholipid metabolism during neuroplasticity and functional activation, and blood-brain barrier transport and drug delivery.

Studies in the cerebral metabolism section deal with research on animal models related to human aging and disease, as well as collaborative efforts with the brain aging and dementia section, which operates an eight-bed patient care unit at the NIH Clinical Center. Physicians, pharmacologists, and physiologists work together on clinical brain imaging studies using positron emission tomography and magnetic resonance. Recent studies demonstrated that early metabolic deficits can be detected in brains of participants with a single memory disorder, presaging the later development of Alzheimer's dementia. Simulation PET studies have shown that metabolic deficits in Alzheimer's disease can be partially reversed with appropriate cognitive tests.

Epidemiology, Demography, and Biometry Program. This program collects and evaluates data on health and illness in the older population. The intramural scientific research carried out by EDBP staff is supplemented by research contracts, interagency agreements, and numerous working arrangements with Federal and non-Federal organizations. Basic information is generated on current and projected health, and social status of older people.

A multicenter, prospective study of 14,000 older Americans entitled "Established Populations for Epidemiologic Studies of the Elderly" (EPESE) was initiated in 1980 to prospectively evaluate social, behavioral and environmental factors related to morbidity and mortality. A public use version of the EPESE baseline dataset for all four sites, as well as followup data from three sites, was made available to investigators in the U.S. The EPESE serves as a primary resource for a broad variety of epidemiologic studies of the elderly, including minorities.

The Women's Health and Aging Study was launched in 1991 as a comprehensive study of functional decline in older women with moderate to severe disability. The 5-year effort, being conducted under a contract awarded to Johns Hopkins University School of Medicine, will closely follow about 1,000 women to evaluate changes in physical status over a 3-year study period. Other factors, such as mortality and use of long-term care, are being evaluated.

In 1991 the EDBP started the Honolulu-Asia Aging Study. A complex cross-national study, the research focuses on people already participating in the Honolulu Heart Program, an ongoing prospective study of cardiovascular diseases of American men ages 70 to 90 of Japanese ancestry. The aging study has use of the heart program participants as a resource for research on dementia and to compare results with those generated by parallel studies in other Asian-ancestry populations. Research has shown important differences between the Japanese ancestry living in Hawaii and in Japan. These studies provide clues as to the genetic and lifestyle components.

The Veterans Study of Memory in Aging was initiated in 1994 with Duke University. The project has recruited 3,000 U.S. Navy veterans who served 1944-45. Half of these men suffered closed head injury with loss of consciousness in 1944-45 and possibly at other times in their lives; the other half suffered no such head injury. Based upon cognitive screening, researchers will retrospectively study the association between head trauma with Alzheimer's disease and other degenerative dementias.

Progressive loss of muscle mass, or sarcopenia, has been hypothesized to be a common pathway by which multiple diseases contribute to disability. EDBP initiated the "Dynamics of Health, Aging and Body Composition" (HEALTH ABC) study to characterize the extent of loss of muscle mass in older men and women, identify clinical conditions accelerating the loss of muscle, and examine the health impact of loss of muscle on strength, endurance, disability, and diseases common in old age. Approximately 3,000 men and women, ages 70-79, half of whom are African American, are followed for 7 years for new onset of physical disability. The HEALTH ABC will provide invaluable information on optimal timing for interventions to prevent or reverse muscle loss and on high-risk groups most likely to benefit.

The EDB program supported the collection and analysis of data on cause of death and characteristics of the last year of life in the 1993 National Mortality Followback Survey (NMFS) conducted by NCHS, CDC. This survey supplements information from death certificates in the vital statistics file with information on characteristics of the decedent featuring an over sampling of centenarian decedents. Agreements are in place with the SSA and HCFA to link the NMFS data with administrative records from those two agencies. Analytic plans call for a joint effort in the production of a report on life and death amongst the oldest of the old.

Other areas of interest include disability and physical function; hip fracture and osteoporosis; heart disease; dementia; sleep disturbance; hearing and vision disorders; methodologic issues in aging research; and cross-cultural and international studies of aging and the diseases of aging.

Biology of Aging Program

The program supports biomedical studies through various NIH grant mechanisms and contracts. The program plans, implements, and supports fundamental molecular, cellular and genetic research on the mechanisms of aging. It also supports resource facilities that provide aged animals and cell cultures for use in aging research.

Animal Models. This program area funds research on the identification and development of animal models, both mammalian and lower organism, for use in aging research.

Biomarkers. This area supports research to identify and validate a panel of biomarkers of aging in a rodent model, with eventual application of these biomarkers to humans.

Cell Biology. This program area investigates aging at the cellular level and includes membranes and membrane receptors, growth factors, signal transduction, extracellular matrix, skin and cartilage, intercellular communication, and proteoglycan structure and function.

Differentiation. This area supports research on muscle biology and muscle regeneration, developmental genetics related to aging, and age-dependent loss of differentiated cell function.

Endocrinology. The endocrinology

NIA Appropriations--Grants and Direct Operations

Fiscal year	Total grants[1]	Direct operations	Total
	[Amounts in thousands of dollars]		
1975[2]	$ 9,565	$ 6,424	$ 15,989
1976	11,445	7,843	19,288
1977	19,852	10,148	30,000
1978	24,375	12,930	37,305
1979	37,888	19,023	56,911
1980	43,952	26,036	69,988
1981	50,260	25,348	75,608
1982	55,410	26,493	81,903
1983	63,483	30,513	93,996
1984	79,872	35,420	115,292
1985	103,530	39,438	142,968
1986	112,127	38,819	150,046
1987	134,689	42,772	177,461
1988	148,575	45,973	194,548
1989	172,708	49,837	222,545
1990	184,111	54,816	238,927
1991	257,905	65,886	323,791
1992	302,908	79,974	382,882
1993	316,107	83,336	399,523
1994	337,975	82,291	420,266
1995	350,253	83,035	433,288
1996	370,728	82,167	452,895

[1] Includes research grants and research manpower development awards. Excludes research contracts.
[2] Comparable amount. Appropriations for aging are included within the NICHD appropriation for FY 1975.

program area supports basic research aimed at understanding the age-related changes in hormone production, metabolism, and action; reproductive aging; biology of menopause; age-related changes in control of prostate growth; and age-related changes in hormonal regulation of bone growth and bone cell function.

Genetics. This area supports research aimed at longevity assurance genes and sequence assurance genes, evolutionary genetics of aging and longevity, sex-dependent biological influences on aging, and the role of somatic cell mutations in aging.

Immunology. This program area encourages research on age-related changes in the immune system including regulation of lymphocyte proliferation, regulation of immune specificity, response of the immune system to biochemical stimuli, autoimmune disease and other immunopathology, endocrine and neuroendocrine control of immune function, and interventions to retard and/or correct age-related decline in immune function.

Molecular Biology. This area funds studies on the generation and metabolism of free radicals, repair of free radical damage in DNA and lipids, erythrocyte senescence, mechanisms of programmed cell death, and interventions to extend life span of model organisms.

Molecular Genetics. This area supports research on regulation of cell proliferation in normal, aging, and transformed cells; senescence-related changes in cell cycle-dependent gene expression, the role of telomeres in cell senescence; and age-related changes in gene expression.

Nutrition and Metabolism. This program supports research on nutritional factors in age-related disease, changes in RDAs with age, roles of nutrition in immune function, roles of dietary factors in oxidative damage and antioxidant defenses, the role of nutrition in age-related changes in tissue function, and the age-related changes in the metabolism of nutrients.

Pathobiology. This area supports research on the molecular basis of Werner's syndrome, arthritis and other age-related diseases; age-related changes in mitochondrial function, molecular basis of age-related pathology; and age-related changes in response to biological stress, especially heat shock and acute phage responses.

Physiology. This area supports research on age-related changes in osteoblast and osteoclast function and bone matrix, the cardiovascular system, and electrolyte balance

Protein Structure and Function. This area supports research on protein oxidation and turnover of damaged proteins, protein tertiary structure, glycation of proteins and the metabolism of glycated proteins, and the post-translational modification of proteins.

The Biology of Aging Program also includes the Office of Biological Resources and Resource Development and the Office of Nutrition. These offices coordinate NIA activities in the indicated areas and serve as liaison between NIA and other agencies.

Geriatrics Program

The program supports the development of clinical research on the special medical needs and problems of the growing aging population in the U.S.

The cardiovascular/pulmonary/renal program area develops and supports research on problems such as alterations in blood pressure regulation with age isolated systolic hypertension orthostatic hypotension aging changes in the microcirculation age-associated alterations in the composition of arteries and the effect of these alterations on cardiovascular function age-related change in quality, quantity, and function of the myocardium and the conduction system of the heart and changes with age in kidney and pulmonary function.

The centers program includes the support of the Claude Pepper Older American Independence Centers.

The endocrinology program area encourages and supports research aimed at providing an understanding of the age-related changes in endocrine function, including menopause, the mechanisms underlying these changes, and the impact of these changes on other physiologic systems.

The geriatric research and training program area supports clinical research on disorders that are concentrated predominately among older people or that are associated with increased morbidity and mortality in the elderly. In addition to these specific clinical problems, the program also addresses the lack of research on clinical problems in nursing homes and other sites of long-term care for the elderly. Another mission is to attract new investigators to the field of aging and to further the development of active investigators in clinical medicine and biomedical research.

The infectious diseases program area supports research on the relationship of physiologic changes associated with age or chronic disease to susceptibility to infections. Other priorities include new strategies for evaluating vaccine efficacy in the elderly, potential prophylactic techniques for infections in the elderly, age-related changes in the effects of stresses such as chemotherapy, radiotherapy, and infection on granulopoiesis and lymphopoiesis, age-related changes in circulating levels of amyloid proteins and effects of amyloid deposition, and the interaction of aging and processes of carcinogenesis.

The mission of the musculoskeletal program area is to develop and support basic and clinical research on age-related changes in function of bone, muscle and cartilage. The program supports research on risk factors, prevention and treatment of falls, gait disorders and hip fractures in the elderly, as well as research on osteoarthritis, and urinary incontinence.

The nutrition, gastroenterology, and metabolism program area develops and supports basic and clinical research on effects of nutritional factors throughout the life span on longevity and age-associated morbidity assessment of nutritional status in the elderly effects of aging on nutrient digestion, absorption, and utilization and the contribution of nutritional status to the etiology and pathogenesis of diseases prevalent in the elderly.

The osteoporosis program supports basic and clinical research to identify age-associated processes which contribute to bone loss and osteoporosis markers and risk factors that are related to changes in bone mass, bone competence and the predisposition to falls and strategies based on modifying or reversing these processes. NIA especially emphasizes research on osteoporosis in advanced age, when the consequences, particularly those of hip fracture, become more severe and result in escalating morbidity and mortality.

The Geriatrics Program has begun an area of concentration--the Integration of Aging and Cancer Research. This aging/cancer interface focuses on age-related changes that contribute to increased cancer incidence and mortality in older persons; time and its importance to development of cancer during a person's lifespan; agressive tumor behavior in the context of the aged host; effects of age and aging on antitumor drugs; and impact of

previous illnesses, disabilities, and degenerative conditions.

Etiologic insights acquired from the development of multiple primary tumors in the elderly are of special interest. Research on tumors that primarily affect older persons (e.g., breast, prostate, colon, lung, and non-Hodgkin's lymphoma) are of importance.

Neuroscience and Neuropsychology of Aging

This program fosters and supports extramural and collaborative research and training to further the understanding of the neural and behavioral processes associated with the aging brain. Research on dementias of old age--in particular Alzheimer's disease--is one of the highest program priorities.

Neurobiology of Aging. The neurobiology of aging program area fosters research on age-related cellular and molecular changes in the structure or function of the nervous system. Studies of neuroimmunology, neurovirology, neuroendocrinology, neuropharmacology, sensory and motor processes, sleep, biorhythmicity, cell death and neural plasticity are of particular interest.

Dementias of Aging. The Dementias Branch supports studies of etiology, pathophysiology, epidemiology, clinical course/natural history, diagnosis and functional assessment, drug design, drug development and trials, and behavioral managment and intervention in the dementias and other psychiatric disorders of later life. thje to retrospectively study the association between closed head injury with Alzheimer's disease and other degenerative dementias. The branch emphasizes development of international and multinational investigations.

The basic research section supports research on Alzheimer's disease and other age-related neurodegenerative disorders, including identification of genetic loci associated with inherited forms of these diseases and biochemical and molecular genetic analysis of the components of amyloid plaques, neurofibrillary tangles, and other abnormal structures found in the brains of Alzheimer's disease victims.

The population studies section supports research in the epidemiology of Alzheimer's disease and on models for large-area registries for the disorder.

The clinical studies section supports research on the diagnosis, treatment, and management of patients with Alzheimer's disease. Research on diagnosis is aimed at the development and evaluation of reliable and valid multidimensional diagnostic procedures and instruments.

Research in the treatment and management of Alzheimer's seeks to develop the knowledge required to interrupt the course of the disorder, to manage its behavioral manifestations, and to ultimately prevent it. Treatment approaches include clinical trials of pharmacologic agents and studies of behavioral and environmental interventions. Preclinical drug discovery, development, and animal testing studies are important aspects.

The research centers section supports Alzheimer's Disease Research Centers and Alzheimer's Disease Center Core Grants programs.

Neuropsychology of Aging. The neuropsychology of aging program emphasizes research, including the use of animal models, and training on the neural substrate of age-related changes in basic cognitive processes, learning and memory.

Behavioral and Social Research

This program supports basic social and behavioral research on the aging process and the problems and needs of older people. It focuses on understanding how psychological and social aging interact with biological aging processes how older people relate to social institutions (e.g., the family, health care systems) and the antecedents and consequences of the dramatic changes in age composition of the population.

The goal of the program is to produce a scientific knowledge base which--by informing professional practice, public policy, and everyday life--can maximize people's health, effective functioning, independence, and well-being in their middle and later years. In order to explain the wide diversity among older people, it encourages comparisons between males and females persons with differing racial, ethnic, and socioeconomic background and inhabitants of countries that vary in styles and standards of living.

Special attention is given to studies of the oldest old (those age 85 and over), one of the fastest growing segments of the population. Of special concern is the care of Alzheimer's disease patients and their families. Emphasis is also placed on many kinds of interventions that can prevent, postpone, or reverse such decrements of old age as chronic ill health, sense of incompetence, memory loss, functional disability, or withdrawal from active participation in social and economic roles.

Adult Psychological Development (APD) supports research concerned with behavioral and social mechanisms and processes influencing cognitive and intellectual functioning, personality, attitudes, and interpersonal relationships over the adult life course. An emphasis is placed on research relevant to maintaining and improving well-being, independence, and effective functioning. Research is needed for seeking out the conditions under which age-related individual changes occur or do not occur, and for supplying information to use in the design of roles and environments that can utilize the special strengths of middle-age and older people and that can maintain and enhance their functioning. The two sections included are: cognitive functioning and aging and personality and social psychological aging.

Social Science Research on Aging (SSR) aims to understand the social and environmental conditions influencing health, well-being, and functioning of people in their middle and later years. Its two sections focus respectively on the dynamic processes linking health, behavior, and aging and on those linking social structures with behaviors, attitudes, health, and status of older people. Both sections are concerned with social and behavioral factors in health and functioning and with assessment and testing of planned and natural interventions for health promotion/disease prevention.

Special attention is given to research on aging and health care, especially such issues in long-term care as: family structures and relationships affecting provision of home care, and interventions to prevent the need for long-term care (e.g., injury prevention and control). Particular emphasis is placed on studies of long-term care of Alzheimer's disease patients and their families in line with the NIA initiative. This program also encompasses social science research on two other institute-wide initiatives: gender, health, and longevity, and minority health. The three sections included are: behavioral geriatrics research, health care organizations and older people in society.

Demography and Population Epidemiology (DPE) supports research and training on the dynamics and consequences of population aging, and aims to describe and understand the changing elderly population in terms of its social, demographic, economic, health, and functional characteristics, and the impact of these changes on society as a whole.

DPE also coordinates policy on aging-related statistical data within the NIA and across other institutes at NIH as well as with other relevant Federal agencies. The Office on Demography of Aging is located in the DPE/BSR, the focal point for coordinating demographic and economic research within NIA. The demography office is also the center of activity for the Federal forum of aging-related statistics, a group which serves a similar function in coordinating research government-wide. DPE's three sections are: health and retirement economics, demography of aging, and population epidemiology.

National Institute on Alcohol Abuse and Alcoholism

Mission

The National Institute on Alcohol Abuse and Alcoholism (NIAAA) is responsible for research on the causes, consequences, treatment, and prevention of alcohol-related

problems. NIAAA conducts and supports biomedical and behavioral research into the effects of alcohol on the human mind and body, prevention and treatment of alcohol abuse and alcoholism, and epidemiology of alcoholism and alcohol-related problems. In carrying out these responsibilities, the institute:

- Conducts and supports basic and biobehavioral research aimed at determining the causes of alcoholism, discovering how alcohol damages the organs of the body, and developing prevention and treatment strategies for application in the Nation's health care system;
- Serves as a national resource for the collection, analysis, and dissemination of scientific findings;
- Supports training and development of scientists for participation in alcohol research programs and activities;
- Conducts policy studies that have broad implications for alcohol problem prevention, treatment, and rehabilitation activities; and
- Conducts epidemiological studies as well as national and community surveys to assess the risks for and magnitude of alcohol-related problems among various population groups.

Important Events in NIAAA History

December 31, 1970--NIAAA was established under authority of the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment, and Rehabilitation Act of 1970 (P.L. 91-616) with authority to develop and conduct comprehensive health, education, training, research, and planning programs for the prevention and treatment of alcohol abuse and alcoholism.

May 14, 1974--Passage of P.L. 93-282, which established NIAAA, NIMH, and NIDA as coequal institutes within the Alcohol, Drug Abuse and Mental Health Administration.

July 26, 1976--Expansion of NIAAA's research authority to include behavioral and biomedical etiology of the social and economic consequences of alcohol abuse and alcoholism under authority of the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act amendments of 1976 (P.L. 94-371).

August 1981--Passage of the Omnibus Budget Reconciliation Act of 1981 (P.L. 97-35) transferred responsibility and funding for alcoholism treatment services to the states through the creation of an Alcohol, Drug Abuse, and Mental Health Services block grant administered by ADAMHA and strengthened NIAAA's research mission.

October 27, 1986--Creation of a new Office for Substance Abuse Prevention in ADAMHA by the Anti-Drug Abuse Act of 1986 (P.L. 99-570) consolidated the remainder of NIAAA's nonresearch prevention activities with those of NIDA and permitted NIAAA's total commitment to provide national stewardship to alcohol research.

July 10, 1992--NIAAA became a new NIH research institute under authority of ADAMHA Reorganization Act (P.L. 102-321).

Biographical Sketch of NIAAA Director Enoch Gordis, M.D.

Born on February 21, 1931, in New York, N.Y., Dr. Gordis received his B.A. degree from Columbia University in 1950 and his M.D. degree from the Columbia College of Physicians and Surgeons in 1954. He trained in internal medicine at the Mt. Sinai Hospital in New York. Following his residency, he spent 10 years at New York City's Rockefeller University conducting research in the areas of lipid metabolism, toxicology of carbon tetrachloride, analytical biochemistry of drug stereoisomers, the metabolism of alcohol, and alcohol withdrawal.

Subsequently he founded the alcohol treatment program at the city hospital center at Elmhurst, N.Y., and was professor of clinical medicine at Mt. Sinai School of Medicine. He directed Elmhurst's alcoholism program from 1971 until his appointment as NIAAA director in November 1986.

Dr. Gordis is a member of numerous organizations including the Institute of Medicine of NAS, the American Physiological Society, the American Federation for Clinical Research, Sigma Xi, the American Gastroenterological Association, the American Society of Addiction Medicine, fellow of the American College of Physicians, and the Research Society on Alcoholism.

Programs and Activities

NIAAA supports research through a program of extramural grant support to scientists at leading U.S. research institutions, through interdisciplinary National Alcohol Research Centers Program grants, and through an active intramural research program on the NIH campus in Bethesda, Md. Additionally, NIAAA is involved in a number of important collaborations within NIH and the international community. Findings from these several research areas are made available and accessible through a wide variety of research dissemination activities.

Extramural Research

NIAAA's extramural research support is aimed at building a solid base of biomedical and behavioral knowledge for improved prevention and treatment of alcohol-related problems. Scientists from a variety of disciplines, including social and behavioral sciences, biology, and medicine participate in the extramural program. Current directions in extramural research span diverse areas such as genetic predisposition to alcoholism, patient-treatment matching studies, the neurosciences, alcohol and pregnancy research, the development of pharmacological interventions to treat alcohol abuse and alcoholism and its effects, and alcohol-related public health policies. Selected extramural program highlights are provided below.

Genetics. The legacy of alcoholism in families has prompted researchers to explore the genetic and environmental factors that contribute to heightened vulnerability to alcoholism and the genetic factors that appear to protect certain individuals from developing the disease. Among its research activities in genetics, NIAAA has a cooperative agreement for a multidisciplinary, collaborative study involving seven research institutions across the U.S. to determine how vulnerability to alcoholism is transmitted through families. This study, initiated in the fall of 1989, involves the detailed diagnostic evaluation and genetic typing of 2,400 individuals comprising several hundred families in which alcoholism may be inherited. The long-term objective of this research is to pinpoint genes that influence the susceptibility to alcoholism.

Alcohol and Pregnancy. NIAAA supports research to determine why and how alcohol consumption during pregnancy can result in offspring afflicted with fetal alcohol syndrome and other alcohol-related defects. Laboratory studies have identified several mechanisms that likely contribute to varying degrees to these defects. These studies may lead to possible preventive therapies

The effects of low-level or moderate drinking on prenatal development are of considerable concern because this pattern of drinking is so prevalent. In order to target prevention and intervention efforts to women at high risk, epidemiological and basic research to identify risk factors for adverse pregnancy outcome, such as genetic predisposition, are supported.

A related topic of interest is the development of biomarkers to confirm exposure of the fetus to alcohol. Several longitudinal studies are determining the nature of neurodevelopomental deficits in children at different ages, which may suggest better remediation strategies. Two recently funded neuroimaging studies correlating changes in brain structure with specific neurobehavioral tests may lead to better diagnosis of partial manifestations of fetal alcohol syndrome.

Medications Development. NIAAA is strongly committed to the development of pharmacological interventions to diminish the craving for alcohol, reduce risk of relapse, and safely detoxify dependent individuals undergoing treatment. Pharmacologic agents are at various stages of development ranging from preclinical research to clinical application for the treatment of alcoholism.

Naltrexone, an opioid antagonist, has been approved by FDA as a safe and effective adjunct to psychosocial treatment for

alcoholism.

Since alcohol-seeking behavior is complex and involves several neurotransmitter systems and neurohormones, NIAAA is exploring a range of additional medications to modify drinking behavior. Serotonin uptake inhibitors have shown considerable promise in animal models and may assist alcoholics with collateral depression. Related topics of interest are medication compliance, differential effect of pharmacotherapies on subtypes of alcoholics, and effects of medications when combined with psychosocial interventions.

Neurosciences. NIAAA-funded research is exploring the numerous targets in the brain on which alcohol acts. New methodologies are now becoming available to measure how alcohol acts on neural circuits in the brain to alter behavior. Noninvasive, functional imaging technologies are being used in animal and human studies to identify the neural circuits involved int the reinforcing properties of alcohol leading to and maintaining addictive alcohol-seeking behaviors. In addition, important new assessments are being made of alcohol-linked behaviors in freely behaving animals performing behavioral tasks combined simultaneously with changes in neurotrasmitters and neuromodulators in specific brain circuits using in vivo techniques such as microdialysis, voltammetry, or electrophysiological recordings in multiple areas of the brain. Such studies will lead to the development of therapeutic agents to treat alcohol abuse and alcoholism.

Treatment. NIAAA continues to emphasize research to improve patient-treatment matching, i.e., assignment of patients to facilities, interventions, and treatment providers according to the patients' psychological and behavioral characteristics and the nature of their alcohol dependence. One of the institute's primary initiatives is a cooperative grant focused on matching studies at multiple sites using large study populations. This large scale permits simultaneous testing of various treatment strategies, exploration of interactions between strategies, and standardization of techniques among the participating centers. In turn, these features will allow for more sophisticated analyses than were previously possible, and will enhance the generalizability of findings to applied treatment settings.

Community Prevention Trials. NIAAA supports an integrated group of community-based controlled prevention trials. The problems to be prevented include alcohol-related trauma, underage drinking, and drinking and driving. All the trials test the impact of environmental interventions (e.g., enhanced law enforcement and community coalitions). One project tests a school- and parent-based intervention, while others test media advocacy strategies or traditional mass media. Experimental and quasi-experimental designs are used. Two studies evaluate the effectiveness of naturally occurring interventions using the methodologies of natural experiments. Results to date indicate that community strategies that focus on schools, parents, and the community. Also, enduced law enforcement, media and educational campaigns, and public/private collaboration can significantly reduce drinking and driving, related driving risks, and traffic injuries and death.

Directors of NIAAA

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
Morris E. Chafitz	Apr. 20, 1924	1972	Sept. 1, 1975
Ernest P. Noble	Apr. 2, 1929	February 1976	April 1978
Loran Archer (Actg)	Nov. 26, 1929	April 1978	April 1979
		November 1981	July 1982
		January 1986	October 1986
John R. DeLuca	Jan. 23, 1944	May 1979	October 1981
William E. Mayer (Actg)	Sept. 24, 1923	August 1982	July 1983
Robert G. Niven	Jan. 23, 1944	August 1983	December 1985
Enoch Gordis	Feb. 21, 1931	November 1986	.....

National Alcohol Research Centers Program. NIAAA administers 14 diverse Alcohol Research Centers nationwide through the institute's National Alcohol Research Center Grants Program. This program is interrelated with and complementary to all other research support mechanisms and scientific activities that investigate the causes, diagnosis, treatment, control, prevention, and consequences of alcohol abuse and alcoholism. The program provides long-term (typically 5 years) support for interdisciplinary research that focuses on particular aspects of alcohol abuse, alcoholism, or other alcohol-related problems. This program encourages outstanding scientists from many disciplines to provide a full range of expertise, approaches, and advanced technologies for developing knowledge in these areas.

A primary goal of any NIAAA-funded center is to become, through excellence in science research, a significant regional or national research resource. In addition, each center affords research training opportunities for persons from various disciplines and professions. Current areas of alcohol center focus are the genetic determinants of alcohol ingestion; epidemiology of alcohol problems; environmental approaches to prevention; effects of alcohol on cellular neurobiology; alcohol and the cell; etiology and treatment of alcohol dependence; alcohol and aging; genetic approaches to the neuropharmacology of alcohol; biobehavioral manifestations of adolescent alcohol abuse; genetics of neuroadaptation to ethanol; clinical and medical epidemiology; and etiology and pharmacological treatment of alcoholism.

Intramural Research

The overall goal of the NIAAA Intramural Research Program is to understand the mechanisms by which alcohol produces intoxication, dependence, and damage to vital body organs, and to develop tools to prevent and treat those biochemical and behavioral processes. Areas of study include identification and assessment of genetic and environmental risk factors for the development of alcoholism the effects of alcohol on the central nervous system, including how alcohol modifies brain activity and behavior metabolic and biochemical effects of alcohol on various organs and systems of the body noninvasive imaging of the brain structure and activity related to alcohol use development of animal models of alcoholism and the diagnosis, prevention, and treatment of alcoholism and associated disorders.

Studies on the effects of ethanol on cell membrane receptors, ion channels, and expression of genes coding for these important proteins are yielding intriguing insights into basic mechanisms of ethanol's action. Combined with studies on region specific effects of ethanol on the release of neurotransmitters, these investigations will elucidate how ethanol produces reward, dependence, tolerance, and brain damage.

NIAAA Appropriations--Grants and Direct Operations

Fiscal year	Total grants[1]	Direct operations	Total
	[Amounts in thousands of dollars]		
1971	$ 7,436	$ 1,819	$ 9,255
1972	12,800	5,316	18,116
1973	11,918	9,541	21,459
1974	13,254	12,137	25,391
1975	22,519	10,351	33,050
1976	19,175	8,470	27,645
1977	21,986	8,627	30,613
1978	23,363	9,812	33,175
1979	29,396	10,167	39,563
1980	19,124	12,968	32,092
1981	18,713	11,678	30,391
1982	9,319	14,705	34,024
1983	24,505	18,533	43,038
1984	32,597	22,230	54,827
1985	39,518	22,159	61,677
1986	45,876	20,519	66,395
1987	58,758	24,599	83,357
1988	68,044	24,725	92,769
1989	91,455	28,596	120,051
1990	114,486	34,708	149,194
1991	121,195	36,946	158,141
1992	131,975	39,506	171,481
1993	134,781	41,347	176,128
1994	143,246	41,454	184,700
1995	147,707	43,028	190,735
1996	157,715	40,878	198,593

[1]Direct operations includes intramural research, research management and support, and contracts.
[2]Total NIAAA is NIH comparable.

Behavioral studies on animals, using mainly mice and monkeys, combined with molecular genetics and behavioral manipulations during development, examine important protective and causal factors for alcohol abuse and dependence.

NIAAA utilizes a combination of clinical and basic research facilities which enables a coordinated interaction between basic research findings and clinical applications in pursuit of these goals. An inpatient ward and a large outpatient program are located in the NIH Clinical Center.

Genetics of Alcoholism. This research focuses on investigating the genetic determinants of the risk for alcoholism. Studies on impulsive and violent alcoholics show that there is a clinical subgroup of alcoholics with polydrug abuse and antisocial personality features who also display deficits in serotonin function. The goal of this research is to understand how natural variants of genes involved in serotonergic neurotransmission affect human behavior. Two approaches are used: molecular cloning and expression studies of genes involved in serotonin function, and intensive behavioral and neuropsychological studies of human families and animal strains with natural variants of serotonin genes.

In conducting this research NIAAA scientists examine a variety of populations to determine how genetics and environment interact in the development of alcoholism and concomitant psychopathologies including drug abuse, antisocial personality, anxiety, and mood disorders. Techniques include family transmission studies and genetic linkage analyses using selected candidate genes and a large number of polymorphic markers.

To identify genes for complex, heterogeneous psychiatric diseases, it is helpful to define genetic characteristics which could correlate more precisely with genotypes. Neurophysiologic differences in alcoholism may serve this purpose these differences include a diminished amplitude of a specific electrophysiological trait--called the P300 evoked potential--and the low voltage alpha component of the electroencephalogram. Approaches include family transmission studies and a genetic linkage study to map the genes determining the variants. Psychiatric interviews are conducted to correlate neurophysiological phenotype with clinical phenotype and behavior.

Alcohol and Essential Fatty Acids. NIAAA researchers are investigating the biological functions of essential fatty acids and the adverse effects of alcohol on these functions. A clinical study of alcoholics has indicated that there is a loss of essential polyunsaturated fatty acids in the tissues and blood cells of these patients. Such losses are believed to be related to the tissue damage that occurs in almost every organ system in alcoholics but particularly in the liver and brain. Alcohol is perhaps the only dietary constituent that is capable of depleting the omega-3 fatty acids from the brain, and this may lead to the degeneration of neural cells and a loss in brain and visual function. An interdisciplinary approach is taken in these studies.

Losses of organ polyunsaturated fats as a consequence of chronic alcohol abuse, the underlying metabolic mechanisms and modulating nutritional factors, and the consequences for membrane function as assessed by biochemical and biophysical means are an integral part of this work. Fluorescence spectroscopy and magnetic resonance imaging are the principal tools used to study the functions of polyunsaturated phospholipids in membranes. Mass spectrometry is used for sensitive analysis of fatty acid metabolites in humans. Studies are also being conducted on the lipid requirements of the nervous system during early development, and the full range of experimental and clinical approaches available in the laboratory are employed in this effort.

Molecular Mechanisms of Alcohol Action in the Brain. Recent NIAAA research studies have demonstrated that alcohol affects signal transduction systems involved in the regulation of nerve cell excitability and the transmission of information at synapses. Using newly developed physiological and molecular biological techniques, institute scientists are working toward determining the molecular mechanisms of alcohol's interaction with these signal transduction systems. Scientists also will investigate the molecular alterations of neural function associated with alcohol tolerance, dependence, and withdrawal. This information will improve our understanding of the molecular basis of alcohol dependence and lead to development of treatments and prevention strategies.

International Activities

The Office of Collaborative Research Activities initiates and fosters collaborative activities with other NIH institutes, government agencies, and other organizations interested in alcohol-related problems. These activities include cosponsorship of workshops and research projects as well as efforts to disseminate research findings. The office administers and manages an international program to further the institute's domestic goals.

Mutually beneficial collaborative research efforts have been developed with other countries and international organizations. Research information is exchanged on a regular basis with over 30 countries. This office also coordinates the institute's science education initiative. Special projects in collaboration with educators of K-12 students are in progress.

Among its many recent collaborative national and international activities, NIAAA has cosponsored projects with other institutes and organizations studying birth defects, liver disease, AIDS, women's health, minority health, aging, and health services research. NIAAA has supported sicentific eschanges to increase the research capability of scientists in several foreign countries or to support collaborative research with grantees. The institute has responded to requests for joint research efforts, developed productive cooperative projects, or supported grantees to work with scientists in Finland, Poland, Mexico, Russia, the Czech Republic, Canada, Spain, and many other countries.

Research Dissemination

NIAAA maintains an active communication program aimed at sharing with health care practitioners, policy makers, others involved in managing alcohol-related programs about research findings with applicability to alcohol treatment and prevention efforts, and the general public. Our scientific communications vehicles include publications such as:

- Special reports to Congress on alcohol and health, triennial reports from the secretary of Health and Human Services to the Congress, which describe research findings and advances in the alcohol field;
- *Alcohol Health & Research World*, a quarterly professional journal available by subscription;

Alcohol Alert, a publication designed to quickly disseminate research findings to health professionals; and

- Monographs on special topics or containing papers from NIAAA-sponsored workshops on critical research areas such as women and alcohol, and alcohol and the cardiovascular system.

Research findings are also shared with the alcohol and general health care communities through two online database services supported by the institute. The first of these, the "Quick Facts" electronic bulletin board, provides access to alcohol-related epidemiologic data and facilitates communication among NIAAA staff and others interested in NIAAA programs and data.

Scientists, clinicians, and others interested in alcohol-related research also have direct access to NIAAA's comprehensive "Alcohol and Alcohol Problems Science Database" through Ovid Technologies, Inc.--a commercial vendor and through the NIAAA's home page on the World Wide Web (http://etoh.niaaa.nih.gov). The database title is ETOH, named after EtOH, one of the chemical designations for ethyl alcohol. ETOH covers literature from the late 1960's to the present, contains over 93,000 bibliographic records, and covers all aspects of alcohol research: psychology, psychiatry, physiology, biochemistry, epidemiology, sociology, neuroscience, treatment, prevention, education, accidents and safety, criminal justice, legislation, employment, labor and

industry, and public policy. The database also contains entries on books, monographs, government reports, dissertations, and conference papers.

Currently, NIAAA's WWW features publications (many available as full text documents), news releases, grant and contract information, and other alcohol-related resources.

National Institute on Deafness and Other Communication Disorders

Mission

Conducts and supports research and research training on disorders of hearing and other communication processes, including diseases affecting hearing, balance, smell, taste, voice, speech, and language through:

- Research performed in its own laboratories and clinics
- A program of research grants, individual and institutional research training awards, career development awards, center grants, and contracts to public and private research institutions and organizations
- Cooperation and collaboration with professional, commercial, voluntary, and philanthropic organizations concerned with research and training that is related to deafness and other communication disorders, disease prevention and health promotion, and the special biomedical and behavioral problems associated with people having communication impairments or disorders
- The support of efforts to create devices which substitute for lost and impaired sensory and communication functions
- Ongoing collection and dissemination of information to health professionals, patients, industry, and the public on research findings in these areas.

Important Events in NIDCD History

October 28, 1988--Public Law 100-553 authorized the formation of the National Institute on Deafness and Other Communication Disorders.

June 26, 1989--The NIDCD Advisory Board held its first meeting.

September 18, 1989--The Advisory Council of NIDCD convened for the first time.

March 1, 1991--The NIDCD clearinghouse was established.

April 4, 1991--The board of scientific counselors of NIDCD held its first meeting.

November 19, 1991--The deafness and other communication disorders interagency coordinating committee met for the first time.

Biographical Sketch of NIDCD Director

James B. Snow, Jr, M.D.

Dr. Snow became the first NIDCD director in February 1990. He is responsible for planning, implementation and evaluation of institute programs to conduct and support biomedical and behavioral research, research training, and public health information in human communication.

He received his M.D. cum laude from Harvard Medical School in 1956. He served his internship in surgery at Johns Hopkins Hospital in Baltimore and his residency and research training in otolaryngology at the Massachusetts Eye and Ear Infirmary in Boston. Beginning in 1960, he served as a captain in the U.S. Army Medical Corps for 2 years. He returned to his home state of Oklahoma and began work at the University of Oklahoma Medical Center where he rose to professor and head of the department of otolaryngology.

In 1972 Dr. Snow moved to Philadelphia to become professor and chairman of the department of otorhinolaryngology and human communication at the University of Pennsylvania School of Medicine. He was the medical director of the smell and taste center and the speech and hearing center of the hospital of the University of Pennsylvania and served as the principal investigator of the University of Pennsylvania Smell and Taste Clinical Research Center. He held hospital appointments at the Veterans Administration Medical Center, Children's Hospital of Philadelphia, the Graduate Hospital, the Pennsylvania Hospital and the Presbyterian-University of Pennsylvania Medical Center.

During the past 35 years, he has specialized in communication disorders. He has published more than 175 articles, books and abstracts about his specialty areas and research findings, which include studies on blood flow in the inner ear, radiation therapy and surgery of cancer of the head and neck, and the chemical senses.

As chairman of the education committee of the International Federal of Oto-Rhino-Laryngological Societies, he has fostered the establishment of national systems of accreditation of training and specialist certification in otorhinolaryngology on a worldwide basis. He has served on the editorial board of *Chemical Senses* and as editor of the *Transactions of the American Broncho-Esophagalogical Association*, the *Transactions of the American Laryngological Association* and the *American Journal of Otolaryngology*.

Dr. Snow is a member of numerous professional societies including the American Academy of Otolaryngology-Head and Neck Surgery, the American Neurotology Society, the American Otological Society, the Association for Chemoreceptive Sciences, the Association for Research in Otolaryngology, and the American Speech-Language-Hearing Association. His activities in organized medicine have included service on the council on scientific affairs of the American Medical Association, as a regent of the American College of Surgeons and as a director of the American Board of Otolaryngology.

He has served as president of the American Broncho-Esophagalogical Association, the Society of University Otolaryngologists-Head and Neck Surgeons, the Association of Academic Departments of Otolaryngology-Head and Neck Surgery, and the American Laryngological Association.

Dr. Snow was a 1970 recipient of the Regents' Award for superior teaching at the University of Oklahoma, held a consulting professorship at the Shanghai Second University of Medical Sciences in China in 1985, was elected honorary fellow of the Japan Broncho-Esophagological Society, and received the Golden Award of the International Federal of Oto-Rhino-Laryngology Societies in 1989. In 1991 he was elected to the Society of Scholars of the Johns Hopkins University, and in 1993 he received the distinguished Achievement Award of the Deafness Research Foundation. In 1994 he received the Senior Executive Service Presidential Meritorious Excecutive Rank Award for his government service. Through his guidance, the NIDCD has developed a strong national infrastructure to support research in human communication.

Major Programs

Research programs at NIDCD are intended to improve methods of prevention, diagnosis, treatment, and rehabilitation of clinical problems of deafness and other communication disorders.

Hearing

Recently, the fields of cellular and molecular biology have furthered hearing research. A multitude of genes for syndromic and nonsyndromic forms of hearing impairment including autosomal dominant and recessive, X-linked and mitochondrial modes of transmission have been located in specific regions of the human genome. In addition, several clinically relevant genes essential for normal auditory development and/or function have been cloned.

Other cochlear-specific genes have been isolated from enriched membranous labyrinth cDNA libraries. New technology, including the development of detailed maps of expressed sequence tags (EST) coupled with the use of inner ear specific cDNA libraries, exon trapping and cDNA library enrichment procedures, will facilitate gene cloning. Once cloned, the molecular biology of hearing and the role of particular proteins in the development and/or maintenance of the inner ear can be determined.

These advances offer researchers many new opportunities to study the characteristics of deafness, hereditary factors involved in hearing loss, and the genes that are critical for the development and maintenance of the

human ear. Scientific advances have also been translated into cochlear implants, digital hearing aids, and tactile devices that provide information by stimulating the skin.

Great strides are being made in the study of the properties of auditory sensory cells, and of the characteristics of the response of the inner ear to sound. Research has verified that despite substantial variability in the performance of children who have received cochlear implants, most demonstrate an improvement in speech perception and production. Speech produced by children who use multichannel cochlear implants is usually more accurate than the speech produced by children with comparable hearing impairment using vibrotactile devices or hearing aids. Cochlear implants also positively influence children's receptive and expressive language skills. The longer children use their implants, the greater their language ability.

To achieve the most benefit from their implants, however, children generally need extensive oral-auditory training following implantation and also benefit from periodic audiological assessments. Cochlear implants have benefited children who are congenitally deaf as well as those who are postlingually deaf. The vast majority of adult implant recipients derive substantial benefit in conjunction with speechreading, and many can communicate effectively without speechreading and are able to communicate by telephone. Dedication to research on cochlear implants throughout the world will improve the capabilities of current implant users and improve our understanding of the auditory system.

New insights have been gained concerning the encoding of complex signals transmitted from the auditory nerve to the brain. The relationship between the neural codes for sound intensity, frequency, duration and temporal characteristics of auditory signals and the perception of the stimulus variables has been further clarified. Valuable progress has been made in understanding the structure and function of efferent feedback pathways to the inner and middle ear. There is now good evidence that this system may aid in the detection of signals in noisy environments and serve to protect the ear from acoustic injury.

Gains have been made about the ways in which the brain creates maps of auditory space and how these maps interact with visual space. This research may have implications in the treatment of children who acquire hearing loss in infancy or early childhood. Further, psychoacoustic and electrophysiologic studies of infants and children are providing important new insights into the development of functional hearing.

In the aging auditory system, discoveries have been made demonstrating changes in the regulation of fluid composition and autoregulation of cochlear blood flow whcih may underlie some of the biologic effects of aging on auditory function. Improved behavioral and electrophysiological techniques for measuring auditory function are providing more accurate assessments of the peripheral and central components of age-related hearing impairment.

Recent development of animal models for bacterial and viral infections hold promise for new diagnostic and therapeutic approaches to sensorineural hearing loss caused by infections. Antiviral drugs may find rapid application in the treatment for these conditions with the advent of suitable animal models in which to test efficacy. In addition, the models will allow a greater understanding of why and to what degree infants and children are susceptible to ototoxic drugs used in the treatment of infections.

Otitis media continues to be a significant focus of research because of its prevalence and cost to society. Important risk factors have been identified. Studies of the eustachian tubes have provided new information on tubal mechanics, surfactant-like (fluid) substances and middle ear pressure regulation. Progress has been made toward defining the role that viruses may play in otitis media and the cellular and molecular changes that occur during viral and bacterial infection of the middle ear.

Balance

NIDCD supports research on balance and the vestibular system. Balance disorders afflict a large proportion of the population, particularly the elderly. The vestibular system, with its receptor organs located in the inner ear, plays an important role in the maintenance of one's orientation in space, balance, posture and visual fixation of objects during motion and regulation of locomotion and other volitional movements. Vestibular disorders can, therefore, yield symptoms of imbalance, vertigo (the illusion of motion), disorientation, instability, falling and visual blurring (particularly during motion). Major disorders affecting the vestibular system result from infection, trauma, impaired blood supply, impaired metabolic function and tumors.

In addition to its roles in the stabilization of gaze and balance, recent findings suggest that the vestibular system plays an important role in regulating blood pressure. This information holds potential clinical relevance to the understanding and management of orthostatic hypotension (lowered blood pressure related to a change in body posture).

The institute supports research to develop and refine tests of balance and vestibular function. Computer-controlled systems measuring the responses activated by stimulating specific parts of the vestibular sense organ are now available. Improved tests of functional disability will have important implications for planning programs of physical rehabilitation for patients with balance and vestibular disorders.

NIDCD Appropriations--Grants and Direct Operations

Fiscal year	Total grants	Direct operations	Total
	[Amounts in thousands of dollars]		
1989	$ 85,763	$ 5,914	$ 91,677
1990	107,123	10,159	117,282
1991	121,775	13,182	134,957
1992	133,212	15,536	148,748
1993	138,313	16,463	154,766
1994	144,902	16,414	161,316
1995	148,522	18,859	167,381
1996	157,159	19,343	176,502

Smell and Taste

NIDCD investigators study the chemical senses of smell and taste to enhance understanding of how individuals communicate with their environment. For example, this research is providing insight into changing preferences and aversions for specific foods and flavors. Improved understanding of the interaction between chemoreception and food consumption will lead to improved nutrition from birth to old age.

Both the olfactory and gustatory systems offer special approaches for understanding fundamental mechanisms of plasticity. NIDCD scientists have found that smell and taste cells have the capacity to replace themselves throughout life. These are the only known mammalian sensory cells with this property.

Advances in the molecular and cellular biology, biophysics and biochemistry of the olfactory and gustatory systems are paving the way for improved diagnosis, prevention, and treatment of chemosensory disorders. The vertebrate olfactory receptor neuron has become an important biologic model system in the area of molecular and cellular biology. The olfactory receptor gene family was recently described in mammals and may contain as many as 1,000 olfactory receptor genes. NIDCD scientists are presently characterizing genetic mechanisms of olfaction which will provide the opportunity to study the molecular pharmacology of the process of smell. In addition, the use of available biochemical and molecular probes will lead to a more complete characterization of the neurotransmitters throughout the gustatory system.

Directors of NIDCD

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
Jay Moskowitz (Actg)	Jan. 9, 1943	Oct. 31, 1988	February 1990
James B. Snow, Jr.	March 12, 1932	February 1990	.....

Voice, Speech and Language

Studies of voice and speech disorders are aimed at determining the nature, causes, treatment and prevention disorders such as stuttering, spasmodic dysphonia, and dysarthria. A recent study has demonstrated a new, effective treatment for one such disorder, spasmodic dysphonia--a hyperactivity of the muscles of the larynx which constricts the vocal folds and severely distorts speech. This treatment involves the injection of minute amounts of botulinum toxin into the laryngeal muscles. The toxin blocks the muscle stimulation and eliminates the hyperactivity, rendering a patient free of the symptoms for as long as 4 months.

Oral speech communication may not be a realistic option for individuals with severe dysarthria. Substantial progress has been made in the development of augmentative communication devices to facilitate the expressive communication of persons with severe communication disabilities. An investigation of conversational performance by augmentative communicative device users is in progress. Other funded research evaluates whether a low cost, laser activated keyboard for accessing personal computers is feasible. By providing access to computers, individuals with disabilities can immediately use personal computer software programs and speech synthesizers for augmentative communication.

Language research continues to expand our understanding of the role of each hemisphere of the brain in communication and language, of early specialization of the brain, and of the recovery process following brain damage. This research is intended to further understanding of the neural bases of language disorders. Research on acquistion, characterization and utilization of American Sign Language is expanding our knowledge of the language of people who are deaf.

National Institute on Drug Abuse

Mission

The National Institute on Drug Abuse (NIDA) provides national leadership for research on drug abuse and addiction. Through its extramural research program and its intramural research program at the Division of Intramural Research in Baltimore, NIDA supports studies on the biological, social, behavioral and neuroscientific bases of drug abuse as well as its causes, prevention, and treatment. In addition, NIDA supports research training, career development, public education and research dissemination in these areas. Through grants and contracts to investigators at research institutions around the country and overseas, NIDA supports research and training on:

- the neurobiological, behavioral, and social mechanisms underlying drug abuse and addiction
- specific biomedical and behavioral effects of drugs of abuse, including marijuana, heroin, and cocaine, on the body and brain
- effective prevention and treatment approaches, including a broad research program designed to develop new treatment medications and behavioral therapies for drug abuse
- the causes and consequences of drug abuse, including impact on society and morbidity and mortality in selected populations, e.g., ethnic minorities, youth, women
- investigation of the relationship of drug use to other problem behaviors, e.g., psychopathology, unemployment, violence
- biomedical, behavioral, and social factors associated with vulnerability/invulnerability to drug abuse and addiction
- the role of drug abuse as a factor contributing to the spread of HIV/AIDS, tuberculosis, and other diseases and the development of effective prevention/intervention strategies
- research on the mechanisms of pain and the search for a nonaddictive analgesic
- research on tobacco and nicotine addiction.

NIDA's intramural research program is located in Baltimore, Md. Originally known as the Addiction Research Center, it conducts multidisciplinary research on basic biological and behavioral mechanisms that underly drug abuse and dependence, including its causes and adverse consequences. Research is also supported on treatments for drug dependence and HIV transmission by injecting drug users. Studies range from molecular to laboratory research with animals to clinical studies with human volunteers. The program employs the latest technology, including positron emission tomography to study the action of drugs in the human brain and transgenic species to better understand the role genes in drug abuse. The intramural program also serves as a national and international training center for young investigators in the drug abuse field.

Important Events in NIDA History

1935--A research facility is established in Lexington, Ky., as part of a USPHS hospital. It became the Addiction Research Center in 1948.

1972--Drug Abuse Warning Network and National Household Survey on Drug Abuse were initiated under the Special Action Office for Drug Abuse Prevention.

1974--NIDA was established as part of ADAMHA, as the lead Federal agency for conducting basic, clinical, and epidemiological research to improve the understanding, treatment, and prevention of drug abuse and addiction and the health consequences of these behaviors. NIDA was mandated to carry on the work of the Drug Abuse Warning Network, and National Household Survey on Drug Abuse. The Addiction Research Center in Lexington, Ky., became NIDA's intramural research program.

National Drug and Alcohol Treatment Unit Survey begins, to identify the location, scope and characteristics of public and private drug prevention and treatment programs.

1975--The Monitoring the Future Survey, also known as the High School Senior Survey, was initiated to measure prevalence and trends of nonmedical drug use and related attitudes of high school seniors and young adults.

NIDA began its "Research Monograph Series," which is its primary vehicle for disseminating the newest scientific information in the drug abuse field. Each monograph contains scientific papers that discuss a variety of subjects including drug abuse treatment and prevention research.

1976--NIDA begins the Community Epidemiology Work Group, made up of state and local representatives meeting semiannually with NIDA staff to assess recent drug abuse trends and to identify populations at risk.

1979--The clinical research program moves from Lexington, Ky., to the campus of the Francis Scott Key Medical Center (later Johns Hopkins Bayview Medical Center) in Baltimore, Md. The basic science program follows in 1985.

NIDA sponsors the Treatment Outcome Prospective Study (TOPS), which continued through 1987 to evaluate the overall effectiveness of treatment and to identify certain factors as important determinants of drug abuse treatment success, such as length of time in treatment.

1984--NIDA funds an evaluation of the Midwestern Prevention Project, a comprehensive program involving schools, parents, media, community, and policy makers in drug prevention and education.

1985--NIDA publishes the first issue of its bimonthly newsletter, *NIDA Notes*.

1986--NIDA's Drug Abuse Information and Treatment Referral Hotline is initiated, 1-800-662-HELP.

NIDA becomes the lead agency to carry out the Drug Free Federal Workplace Program, as mandated by presidential order.

1987--NIDA initiates the National AIDS Demonstration Research projects to study and change the high-risk behaviors of injection drug users not enrolled in drug treatment and their sex partners.

1990--NIDA established the Medications Development Division, focusing on developing new medications for enhancing options and effectiveness of drug abuse treatment.

1991--The Monitoring the Future Survey, also called the High School Senior Survey, is expanded to include 8th and 10th graders. NIDA begins data collection for the Drug Abuse Treatment Outcome Study (the

successor to TOPS) to assess the effectiveness of treatment in reducing drug abuse and to identify predictors of drug abuse treatment success.

NIDA holds its first research technology transfer conference in Washington, D.C.: "National Conference on Drug Abuse Research and Practice: An Alliance for the 21st Century."

1992--NIDA is transferred to NIH from ADAMHA, which is reorganized.

1993--NIDA holds its second research technology transfer conference in Washington, D.C. second national conference on Drug Abuse Research and Practice: An Alliance for the 21st Century.

The institute obtained FDA approval for LAAM, the first medication approved in a decade for the treatment of opioid addiction.

1995--NIDA designated the development of a cocaine treatment medication as one of its top priorities.

The institute held the first "National Conference on Marijuana Use: Prevention, Treatment, and Research" in Arlington, Va.

NIDA Legislative Chronology

1966--P.L. 89-793, the Narcotic Rehabilitation Act, provide for increased Federal effors in the rehabilitation and treatment of narcotic addicts (limited to opiate abusers).

1970--P.L. 91-513, the Comprehensive Drug Abuse Prevention and Control Act, replaced the PHS act's definition of "narcotic addict" with a definition of "drug dependent person" to authorize treatment for both narcotic addicts and other persons with drug abuse problems.

1972--P.L. 92-255, the Drug Abuse Office and Treatment Act, created a Special Action Office for Drug Abuse Prevention (SOADAP) and authorized a separate organizational entity--NIDA--within the Department to become operational in 1974. In cooperation with other Federal agencies, especially NIMH's Division of Narcotic Addiction and Drug Abuse, SAODAP established a national network of multimodality drug abuse treatment programs.

1974--P.L. 93-282, created ADAMHA which was charged with supervising the functions of NIMH, NIDA, and NIAAA.

Programs and responsibilities of DNADA and SAODAP were moved to NIDA.

1979--P.L. 96-181, the Drug Abuse Prevention, Rehabilitation, and Treatment Act, mandated that at least 7 percent in FY 1980 and 10 percent in FY 1881 of NIDA's Community Programs budget be spent on prevention.

1982--P.L. 97-35, the Omnibus Budget Reconciliation Act, combined NIDA's community programs project grants and contracts and formula grants within an ADM block grant giving more control of treatment and prevention services to the states.

1986--P.L. 100-690, the Anti-Drug Abuse Act of 1986, increased the block grant, created a substance abuse treatment enhancement to the block grant, and provided increased funds for AIDS research.

Executive Order 12564 called for the implementation of a drug-free workplace. As a result of this action, NIDA created the Office of Workplace Initiatives.

1987--P.L. 100-71, Supplemental Appropriations Act of 1987, required DHHS (NIDA) to publish guidelines in the *Federal Register* for Federal drug testing.

1988--P.L. 100-690, the Anti-Drug Abuse Act of 1988, established the Office of National Drug Control Policy (ONDCP) authorized funds for Federal, state and local law enforcement school-based drug prevention efforts and drug abuse treatment with special emphasis on injecting drug abusers at high risk for AIDS.

1988 and **1990**--P.L. 101-166 and P.L. 101-517, the Departments of Labor, HHS, and Eduation Appropriations Act for FY 1990 and 1991, contained identical prohibitions precluding the use of funds provided under these enactments to carry out any program of distributing sterile needles.

1992--P.L. 102-321, the ADAMHA Reorganization Act, transferred NIDA to NIH, earmarks 15 percent of the institute's research appropriation for health services research, establishes a Medication Development Program within NIDA, provides authority to designate Drug Abuse Research Centers for the purpose of interdisciplinary research relating to drug abuse and other biomedical, behavioral, and social issues related to drug abuse, and creates an Office on AIDS at NIDA

P.L. 102-394, the Departments of Labor, HHS, and Education FY 1993 Appropriations Act, provided that $2 million to carry out section 706 of P.L. 102-321, which required the DHHS Secretary, acting through the director, NIDA, to request that the NAS study U.S. programs that provide both sterile hypodermic needles and bleach. The act also prohibited the use of appropriated funds for any sterile needle distribution program.

1993--P.L. 103-112, the Labor/HHS and Education FY 1994 Appropriations Act, prohibited the use of funds under the act for 1) any further implementation of section 706 of P.L. 102-321, which required the NAS to study U.S. programs that provide both sterile hypodermic needles and bleach, and 2) any program for distributing sterile needles.

P.L. 103-43, the NIH Revitilization Act of 1993, required NIDA to conduct a study on the relationship between the consumption of legal and illegal drugs.

1994 and **1995**--P.L. 103-333, the Departments of Labor, HHS and Education Appropriations Act for FY 1995 and P.L. 104-134, the Omnibus Consolidated Rescissions and Appropriations Act for FY 1996, each prohibited use of any funds provided in the enactments to carry out any program of distributing sterile needles.

Biographical Sketch of NIDA Director Alan I. Leshner, Ph.D.

Dr. Leshner received his undergraduate degree in psychology from Franklin and Marshall College, and the M.S. and Ph.D. degrees in physiological psychology from Rutgers University.

From 1988 to 1994, he was deputy director of NIMH. He also served as acting director of the institute from 1990 to 1992.

Dr. Leshner spent 10 years at Bucknell University where he was professor of psychology. While on the Bucknell faculty, he also held long-term visiting appointments at the Postgraduate Medical School in Budapest, Hungary, at the Wisconsin Regional Primate Research Center of the University of Wisconsin, and as a Fulbright scholar at the Weizmann Institute of Science in Israel. From Bucknell, he went to the NSF, where he held a variety of positions. Most recently, he was director of the office of science and technology centers development, responsible for a foundation-wide program to develop and support major research centers around the country across all fields of science and technology. Before assuming that position in 1987, he had been deputy to the NSF assistant director for biological, behavioral and social sciences since 1985.

Dr. Leshner served in numerous other positions since joining the NSF staff in 1979, including overseeing the National Science Board Commission on Precollege Education in Mathematics, Science and Technology, one of the two national commissions of the early 1980's that brought renewed attention to the Nation's severe problems in elementary and secondary education.

His research has focused on the biological bases of behavior. His laboratory's work emphasized the role of peptide and hormone effects on appetitive behavior, motivation, learning and memory, and such social behaviors as aggression and submission.

Dr. Leshner is the author of *An Introduction to Behavioral Endocrinology*, a major text on the relationship between hormones and behavior. He has written numerous book chapters and papers in professional journals and has published extensively in the areas of science and technology policy and education.

He has been elected a fellow of the American Association for the Advancement of Science, the American Psychological Association, the American Psychological Society, and the New York Academy of Sciences. He has received awards for his national leadership from such diverse groups as the American Psychiatric Association, the National Alliance for the Mentally Ill, the American Academy of Child and Adolescent Psychiatry, the National Mental Health Association, and the National Prevention

Coalition.

NIDA Programs

Division of Epidemiology and Prevention Research

The Division of Epidemiology and Prevention Research conducts research on the epidemiology, etiology, natural history, and consequences of drug abuse and strategies to prevent drug abuse among general, special and underserved populations. Major research efforts focus on identifying risk and protective factors for drug abuse, identifying populations at high-risk for drug abuse, and exploring the natural history of drug abuse and related comorbid conditions. The information obtained from these studies guides NIDA in determining its research priorities.

The division's programs address questions about what kinds of drugs are being abused, to what extent and by whom. Activities range from support for surveys designed to monitor drug use trends among high school students, to developing networks of community researchers for the purpose of identifying new trends in patterns of drug use in the U.S., to conducting in-depth analyses of data which increase knowledge about the nature and extent of drug abuse, and to performing methodologic research to improve the measurement of drug abuse patterns.

The extramural community research program supports studies on the epidemiology and prevention of drug use and abuse-related consequences including HIV/AIDS, hepatitis B and C, and violence; the antecedents, determinants, correlates, and consequences of drug use and abuse and these conditions; the efficacy, effectiveness, and efficiency of community-based interventions in reducing these drug-abuse-related conditions; and innovative methodologies to improve community-based epidemiologic and prevention efficacy research.

The extramural epidemiologic research program funds research on the origins and patterns of drug use/abuse and the disease of addiction, including surveys among general and special populations; the identification and study of resiliency and risk factors for drug use and abuse; etiologic studies on drug use/abuse and the human developmental process; improved methodological studies and innovative statistical research designs; and international epidemiologic studies that focus on drug use, etiologic factors, and related concerns around the world.

The extramural prevention research program supports studies to develop and test strategies to prevent drug use, to prevent escalation from initial drug use to dependence among high risk individuals and groups, and to determine the efficacy of population-based, comprehensive multiple component interventions.

The division works with state, Federal, and international agencies and private organizations to encourage the sharing of drug abuse information and prevention models.

Directors of NIDA

Name	Date of Birth	Dates of Office	
		From	To
Robert L. DuPont		September 1973	July 1978
William Pollin		1979	1985
Charles R. Schuster		1986	1992
Richard A. Millstein (Actg)		January 1992	1994
Alan I. Leshner		1994	

Division of Basic Research

Elucidating the basic behavioral and biomedical mechanisms underlying drug abuse, its causes, and its hazards is the goal of the Division of Basic Research. Research supported by the division helps form the foundation needed to make advances in the treatment and prevention of drug abuse. The division conducts research focusing on the behavioral processes underlying the use of abused substances, which includes studies of drugs' effects on human and animal behavior, as well as studies of social and other factors in drug abuse and addiction. NIDA-funded scientists also seek to understand how abused drugs influence performance, perception and cognitive functions such as learning and memory.

Because drugs affect the brain and its control over mood and behavior, a significant part of the division's research is connected to the broad field of neuroscience. With a clearer understanding of the brain's functions (e.g., the neurobiology of drug reinforcement), and how they are affected by illicit drugs, researchers hope to improve treatment for drug addiction and to prevent drug dependence. The division also supports studies on the motivational processes underlying drug use and relapse to drug use such as craving.

The division monitors a broad spectrum of neurobiological and other biomedical research including studies that seek to determine: the specific mechanisms mediating drugs' effects on the heart and other organs; the mechanisms of drug tolerance and dependence; the basic chemistry of drugs and their analogs; and the processes through which the body absorbs, metabolizes and excretes drugs. In addition, investigators funded by the division explore the effects of drugs on pregnancy and offspring and short- and long-term consequences of multiple drug use. The division also supports studies to determine the neurochemical and behavioral effects of newly developed drugs, with a special emphasis on finding nonaddicting analgesics. Other research develops methodologies for testing new compounds to determine their potential for abuse.

Division of Clinical and Services Research

The Division of Clinical and Services Research supports a program aimed to enhance the understanding of the pathophysiology of drug abuse/addictive disorders, their complications including AIDS, and their treatment, at the clinical level. The work of the division encompasses physiological/neurobiological, behavioral, medical, developmental, and services-delivery approaches. In each area the emphasis is on elucidation of mechanisms underlying the drug abuse/addictive disorders and their complications, the development, improvement and evaluation of treatments, and access to quality and cost-effectiveness of care.

The Clinical Medicine Branch stimulates, plans and develops a national research program focusing upon the clinical, health, and developmental consequences of drug abuse/addictive disorders. The program encompasses studies of natural history of infectious (particularly HIV/AIDS and tuberculosis) and noninfectious complications of drug abuse/addictive disorders, effects of addiction on human development, efficacy of clinical interventions for complications of drug abuse/addiction, and pathophysiology/pathogenesis of diseases associated with drug abuse disorders.

The Etiology and Clinical Neurobiology Branch conducts a national research program focusing on the clinical neurobiology of drug abuse/addictive disorders. This program targets questions of how these disorders

NIDA Appropriations--Grants and Direct Operations

Fiscal year	Total grants	Direct operations	Total
	[Amounts in thousands of dollars]		
1974	$ 25,894	$ 39,431	$ 65,235
1975	28,387	34,431	62,818
1976	32,516	32,191	64,707
1977	25,924	33,830	59,754
1978	30,832	30,181	61,013
1979	36,917	34,191	71,108
1980	38,055	35,165	73,220
1981	45,064	26,585	71,649
1982	35,888	21,441	57,329
1983	38,053	23,651	61,704
1984	45,107	25,991	71,098
1985	54,182	26,948	81,130
1986	60,080	23,231	83,311
1987	96,690	42,617	139,307
1988	106,956	49,296	156,252
1989	168,024	60,147	228,171
1990	238,773	90,787	329,560
1991	285,535	98,121	383,656
1992	296,799	102,301	399,100
1993	300,578	102,487	403,465
1994	324,990	99,325	424,315
1995	339,026	97,700	436,726

affect the structure, function, development and maturation of the human central nervous system, as well as how the structure and physiology of the human CNS and genetic factors affect susceptibility, development, and course of drug abuse/addictive disorders.

In addition, the branch supports studies of the neurobiological mechanisms underlying both pharmacological and nonpharmacological treatments of drug abuse/addictive disorders. Investigations of neurobiological aspects of HIV infection/AIDS in patients with substance abuse/addictive disorders are also supported. Approaches include functional and structural brain imaging, as well as other state-of-the-art techniques.

The Services Research Branch conducts a national program addressing issues of financing and cost, organization, management and effectiveness of health services delivered to patients with drug abuse disorders, as well as health services delivered to such patients in relation to HIV/AIDS. Investigations are carried out at the patient, program, and system levels.

Medications Development Division

Finding new and better pharmacotherapies to treat drug addiction is the mission of the Medications Development Division. Its founding in 1990 strengthened NIDA's commitment to improving drug abuse treatment and preventing the spread of AIDS.

The division funds researchers at every step of the complex medication development process. By expanding NIDA's in-house pharmacological research capabilities, forging drug development agreements with pharmaceutical firms, and establishing a nationwide network of clinical research sites where medications can be tested, the division aggressively pursues ways to enhance and quicken the medication development process.

The division continually searches for compounds that may be effective against drug use. Where appropriate, the division emphasizes the translation of basic research findings regarding medications to clinical concept testing and development.

Division of Intramural Research

NIDA's Division of Intramural Research, with a staff of more than 180, including 60 doctorate-level scientists, is one of the largest research facilities in the U.S. devoted to studying drug abuse and addiction.

Located in Baltimore, Md., the DIR provides an environment where NIDA scientists can collaborate within one facility on a variety of research projects crucial to understanding drug addiction.

Research conducted by intramural NIDA scientists in the DIR complements the many studies supported by NIDA awarded grants and contracts across the country and abroad. Areas under investigation include the causes, treatment, and prevention of drug abuse and addiction; the biochemical and behavioral mechanisms underlying the addictive process; the addictive potential of new drugs; and bases for selective individual vulnerabilities to abused drugs.

Work ranges from basic molecular studies through laboratory work with animals to clinical studies with human volunteers. The center uses the latest research technologies, such as positron emission tomography, to study the action of drugs in the living human brain and transgenic techniques, in which genetically altered mice are created to examine the role genes play in vulnerability to drug abuse.

DIR researchers have played central roles in defining molecular sites for cocaine and opiate action and have used their insights to add to new therapeutic studies.

In addition to its research role, the DIR also serves as a training ground for researchers from across the world to receive training in its laboratories. Approximately 25 percent of all DIR personnel are trainees.

Special Programs

NIDA Training Programs. To ensure an adequate supply of professionals in the drug abuse field, NIDA's research training includes individual fellowships and institutional training programs. NIDA's training program emphasizes basic biomedical, clinical, behavioral, neuroscience, and epidemiological research in drug abuse.

In addition, NIDA supports a Science Education Program in recognition of the need to improve science education and literacy in the U.S. The purpose of the program is to provide educators with tools that can be used to effectively interest students in science.

AIDS Program. Because transmission of HIV is linked directly and indirectly to drug abuse, NIDA's new Office on AIDS collects valuable information on ways of limiting behaviors associated with drug use that are likely to spread the disease. By devising strategies that drug abuse treatment and prevention practitioners can use to combat AIDS, NIDA is helping reduce the transmission of HIV among drug abusers, their sexual partners, and their children.

NIDA's AIDS program also focuses on sharing its research findings with researchers, at-risk groups, prevention and treatment practitioners, and the general public. As part of this effort, the institute provides technical assistance to help communities form coalitions to increase awareness at the grassroots level of the association between AIDS and drug abuse. In addition, NIDA has developed several comprehensive, national public education campaigns to deliver mass media messages about the prevention of drug abuse and AIDS.

Research Program on Women and Gender Differences. Prior to 1995, NIDA's program on women's health focused on pregnant and parenting women and the effects of drug use and abuse on the offspring. The program was broadened in 1995 to include research on drug use, abuse, and addiction in women, regardless of age and reproductive status, as well as research on gender differences. Leadership for the program is provided by the women's health coordinator and the advisory women and gender research group representing each of NIDA's program branches.

At NIDA the study of women and gender differences is integrated throughout all program divisions and consists of four areas: etiology; consequences and impact; prevention; and treatment and services. Etiology research consists of preclinical, clinical, and epidemiological field studies aimed at investigating gender differences in the nature and extent of drug-using behaviors; in the pathways and determinants of initiation, progression and maintenance of drug use; and in the basic behavioral and neurochemical mechanisms underlying drug dependence and vulnerability.

The institute supports human and animal basic research as well as field studies directed at identifying sex and gender differences in the consequences and impact of drug use, abuse, and addiction. Studies examine gender differences in the reinforcing and stimulus properties of abused drugs; the role of the menstrual cycle and sex hormones in modulating drug use and effects; and gender specific biological, physiological, cognitive, and behavioral mechanisms.

A large HIV/AIDS initiative targets pregnant and nonpregnant women and adolescent females; addresses drug use factors that may influence the course of the disease, including modulation of infectivity; and the pathogenesis of progression to AIDS. Also studied are interventions to reduce HIV risk factors in drug users; issue related to access, utilization, and adherence to HIV-related medical regimens; and effectiveness of HIV treatment in drug users.

Among NIDA's research objectives is the development of gender-sensitive prevention strategies that address issues specific to females of all ages, including the identification of risk and protective factors associated with gender value systems and life experiences, and ethnicity and culture. Additionally, the institute supports a comprehensive drug abuse treatment program that includes pharmacological, psychotherapeutic, behavioral, and psychosocial modalities. Studies examine development and effectiveness of drug abuse treatment models that are unique to women, including treatments that encompass coexisting psychiatric disorders (e.g., anxiety, depression, PTSD, and eating disorders).

Research Dissemination. As part of its overall mission to promote the use of research in reducing the problems of drug

abuse in the U.S., NIDA carries out multifaceted activities to disseminate research results to researchers, prevention and treatment practitioners, other health care providers, policymakers, and the general public. NIDA's public information branch coordinates these activities, which disseminate the most up-to-date findings by NIDA-supported researchers and other leading investigators in the drug abuse field through print and audiovisual materials to diverse audiences.

Special Populations. Epidemiologic data show that drug abuse and HIV/AIDS have disproportionately severe consequences for minority populations. Minority group persons who abuse drugs are more likely to die and suffer from severe drug-related illnesses and are less likely to receive appropriate prevention and treatment services. More research is needed in order to develop a rigorous scientific knowledge base on minority populations and drug abuse that can support the formation of policy, prevention/intervention efforts, and a full range of treatment approaches (e.g., pharma-cologic, clinical, behavioral) that are responsive and appropriate to each popula-tion's needs.

The Special Populations Office supports activities to encourage research on minority health issues related to drug abuse and is administratively responsible for some of the research training programs pertaining to minority and other populations. It also assesses and makes recommendations regarding research needs and strategies and monitors progress towards the achievement of these goals.

Division of Research Grants

Mission

The Division of Research Grants (DRG): 1) serves as the central receipt point for most research grant and training applications submitted to the Department of Health and Human Services (DHHS), and makes initial referral to the various DHHS components; 2) assigns all NIH applications to the appropriate institutes or centers and also to the scientific review groups within DRG or the other institutes or centers; 3) provides the scientific merit review of most research grant and fellowship applications submitted to the NIH; 4) provides staff support to the Office of the Director, NIH, in the formulation of grant and award policies and procedures; and 5) assists other NIH components in providing and disseminating data on the intramural and extramural NIH programs, information on the NIH peer review system, and information about the research grant and fellowship application process and procedures to the scientific community, the Congress, other NIH staff, and the general public.

Important Events in DRG History

1944--Public Health Service Act (P.L. 78-410, sec. 301, July 1) authorized the Surgeon General to "make grants-in-aid to universities, hospitals, laboratories, and other public or private institutions, and to individuals for such research projects as are recommended by the National Advisory Health Council, or, with respect to cancer, recommended by the National Advisory Cancer Council." The act also authorized the award of fellowships in the health sciences.

1946--The Research Grants Office was established January 1 under authority of section 301 of the Public Health Service Act to administer a number of research projects transferred to PHS from the Office of Scientific Research and Development at the end of 1945. The office was elevated to division status at end of 1946.

DRG was assigned responsibility for operating and administering a program of extramural research and training through grants-in-aid of research in the biomedical and health-related sciences (with the exception of cancer research programs operated by NCI). DRG retained the operating responsibility until each successive institute was established and took over the programs in its categorical fields.

The division was instructed by National Advisory Health Council to establish study sections for scientific and technical review of research grant applications, and to explore neglected areas of research in the health sciences.

1947--Assigned responsibility for development and administration of the research fellowships program, DRG was renamed Division of Research Grants and Fellowships.

A Central Qualifications Board was formally established August 14 to coordinate review of fellowship applications.

1949--Authority was delegated to DRG May 17 to make awards, and set stipends, allowances, and travel for PHS research fellows (section 202 of the PHS act as amended).

1950--Title was changed back to Division of Research Grants with no change in functions.

1953--A research documentation section was created for the collection, storage, and retrieval of scientific information resulting from the research grants program.

DRG was awarded the Albert Lasker Award "for outstanding administration of a research grants program, enabling thousands of capable scientists in hundreds of institutions to contribute knowledge substantially advancing the Nation's health."

1956--A Health Research Facilities Branch was established to operate the construction program authorized in the Health Research Facilities Act (P.L. 84-835).

1957--The Grants Review Branch was established to coordinate activities of the 27 study sections then in existence.

1958--Responsibility for research grant and training programs in noncategorical areas, operated by the division since 1946, was transferred to the new Division of General Medical Sciences.

Following the transfer, the DRG reorganized to concentrate on review of research grant and fellowship applications, coordination of all extramural programs operated by the institutes and DGMS, and operation of the health research facilities program and grants management.

1959--The Statistics and Analysis Branch was established.

1961--To develop and support independent investigators of high competence, the Research Career Program was initiated. A Career Development Review Branch was established.

The Grants Associates Program began recruitment and training of professional staff for the extramural branches of all granting divisions of PHS, with DRG serving as a primary training focus.

The *Research Grants Index* was published for the first time.

1962--DRG was assigned overall responsibility for coordinating policies and practices for administration of grants and awards for all PHS extramural programs. An interbureau advisory committee was created to coordinate the programs and to assist the division.

A Policy and Procedure Office, was established in the Office of the Chief to coordinate the review, development, and implementation of PHS policies on grants and awards. Health Research Facilities was transferred to the new Division of Research Facilities and Resources.

1963--Codification of PHS policies and regulations led to the publication of a grants manual.

1964--A DRG newsletter was initiated. Three associate chiefs were added to strengthen management in scientific evaluation, technical communications, analyses of extramural programs, statistical interpretations of grant support, and staff training and orientation.

1965--The Civil Rights Liaison Office was established.

The grants manual was replaced by the "Policy Statement and Guide to Operating Procedures for Research Grants."

DRG expanded its data processing services to include computer-preparation of notices-of-awards and approval lists for research grants.

1966--DRG assumed additional responsibilities for review with the transfer from the institutes of the committee on scientific publications, the NCI collaborative research panel, the environmental sciences review committee and the review functions of six panels of the U.S.-Japan Cooperative Medical Science program.

DRG recommended an increase in the

responsibility of grantee institutions for scientific and administrative management of research projects approved by the Surgeon General to over 40 additional institutions for 2 years.

The Surgeon General issued the policy and procedure on clinical research and investigations involving human subjects in February. Expanded in July, it required institution-wide assurances to be coordinated and reviewed by DRG. Assurances from most major grantees were received and accepted.

DRG expanded its computerized central data system to include training grants and research career awards in an analogous pattern for research grants, and set up a computer-based record for trainees on training grants and biographical records for research career awardees.

DRG established a general systems research section and research operations support section under the associate director for research analysis and evaluation. The NIH Central Scientific Classification System for research grants was installed.

1967--An Institutional Relations Office was established.

1968--DRG expanded the computer-based central data system, information for management planning analysis and coordination (IMPAC), to include the fellowship programs in addition to research, training grant, and research career award programs.

1969--DRG became a part of the Office of the Associate Director for Extramural Research and Training. Grants management function was transferred to the Office of Financial Management in the Office of the Associate Director for Administration.

DRG assumed responsibility for preparation of "Notice of NIH Conferences."

1970--DRG assumed initial review of all FDA applications for research grants. The Research Analysis and Evaluation Office was given branch status with expanded responsibilities as principal staff resource to DRG and NIH program officials in the analysis and evaluation of the NIH extramural programs.

Responsibility for review of fellowship applications was passed to supporting institutes and divisions.

1971--The computer retrieval of information on scientific projects (CRISP) system was designed to provide scientific and associated grant identification information.

Study sections were assigned responsibility for initial review of all new RCDA applications.

1972--An Office of Associate Director for Scientific Review was established to coordinate all DRG activities that impinge on the review process and to assist ICD's in devising most effective methods for review of new special emphasis programs.

The Administrative Branch was established incorporating duties of the Internal Operations Branch and other related functions.

The institutional relations section was elevated to branch status.

The Statistics and Analysis Branch was reorganized into special projects and surveys section, reports and data evaluation section, and an Office of Systems Planning in the Office of the Chief.

1973--The Career Development Review Branch was abolished. An Office of Research Manpower was established. Grantee institutions were requested to establish central control offices for distribution of research grant applications to their investigators.

1974--The first receipt date for new individual and institutional postdoctoral research fellowship awards was scheduled for February 1. Review of individual fellowship award applications was assigned to the study sections.

Research Grants Review Branch was abolished. Scientific Review Branch and Referral Branch were established. Institutional Relations Branch was transferred from DRG to the immediate Office of the Director, NIH, and renamed the Office for Protection From Research Risks.

DRG was assigned responsibility for conducting an ongoing inventory of clinical trials supported by grants and contracts, and NIH intramural research investigators.

1975--Study sections were assigned responsibility for considering animal welfare in review of grant and contract applications with special attention to the department's *Principles for the Use of Laboratory Animals*.

DRG developed a computerized tracking system to identify research involving human subjects and to assure compliance by grantee investigators with departmental policy concerning protection of human subjects.

The single review section in the Scientific Review Branch was replaced by four review sections--biomedical sciences, clinical sciences, social and behavioral sciences, and specials--under the immediate Office of the Chief.

1976--A new review cycle was established on January 1 for grant and award applications to conform with the new Federal fiscal year (October 1-September 30).

1978--The behavioral and social sciences review section was changed to behavioral and neurosciences review section.

The Extramural Associates Program was established under the Intergovernmental Personnel Act (P.L. 91-648) to promote participation of ethnic minorities and women in NIH-supported research.

1979--DRG chartered four new study sections: biochemical endocrinology, chemical pathology, diagnostic radiology and nuclear medicine, and mammalian genetics.

The grants peer review study team published phase II of the report to the director, NIH. Over 3,000 copies were mailed to those who participated in the opinion poll.

An NIH review scientist registry and consultant file was officially initiated.

1980--DRG was directed to discontinue use of normalized rating scores after the May/June council round.

1981--Eight new study sections were chartered: behavioral and neurosciences, behavioral medicine, biomedical sciences, bio-organic and natural products chemistry, clinical sciences, experimental cardiovascular sciences, experimental immunology, and physical biochemistry.

A Scientific Review Branch reorganization established three additional review sections: biological sciences, manpower, and physiological sciences.

1982--The hearing research study section was chartered.

1983--The Scientific Review Branch, Referral Branch, and Office of Research Manpower were consolidated into the Referral and Review Branch.

As a result of the congressionally mandated Small Business Innovative Research (SBIR) Program, DRG's responsibilities increased. DRG was the central information source for the small business community, provided the scientific merit review of SBIR applications, and established an SBIR database for statistical studies and future mailings.

The respiratory and applied physiology study section was chartered.

1984--The Research Analysis and Evaluation Branch was abolished. A position of assistant director for special projects was established. The neurology C study section was established.

1985--The reproductive endocrinology study section was chartered.

1986--A DRG study section seminar series was established, whereby section members give scientific presentations of general interest to NIH.

The metabolic pathology study section was chartered.

1987--The Referral and Review Branch was reorganized the manpower review section was dissolved, and the fellowship and some other study sections were redistributed. The nursing research study section was chartered. The Reviewers Reserve, a pool of experienced, precertified reviewers, was developed and is managed by DRG. The division's 40th year was commemorated and the division participated in the NIH centennial celebration.

1988--The Statistics and Analysis Branch was reorganized and named the Information Systems Branch. The review sections in the Referral and Review Branch were reorganized with the addition of the immunology, virology and pathology review section and the redistribution of several study sections.

1989/90--The DRG advisory committee was established as a council of experts outside the NIH to advise DRG on policies and procedures.

Ten new study sections were chartered: AIDS and related research (7; genome; international and cooperative projects; and physiological sciences. AIDS and fellowship applications were given expedited review.

A local area network (LAN) was implemented to link the DRG personal computers to each other and to the main NIH computer system. Four videotapes were made on the NIH peer review system and application process and DRG.

1991/92--The lung biology and pathology study section and the behavioral and neurosciences special emphasis panel were established and chartered. The Information Systems Branch was reorganized into the data management and control section, information systems management section, networking and telecommunications section, research documentation section, systems analysis section, and statistics, analysis and evaluation section.

DRG was instrumental in enabling the "NIH Guide for Grants and Contracts" to be distributed electronically to over 275 research institutions, and the division also developed a computer system to enable the public to receive NIH program guidelines and division publications electronically.

The visual sciences C study section was chartered.

The Westwood Building library, managed by DRG staff, was established.

1993/94--The NIH Grant Line, a computer bulletin board, providing information on NIH extramural program guidelines, was expanded to include new grants and awards and membership rosters of study sections.

CRISP, designed in 1971 to furnish scientific grant information, was issued on CD-ROM and through the Gopher system via Internet.

The division developed and manages the revised "NIH Consultant File" to identify potential peer reviewers.

1995/96—DRG relocated from the Westwood Building where they had been since 1965, to the Rockledge Centre, located near the NIH Campus in Bethesda.

The division developed DART (Division Application Review Tracker), an automated tracking system enabling users to view and manage grant application data through the peer review process.

The 50th Anniversary of DRG and peer review was celebrated with a symposium: "Past, Present and Future of Peer Review."

Most of the Information Systems Branch was transferred to the Office of Extramural Research in the Office of the Director, NIH.

Biographical Sketch of DRG Director

Ellie Ehrenfeld, Ph.D.

In January 1997, Dr. Ehrenfeld, former professor of molecular biology and biochemistry and dean of the School of Biological Sciences at the University of California, Irvine, was sworn in as the ninth DRG director. She earned a B.A. degree, *cum laude* in chemistry from Brandeis University, and a Ph.D. degree in biochemistry from the University of Florida.

She conducted postdoctoral research at the Albert Einstein College of Medicine in the department of cell biology and subsequently served on the faculty there. In 1974, she became associate professor in the microbiology and biochemistry departments at the University of Utah College of Medicine, rising to the position of professor of biochemistry and cellular, viral and molecular biology. In 1992, she became dean of the School of Biological Sciences at the University of California, Irvine, where she served until assuming her current post.

Dr. Ehrenfeld's studies of poliovirus elucidated the mechanism of virus-induced inhibition of host cell protein synthesis and the role of RNA-dependent RNA polymerase. This work and her studies of hepatitis A virus have direct impact on the creation of new antiviral drugs and vaccines. Her research has been supported continuously by the NIH for 23 years, and she was an NIH Merit awardee.

She is the recipient of numerous awards, including the Bill Joklik Lectureship Award, American Society of Virology; the Outstanding Professor Award, University of Utah School of Medicine; Dreyfus Teacher Scholar Award; U.S.P.H.S. Career Development Award; Honorary Member, Association of Microbiology of Chile; and the Merck Faculty Development Award.

Dr. Ehrenfeld has served as member or chair of many peer review committees: Genetic Basis of Disease Review Committee, NIH (chair); FDA Vaccines and Related Biological Products Advisory Committee; National Multiple Sclerosis Society Advisory Committee on Fundamental Research; Research Advisory Panel, U.S. Army Medical Research, Walter Reed Army Institute of Research; Experimental Virology Study Section, NIH; and Microbiology Training Committee, National Institute of General Medical Sciences, NIH. She has also served on the National Advisory General Medical Sciences Council; on the Board of Scientific Counselors, National Institute of Allergy and Infectious Diseases; as a consultant to the Immunopathology Laboratory, Scripps Institute for Medical Research; and on the editorial boards of virology and biological chemistry journals. She has authored or coauthored numerous books and scientific articles.

DRG Study Sections

The following review groups evaluate research grant applications. Their dates of establishment are denoted in parentheses.

AIDS and Related Research IRG (1994)
AIDS and Related Research-1-7 (1990)

Biobehavioral and Social Sciences IRG (1994)
Behavioral Medicine (1980)
Biopsychology (1978)
Human Development and Aging-1, 2 (1981) & 3 (1983)
Social Science and Population (1977)

Biochemical Sciences IRG (1994)
Biochemistry (1951)
Medical Biochemistry (1990)
Pathobiochemistry (1982)
Physiological Chemistry (1959)
Special Study Section-2 (1976)
Special Study Section-6 (1976)

Biophysical and Chemical Sciences IRG (1994)
Bio-organic & Natural Products Chemistry (1980)
Biophysical Chemistry (1981)
Medicinal Chemistry (1981)
Metallobiochemisrty (1980)
Molecular and Cellular Biophysics (1982)
Physical Biochemistry (1980)
Special Study Section-Z (1976)

Cardiovascular Sciences IRG (1994)
Cardiovascular (1990)
Cardiovascular and Renal (1973)
Experimental Cardiovascular Sciences (1980)
Hematology-1&2 (1982)
Pathology A (1961)
Pharmacology (1972)

Cell Development and Function IRG (1994)
Biological Sciences-2 (1989)
Cellular Biology and Physiology-1&2 (1983)
Molecular Cytology (1975)
Human Embryology and Development-2 (1991)
International and Cooperative Projects (1989)
Molecular Biology (1967)
Special Study Section-Y (1976)

Endocrinology & Reproductive Sciences IRG

Directors of DRG

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
Cassius James Van Slyke	1900	January 1946	Dec. 1, 1959
David E. Price	July 5, 1914	1948	1950
Ernest M. Allen	Dec. 1, 1904	1951	1960
Dale R. Lindsay	Aug. 9, 1913	1960	1963
Eugene A. Confrey	Apr. 6, 1922	October 1963	1969
Stephen P. Hatchett	June 30, 1915	1969	August 1976
Carl D. Douglass	1928	August 1976	December 1985
Jerome G. Green	June 20, 1929	January 1986	June 1, 1995
Ellie Ehrenfeld	March 1, 1942	January 1997	

(1994)
Biochemical Endocrinology (1979)
Endocrinology (1951)
Human Embryology & Development-1 (1991)
Reproductive Biology (1965)
Reproductive Endocrinology (1985)

Genetic Sciences IRG (1994)
Biological Sciences-1(1989)
Genetics (1958)
Genome (1990)
Mammalian Genetics (1979)

Health Promotion & Disease Prevention IRG (1994)
Epidemiology & Disease Control-1 & 2 (1987)
Nursing Research (1987)
Alcohol and Toxicology 1, 2, 3 & 4 (1997)

Immunological Sciences IRG (1994)
Allergy and Immunology (1967)
Experimental Immunology (1980)
Immunobiology (1967)
Immunological Sciences (1975)
Special Study Section-4 (1976)

Infectious Diseases & Microbiology IRG (1994)
Bacteriology and Mycology-1 & 2 (1986)
Experimental Virology (1975)
Microbial Physiology and Genetics-1 & 2 (1982)
Tropical Medicine and Parasitology (1959)
Virology (1969)

Musculoskeletal & Dental Sciences IRG (1994)
General Medicine-A1 (1983)
General Medicine-B (1965)
Geriatrics & Rehabilitation Medicine (1997)
Oral Biology and Medicine -1 and -2 (1984)
Orthopedics and Musculoskeletal (1981)
Special Study Section-5 (1976)

Neurological Sciences IRG (1994)
Neurological Sciences-1&2 (1984)
Neurological Sciences-3 (1997)
Neurology-A (1962)
Neurology-B1& B2 (1962)
Neurology-C (1984)

Nutritional and Metabolic Sciences IRG (1994)
General Medicine-A2 (1983)
Metabolism (1959)
Nutrition (1959)

Oncological Sciences IRG (1994)
Chemical Pathology (1979)
Experimental Therapeutics-1 & 2 (1985)
Metabolic Pathology (1986)
Pathology-B (1961)
Radiation (1955)
Special Study Section-1 (1976)

Pathophysiological Sciences IRG (1994)
Lung Biology and Pathology (1991)
Physiology (1946)
Respiratory and Applied Physiology (1983)
Special Study Section-3 (1976)

Sensory Sciences IRG (1994)
Sensory Disorders and Language (1962)
Hearing Research (1982)
Visual Sciences A (1962), B (1972) & C (1991)

Surgery, Radiology, & Bioengineering IRG (1994)
Diagnostic Imaging (1997)
Diagnostic Radiology (1987)
Surgery, Anesthesiology, and Trauma (1977)
Surgery & Bioengineering (1977)
Special Study Section 7 - 9 (1976)
Special Study Section W (1976)

Warren Grant Magnuson Clinical Center

Mission

The Warren Grant Magnuson Clinical Center (CC) provides hospital services to patients who participate in clinical research conducted at NIH. The CC strives to be a model for clinical research by assuring quality patient care, delivering excellent support services, and recruiting and maintaining expert staff. Authorized by Congress to provide patient care necessary to conduct biomedical research, the CC was specially designed to place patient care facilities close to research laboratories to promote the quick transfer of new findings of scientists to the treatment of patients. Institutes admit to their units and clinics only those patients (upon referral by personal physicians) who have the precise kind or stage of illness under investigation by scientist-clinicians.

CC departments are responsible for the hospital services, except for direct physician care, and conduct research in their own specialties.

In addition to biomedical research and patient care, the CC offers opportunities for advanced training to physicians, medical and nursing students, and members of the paramedical professions. This training includes a core curriculum in clinical research, a graduate and postgraduate program, a clinical electives program, and many lecture series. Monthly clinical staff conferences present the results of the cooperative biomedical research carried out at the CC by the scientists and clinicians of the institutes and CC departments.

Important Events in CC History

November 1948--Construction of the Clinical Center was started.
June 22, 1951--The cornerstone ceremony was officiated by Oscar R. Ewing, Federal security administrator. President Harry S. Truman was the honored guest.
July 2, 1953--The CC was dedicated by DHEW Secretary Oveta Culp Hobby.
July 6, 1953--The first patient was admitted to the Clinical Center.
September 5, 1963--A new surgical wing for cardiac and neurosurgery was dedicated by Dr. Luther L. Terry, Surgeon General.
July 2, 1969--A dedication ceremony was held to name the CC's Jack Masur Auditorium.
April 1977--Construction of the ambulatory care research facility was started.
November 1977--The Critical Care Medicine Department was established.
October 22, 1981--The outpatient clinic facility was dedicated. The research hospital was renamed the Warren Grant Magnuson Clinical Center.
September 20, 1982--The NIA Laboratory of Neurosciences was dedicated.
March 22, 1984--The first magnetic resonance imaging unit became operational for patient imaging.
October 1984--NCI's Radiation Oncology Building was dedicated.
April 13, 1985--Two cyclotrons were delivered to the underground facility operated by the Nuclear Medicine Department.
November 20, 1987--The Lipsett Amphitheater in the clinic was dedicated.
September 14, 1990--A 4-year-old patient with adenosine deaminate deficiency was the first to receive gene therapy treatment.
April 8, 1991--The Department of Transfusion Medicine opened its state of the art facility.
June 1992--The A-wing addition was completed, adding NCI and NIAID labs focusing on AIDS research.
July 1993--The hematology/bone marrow unit opened to improve transplant procedures and develop gene therapy techniques.
May 1994--First multi-institute unit designed and staffed for children opened.
November 1996--A Board of Governors was appointed by the Secretary of HHS, marking a new governing system for the CC.
July 1997--To meet increasing investigative needs for cell products used in immunotherapy, gene therapy, and stem cell transplantation, a cell processing facility was created.

CC Legislative Chronology

July 1, 1944--Public Law 78-410, the Public Health Service Act, authorized establishment of the Clinical Center.
July 8, 1947--Under P.L. 80-165, research construction provisions of the Appropriations Act for FY 1948 provided funds "For the acquisition of a site, and the preparation of plans, specifications, and drawings, for additional research buildings and a 600-bed clinical research hospital and necessary accessory buildings related thereto to be used in general medical research...."

Biographical Sketch of CC Director John I. Gallin, M.D.

Dr. Gallin became CC director and NIH associate director for clinical research on May 1, 1994. Prior to his appointment, he had served as director, Division of Intramural Research, NIAID, since 1985 and as chief of its Laboratory of Host Defenses since 1991.

A New York native, he graduated with honors from Amherst College, where he received an honorary doctor of science in

1988. He earned an M.D. degree at Cornell University Medical College in 1969. He was an intern, resident, and senior chief medical resident at New York University-Bellevue Hospital Medical Center.

Dr. Gallin's primary research centers on how phagocytes--the body's scavenger cells--function. When the cells fail to produce the oxygen-rich chemicals that normally kill germs, a rare hereditary immune disorder--chronic granulomatous disease (CGD)--results.

His laboratory has actively pursued gene therapy for the treatment of CGD. He also has helped lead investigations demonstrating that the immune stimulant interferon-gamma reduces infections in CGD. Currently, he and his colleagues are pursuing the use of interferon-gamma in the treatment of other infectious diseases such as tuberculosis.

Dr. Gallin lectures internationally on inflammation and topics of host defense. Among his honors are the PHS Distinguished Service Award, the Young Investigator Award of the American Federation for Clinical Research, and the Squibb Award of the Infectious Diseases Society of America. In 1991 he received the PHS award for orphan product development, an honor that recognizes work in finding treatments for diseases and disorders that affect a small number of patients worldwide.

Major Programs

Unlike most hospitals, the CC does not offer general diagnostic treatment services. In its beds and clinics are patients who consent to participate in one of the 1,000 studies (protocols) sponsored by 18 institutes conducting research on the NIH grounds. The 13-story, 325-bed hospital logs about 7,000 inpatient admissions each year. Another 68,000 outpatient visits are made annually. Nearly 1,400 healthy people serve each year as clinical research volunteers. Some 1,200 physicians and 650 nurses provide patient care.

Clinical Center departments specifically tailor their services to serve the unique needs of medical research and patient care at NIH.

Clinical Pathology provides laboratory services for CC patients, develops new test methods, conducts research in laboratory medicine, and offers subspecialty training programs in the subdisciplines of clinical pathology. Five services make up the department: clinical chemistry; hematology; immunology; microbiology; and phlebotomy. The department performs some 4 million tests per year for CC patients. Research focuses on lipoprotein disorders, mineral metabolism, thrombosis and hemostasis, identification of cell populations by flow cytometry and the identification of microorganisms causing human disease. Further, the department is developing tests using molecular biology in each of the four clinical services.

Critical Care Medicine was established in November 1977 in response to a need for a modern facility to care for increasing numbers of critically ill patients. Critical care physicians, nurses, and technical staff working with highly advanced technology and equipment provide care for any CC patient with serious but reversible medical problems. The nine-bed unit performs clinical research in collaboration with other NIH institutes on AIDS, sepsis, and pulmonary biology in addition to providing care.

Diagnostic Radiology research focuses on rare diseases or those in which traditional imaging methods have presented major problems in diagnosis, detection, or followup. New areas of research in MRI (magnetic resonance imaging) have concentrated on developing "contrast" agents that improve image resolution and on defining and analyzing optimal strategies for rapid scanning. The ultrafast computerized tomography (CT) scanner can display diagnostic images of patients unable to hold still for more conventional scanners. This is especially valuable when treating infants, children, and extremely ill adults.

Nuclear Medicine provides a broad scope of diagnostic and therapeutic services for CC patients and engages in collaborative research with institute investigators on the medical application of radionuclides. Nearly 5,000 patient studies were conducted last year. A new, miniaturized, PET camera for animal studies was produced by the physics group in collaboration with BEIP. Other research examines radiation effects on DNA by delivering the radioactive atom on triplex-forming oligonucleotides directly to gene targets. Ongoing studies with NCI laboratories have further developed radiolabeled monoclonal antibodies for tumor diagnosis and therapy.

Positron emission tomography (PET) is a method of imaging the body's physiologic functions such as blood flow and metabolism. Patients receive a short, half-lived radiopharmaceutical containing a radioactive atom that is produced by cyclotrons.

As positrons encounter electrons in the body, they produce high-energy photons that can be traced by radiation detectors surrounding the body. By evaluating the concentrations, physicians can study blood flow, tissue receptors, and glucose metabolism.

The PET department is organized as a scientific core concentrating on radiochemistry. Resources include two medical cyclotrons to produce radionuclides; six lead-lined chemistry hoods where radiopharmaceuticals are formulated; laboratories for radiochemistry; three PET tomographs and computer hardware; and software for generating and analyzing the PET images.

Rehabilitation Medicine Department has five sections that provide services to approximately 25,000 NIH patients. The medical section has continued to develop and validate functional outcome measures to assess musculoskeletal abnormalities and the impact of developmental delays on children with congenital problems (e.g., Beckwith Weidemann syndrome and osteogenesis imperfecta). The speech-language pathology section has developed quantitative measures to assess tongue motion and force and to characterize tissue changes in the oral pharynx.

The biomechanics section has continued to develop software to assess balance and motion in real time. The physical therapy section has developed and applied new techniques to assess excercise capacity using a metabolic testing device. This allows NIH investigators to correlate exercise performance with other biological measures such as cytokines and hormone levels.

The occupational therapy section has continued its efforts to validate and apply an instrument that evaluates motor and process skills in a variety of medical conditions such as Alzheimer's and stroke. The recreation therapy section has initiated evaluations of coping strategies for patients in clinical trials. Relaxation training and self-help approaches to assist patients in adjusting to illness and treatments have been introduced this year. The department continues a program in student training.

The *Department of Transfusion Medicine* (DTM) continues to provide safe and effective blood and blood components for CC patients. This includes approximately 500 units of whole blood or red cells and approximately 1,800 units of platelets a month for treatment of patients undergoing surgery, bone marrow transplantation or therapy for such diseases as aplastic anemia, leukemia, or other malignant conditions. Projects include a core facility for providing hematopoietic cells for transplantation, immunotherapy, and gene therapy, expansion of molecular-level testing in the tissue typing (HLA) and establishement of stem cell infusion services in an outpatient transfustion clinic. The HLA lab was one of nine designated as a "lead laboratory" based on performance in an international cell exchange. It is the only lab in the world to be so designated for 7 consecutive years. The department's Blood Bank also acts as a reference center for transfusion problems referred by labs and hospitals throughout the country.

The department investigates the relationship between blood transfusion and hepatitis. DTM staff expanded their studies of hepatitis C to to look at blood donor risk factors and instituted clinical sutdies of the newly reported agent, hepatitis G. The apheresis activities included studies to stimulate the production of granulocytes and hematopoietic stem cells in normal donors to collect

Directors of CC

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
Jack Masur	June 12, 1908	1948	1951
		1956	1969
John A. Trautman	March 30, 1902	1951	1954
Donald W. Patrick	.....	1954	1956
Thomas C. Chalmers	1917	1970	1973
Robert S. Gordon, Jr.	.....	1974	1975
Mortimer B. Lipsett	February 20, 1921	1976	1982
John L. Decker	June 27, 1921	1983	1990
Saul Rosen (Acting)	July 29, 1928	1990	1994
John I. Gallin	March 23, 1943	May 1, 1994	

more effective transfusion components.

In 1990 the DTM was the site of the first human gene therapy experiments involving children with severe congenital immune deficiency disorders. Eight clinical research protocols are now being carried out in such diseases as breast cancer, AIDS, Fanconi anemia, Gaucher disease, and chronic granulomatous disease. Lymphocytes are harvested from donors and patients for potential cellular vaccines. Innovative cellular therapies complement the department's traditional role in transfusion therapy.

Hospital Epidemiology Service (HES) includes a physician, an epidemiologist, and four infection control specialists. HES has implemented an infection prevention and control program that operates within the guidelines of several agencies: the Joint Commission on Accreditation of Healthcare Organizations, the Centers for Disease Control and Prevention (CDC), and the Occupational Safety and Health Administration. The HES seeks to prevent occurrence and transmission of hospital infections by using ongoing educational programs, infection surveillance, investigations of outbreaks, isolation procedures and engineering controls, and employee health protocols.

Although tuberculosis historically has been a rare disease in the CC, with the continued implementation of protocols to study multidrug resistant tuberculosis and the issuance of revised guidelines from CDC, HES continues focus on development of a comprehensive plan to minimize transmission of tuberculosis. The global emergence of antibiotic-resistant organisms has also prompted HES to develop specific policies and procedures to prevent transmission of these pathogens at the CC.

Information Systems (ISD) consolidates the planning, development, and maintenance of CC computing activities. ISD manages the CC medical information system (MIS), a large, online computerized system that provides access to patient records and allows users to retrieve and add data. The department operates the computer center, providing round-the-clock service to patient units, clinical pathology, pharmacy, radiology, admissions, and other departments engaged in administrative, diagnostic, and therapeutic activities. In addition, ISD provides advice and support to CC departments about micro- or minicomputers, or other computer hardware or software. MIS is used by over 4,000 physicians, nurses, and other hospital professionals. On a typical day, 1,200 different hospital staffers make 8,800 distinct accesses to the system write 5,300 orders and request nearly 20,000 online patient retrievals for 2,000 patients.

Pharmacy provides a 24-hour comprehensive service for patients. The clinical pharmacy service is staffed by pharmacists with advanced specialty training. They assist physicians in designing, monitoring, and evaluating patient drug regimens to assure proper, rational drug therapy. The clinical pharmacokinetic research lab monitors drug levels in patients and interprets patient response to drug therapy. The formulation, development, control, assay, dispensing, and clinical monitoring of investigational drugs make the CC's pharmacy program unique. Pharmacy manufactures nearly 1 million investigational drug units and registers and labels some 2 million units each year. The inpatient pharmacy mixes an average of 750 I.V. admixtures daily and dispenses close to 1 million unit doses of medicine yearly. The outpatient pharmacy fills approximately 500 prescriptions a day.

Other departments and offices supporting the research effort include anesthesiology; housekeeping and fabric care, clinical bioethics, materials management; medical record; nursing; nutrition; outpatient; social work; spiritual ministry; and surgical services.

John E. Fogarty International Center for Advanced Study in the Health Sciences

Mission

The John E. Fogarty International Center for Advanced Study in the Health Sciences:

- supports international research and research training activities in targeted areas of emphasis;
- supports international scientific collaboration through international fellowships small grants, scientist exchanges, and international conferences;
- identifies significant international research issues/opportunities and facilitates ICD interest and involvement;
- provides administrative services for recruitment of foreign scientists into the intramural research laboratories of the NIH;
- coordinates the activities of the NIH concerned with the health sciences internationally; and
- receives foreign visitors to NIH.

Important Events in FIC History

January 18, 1967--Rep. Melvin Laird (Wisc.) proposed to Congress to establish an international research and study center at NIH as a memorial to the late Rep. John E. Fogarty (R.I.). Subsequently President Lyndon B. Johnson announced that he was seeking funds to establish the John E. Fogarty International Center for Advanced Study in the Health Sciences.

February 26, 1968--Departmental approval was given to establish the Fogarty International Center.

March 16, 1968--Official notice was published in the *Federal Register*.

July 1, 1968--FIC became operational. The NIH Office of International Research was abolished and several of its functions were transferred to FIC.

June 1979--The Task Force to Assess the Missions and Functions of the Fogarty International Center reported to the director, NIH, on its year-long study of the center, reaffirming FIC's importance as the focus for international aspects of biomedical and behavioral research at NIH, and recommending specific measures for strengthening and broadening its programs.

June 1982--FIC was designated a WHO Collaborating Center for Research and Training in Biomedicine.

September 1985--The first meeting of the FIC Advisory Board was held.

November 1985--FIC was established in law (P.L. 99-158, sec. 482).

Biographical Sketch of FIC Director

Philip E. Schambra, Ph.D.

Dr. Schambra was born in Saginaw, Mich., on November 8, 1934. He received a B.A. degree in physics from Rice University in 1956 and his Ph.D. in biophysics from Yale University in 1962. He did postdoctoral work for 2 years at the Institute for Radiobiology in Karlsruhe, West Germany. From 1964 to 1967, he worked at the Donner Laboratory at the University of California, Berkeley. His scientific field of specialization is the biological effects of densely ionizing radiation.

In 1967 he joined the NIH as a grants associate. He then served for 3 years at the Office of Management and Budget as examiner for the NIH budget. From 1971 through 1974, he worked on the staff of the President's Council on Environmental Quality.

Returning to the NIH in 1974, Dr. Schambra served as associate director for interagency programs of NIEHS, where he directed and administered a variety of interagency and international activities involving NIEHS and other agencies.

In 1980 he became chief of the International Coordination and Liaison Branch at FIC. In 1984, he was assigned to the U.S. Embassy in New Delhi, India, as science attache and international health representative. In India, he had direct responsibility for many cooperative U.S.-Indian science projects, and played a major role in initiating the Indo-U.S. Vaccine Action Program. In August 1988, he was appointed FIC director.

Major Programs

Grants

The FIC AIDS International and Training Research Program enables U.S. universities and other research institutions to provide HIV/AIDS-related training to scientists and health professionals from developing nations and to forge collaborative ties with research institutions in countries highly impacted by the AIDS virus.

In collaboration with NIEHS and CDC's National Institute of Occupational Safety and Health, the International Training and Research Program in Environmental and Occupational Health funds nonprofit public or private institutions to support international training and research programs in general environmental and occupational health for foreign health scientists, clinicians, epidemiologists, toxicologists, engineers, industrial hygenists, chemists and allied health workers.

In cooperation with NICHD, the FIC International and Training Research Program in Population and Health funds U.S. nonprofit public or private institutions to support population-related sciences research.

The International Training and Research Program in Emerging Infectious Disease, developed in collaboration with NIAID, addresses the need for international training and biomedical and behavioral research in these disease areas.

FIC is also the U.S. Government's organizational focus for an interagency program to identify bioactive products from plant and marine sources while preserving the rich natural diversity of rain forests and oceans. Funded by NIH, the National Science Foundation, and the U.S. Agency for International Development, but administered by FIC, the International Cooperative Biodiversity Groups Program promotes both economic growth and ecological conservation by demonstrating the value of biological resources from which natural pharmaceuticals are derived.

In cooperation with the NIH Office of Research on Minority Health, FIC has established a Minority International Research Training Program to provide international educational training and research opportunities to groups underrepresented in the scientific professions. Training grants are provided to U.S. colleges and universities, including consortia with minority representation, to stimulate students to pursue scientific careers by enhancing their undergraduate and graduate training through international experiences. Awards are provided to faculty members to conduct independent research and to serve as mentors to students abroad.

A small grants program, called the Fogarty International Research Collaboration Awards, or FIRCA, is offered to U.S. institutions for collaboration between U.S. principal investigators on regular NIH research grants and scientists in Africa, Asia (except Hong Kong, Japan, Singapore, South Korea and Taiwan), Central and Eastern Europe, Latin America and the non-U.S. Caribbean, the Middle East, and Pacific Ocean Islands (except Australia and New Zealand). The FIRCA provides funds for supplies and equipment necessary to the collaborative research project (for the foreign collaborator's laboratory only), and funds for travel for the U.S. principal investigator, the foreign researcher, and/or associates. A similar award, the HIV/AIDS and Related Illnesses Collaboration Award, provides small grants in support of cooperative research between NIH grant recipients and foreign institutions throughout the world.

Fellowships

Fellowship programs administered by the FIC enable foreign scientists to pursue their research interests in U.S. laboratories and, conversely, provide opportunities for U.S. researchers to work in foreign laboratories. The International Research Fellowship Program enables promising postdoctoral biomedical or behavioral scientists from developing and emerging nations to gain further research experience by working in the laboratory of a distinguished U.S. scientist on a problem of mutual interest.

The Senior International Fellowship Program is for U.S. researchers well recognized and established in their careers who wish to spend up to 12 months in a foreign laboratory pursuing a project of mutual interest to the fellow and the foreign host scientist.

Several foreign countries support fellowships that enable U.S. biomedical researchers who hold doctoral degrees to spend up to a year in a foreign research laboratory. The FIC is involved in the initial stages of these programs, but the funding and administration is by the foreign country. The FIC publicizes the availability of postdoctoral research fellowships from the Israeli Ministry of Health, the Japan Society for the Promotion of Science, the Japanese Science and Technology Agency, the Swedish Medical Research Council, the Alexander von Humboldt Foundation in Germany, and the National Science Council in Taiwan. The FIC also arranges for receipt and technical merit review of applications and transmits the applications and reviewers' comments to the awarding country for final selection.

Scholars-in-Residence

Fogarty International Scholars are recognized leaders in their fields who work on critical, often multidisciplinary, research problems during sabbatical periods on the NIH campus.

International Relations

The FIC serves as the coordinating link between NIH and other U.S. agencies, foreign governments and international organizations on international biomedical research matters. It is responsible for the administrative oversight of all intergovernmental agreements in which the NIH participates.

The center also fosters and facilitates international cooperation in biomedical research by disseminating information on foreign biomedical research activities to the NIH research institutes and informing foreign agencies and institutions, including WHO, about the international activities of the NIH; initiating, developing and supporting, in cooperation with other NIH offices, new activities to address international health problems; preparing background materials for NIH senior staff participation in international meetings and discussions; providing advice to the director and deputy director, NIH, and to senior staff of the NIH research institutes on policies and procedures relating to international activities; assisting the institutes by obtaining clearances for awards requiring State Department approval and by interpreting DHHS and State Department procedures relating to international travel; serving as a channel for communications to and from U.S. embassies abroad and foreign embassies in Washington; and coordinating responses to inquiries on international issues.

The FIC ensures that NIH interests are represented as new opportunities for research collaboration in the life sciences arise through initiatives of the U.S. Government, foreign governments, multilateral and international organizations.

In its role as a WHO Collaborating Center for Research and Training in Biomedicine, the FIC provides research fellowships and grants, conducts studies, and sponsors workshops involving the NIH, WHO, PAHO and U.S. and foreign biomedical research organizations to identify and further strengthen the health of the U.S. population and contribute to the enhancement of health worldwide.

As the NIH focus of international activities, the FIC has both an integrative and administrative role in activities supported by other PHS components and other Federal

agencies. The FIC is the NIH representative in maintaining liaison with such international organizations as WHO, PAHO, the European Union, and the European Medical Research Councils.

The FIC director meets regularly with international representatives of the NIH ICD's to exchange information and views on NIH international activities and to discuss implementation of related policies and procedures.

Directors of FIC

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
Milo D. Leavitt, Jr.	June 24, 1915	June 16, 1968	July 1978
Leon Jacobs	March 26, 1915	July 1, 1978	June 29, 1979
Edwin D. Becker (Actg)	May 3, 1930	July 1979	April 1980
Vida H. Beaven	June 2, 1939	April 1980	January 1981
Claude Lenfant	October 12, 1928	February 1981	July 1982
Mark S. Beaubien (Actg)	October 20, 1921	July 1, 1982	January 1984
Craig K. Wallace	December 4, 1928	January 1984	December 1988
Carl Kupfer (Actg)	February 9, 1928	Jan. 1, 1988	July 1988
Philip E. Schambra	November 8, 1934	August 1988	.....

International Services Branch

The ISB provides support to foreign scientists in the NIH visiting, special volunteer, and guest researcher programs.

For foreign scientists engaged in NIH intramural research, the ISB handles administrative and immigration matters ISB also provides visa assistance to foreign special experts, exchange scientists, special volunteers, and visiting fellows engaged in research in the Center for Biologics Evaluation and Research, FDA.

Division of Computer Research and Technology

Mission

The Division of Computer Research and Technology incorporates the power of modern computers into biomedical programs and administrative procedures of NIH by focusing on three primary activities: conducting computational biosciences research developing computer systems and providing computer facilities. In fulfilling these responsibilities, the division:

- promotes the application of high performance computing and communication to biomedical problems, including image processing, structural biology, protein folding, database searching, gene linkage analysis, and computational chemistry, using the most advanced, massively parallel scalable computing
- applies computing technology to research problems involving macromolecular structure representation and modeling, and protein and DNA sequence analysis
- develops and provides computer networking facilities and services, and supports, guides, and assists other NIH components in local area networking
- provides professional programming services and computational and data processing facilities to meet NIH program needs
- conducts research in biomathematical theory and biophysical instrumentation to explain biological phenomena in physical and chemical terms
- operates and maintains the NIH Computer Center and all centrally owned, shared-use computing resources; designs and develops software; and provides extensive personal support, training, and documentation for computer and network users
- develops computer-based systems for laboratory and clinical applications, and conducts computer science and engineering research and development
- consults and collaborates in computational, statistical, and mathematical aspects of data analysis; supports software systems to perform these analyses; and conducts independent research in statistics and mathematics with applications to biomedicine
- provides guidance and support to scientists and administrators throughout NIH in the effective use of personal computers, workstations, local area networks and associated automation technology
- serves as the central systems analysis, design and programming resource for data processing and database projects relating to scientific, technical, management, and administrative data
- serves as a scientific and technological resource for other parts of the PHS
- Applies mathematics, statistics, and computer sciences to biomedical problems such as signal processing, image processing, modeling physiological systems, and data analysis problems in laboratory experiments.

Important Events in DCRT History

1954--A central data processing facility was established in Office of the Director, NIH, under Dr. Harold Dorn, combining EAM (punched card) equipment and biometric expertise.

1956--The biometric facility became the Biometrics Branch in the new DRS in May the NIH director established a committee on electronic data processing and computers.

1958--NIH installed its first electronic digital computer as an experimental device.

March 8, 1960--The Surgeon General approved establishment of a Computation and Data Processing Branch in DRS.

October 1961--NIH installed its first "second generation" computer.

April 25, 1962--The director, NIH, appointed a steering committee to undertake a comprehensive study of data processing activities at NIH.

April 1963--The NIH steering committee recommended the establishment of a Division of Computer and Information Sciences (subsequently changed to DCRT), including provision for the transfer of the Computation and Data Processing Branch, DRS, to the new organization.

April 16, 1964--The department approved establishment of DCRT.

June 22, 1965--As a result of a joint NBS/NIH study of NIH data processing requirements, a contract was awarded for conversion of the NIH computer system from second- to third-generation equipment.

April 1, 1966--The first components of the third-generation computer system were installed.

January 1, 1967--DCRT was reorganized with the establishment of the Laboratory of Applied Studies, the Computer Systems Laboratory and the Physical Sciences Laboratory in addition to the Computation and Data Processing Branch.

December 20, 1968--The Computation and Data Processing Branch was subdivided into the Computer Center Branch and the Data Management Branch.

April 1969--First time-sharing computers went into service for the NIH research community.

June 1969--Minicomputers designed by DCRT were first installed in NIH laboratories.

July 1974--The Laboratory of Statistical and Mathematical Methodology was established.

May 31, 1979--An interagency agreement between HEW and GSA established the general-purpose portion of the NIH Central Computer Utility at DCRT as a Federal Data Processing Center.

April 1983--The Personal Workstation Project (PWP) was established to determine how effectively personal computers could be used at NIH.

May 1984--PWP became the Personal Workstation Office (PWO), established to guide and support the use of personal computers throughout NIH.

September 9, 1988--The Personal Computing Branch was established from the Personal Workstation Office.

1988--The Convex Unix-based superminicomputer was installed, and the network task group was created.

1990--Extensive networking (NIHnet) was installed at NIH, providing connectivity for 60 local area networks.

1991--The IPSC massively parallel supercomputer with 128 nodes was installed, giving the division a leadership role in

biomedical applications for the high performance computing and communications initiative. An image processing unit was created and a series of peer reviews of division programs was initiated and carried out.

1992--DCRT developed its own strategic plan to chart the division's course for the next 5 years. In addition, the Network Systems Branch was formed to provide united leadership for a primary division activity. DCRT also opened its Scientific Computing Resource Center, a walk-in facility for NIH personnel that supports scientific computing.

January 1993--The division was reorganized, with the establishment of the Office of Computational Biosciences, including the Computational Biosciences and Engineering Laboratory, the Laboratory of Structural Biology, and the Physical Sciences Laboratory and the Office of Computing Resources and Services, including the Networks Systems Branch, Computing Facilities Branch, Distributed Systems Branch, Customer Services Branch, Information Systems Branch, and the Scientific Computing Resource Center. NIHnet expanded to include 224 local area networks with 105 on-campus LANs connected via high-speed fiber backbone.

January 1994--DCRT celebrated its 30th anniversary.

February 1994--Technical Assistance and Support Center (TASC) was inaugurated to help customers obtain computer-related information.

May 1995--Internet Expo Day helped NIH staffers to discover the World Wide Web and its enormous potential to disseminate and exchange information.

June 1996--DCRT's Computer Center was designated as a DHHS data center consolidation site.

July 1996--The NIH Data Warehouse (formerly known as ADBIS) was introduced to NIH. The warehouse obtains data from several sources and provides a one-stop-shop graphical user interface to NIH administrative and accounting information.

November 1996--A 96-node IBM SP highly parallel supercomputer--one of the world's most powerful--was introduced to support NIH high-performance scientific computing requirements.

February 1997--DCRT's IBM RS/6000 SP highly parallel supercomputer was expanded from 56 to 94 nodes. Because the newer nodes are more powerful, the expansion more than doubled support for NIH high-performance scientific computing needs.

The division inaugurated Secure Internet-Linked (SILK) technology to provide Web access to enterprise data.

March 1997--DCRT modernized and improved the cost effectiveness of the NIH Computer Center by installing new parallel complimentary metal oxide semiconductor (CMOS) processors to replace traditional mainframes. The division also enhanced the enterprise computing environment by adding a UNIX-based open system server.

May 1997--The division sponsored a Web Information Day--"Tools for the Web, the Web as a Tool." Open to NIH employees, the all-day program featured seminars and demos that focused on effective Web use.

June 1997--SILK was expanded to let users implement their own customized servers.

July 1997--DCRT completed consolidation of the data center operated by the Program Support Center Information Technology Service into the NIH Computer Center.

September 1997--Consolidation was completed of the Administration for Children and Families National Computer Center into the NIH Computer Facility.

Biographical Sketch of DCRT Director

William L. Risso (Acting)

Mr. Risso was named acting DCRT director on April 1, 1996.

He has served as DCRT deputy director since 1991. His other positions within the division include assistant director (1988-91), assistant to the director (1988-87), and electronics engineer (1971-86).

After receiving his master's degree in engineering from Dartmouth College in 1970, Mr. Risso joined DCRT the next year.

His accomplishments include reengineering the NIH's business process through electronic commerce, improving access to databases, and other initiatives that are simplfying purchasing and information use across campus. He has designed hardware and software and has worked on early computerized axial tomography (CAT) and positron emission tomography (PET) scanners, patient monitoring computer systems, and early computer networks.

For his work at DCRT, Mr. Risso has received many honors and awards, including the NIH Director's Award (1994) and a PHS Special Recognition Award (1995).

DCRT Programs

The Office of the Director consists of the Office of Computational Biosciences and the Office of Computing Resources and Services, which provide leadership for the scientific (computational biology, computational chemistry) and administrative services of DCRT, respectively. The director and staff provide leadership with regard to NIH policy and programs involving computing, networking and information systems, and provide liaison with the NIH Office of the Director, the ICDs, and numerous committees and user groups. The computational molecular biology section furnishes support, services, and training in sequence analysis and molecular modeling maintains and supports genetic/genomic databases and software and has introduced Gopher and Mosaic information services to NIH.

The Computational Bioscience and Engineering Laboratory (CBEL) provides high performance parallel supercomputing and image processing systems and leadership in the research, development, and biomedical application of massively parallel computers in a networked environment. CBEL collaborates with research investigators to model complex systems and analyze and interpret data, signals and images in computationally intensive task areas, including electron and light microscopy, x-ray crystallography and multidimensional nuclear magnetic resonance spectroscopy, molecular dynamics and quantum chemistry, drug design, protein folding, medical imaging, and radiation treatment planning.

The Laboratory of Structural Biology carries out biomolecular research using experimental approaches to directly measure forces between and within biomolecules as well as computational approaches to model and simulate biomolecular conformation and assembly. The section on molecular forces investigates the physical forces governing biomolecular function. The molecular graphics and simulation section (MGSS) develops and implements computational methods on leading edge workstations and high performance parallel platforms, with the goal of increasing the realism of simulated molecular properties. The MGSS studies macromolecular motion and interaction using molecular dynamics and quantum mechanics based methods for systems of biomedical interest. The analytical biostatistics section (ABS) develops and applies statistical-based methods to protein secondary structure prediction, structure-function prediction, and the classification of protein folds. The ABS also pioneers the application of mathematical models and statistical techniques to problems arising in endocrinology, biochemistry, and pharmacology such as the analysis of human growth data andthe modeling of drug- or hormone-receptor interactions.

The LSB develops computational methods for predicting the three-dimensional structures of proteins from primary sequences. The center for molecular modeling section provides software tools, guidance,

Directors of DCRT

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
Arnold W. Pratt	1920	August 1966	May 1990
David Rodbard	July 6, 1941	November 1990	April 1996
William L. Risso (Actg)	October 26, 1944	April 1996	.....

and research collaboration in computational chemistry and structural biology.

The laboratory also develops computer programs and applications of general-purpose computers, workstations, supercomputers, and highly paralles computers for research in molecular and computational biology and chemistry.

The Physical Sciences Laboratory (PSL) brings to bear applications of mathematics and physics on a broad range of biomedical problems. Examples are the development of medical image processing methods, theories for using optical techniques in noninvasive diagnosis, studies of chemical reactions and diffusion in complex media, mathematical modeling of various aspects of cell and tissue physiology, and methods for describing macromolecular energetics.

PSL projects include an analysis of the detectibility and resolution of tumors by time-resolved optical spectrophotometry, apply a model developed in the PSL to interpret data relating to calcium absroption in bone in several diseases, and an investigation of structural transformations of clathrin-coated pits during receptor-mediated endocytosis. The laboratory serves as a general resource for collaborations involving physical sciences (e.g., crystallography, NMR spectroscopy) applied to problems of interest to medical researchers.

The Network Systems Branch provides leadership in developing and implementing networking and other communications technologies for the NIH campus and its outlying facilities, including connections with national and international data networks. The branch explores new technologies applicable to the NIH environment, provides continuous guidance and support for locally managed networks, and maintains liaisons with other DHHS components to improve the overall information dissemination infrastructure.

The Computing Facilities Branch (CFB) plans operates, and supports scientific and administrative computing resources for NIH-wide use and for use by other Federal Government agencies. CFB promotes awareness and efficient and effective use of computing resources by its customers; investigates new and emerging customer comuting requirements; and conducts research and development to identify, evaluate, and adapt new computer architectures and technologies. Services are provided on several platforms.

Mainframe computer systems support large-scale administrative applications and massive data management requirements, including the NIH administrative database and the IMPAC and CRISP systems, as well as providing a variety of batch and interactive processing capabilities.

In addition, modern relational database management systems on the mainframes provide for client-server methods to access them. Scientific computing services are provided by a general purpose scientific computer system, supplemented by a vector supercomputer and a parallel supercomputer.

The Advanced Laboratory Workstation System offers network-based support and access to a distrbuted file system for users of scientific and engineering workstations. The branch provides round-the-clock oversight for these facilities and for a wide variety of Internet and World Wide Web services. CFB services are available to users 7 days a week, 24 hours a day via high-speed point-to-point and dial connections and via the Internet.

The Customer Services Branch (CSB) furnishes centralized, integrated computer support services to DCRT customers. As the primary interface to the NIH computing community, CSB performs its liaison role by consulting with customers to resolve computing problems and provide advice referring questions to appropriate experts within DCRT operating DCRT"s computer training program and disseminating technical information, documentation, and certain software. The branch designs and develops methodologies for software change control, and it promotes NIH community awareness of DCRT services.

The Information Systems Branch (ISB) provides advice and assistance to research investigators, program officials, and administators throughout NIH in planning and obtaining data processing and computation services. ISB serves as a central resource for systems analysis, design, and programming expertise for NIH management and data processing projects related to administrative, scientific, and technical data.

The branch develops and maintains specified central NIH administrative systems and general-purpose and information handling techniques for data management and information processing. ISB plans data processing and computation projects involving DCRT central facility computers aas well as exchanges technical knowledge and operating expertise with other operations research, systems analysis, computer programming, and data processing organizations within and outside the NIH.

The Statistical Support Staff provides 1) a combination of research in mathematical statistics and computer information science with collaboration and service in all computational aspects of biomedical data analysis; 2) advice and consultation on the quantitative analysis of biomedical research data and use of the computer in such analysis, including interpreting output and developing statistical procedures when needed; 3) selection, maintenance and support of a large collection of mathematical/statistical computer systems for general use in the analysis of modeling of research data; and 4) training and teaching the effective use of these systems to biomedical researchers, administrators and other NIH users, including a rapid response to user queries.

National Library of Medicine

Mission

The National Library of Medicine, one of three national libraries, is the world's largest research library in a single scientific and professional field.

The Library has a statutory mandate from Congress to apply its resources broadly to the advancement of medical and health-related sciences. It collects, organizes, and makes available biomedical information to investigators, educators, and practitioners, and carries out programs designed to strengthen existing and develop new medical library services in the U.S. It is the central resource for the existing national biomedical information system.

Important Events in NLM History

1836--The Library of the Office of the Surgeon General of the Army was established (the present NLM).

1865--John Shaw Billings, M.D., was assigned to supervise the Surgeon General's Library, which he developed into a national resource of biomedical literature.

1880--The first volume of *Index Catalogue* was published. By 1961, when it was discontinued after 61 volumes, this publication had listed 3,674,111 citations to medical books and articles, making it preeminent among scientific bibliographies of the world.

January 1922--The Library of the Office of the Surgeon General (Army) was renamed Army Medical Library.

April 1952--The Army Medical Library was renamed the Armed Forces Medical Library.

October 1, 1956--The Armed Forces Medical Library was designated the National Library of Medicine and placed under PHS.

December 1961--The new building at 8600 Rockville Pike was dedicated.

January 1964--The Medical Literature Analysis and Retrieval System (MEDLARS) became operational at NLM.

January 1, 1967--A Toxicology Information Program was established at NLM in response to recommendations of the President's science advisory committee.

July 1, 1967--The PHS Audiovisual Facility, renamed the National Medical Audiovisual Center (NMAC), became a component of NLM.

1968--NLM became a component of NIH. The Lister Hill National Center for Biomedical Communications, NLM's R&D component, was created by Congress.

October 1971--MEDLINE (MEDLARS Online) was initiated to provide online

access to a major portion of the MEDLARS database.

September 1972--TOXLINE, an online bibliographic service covering pharmacology and toxicology, became operational.

May 22, 1980--NLM's Lister Hill National Center for Biomedical Communications (LHNCBC) building was dedicated. The new building, adjacent to the Library, houses NLM's research and development component (LHNCBC), as well as its grants, toxicology, and audiovisual programs.

February 5, 1986--Grateful Med, a PC-based user-friendly software for accessing MEDLARS, was introduced to the health community.

October 1993--NLM's Internet WWW site appeared.

November 25, 1994--The "Visible Human Male," a large computer dataset of images based on a cadaver, was introduced. The "Visible Human Female" appeared 1 year later.

April 16, 1996--The Internet Grateful Med allowed anyone with access to the WWW to request a code and search MEDLINE via the Internet.

June 18, 1997--All web-based access to NLM's MEDLINE is made free.

NLM Legislative Chronology

August 3, 1956--An amendment to Title III of the PHS act, the National Library of Medicine Act, placed the Armed Forces Medical Library under the PHS, and renamed it the National Library of Medicine (P.L. 84-941).

October 22, 1965--The Medical Library Assistance Act of 1965 (P.L. 89-291) was signed into law, authorizing NLM's extramural programs of grant assistance to help expand and improve the Nation's medical library and health communications resources, technology, and manpower for service to the health community.

August 3, 1968--Public Law 90-456 authorized the designation of the Lister Hill National Center for Biomedical Communications.

November 4, 1988--Public Law 100-607 authorized the establishment of a National Center for Biotechnology Information at the NLM.

June 10, 1993--Public Law 103-43 authorized the establishment of the National Information Center on Health Services Research and Health Care Technology at NLM.

Biographical Sketch of NLM Director

Donald A.B. Lindberg, M.D.

Dr. Lindberg assumed the directorship of NLM in August 1984. Born September 21, 1933, in Brooklyn, N.Y., he received his A.B. degree (magna cum laude) from Amherst College and his M.D. degree from the College of Physicians and Surgeons of Columbia University. He received his specialty training in anatomic and clinical pathology at Columbia-Presbyterian Medical Center in New York. He also holds honorary degrees from Amherst College, State University of New York, and the University of Missouri.

Following early research in experimental pathology, he later began a long-term investigation of the use of computers in medicine, founding in 1963 one of the Nation's first medical computer centers at the University of Missouri. His most recent research has been in applying artificial intelligence techniques to the development of expert consulting systems.

Prior to joining the Library, Dr. Lindberg was director of the Information Science Group and professor of pathology at the University of Missouri School of Medicine in Columbia. He taught pathology at Missouri from 1962 until his present appointment. He also served as chairman of the department of information science at the university's School of Library and Information Science.

Dr. Lindberg has published extensively in the fields of pathology and medical information. He is the author of two books--*The Computer and Medical Care* (1968) and *The Growth of Medical Information Systems in the United States*.

From 1992 to 1995 he served in the concurrent position of director of the National Coordination Office for High Performance Computing and Communications, Executive Office of the President.

Major Programs

MEDLARS

The Library's computer-based MEDLARS was established in January 1964 to achieve rapid bibliographic access to NLM's vast store of biomedical information. The principal objective of MEDLARS is to provide references to the biomedical literature for researchers, clinicians, and other health professionals. This is accomplished through:

1) preparation of citations for publication in *Index Medicus*, a comprehensive, subject-author index to articles from approximately 3,000 of the world's biomedical journals;

2) compilation of other recurring bibliographies on specialized subjects of wide interest; and

3) provision of online search services through MEDLINE, TOXLINE, and other databases.

Agreements with foreign institutions provide MEDLARS services to an international community of health scientists.

NLM Appropriations--Extramural Programs and Direct Operations

Fiscal year	Total grants	Direct operations	Total
	[Amounts in thousands of dollars]		
1956	.....	$ 1,215	$ [1]1,215
1957	.....	1,314	[1]1,314
1958	.....	1,450	1,450
1959	.....	,526	1,526
1960	.....	1,566	1,566
1961	.....	1,738	1,738
1962	.....	2,066	2,066
1963	$ 6	3,329	3,335
1964	.....	4,074	4,074
1965	120	3,838	3,958
1966	4,030	5,655	9,685
1967	12,755	7,437	20,192
1968	10,550	11,124	[2]21,674
1969	5,788	12,372	18,160
1970	6,157	13,525	19,682
1971	5,992	15,448	21,440
1972	6,892	17,235	24,127
1973	6,622	18,528	25,150
1974	7,029	19,300	26,329
1975	6,682	22,168	28,850
1976	6,433	22,632	29,065
1977	8,000	27,234	35,234
1978	7,987	29,632	37,619
1979	8,987	32,444	41,431
1980	9,925	34,054	43,979
1981	9,830	34,836	44,666
1982	7,500	37,535	45,035
1983	13,400	38,543	51,943
1984	7,500	42,113	49,613
1985	2,240	43,670	55,910
1986	12,254	45,143	57,397
1987	14,282	51,843	66,125
1988	14,724	57,873	72,597
1989	16,120	64,395	80,515
1990	23,318	62,410	85,728
1991	25,491	65,917	91,408
1992	26,738	72,199	98,937
1993	26,549	76,947	103,496
1994	28,420	89,363	117,783
1995	30,783	96,940	127,723
1996	33,185	107,226	140,411

[1]Medical Library assistance (extramural programs).

In 1971 NLM initiated its MEDLINE service to provide an online bibliographic searching capability through terminals in libraries at medical schools, hospitals, and research institutions throughout the country. By typing simple instructions on a terminal or personal computer connected by communications networks to the central computer, a physician or other health professional can retrieve almost instantaneously references to the most current indexed journal articles in this area of interest. In addition to MEDLINE, other online databases deal with toxicology information, cataloging information, audiovisual materials, history of medicine, cancer literature, hospital and health care literature, medical ethics, and reproductive biology. Almost 150,000 institutions and individuals in the U.S. now have access to these databases.

Online Databases

Regional Medical Library Services

Directors of NLM

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
Frank B. Rogers	Dec. 31, 1914	1956	1963
Martin M. Cummings	Sept. 7, 1920	1964	August 1984
Donald A.B. Lindberg	Sept. 21, 1933	August 1984	.....

To provide more efficient dissemination of biomedical information, NLM has been developing a network arrangement through which MEDLARS and interlibrary loan services can be shared efficiently by medical libraries. The network consists of eight Regional Medical Libraries. Although NLM remains the heart of the network, more and more services are being provided directly by regional libraries.

Lister Hill National Center for Biomedical Communications

The center explores the use of computer, communication, and audiovisual technologies to improve the organization, dissemination, and utilization of biomedical information, and is the focus of the Library's high performance computing and communications initiatives.

Toxicology Information Program

The general objectives of the program are to create computer-based toxicology and environmental health data banks from scientific literature and from files of collaborating industrial, academic, and governmental agencies, and to establish toxicology information services for scientists.

National Center for Biotechnology Information

The NCBI, created in 1988, builds databases and information analysis/retrieval systems for genomic information and does research into advanced information-handling methods for biotechnology and related information.

National Information Center on Health Services Research and Health Care Technology

The goal of this program is to create information services that make the results of health services research readily available--including clinical guidelines, technology assessments, and health care technology.

Extramural Programs

The extramural grant and contract programs of NLM were originally authorized by the Medical Library Assistance Act of 1965 (P.L. 89-291) to provide better health information services through grant support to the Nation's medical libraries. The act, since extended by Congress, offers assistance for library resources, research in biomedical communications, biomedical publications, training for research careers in medical informatics, and Regional Medical Libraries. Research project grants in medical informatics are awarded under authority of title III, part A, sec. 301, of the PHS act.

National Human Genome Research Institute

Mission

The National Human Genome Research Institute (NHGRI) was established in 1989 originally as the National Center for Human Genome Research. One of its chief mission's is to lead NIH's contribution in the Human Genome Project--a worldwide effort to determine the location of the estimated 100,000 human genes and to read the entire set of genetic instructions encoded in human DNA. NHGRI carries out this task by providing financial support to investigators at university and other research laboratories throughout the country.

In 1993 NHGRI created an in-house component to carry out a second part of its mission: to develop and use genome technologies to understand and treat inherited disease.

Recognizing its growth and leadership in genetics research, the Secretary of the Department of Health and Human Services elevated the center to an NIH institute in early 1997.

NHGRI is organized into three main divisions: the Office of the Director, which provides guidance to scientific programs and oversees the general operation of the Institute; the Division of Extramural Research, which awards funds to researchers carrying out the goals of the Human Genome Project; and the Division of Intramural Research, which is home to the institute's in-house genetics research laboratories.

Research direction and policies and final approval of NHGRI grants come from the 15-member National Advisory Council for Human Genome Research, which meets three times a year, usually in Bethesda. Members include representatives from health and science disciplines, public health, social sciences, and the general public. Portions of Council meetings are open to the public.

Important Events in NHGRI History

August 15, 1988--Program advisory committee on the human genome was established to advise NIH on all aspects of research in the area of genomic analysis.
October 1, 1988--The Office for Human Genome Research was created within the NIH Office of the Director. Also, NIH and DOE signed a memorandum of understanding outlining plans for cooperation on genome research.
February 29-March 1, 1988--NIH Director James Wyngaarden assembled scientists, administrators, and science policy experts in Reston, Va., to lay out an NIH plan for the Human Genome Project.
January 3-4, 1989--The program advisory committee on the human genome held its first meeting in Bethesda, Md.
October 1, 1989--NCHGR was establish to carry out the NIH's component of the U.S. Human Genome Project.
April 1990--The 5-year plan with specific goals for the project was published.
May 8, 1990--The National Advisory Council for Human Genome Research was established.
July 1, 1990--The genome research review committee was created so NCHGR could conduct appropriate peer review of human genome grant applications.
October 1, 1990--The U.S. Human Genome Project officially began.
January 22, 1991--The National Advisory Council for Human Genome Research met for the first time in Bethesda, Md.
April 10, 1992--James Watson resigned as first director of NCHGR. Michael Gottesman was appointed acting NCHGR director.
February 1993--The NCHGR Division of Intramural Research was established.
April 4, 1993--Francis S. Collins was appointed NCHGR director.
October 1, 1993--U.S. Human Genome Project revised its 5-year goals through September 1998.
September 30, 1994--The genetic mapping goal was achieved 1 year ahead of schedule.
November 15, 1995--NCHGR celebrates its fifth anniversary. J.D. Watson Lecture was established.
April 1995—Task Force on Genetic Testing established as a subgroup of the NIH-DOE ELSI Working Group.
April 11, 1996—Human DNA sequencing begins with pilot studies at six U.S. universties.
April 24, 1996—An international team completes DNA sequence of first eukaryotic genome, *Saccharomyces cerevisiae*, or common brewer's yeast.
September 1996—Center for Inherited Disease Research, a project cofunded by eight ICDs to study the genetic components of complex disorders, is established on the Johns Hopkins Bayview Medical Center campus in Baltimore.

Biographical Sketch of NHGRI Director Francis S. Collins, M.D, Ph.D.

Dr. Collins was appointed NCHGR director in April 1993. He was formerly a Howard Hughes Medical Institute investigator and professor in the departments of internal medicine and human genetics at the University of Michigan School of Medicine in Ann Arbor. He was also director of the NCHGR-supported human genome center at Michigan.

He pioneered the development of a powerful new gene-finding method known as "positional cloning," which utilizes the inheritance pattern of the disease within families to pinpoint the location of the gene. Positional cloning has been used to isolate genes even when no information about the gene's function or biochemistry is known. He is perhaps best known for using positional

cloning techniques to isolate the genes for cystic fibrosis, neurofibromatosis type 1, Huntington's disease, and several others.

He is also chief of NHGRI's Laboratory of Gene Transfer. He pioneered the development of a powerful gene-finding method known as "positional cloning," which utilizes the inheritance pattern of a disease within families to pinpoint the location of the responsible gene on a chromosome. Positional cloning has been used to isolate dozens of disease genes, and forms the basic strategy for implementing the tools of the Human Genome Project.

Born in Staunton, Virginia, in 1950, Dr. Collins received his bachelor of science degree with highest honors from the University of Virginia. He received both his M.S. and Ph.D. degrees in physical chemistry from Yale University and an M.D. degree from the University of North Carolina School of Medicine. He completed his internship and residency in internal medicine at the North Carolina Memorial Hospital. From 1981 to 1984, he was a fellow in human genetics and pediatrics at Yale. He joined Michigan in 1984, becoming professor in 1991. He became an HHMI assistant investigator in 1987 and full investigator in 1991. He is a diplomate of the American Board of Internal Medicine, the American Board of Medical Genetics, and the American College of Medical Genetics.

He was elected to the IOM in 1991 and the NAS in 1993. He is also a member of the board of directors of the American Society of Human Genetics, the American Federation for Clinical Research, the American Society for Clinical Investigation, and the Association of American Physicians.

Among Dr. Collins' awards and honors, he has received the Gairdner Foundation International Award, the Young Investigator Award of the American Federation for Clinical Research, the Doris Tulcin Award for Cystic Fibrosis Research, the University of Michigan's Distinguished Faculty Achievement Award, the National Medical Research Award, and the University of Pittsburgh Dickson Prize. He holds honorary degrees from Emory University and Yale University.

Major Programs

Office of the Director

In addition to overseeing NHGRI's scientific programs, the Office of the Director manages administrative functions, including financial management, human resources, and policy and public affairs activities.

Division of Extramural Research

The leading player in the Human Genome Project, NHGRI's Division of Extramural Research oversees research projects to map and sequence the full set of genetic instructions, known as the "genome," of the human and several important model organisms; to develop computerized data storage and analysis techniques for this information; and to examine the ethical and social impact of human genetics research. These research activities take place primarily in university laboratories, research institutions, and private companies throughout the country.

Human Genome Project research aims to achieve the goals established in research plans in 1990 and updated in 1993. Work toward these goals is managed by program directors in genome analysis, genome informatics and genetic variation, large-scale DNA sequencing, technology development, and the ethical, legal, and social implications of human genome research.

With original goals for genetic and physical mapping of the human genome essentially met, NHGRI supports improvements in genetic mapping technology, such as new types of genetic markers, novel genotyping technology, and new analytical tools to maximize the usefulness of genetic maps, especially for teasing apart the genetic contributions to complex traits.

Genome researchers have begun systematic sequencing of human DNA to meet the project's most ambitious goal: to spell out letter by letter, the complete set of genetic instructions for a human being. The Division of Extramural Research supports projects to further improve DNA sequencing technology and increase capability for high-throughput DNA sequencing in the human and model organisms.

In addition, studies to develop new or improved methods for rapidly identifying and efficiently mapping all coding regions, genes, and other functional elements in genomic DNA are under way.

HGP informatics activities develop and apply new technologies for acquisition, management, analysis, and dissemination of genomic mapping and sequencing information. Informatics research and development projects are carried out with the active participation of the ultimate end users, biological scientists.

Because it is vitally important for society to use new technologies safely and responsibly, the Human Genome Project has set aside some 5 percent of its research budget to study the ethical, legal, and social implications (ELSI) of genome research. Results of ELSI studies provide policy makers with an information base upon which to formulate laws and other policies about the use of genetic technologies. The ELSI program focuses its research on four priority areas: privacy and fair use of genetic information; responsible clinical integration of genetic technologies; issues surrounding human genetics research; and education of health care providers and the public.

NHGRI Appropriations--Grants and Direct Operations

Fiscal year	Total grants*	Direct operations	Total
	[Amounts in thousands of dollars]		
1990	$ 54,589	$ 4,938	$ 59,527
1991	82,368	5,021	87,389
1992	98,549	6,207	104,756
1993	100,000	6,095	106,095
1994**	99,340	27,677	127,017
1995	105,539	48,250	153,789
1996	118,669	50,617	169,286

* Includes the intramural research program, R&D contracts, and research management and support.
** First appropriation for Division of Intramural Research.

Division of Intramural Research

NHGRI's Division of Intramural Research (DIR) was established on the NIH campus in 1993. The overall mission of the division is to develop and implement technology for the rapid isolation and analysis of disease genes, and new strategies for treatment of genetic diseases. DIR scientists foster productive collaborations with other human genetics research projects at the NIH, complementing ongoing activities in human molecular genetics, structural biology, and gene therapy.

Research activities take place in six main laboratories, including, the Clinical Gene Therapy Branch, Genome Technology Branch, Laboratory of Genetic Disease Research, Laboratory of Cancer Genetics, Laboratory of Gene Transfer, and the Medical Genetics Branch.

In addition to studies of so-called "single-gene" disorders that arise from errors in one gene, DIR scientists are investigating new strategies to tease apart the complex genetic and environmental contributions to disorders that commonly affect Americans, such as many cancers and diabetes. Improved diagnostics are being developed to detect chromosomal abnormalities that lead to reproductive and developmental problems as well as cancers.

DIR researchers have also established clinical and laboratory training programs in medical genetics. Education programs are under development or in place for genetic counselors, nurse geneticists, and M.D. and Ph.D. fellows in medical genetics. Research is also conducted on how best to communicate genetic information to individuals and families at risk.

Directors of NHGRI

Name	*Date of Birth*	*Dates of Office*	
		From	*To*
James D. Watson	1928	1989	April 10, 1992
Michael Gottesman (Actg)	1946	April 10, 1992	April 1993
Francis S. Collins	1950	April 1993	

An Office of Genome Ethics, still in its formative stages, is addressing specific questions raised by genetics research as well as setting up a model curriculum in ethical conduct of research for trainees in genetics. DIR also sponsors active training programs for visiting investigators and minority scientists.

Center for Inherited Disease Research

Established in 1996, the Center for Inherited Disease Research (CIDR) is a joint effort by eight NIH institutes. NHGRI serves as lead agency and manager of the CIDR facility. Located on the campus of the Johns Hopkins Bayview Medical Center, CIDR provides high-throughput genotyping services to researchers attempting to identify genetic factors involved in multifactorial human diseases. CIDR will focus on mapping genes contributing to such common diseases as cardiovascular and pulmonary disease, cancer, psychiatric disorders, hearing and language disorders, neurological disease, diabetes, and autoimmune diseases, among others. The Center will provide the research community with the resources to analyze at least 6-9 common disorders per year.

National Center for Research Resources

Mission

NCRR conceives and develops a broad array of critical research technologies and resources and ensures their availability, thereby strengthening and enhancing biomedical research supported or performed by NIH.

The center, established on February 15, 1990, merged the Division of Research Resources--which provided extramural research resources to NIH-supported institutions, and the Division of Research Services--which provided resources to NIH intramural research programs.

Research resources and technologies provided by NCRR include General Clinical Research Centers--hospital inpatient and outpatient facilities staffed by specially trained medical personnel that host multicategorical clinical research studies; biomedical research technology resources--state-of-the-art computers, laboratories, and complex instrument systems that provide scientists with the latest tools from the physical sciences, mathematics, and engineering; animal resources--facilities such as the seven Regional Primate Research Centers and other valuable animal colonies at which laboratory models of human disease are developed and studied; and nonmammalian research models such as cell systems, lower organisms, and other biological materials critical to research on human diseases.

NCRR programs also provide funds for pilot research projects and unanticipated research opportunities, science education for minority students and teachers, and for enhancing the research capabilities of minority institutions that award doctorates in the health professions or health-related sciences. NCRR also offers the ICDs scientific library and translation services, and medical arts and photography.

Important Events in NCRR History

February 15, 1990--Dr. Louis W. Sullivan, secretary of Health and Human Services, merged the Division of Research Resources and the Division of Research Services, forming the National Center for Research Resources.

DRR Important Events

April 13, 1962--Dr. Luther L. Terry, PHS Surgeon General, announced the creation of the Division of Research Facilities and Resources.
1962--The Biomedical Research Technology Program began with the transfer of centers for biomedical computing and bioengineering.
June 1962--Regional Primate Research Centers transferred from the National Heart Institute to DRFR.
July 15, 1962--Dr. Shannon, NIH director, officially established DRFR.
August 1966--BRTP funded the first centers in mass spectrometry and nuclear magnetic resonance.
January 4, 1969--DRFR was renamed the Division of Research Resources and placed into the Bureau of Health Professions Education and Manpower Training.
September 18, 1970--The Division of Research Resources was removed from BHME, and became a separate NIH division.
June 1972--The Minority Biomedical Research Support Program was formed to increase minority opportunities in biomedical research.
October 29, 1975--The NIH director approved a broadened mission for the division and an internal reorganization.
March 1979--The BRTP funded the first synchrotron facility for use in x-ray crystallography by NIH investigators.
March 1980--The Minority High School Student Research Apprentice Program was begun.
September 1985--The Research Centers in Minority Institutions Program was established to enhance research environments at predominantly minority institutions.
August 1986--DRR funded at the University of Illinois the only national laboratory dedicated to biomedical applications of fluorescence.
September 1987--DRR funded the Pittsburgh Supercomputer Center.
October 1988--The Research Facilities Improvement Program was begun.
October 1, 1989--Funding for the Research Centers in Minority Institutions Program was transferred from the Office of the Director, NIH, to DRR, which had managed the program since its inception.
October 17, 1989--The biological models and materials resources section of the Animal Resources Program was raised to program status as the Biological Models and Materials Research Program.
October 22, 1989--The Minority Biomedical Research Support Program was transferred from DRR to NIGMS.

DRS Important Events

1956--DRS was established on January 1 to provide equipment and professional and technical services essential to intramural programs.
1960--NIH acquired 513 acres of farmland near Poolesville, Md., on May 5 as the site of the NIH Animal Center.

Three branches--Instrument Engineering and Development; Library; and Medical Arts and Photography--were established.
1974--WHO designated the Veterinary Resources Branch as a Collaborating Center for Defined Laboratory Animals (the NIH Animal Genetic Resource). The International Council for Laboratory Animal Science designated the small animal section, VRB, as an international nude mouse reference center. Well-defined open formula diets for mice and rats were developed and put into use, enabling elimination of nutritional status as an experimental variable.

DRS was made responsibile for administrative support of the interagency primate steering committee established to plan and develop a national primate program to an adequate supply for health-related activities. A center for domestic production of nonhuman primates for NIH intramural research was established at Perrine, Fla.
1977--A unit was established to monitor the genetic integrity of mice and rats maintained by VRB.
1980--A reproductive services laboratory was established to develop and apply gamete and embryo cryopreservation techniques to preserve animal models.
1983--The assistant secretary for health reorganized the interagency primate steering committee as the interagency research animal committee (IRAC) responsible for conservation, use, care and welfare of research animals. NIH remained the lead agency, with DRS providing administrative support. DRS also incurred responsibilities in support of the NIH animal care and use committee, including projects to help institute intramural programs fulfill NIH requirements.
1985--Integration and automation of the NIH Library circulation and catalog system was completed.

Directors of NCRR

Name	Date of Birth	Dates of Office	
		From	To
Robert A. Whitney, Jr.	.....	November 1984	August 1992
Judith L. Vaitukaitis	.....	September 1992	.....
Directors of DRR			
Frederick L. Stone	.....	July 15, 1962	July 1965
Thomas J. Kennedy	.....	July 1, 1965	July 1, 1976
Thomas G. Bowery	.....	Sept. 3, 1968	Jan. 15, 1981
James F. O'Donnell (Actg)	.....	January 1981	September 1982
Betty H. Pickett	.....	Oct. 1, 1982	Oct. 1, 1988
Directors of DRS			
Chris A. Hansen	Sept. 15, 1915	April 1956	July 1968
William B. DeWitt	June 3, 1921	July 1968	August 1971
Roger D. Estep	.....	November 1971	July 1972
Joe R. Held	1931	July 1972	November 1984

Production of nonhuman primates at the Perrine, Fla., breeding center was discontinued because of decreased need and budget restrictions.

A statement of "U.S. Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training," prepared by the IRAC at the request of the Office of Science and Technology Policy, was published in the *Federal Register* on May 20, expressing acceptance of the principles by Federal agencies participating in IRAC.

1986--DRS celebrated its 30th anniversary. VRB phased out dog breeding and large-scale production of rodents to focus on more direct support of research projects. Developing and breeding small numbers of special laboratory rodents continued in the NIH Genetic Resource.

The Medical Arts and Photography Branch began to supply videorecording services.

VRB coordinated development of an NIH-wide "Animal Awareness Program" for the NIH animal care and use committee. Posters and presentations stressed the importance of humane care of laboratory animals.

1987--The Office of Animal Care and Use (OACU) was established, located in the Office of Intramural Research but administratively supported by DRS. Its mission is to ensure that NIH intramural programs comply with Federal laws and regulations on animal care and use. The DRS director was named OACU director. Administration of the IRAC and the NIH animal care and use committee was transferred from VRB to OACU.

The In-vivo NMR Research Center, managed by the BEIB, began operations, providing facilities for NIH investigators using magnetic resonance imaging or NMR spectroscopy.

NCRR Legislative Chronology

July 30, 1956--The Health Research Facilities Act of 1956 (Title VII of the PHS act) authorized a PHS program of Federal matching grants to public and nonprofit institutions for health research facilities construction. Congress extended title VII through 1971. No grants were made under this authority after 1969.

August 19, 1959--Congress appropriated $2 million to establish two primate research centers.

September 15, 1960--Public Law 86-798 amended the PHS act to authorize grants-in-aid to universities, hospitals, laboratories, and other public and nonprofit institutions to strengthen their programs of research and research training in sciences related to health. The act also authorized the use of funds appropriated for research or research training to be set aside by the Surgeon General in a special account for general research support grants. Passage of this law resulted in the Biomedical Research Support Program.

July 29, 1971--The Minority Biomedical Research Support Program was created with $2 million from the Senate Appropriations Committee under authority of sec. 301(c) of the amended PHS act.

October 3, 1984--The Research Centers in Minority Institutions Program was created with a $5 million congressional appropriation to the NIH Office of the Director. DRR was given administrative authority for the program.

December 22, 1987--Public Law 100-202 provided $23,935,000 for the "repair, renovation, modernization, and expansion of existing research facilities, and for the purchase of associated equipment." The accompanying report, H.R. 100-498, directed that the money be spent on improving AIDS research facilities. The Research Facility Improvement Program was created in DRR in response to this legislation.

Biographical Sketch of NCRR Director

Judith L. Vaitukaitis, M.D.

Dr. Vaitukaitis is a native of Hartford, Conn. She earned a B.S. degree in chemistry and biology from Tufts University in 1962, and an M.D. degree from Boston University School of Medicine in 1966. She completed her residency at Cornell Medical Services, Bellevue Memorial Hospital, New York. In 1970 she came to NIH as a postdoctoral researcher in the Endocrinology Branch of NCI. She continued her postdoctoral training in the Reproduction Research Branch, NICHD, first as a special research fellow in the USPHS and then as a senior staff fellow. She subsequently served as senior investigator and medical officer in that branch until 1974.

From 1974 to 1983, Dr. Vaitukaitis served as professor of medicine at the Boston University School of Medicine, including 6 years as professor of physiology. In addition to teaching, she conducted extensive basic research on the mechanisms controlling hormonal action and metabolism at the cellular level, and clinical research in reproductive endocrinology.

For significant contributions to the development of radioassay methodology, including the development of the first specific pregnancy assay, she received the Clinical Radioassay Society's 1980 Mallinckrodt Award for Investigative Research. The pregnancy assay she developed continues to be used. It has evolved into over-the-counter products for early pregnancy detection and as a method for monitoring patients with tumors developed from placental tissue.

In 1982 Dr. Vaitukaitis wrote *Clinical Reproductive Neuroendocrinology* and in 1983 received Boston University School of Medicine's Distinguished Alumna Award. Her clinical studies were conducted in Boston University's General Clinical Research Center, where she served as codirector from 1975 to 1977 and director from 1977 to 1986.

Dr. Vaitukaitis returned to NIH in 1986 as director of NCRR's General Clinical Research Centers Program. She became deputy director for extramural research resources in 1991, acting NCRR director in September 1992, and director in May 1993.

Major Programs--Extramural

General Clinical Research Centers

NCRR's nationwide network of 75 General Clinical Research Centers offers a special environment for the study of research patients by medical scientists in their pursuit of improved diagnosis and treatment of human disease and disability. At clinical research centers, advances in basic sciences are translated into clinical tools used to diagnose, treat and prevent illness. Grants awarded through this program may be used for equipment, special laboratories, diet kitchens, salaries for highly trained staff (including nurses, dietitians, biostatisticians and other professionals), and the hospitalization costs of research patients. Support for biostatistical as well as for data management and analysis also may be provided.

Regional Primate Research Centers

NCRR's seven regional Primate Research Centers provide unique research resources for biomedical and behavioral research using nonhuman primates as experimental animal models. Initial awards were made for construction of physical facilities at all seven

NCRR Appropriations--Grants and Direct Operations

Fiscal year	Total grants	Direct operations	Total[1]
	[Amounts in thousands of dollars]		
1963	$ 125,500	$ 1,207	$ 126,707
1964	130,600	1,319	131,919
1965	145,884	1,945	147,829
1966	148,850	4,104	152,954
1967	144,768	3,901	148,669
1968	169,416	4,298	173,714
1969	130,501	4,409	134,910
1970	129,009	3,703	132,712
1971	123,988	2,913	126,901
1972	132,286	3,362	135,648
1973	131,625	4,142	135,767
1974	129,334	4,138	133,472
1975	121,331	5,869	127,200
1976	124,307	5,958	130,265
1977	129,303	8,197	137,500
1978	136,297	8,798	145,095
1979	144,437	9,727	154,164
1980	159,702	9,494	169,196
1981	167,170	8,457	175,627
1982	175,505	8,672	184,177
1983	204,638	9,279	213,917
1984	233,270	9,907	243,177
1985	292,047	11,594	303,641
1986	279,203	13,185	292,388
1987	308,351	14,430	322,781
1988	328,826	15,324	344,150
1989	325,364	15,534	340,898
1990	336,904	17,230	353,734
1991	318,397	17,409	335,806
1992	296,457	17,756	314,213
1993	294,994	17,663	312,657
1994	313,905	18,010	331,915
1995[2]	331,634	20,289	351,923

[1] Includes health research facilities construction grants transferred to the Bureau of Health Professions Education and Manpower Training in FY 1969. Appropriations for such construction were terminated by Congress in FY 1970.
[2] Includes AIDS funds transferred from the Office of AIDS Research.

centers. Operating awards are made each year following review of each center's proposed budget by NIH staff. The overall programs of each center also receive regular peer review from outside supporting agencies. Universities serve as host institutions for centers and provide academic environments of high standard for staff and visiting scientists.

Areas of emphasis include reproductive biology, infectious diseases, neurosciences, biobehavioral research, metabolic, nutritional and cardiovascular diseases, and environmental health and toxicology. Based on the availability of facilities and other resources, the centers maintain extensive collaborative programs for scientists from many institutions. Visiting scientist programs for investigators from the U.S. and abroad also are included within the centers.

Laboratory Animal Sciences

The Laboratory Animal Sciences Program funds research, research animal resources, and scientific training in the field of comparative medicine. Of particular interest is to develop new and improved animal models of human disease. To assist institutions in their efforts to meet animal care guidelines established by PHS and the requirements of the Animal Welfare Act, LASP supports projects to enhance the environmental conditions of laboratory animals and improve their health. The goal of LASP-supported training is to provide graduate veterinarians with the research skills and motivation to become career participants in biomedical and health research.

AIDS Animal Models

The Chimpanzee Biomedical Research Program was established in 1986 to provide a stable supply of healthy chimpanzees for biomedical investigations related to AIDS and hepatitis, and to perpetuate the chimpanzee population in the U.S.

The Specific-Pathogen-Free (SPF) Rhesus Monkey Breeding and Research Program was established in 1988 to create self-sustaining rhesus breeding colonies that are free from contamination with certain simian retroviruses and herpes B virus, and to make SPF animals available for PHS-supported research projects related to AIDS.

Biomedical Research Technology

A biomedical research technology resource combines expensive equipment, complex methodologies, and scarce expertise to help find solutions to important biomedical research problems. It serves investigators within a university, research institution, region, or the entire Nation. Biomedical research technology resource centers take many forms such as biomedical computer centers, biomedical engineering centers, and instrument-oriented centers for studying biomolecular and cellular structure and function.

Program funds support the technology resource allowing scientific collaborators to increase its usefulness in biomedical research. Thus, the resource adds a new dimension in special expertise and capability to the research potential of qualified investigators. Particular emphasis is placed on shared resources operating on a regional or national basis.

The program also funds grants for the development of new technologies and instrumentation for biomedical research.

Biomedical Research Support

The Biomedical Research Support Program includes three science education programs to improve science literacy and attract tomorrow's cadre of biomedical scientists. The Minority High School Student Research Apprentice Program (MHSSRAP), begun in 1980, provides summer "hands on" research experiences. The goal is to motivate minority students to pursue careers in health research or a health profession. The program includes teachers in elementary, middle and junior high schools, plus preservice teachers. The MHSSRAP is being phased out and replaced by the new competitive program "NCRR Minority Initiative: K-12 Teachers and High School Students."

The Science Education Partnership Award Program fosters alliances among educators, biomedical researchers, and local communities. Model programs further knowledge and excitement about the health sciences in young people (K-12) and the public.

The Science Teaching Enhancement Award Program is testing the feasibility of preparing science instructors (grades 6-12) to become master teachers. These individuals assume leadership roles in acting as liaisons between biomedical research scientists, their home institutions and science educators, school administrators, and others in the local school systems. The goal is to improve the quality of precollege science education.

The Institutional Development Award Program is a congressionally mandated effort to broaden the geographic distribution of NIH funding. The program helps investigators in designated states obtain long-range NIH research grant funding.

The unique Shared Instrumentation Grant Program provides funds for instruments costing $100,000 to $400,000. Groups of 10 or more NIH-supported investigators share NMR imagers, coupled hybrid mass spectrometers, scanning laser confocal microscopes, and the latest in gene sequencing equipment. This cost-effective program affords NIH grantees with tools for state-of-the-art biomedical research.

Research Centers in Minority Institutions

Begun in 1985, the Research Centers in Minority Institutions Program is a congressionally mandated initiative.

The program seeks to expand the national capability for research in health sciences by assisting, through grant support, predominantly minority institutions that offer doctorates in either the health professions or health-related sciences. The grants enhance the capacity of minority institutions to conduct biomedical and behavioral research by strengthening their research environments. Funds are typically used to hire additional research faculty in the biomedical and behavioral sciences, support training in specialized analytical methods, upgrade facilities, and purchase advanced scientific instruments.

Biomedical Models

The Biomedical Models Program develops and supports nonmammalian models such as lower vertebrates and invertebrates and nonanimal models such as cell systems, lower organisms, and nonbiological systems for biomedical research and provides biological materials that serve as important resources to the biomedical community. The program is enhancing and expanding utilization of nonmammalian models in biomedical research.

Major Programs--Intramural

Biomedical Engineering and Instrumentation

The Biomedical Engineering and Instrumentation Program supports intramural scientists in applications of engineering, mathematics, physics, and the physical sciences to the solution of problems in biology and medicine, through 1) collaborations involving measurement, imaging, mathematical and physical modeling, and design of specialized equipment, and 2) construction, modification, maintenance, repair, and lease of scientific equipment.

Veterinary Resources

The Veterinary Resources Program contributes to intramural research at NIH by procuring, housing, and maintaining laboratory animals at holding facilities in Bethesda and Poolesville. VRP provides technical consulting services to meet individual research needs in studies involving nonhuman primates, dogs, cats, rabbits, rodents, and livestock. Services and support available to intramural scientists include: disease diagnostics, animal model selection and development, genetic monitoring, germfree technology, behavior, nutrition, preoperative and postoperative care, cryopreservation, and surgery. VRP also manages the NIH Animal Genetic Resource, which supplies scientists at NIH and around the world with a large selections of genetically defined small animal models.

Library Services

The NIH Library provides NIH with extensive research information resources and services. Housing approximately 80,000 monographs, 155,000 bound periodicals, and 2,600 current journal titles, the NIH Library is one of the country's largest biomedical libraries. It provides free access to a variety of databases including MEDLINE, AIDSLINE, PDQ, EMBASE, Biological Abstracts, PsychInfo, CANCERLIT, BIOETHICSLINE, and CHEMLINE. Several training courses are available on how to use these resources. The library also can translate foreign-language medical and scientific articles into English.

Medical Arts and Photography

The Medical Arts and Photography Branch provides NIH with complete visual communication services. MAPB designers, artists, photographers, video production specialists, etc., work with NIH personnel to produce effective visual presentations of biomedical research results. Services include design, graphics, video production, medical illustration, micro- and macrophotography, information and patient photography, and consulting.

Buildings

Building 1

History: Building 1, the Shannon Bldg., was constructed to serve as an administrative center for NIH. Original construction plans

Part 3
Obligations From Appropriations

NIH Obligations and Amounts Obligated for Grants and Direct Operations

[Amounts in thousands of dollars]

Fiscal year	Total grants[1]	Direct operations[2]	Total appropriations[3]
1938	$ 140	$ 324	$ 464
1939	171	293	464
1940	277	430	707
1941	237	474	711
1942	230	470	700
1943	181	1,097	1,278
1944	182	2,373	2,555
1945	142	2,693	2,835
1946	850	2,565	3,415
1947	4,004	4,072	8,076
1948	12,475	16,401	28,876
1949	30,469	13,015	43,484
1950	43,823	15,412	59,235
1951	29,626	15,935	45,561
1952	34,863	17,147	52,010
1953	38,205	18,022	56,227
1954	48,196	21,248	69,444
1955	54,214	26,749	80,963
1956	63,243	34,856	98,099
1957	123,111	46,744	169,855
1958	47,187	63,074	210,261
1959	208,407	76,803	285,210
1960	292,910	88,407	381,317
1961	417,690	103,957	521,647
1962	518,823	119,834	638,657
1963	607,137	144,305	751,442
1964	715,152	161,817	876,969
1965	774,520	183,747	958,267
1966	887,521	211,640	1,099,161
1967	798,923	262,658	1,061,581
1968	804,230	278,631	1,082,861
1969	813,052	670,091	1,483,143
1970	771,259	672,718	1,443,977
1971	848,292	748,022	1,596,314
1972	978,744	1,102,836	2,081,580
1973	967,529	555,572	1,523,101
1974	120,828	873,604	1,994,432
1975	1,306,475	802,411	2,108,886
1976	1,398,556	839,854	2,238,410
1977	1,566,451	1,015,537	2,581,988
1978	1,785,435	1,042,579	2,828,014
1979	2,096,031	1,088,610	3,184,641
1980	2,343,220	1,085,622	3,428,842
1981	2,514,010	1,058,496	3,572,506
1982	2,566,068	1,077,393	3,643,461
1983	2,874,673	1,138,462	4,013,135
1984	3,262,598	1,230,955	4,493,553
1985	3,811,120	1,310,437	5,121,557
1986	3,920,848	1,376,129	5,296,977
1987	4,644,400	1,530,638	6,175,038
1988	4,930,061	1,680,369	6,610,430
1989	5,358,969	1,799,209	7,157,978
1990	5,554,184	2,027,300	7,581,484
1991	5,971,418	2,182,683	8,154,101
1992	[4]7,380,134	[4]2,630,234	[4]10,010,365
1993	7,572,296	2,755,821	10,328,117
1994	8,015,581	2,895,388	10,910,969
1995	8,295,570	3,045,271	11,340,841
1996	8,840,800	3,039,847	11,880,647

[1]Includes grants for research, fellowships, training, health research facilities and community mental health centers construction, regional medical programs, state control programs, community demonstration projects, and student loans, scholarships, control programs, etc.
[2]Includes funds for research and development contracts, intramural research, the National Library of Medicine, and funds necessary for administrative and program management of NIH.
[3]Includes NLM, OD, and direct construction.
[4]Comparable for ADAMHA.

Obligations from Appropriations by Component

[Amounts in thousands of dollars]

FY	GRS-NIH	NCI	NIMH	NHLBI	NIDR	NIDDK	NIAID	NINDS	HRF	DBS	NICHD	NIGMS[13]	RMP
1938	64	400	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1939	64	400	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1940	137	570	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1941	141	570	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1942	135	565	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1943	743	535	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1944	2,025	530	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1945	2,274	561	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1946	2,866	549	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1947	6,255	1,821	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1948	10,126	14,500	4,250	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1949	11,333	21,762	5,821	2,835	1,733	.....	.....	.....	.....	.....	.....	.....	.....
1950	11,705	20,645	9,234	15,777	1,875	.....	.....	.....	.....	.....	.....	.....	.....
1951	14,006	14,427	6,970	8,217	1,941	.....	.....	.....	.....	.....	.....	.....	.....
1952	5,400	14,415	9,813	9,653	1,601	4,064	5,501	1,562	.....	.....	.....	.....	.....
1953	4,989	16,277	10,474	11,209	1,595	4,335	5,534	1,814	.....	.....	.....	.....	.....
1954	4,669	19,520	11,741	14,934	1,630	6,891	5,676	4,383	.....	.....	.....	.....	.....
1955	5,124	21,676	14,030	16,584	1,992	8,283	5,744	7,530	.....	.....	.....	.....	.....
1956	6,769	24,994	18,052	18,971	2,175	10,884	6,520	9,735	.....	.....	.....	.....	.....
1957	12,612	42,551	30,006	32,193	5,898	15,907	13,448	17,240	.....	.....	.....	.....	.....
1958	17,041	55,250	38,457	34,943	6,340	20,336	17,433	20,463	.....	.....	.....	.....	.....
1959	28,957	69,348	49,853	45,449	7,405	31,126	24,039	29,033	.....	.....	.....	.....	.....
1960	40,367	84,848	67,470	61,068	7,998	45,962	33,453	40,152	.....	.....	.....	.....	.....
1961	75,957	105,906	91,923	85,990	12,477	58,365	42,777	48,252	.....	.....	.....	.....	.....
1962	121,103	109,871	107,711	91,003	12,958	78,530	53,286	61,158	3,036	.....	.....	.....	.....
1963	136,003	122,379	139,517	104,318	17,451	95,110	62,382	70,759	3,523	.....	.....	.....	.....
1964	45,737	131,349	170,990	117,405	19,151	104,970	66,213	81,970	4,273	.....	[1]30,450	104,460	.....
1965	49,998	147,763	[2]186,068	123,362	20,273	112,729	69,847	87,881	4,423	.....	42,207	113,718	.....
1966[3]	58,561	161,312	226,588	[2]140,242	23,482	121,619	77,709	100,241	5,256	.....	54,536	127,062	2,553
1967	67,623	170,408	([2])	163,552	28,218	132,568	86,705	112,509	40,419	7,784	64,418	145,770	29,256
1968	76,640	177,349	([4])	162,134	29,283	139,321	90,430	121,979	38,369	7,699	66,824	156,125	.....
1969	82,920	182,436	.....	161,916	29,571	140,297	92,611	126,085	.....	8,030	71,205	160,104	.....
1970[6]	4,360	181,345	.....	160,258	28,716	131,453	97,055	97,164	([7])	8,235	75,962	148,090	.....
1971[6]	([8])	232,853	.....	194,826	35,211	137,947	102,053	103,445	.....	9,277	94,744	159,841	.....
1972[6]	.....	[9]378,617	.....	232,573	43,289	153,342	109,044	116,435	.....	9,280	116,498	173,338	.....
1973[14]	.....	431,245	.....	255,722	40,864	142,818	103,025	107,368	.....	([10])	111,207	154,035	.....
1974[16]	.....	581,021	.....	327,250	50,020	177,374	120,822	143,535	.....	.....	144,146	188,600	.....
1975	.....	699,305	.....	327,814	50,019	173,564	119,417	142,448	.....	.....	142,427	189,533	.....
1976	.....	760,548	.....	368,564	50,690	174,933	125,563	140,393	.....	.....	135,873	189,945	.....
1977	.....	814,905	.....	396,531	55,405	219,444	140,382	154,594	.....	.....	145,111	204,758	.....
1978	.....	872,380	.....	447,834	61,685	259,857	161,814	177,312	.....	.....	165,817	230,415	.....
1979	.....	936,738	.....	509,996	64,999	302,692	191,119	212,079	.....	.....	197,349	277,259	.....
1980[20]	.....	998,047	.....	527,091	67,600	340,131	214,657	241,353	.....	.....	208,346	312,339	([5])
1981	.....	989,342	.....	549,662	71,107	369,292	232,028	252,182	.....	.....	220,366	333,504	.....
1982	.....	986,564	.....	559,606	71,962	368,188	235,835	265,485	.....	.....	226,172	339,837	.....
1983	.....	986,811	.....	624,065	79,272	413,440	278,939	96,251	.....	.....	254,323	369,810	.....
1984	.....	1,081,460	.....	705,064	88,380	463,664	319,593	335,952	.....	.....	275,550	415,896	.....
1985	.....	1,177,853	.....	803,810	100,414	539,499	370,047	396,170	.....	.....	312,578	480,975	.....
1986	.....	1,210,284	.....	821,901	98,755	547,373	367,142	414,406	.....	.....	308,211	493,535	.....
1987	.....	1,402,790	.....	929,981	117,926	510,880	545,433	490,136	.....	.....	366,651	570,867	.....
1988	.....	1,468,435	.....	965,283	126,216	534,359	638,521	534,483	.....	.....	396,584	632,624	.....
1989	.....	1,570,342	.....	1,045,508	130,689	559,274	740,239	471,632	.....	.....	425,628	682,134	.....
1990	.....	1,648,330	.....	1,070,683	135,432	579,984	831,181	489,348	.....	.....	441,955	680,305	.....
1991	.....	1,712,669	.....	1,124,915	148,691	615,262	906,003	542,313	.....	.....	478,947	761,231	.....
1992[25]	.....	1,947,541	560,285	1,190,070	158,900	661,446	960,082	580,790	.....	.....	518,577	818,297	.....
1993	.....	1,978,340	[26]582,851	1,214,693	161,116	680,514	984,114	599,466	.....	.....	527,767	832,191	.....
1994	.....	2,076,218	613,352	1,277,852	169,490	715,622	1,063,696	630,584	.....	.....	554,836	875,495	.....
1995	.....	2,129,369	631,060	1,314,969	174,021	737,043	1,092,507	649,121	.....	.....	570,309	904,738	.....
1996	.....	2,254,940	659,941	1,351,422	183,478	768,353	1,171,160	683,504	.....	.....	592,971	944,312	.....

[1]Derived by transfers from other NIH appropriations as authorized by Congress.
[2]Includes funds for construction of community mental health centers (1965=$35,000,000 1966=$50,000,000).
[3]Includes supplemental.
[4]Transferred to HSMHA, July 1, 1967.
[5]Transferred to HSMHA, July 1, 1968.
[6]Includes supplemental.
[7]Discontinued as an appropriation July 1, 1969.
[8]GR & S discontinued. Research Resources appropriation established. DCTR portion transferred to Management.
Renamed National Center for Research Resources in 1990.
[9]Includes Cancer Conquest Program of $100,000,000.
[10]Transferred to FDA July 1, 1972.
[11]Formerly a part of the Neurology Institute.
[12]Formerly a part of the Management Fund.
[13]Formerly a part of GR & S.

Obligations from Appropriations by Component--*continued*

[Amounts in thousands of dollars]

NIA[19]	NIEHS	NIAMS[21]	NIDCD[23]	FIC	BHME	NLM	NEI[11]	OD[12]	NCRR[8]	NINR[22]	NHGRI[24,27]	CONST (BRF)	NIDA[26]	NIAAA[26]	Total[15]
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	464
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	464
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	707
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	711
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	700
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,278
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,555
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,835
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,415
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8,076
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28,876
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	43,484
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	59,236
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	45,561
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	52,009
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	56,227
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	69,444
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	80,963
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	98,100
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	169,855
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	210,263
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	285,210
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	381,318
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	521,647
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	638,656
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	751,442
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	876,968
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	958,269
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,099,161
.....	12,351	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,061,581
.....	16,709	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,082,862
.....	17,906	.....	.....	937	387,141	21,739	.....	.....	.....	.....	.....	245	.....	.....	1,483,143
.....	17,254	.....	.....	2,731	377,983	19,758	22,805	7,988	62,572	.....	.....	247	.....	.....	1,443,976
.....	20,093	.....	.....	3,415	375,059	21,381	29,985	8,902	66,187	.....	.....	1,095	.....	.....	1,596,314
.....	26,353	.....	.....	4,237	566,507	23,859	36,928	11,242	74,963	.....	.....	5,075	.....	.....	2,081,580
.....	26,137	.....	.....	3,874	.....	24,964	34,389	11,213	72,846	.....	.....	3,394	.....	.....	1,523,101
.....	32,126	.....	.....	5,048	.....	29,236	45,155	12,695	130,127	.....	.....	7,276	.....	.....	1,994,431
.....	35,865	.....	.....	5,673	.....	28,843	43,708	17,298	127,131	.....	.....	5,841	.....	.....	2,108,886
19,221	36,787	.....	.....	5,666	.....	27,014	50,089	18,334	130,256	.....	.....	7,534	.....	.....	2,238,410
29,879	50,891	.....	.....	7,723	.....	34,527	63,654	16,921	137,408	.....	.....	109,855	.....	.....	2,581,988
37,057	63,933	.....	.....	8,253	.....	35,972	85,173	18,857	144,839	.....	.....	56,814	.....	.....	2,828,012
56,471	77,463	.....	.....	8,902	.....	40,538	104,850	19,820	154,069	.....	.....	30,297	.....	.....	3,184,641
69,687	83,637	.....	.....	8,655	.....	43,891	109,603	20,781	169,083	.....	.....	13,941	.....	.....	3,428,842
75,596	92,923	.....	.....	9,108	.....	44,660	177,666	22,465	175,551	.....	.....	17,054	.....	.....	3,572,506
81,797	106,084	.....	.....	9,172	.....	44,858	130,321	23,563	184,058	.....	.....	9,959	.....	.....	3,643,461
93,946	164,631	.....	.....	10,115	.....	45,980	141,643	25,726	213,652	.....	.....	14,531	.....	.....	4,013,135
115,216	180,418	.....	.....	11,163	.....	50,624	154,970	26,976	243,046	.....	.....	25,581	.....	.....	4,693,553
142,968	194,486	.....	.....	11,563	[17]	55,184	181,298	35,396	[18]3,641	.....	.....	15,675	.....	.....	5,121,557
150,910	188,819	.....	.....	10,866	.....	55,206	186,343	130,905	292,388	.....	.....	19,933	.....	.....	5,296,977
177,461	209,251	138,675	.....	11,376	.....	61,675	216,528	56,917	322,781	19,924	.....	25,786	.....	.....	6,175,038
194,548	215,439	147,543	.....	15,604	.....	67,700	224,835	61,716	344,150	23,361	.....	19,029	.....	.....	6,610,430
222,545	223,309	158,886	94,275	15,739	.....	78,798	230,999	72,071	381,934	29,118	.....	24,218	.....	.....	7,157,978
238,927	228,725	168,538	117,283	15,479	.....	81,683	236,456	107,129	353,771	33,508	59,527	67,240	.....	.....	7,581,484
323,791	240,606	193,449	134,957	17,505	.....	91,182	253,354	95,853	335,776	39,892	87,389	49,316	.....	.....	8,154,101
382,582	252,031	203,516	148,748	19,574	.....	98,937	269,766	143,542	314,198	44,925	104,756	61,441	399,100	171,481	10,010,368
399,523	251,187	212,208	154,655	19,702	.....	103,496	275,368	191,935	312,365	48,477	106,095	112,731	403,065	176,128	10,328,117
420,268	264,111	223,160	162,782	21,662	.....	117,783	289,906	227,044	332,903	51,002	127,017	86,335	424,315	185,538	10,910,969
433,288	272,012	230,816	168,006	23,729	.....	127,723	299,383	239,390	351,923	52,869	153,789	157,682	436,726	190,548	11,340,841
453,492	287,614	243,014	175,864	25,243	.....	139,111	313,008	260,432	390,163	55,671	169,268	100,957	458,231	198,480	11,880,647

[14]No appropriation bill signed in 1973. Figures are based on the continuing resolution.
[15]Totals exclude special foreign currency program.
[16]Reserve legislated by P.L. 93-192 not reflected.
[17]Transferred to Health Resources Administration, July 1, 1973.
[18]GRSG transferred from IRD's to RR.
[19]Formerly a part of NICHD.
[20]No enacted appropriation authorized under continuing resolution.
[21]Formerly a part of NIDDK.
[22]Transferred from Health Resources and Services Administration.
[23]Formerly part of NINDS.
[24]Prior to establishment of NCHGR in FY 1990, funds for this effort were appropriated to NIGMS. The Office of Human Genome Research provided overall planning and coordination with other agencies.
[25]Comparable for ADAMHA (NIMH, NIDA, and NIAAA).
[26]Formerly part of ADAMHA (NIMH, NIDA, and NIAAA).
[27]Became an institute in 1996.

Part 4
The Staff

Number and Types of Personnel at the Hygienic Laboratory

Year	Commissioned	Professors	Other scientific and technicians	Nonscientific	Total
1909	9	3	13	28	53
1910	11	2	12	28	53
1911	13	3	12	27	55
1912	12	3	12	29	56
1913	17	3	11	32	63
1914	22	3	11	35	71
1915	14	3	13	34	64
1916	13	3	22	31	69
1917	16	3	23	36	78
1918	13	3	39	37	92
1919	13	3	38	42	96
1920	13	3	37	50	103
1921	10	3	39	75	127
1922	17	3	45	65	130
1923	10	3	52	56	121
1924	11	3	51	48	113
1925	14	3	49	50	116
1926	13	3	47	51	114
1927	15	3	43	53	114
1928	13	3	45	57	118
1929	12	3	51	62	128

Source: Victor H. Kramer, *The National Institute of Health: A Study in Public Administration* , (New Haven, Conn.: Quinnipiack Press, Inc., 1937), p. 82.

Employment

Year	Number of employees
1930	140
1931	150
1932	165
1933	139
1934	160
1935	159
1936	183
1937	695
1938	912
1939	1,048
1940	1,137
1941	1,367
1942	1,456
1943	1,352
1944	1,144
1945	1,090
1946	1,436
1947	1,505
1948	2,245
1949	2,937
1950	2,888
1951	3,012
1952	3,277
1953	3,888
1954	4,621
1955	5,412
1956	6,334
1957	7,215
1958	7,145
1959	8,484
1960	9,109
1961	10,175
1962	11,037
1963	11,511
1964	11,822
1965	12,194
1966	12,643
1967	11,730
1968	13,105
1969	13,350
1970	13,243
1971	14,002
1972	13,789
1973	12,931
1974	13,318
1975	13,897
1976	14,495
1977	14,658
1978	14,610
1979	14,439
1980	14,634
1981	14,984
1982	14,869
1983	15,449
1984	15,212
1985	14,799
1986	14,479
1987	15,243
1988	15,486
1989	15,206
1990	16,181
1991	16,947
1992	17,405
1993	18,664
1994	17,210
1995	16,537
1996	16,440
1997	16,680

Source: Division of Personnel Management, NIH.

Staff by Pay System

Year	Commissioned Corps	Civil Service Full-time	Other Civil Service	Total
1948	189	1,633	[1]423	2,245
1949	251	2,061	625	2,937
1950	279	2,038	571	2,888
1951	352	2,150	510	3,012
1952	401	2,313	563	3,277
1953	473	3,110	305	3,888
1954	515	3,811	295	4,621
1955	595	4,422	395	5,412
1956	664	5,189	481	6,334
1957	761	5,806	648	7,215
1958	777	[2]6,197	[3]171	7,145
1959	803	6,676	1,005	8,484
1960	875	7,166	1,068	9,109
1961	943	8,026	1,206	10,175
1962	1,049	8,964	1,024	11,037
1963	1,153	9,341	1,017	11,511
1964[4]	1,184	9,700	938	11,822
1965	1,189	9,985	1,020	12,194
1966[5]	1,329	10,137	1,177	12,643
1967	1,248	9,392	1,090	11,730
1968	1,354	10,522	1,224	13,105
1969[5]	1,271	10,163	1,916	13,350
1970	1,221	10,042	1,980	13,243
1971	1,190	10,939	1,873	14,002
1972[5]	1,174	10,453	2,162	13,789
1973	1,026	10,284	1,621	12,931
1974	1,048	10,574	1,696	13,318
1975	999	10,644	2,254	13,897
1976	1,030	11,055	2,410	14,495
1977	1,001	10,972	2,865	14,658
1978	1,065	11,077	2,528	14,610
1979	972	11,135	2,332	14,439
1980	951	11,252	2,431	14,634
1981	934	11,660	2,390	14,984
1982	831	11,571	2,467	14,869
1983	779	12,092	2,578	15,449
1984	747	12,055	2,410	15,212
1985	729	11,777	2,293	14,799
1986	730	11,658	2,091	14,479
1987	725	12,436	2,082	15,243
1988	708	12,713	2,070	15,486
1989	673	12,512	2,021	15,206
1990	822	13,248	2,111	16,181
1991	876	13,953	2,118	16,947
1992	991	14,344	2,160	17,405
1993	1,003	15,304	2,356	18,663
1994	956	14,241	2,013	17,210
1995	901	13,722	1,913	16,536
1996	846	13,717	1,877	16,440
1997	794	14,172	1,714	16,680

[1]Includes consultants, members, cooperative employees, and a few miscellaneous employees (through 1957).
[2]Includes visiting scientists and staff fellows (through present).
[3]Includes part-time and intermittent employees and excludes consultants (through present).
[4]As of Sept. 1.
[5]As of Oct. 1.
Source: Division of Personnel Management, NIH.

Full-Time Civil Service Employees by GS, 210g,1 SES,4 and Wage Board

Year	GS	210g	SES	Wage Board
1948	1,397	.....	.....	.....
1949	1,760	.....	.....	.....
1950	1,603	1	.....	7
1951	1,712	4	.....	8
1952	1,848	7	.....	9
1953	2,248	8	.....	9
1954	2,735	13	.....	9
1955	3,513	19	.....	890
1956	4,164	30	.....	995
1957	4,682	44	.....	1,080
1958	4,989	45	.....	1,147
1959	5,324	53	.....	1,184
1960	5,570	58	.....	1,445
1961	6,226	82	.....	1,597
1962	6,976	90	.....	1,736
1963	7,294	96	.....	1,780
1964	7,690	92	.....	1,764
1965[2]	7,979	95	.....	1,777
1966[3]	8,037	92	.....	1,828
1967	7,315	79	.....	1,847
1968	8,365	81	.....	1,864
1969[3]	8,081	80	.....	1,781
1970	8,063	86	.....	1,665
1971	8,474	90	.....	1,935
1972[3]	8,376	89	.....	1,487
1973	8,047	84	.....	1,489
1974	8,257	72	.....	1,598
1975	8,398	71	.....	1,622
1976	8,490	77	.....	1,650
1977	8,331	79	.....	1,526
1978	8,552	80	.....	1,510
1979	8,447	5	190	1,538
1980	8,492	5	183	1,614
1981	8,800	5	179	1,598
1982	8,614	4	170	1,544
1983	8,873	3	167	1,559
1984	8,815	3	169	1,442
1985	8,650	3	170	1,397
1986	8,734	2	171	1,329
1987	9,354	1	172	1,313
1988	9,654	2	175	1,234
1989	9,635	2	177	1,197
1990	10,295	6	189	1,240
1991	10,908	7	190	1,188
1992	11,193	10	195	1,114
1993	12,172	15	226	1,094
1994	11,538	15	219	986
1995	11,270	13	208	874
1996	11,323	13	190	841
1997	11,775	13	182	798

[1]Through 1955, known as Public Law 692 employees. Changed from 208g, PHS Act of 1975.
[2]As of Sept. 1.
[3]As of Oct. 1.
[4]Civil Service Reform Act of 1978.
Source: Division of Personnel Management, NIH.

Professional Staff by Type of Doctoral Degree

Year	M.D.	Ph.D.	D.D.S.	D.V.M.	Other[1]	Total
1958	529	431	.....	.....	70	1,030
1959	563	527	.....	.....	62	1,152
1960	594	565	.....	.....	61	1,220
1961	667	614	.....	.....	68	1,349
1962	776	604	.....	.....	78	1,458
1963	890	710	.....	.....	111	1,711
1964	961	730	.....	.....	134	1,825
1965	982	757	.....	.....	135	1,874
1966	1,150	848	50	47	48	2,143
1967	1,079	719	54	48	36	1,936
1968	1,102	781	128	47	32	2,090
1969	1,066	825	127	51	40	2,109
1970	1,010	888	127	53	44	2,122
1971	1,026	945	118	61	64	2,214
1972	1,011	995	105	62	59	2,232
1973	939	1,131	44	46	43	2,203
1974	978	1,164	43	42	35	2,262
1975	1,001	1,117	44	42	47	2,251
1976	993	1,159	58	58	44	2,312
1977	1,008	1,200	55	68	59	2,390
1978	996	1,277	53	66	59	2,451
1979	1,001	1,314	55	71	60	2,501
1980	1,054	1,413	61	73	74	2,675
1981	1,135	1,448	58	71	66	2,778
1982	1,145	1,457	57	79	58	2,796
1983	1,220	1,697	61	73	57	3,108
1984	1,251	1,799	59	74	58	3,241
1985	1,215	1,777	53	79	59	3,183
1986	1,206	1,738	55	80	58	3,137
1987	1,316	1,800	53	78	54	3,301
1988	1,386	1,756	52	87	75	3,356
1989	1,315	1,571	50	86	67	3,089
1990	1,422	1,540	48	93	63	3,166
1991	1,480	1,557	43	95	58	3,233
1992	1,535	1,665	42	97	83	3,422
1993	1,546	2,489	24	75	208	4,342
1994	1,439	2,178	21	61	183	3,882
1995	1,241	2,009	26	59	173	3,508
1996	1,077	1,940	12	48	159	3,236
1997	959	1,824	10	47	152	2,992

[1]Includes D.D.S., D.V.M., etc., through 1965. Source: Division of Personnel Management, NIH.

Part 5
Real Property and Facilities

(later changed) provided for space for various shops, a central stores operation, and a boiler plant.

Initiating legislation	June 22, 1936.
Construction begun	January 1938.
Cornerstone laid	June 30, 1938.
Construction completed	December 1938.
Occupancy by NIH	Dec. 1, 1938.
Cost of original construction	$880,746
Total cost of building (cost of original construction plus changes and improvements)	$885,000
Gross area (sq. ft.)	95,948
Space allocations (sq.ft.)	
Office	36,108
Lab	2,535
General Service	16,716
Public Area	24,875
Total	80,234

Present use: Administration.

Building 2

History: Building 2 was built as a laboratory research building. It was originally called the Industrial Hygiene Laboratory Building.

Initiating legislation	June 22, 1936.
Construction begun	January 1938.
Construction completed	December 1938.
Cost of original construction	$327,966
Total cost of building (cost of original construction plus cost of changesand improvements)	$682,000
Gross area (sq. ft.)	47,979
Space allocations (sq.ft.)	
Office	7,381
Lab	19,619
Lab Support	1,288
General Service	4,390
Public Area	9,207
Total	41,825

Present use: Research by NIDDK.

Building T2

History: Building T2 was constructed as a general warehouse facility.

Construction completed	1951.
Cost of original construction	$2,000
Gross Area (Sq. Ft.)	405

Present use: Storage

Building 3

History: Building 3 was built to provide space for offices, laboratory research, and animal breeding. It was originally called the Public Health Methods and Animal Unit Building.

Initiating legislation	June 22, 1936.
Construction begun	January 1938.
Cornerstone laid	
Construction completed	December 1938.
Cost of original construction	$327,996
Total cost of building (cost of original construction plus cost of changesand improvements)	$791,000
Gross area (sq. ft.)	48,285
Space allocations (sq.ft.)	
Office	2,373
Lab	21,569
Lab Support	2,035
General Service	5,931
Public Area	9,162
Total	41,070

Present use: Research by NHLBI.

Building 4

History: Building 4 was constructed for laboratory research by NIAMD.

Initiating legislation	June 21, 1936.
Construction begun	December 1938.
Cornerstone laid	
Construction completed	May 1941.
Cost of original construction	$654,573
Total cost of building (cost of original construction plus cost of changes and improvements)	$14,151,000
Gross area (sq. ft.)	163,157
Space allocations (sq. ft.):	
Office	10,409
Lab	26,870
Lab Support	5,420
Animal	989
General Service	20,708
Public Area	15,850
Total	80,246

Present use: Research by NIAID.

Building 5

History: Building 5 was constructed for laboratory research by NIAID.

Initiating legislation	June 21, 1938.
Construction begun	December 1938.
Construction completed	1941.
Cost of original construction	$654,573
Total cost of building (cost of original construction plus cost of changes and improvements)	$997,000
Gross area (sq. ft.)	71,735
Space allocations (sq. ft.):	
Office	12,109
Lab	22,686
Lab Support	7,392
General Service	22,946
Public Area	15,273
Total	80,406

Present use: Research by NIDDK.

Building 6

History: Building 6 was constructed as a research laboratory for NCI.

Construction completed	September 1939.
Cost of original construction	$669,761
Total cost of building (cost of original construction plus cost of changes and improvements)	$1,831,000
Gross area (sq. ft.)	74,196
Space allocations (sq. ft.)	
Office	7,758
Lab	27,147
Lab Support	8,726
Animal	2,901
General Service	8,872
Public Area	17,896
Total	73,359

Present use: Research by NICHD, NEI, NIDDK, and NIAMS.

Building 6A

Cost of original construction	$833,448
Total cost plus improvements	$2,725,000
Gross area (sq. ft.)	21,720
Space allocations (sq. ft.)	
Office	316
Lab	9,579
Lab Support	1,601
General Service	3,752
Public Area	4,007
Total	20,217

Present use: Research by NICHD, NIDDK, and NEI.

Building 6B

History: Building 6 was constructed for the AAALAC program. It was to house laboratory animals to be used in research.

Construction began	May 26, 1988
Construction completed	Aug. 17, 1990
Cost of original construction	$8,462,000
Total cost of building (cost of original construction plus changes and improvements	$8,462,000
Gross Area	51,142
Space allocations (sq. ft.)	
Office	2,441
Lab	19,799
Lab Support	726
Animal	7,039
General Service	5,618
Public Area	12,249
Total	47,872

Present use: Research

Building 7

History: Formerly called Memorial Laboratory, Building 7 was constructed as a research laboratory for the NIAID. The building has many special features (such as electrically heated grids for sterilizing air) that permit study of extremely infectious diseases.

Initiating legislation	Aug. 25, 1937.
Construction begun	July 1945.
Occupancy by NIH	May 1947
Cost of original construction	$1,192,634
Total cost of building (cost of original construction plus cost of changes and improvements)	$1,335,000
Gross area (sq. ft.)	49,972
Space allocations (sq. ft.)	
Office	4,369
Lab	11,500
Lab Support	3,532
Animal	3,133
General Service	10,958
Public Area	10,716
Total	44,208

Present use: Research by NIAID and NINDS.

Building 8

History: Building 8 was constructed as an office building.

Cornerstone laid	April 1945.
Occupancy by NIH	December 1946.
Cost of original construction	$199,614

(continued on next page)

Total cost of building (costs of original construction plus cost of changesand improvements) .	$5,931,000
Gross area (sq. ft.)	58,097
Space allocations (sq. ft.):	
Office	4,418
Lab	13,057
Lab Support	3,169
Animal	2,783
General Service	5,472
Public Area	8,393
Total	37,292

Present use: Research by NIDDK.

Building 8A

Original cost of construction	$9,426,052
Total cost of building (costs of original construction plus cost of changes and improvements)	9,426,000
Gross area (sq. ft.)	49,702

Space allocations (sq. ft) *Included in Bldg. 8*

Building 9

History: Building 9 was constructed to house facilities for breeding smaller animals for research.

Construction begun	September 1942.
Construction completed	February 1943.
Occupancy by NIH	January 1943.
Cost of original construction	$197,451
Total cost of building (cost of original construction plus cost of changes and improvements)	$810,000
Gross area (sq. ft.)	49,637
Space allocations (sq. ft.):	
Office	4,307
Lab	13,908
Lab Support	834
Animal	3,954
General Service	3,705
Public Area	8,825
Total	35,533

Present use: Research by NHLBI, NCI, NIAMS, NHGRI, NIDCD, NICHD, NIDDK, NEI, and NIMH.

Building 10

History: Building 10, the "Clinic"--known as the Warren Grant Magnuson Clinical Center--was constructed as a research hospital in which laboratory research and clinical investigations with associated patient care take place.

Initiating legislation	June 14, 1948.
Construction begun	November 1948.
Cornerstone laid	June 22, 1951.
Construction completed	Aug. 26, 1955.
Occupancy by NIH	November 1952 (staff).
Cost of original construction	$30,418,398
Total cost of building (cost of original construction plus cost of changes and improvements) .	$154,423,000
Gross area (sq. ft.)	2,865,296
Space allocations (sq. ft.):	
Office	284,528
Lab	271,289
Lab Support	62,789
Animal	26,573
Patient Care	299,350
General Service	257,883
Public Area	429,912
Total	1,632,324

Present use: Research hospital.

Building 10A

History: Building 10A, the "Surgical Wing," was constructed to house research facilities for cardiac and neurosurgery, associated research laboratories, and the NIH Blood Bank. As of 1990, Bldg. 10A has been renovated to house small animals under the AAALAC program.

Initiating legislation	1957 appropriation act.
Construction begun	August 1959.
Construction completed	Jan. 25, 1963.
Cost of original construction	$2,112,563
Total cost of building (cost of original construction plus cost of changes and improvements)	$2,165,000
Gross area (sq. ft.)	44,704
Space allocations (sq.ft.): *Included with Building 10*	
Animal	33,064
General Service	3,702
Total	36,766

Present use: AAALAC Animal Center.

Buildings 11 and 11A-C

History: Buildings 11 and 11A provide central utility production such as compressed air, steam, chilled water for air-conditioning systems and emergency electric power. They also house vehicle wash, incineration plant and GI can-washing facilities.

Initiating legislation	June 1948 and June 1949 (11-11A).
Construction begun	January 1951.
Construction completed 11	March 1954.
11A	June 1955.
11B	1959.
11C	1961.
Occupancy by NIH 11	November 1952.
11A	May 1953.
11B	1959.
11C	1961.
Cost of original construction	$6,240,000
Total cost of building (cost of original construction plus cost of changes and improvements)	$8,220,000
Gross area (sq. ft.)	185,782
Space allocations (sq. ft.)	
Office	2,664
Animal	1,714
General Service	87,506
Public Area	10,069
Total	101,953

Present use: Central utility production: boiler plant (11), incinerator (11A), compressors (11B-C).

Building 12

History: Building 12 was constructed to provide maintenance, overhaul, and storage facilities for NIH vehicles, and to provide general storage space. A major portion of the building has been converted to office and machine space for data processing and computer operations although the garage and fire department still are located in the building.

Initiating legislation	June 1948 and June 1949.
Construction begun	May 1949.
Construction completed	October 1950.
Occupancy by NIH	September 1950.
Cost of original construction	$897,842
Total cost of building (cost of original construction plus cost of changes and improvements) .	$1,950,000
Gross area (sq. ft.)	56,010
Space allocations (sq. ft.)	
Office	33,236
General Service	15,265
Public Area	5,619
Total	53,120

Present use: Stated above.

Building 12A

History: Building 12A was authorized to permit expansion of data processing and computer operations and eventually will be used entirely for that purpose. The building presently is used as general office space for personnel of various NIH organizations including data processing.

Initiating legislation	Aug. 14, 1962.
Construction begun	Apr. 15, 1964.
Construction completed	Sept. 8, 1965.
Occupancy by NIH	Sept. 7, 1965.
Cost of original construction	$1,563,000
Gross area (sq. ft.)	70,623
Space allocations (sq. ft.)	
Office	41,682
Lab	1,100
General Service	9,263
Public Area	13,716
Total	65,761

Present use: Stated above.

Building 12B

Cost of original construction	$2,180,000
Gross area (sq. ft.)	36,936
Space allocations (sq. ft.):	
Office	6,357
General Service	13,333
Public Area	9,554
Total	29,244

Occupants: DCRT, MBEPB, NCI, and DES.

Building 13

History: Building 13 was constructed to house facilities for general maintenance and repair work, scientific apparatus construction, stores and stock (including refrigerated food storage), and laundry and drycleaning facilities.

Initiating legislation	June 1948 and June 1949.
Construction begun	December 1950.
Construction completed	August 1952.
Cost of original construction	$3,324,232
Total cost of building (cost of original construction plus cost of changes and improvements) .	$5,382,000
Gross area (sq. ft.)	227,620
Space allocations (sq. ft.)	
Office	60,750
Lab	6,724
Lab Support	1,335
Patient Care	3,436
General Service	116,829
Public Area	30,197
Total	219,428

Present use: General maintenance and repair work (shops), planning, construction and operating staffs (DES), laundry and dry-cleaning (CC), storage and supply (DAS), instrumentation and environmental services (DRS), employee health unit (CC), Biomedical Engineering and Instrumentation Branch and Environmental Safety Branch (NCRR).

Buildings 14A-D

History: Buildings 14A through D were constructed for housing and breeding small animals, storage of animal food and bedding, cage washing and sterilization.

Initiating legislation	June 29, 1949.
Construction begun	September 1951.
Construction completed	November 1953.
Occupancy by NIH	February 1954.
Cost of original construction	$3,492,122
Total cost of building (cost of original construction plus cost of changes and improvements)	$3,818,000
Gross area (sq. ft.) (Buildings 14A-H)	254,766
Space allocations (sq. ft.) (14A-H)	
Office	13,540
Lab	3,940
Lab Support	4,481
Animal	109,363
General Service	36,979
Public Area	79,204
Total	238,471

Present use
A--office space and storage for animal food and bedding, cage washing, and sterilization.
B&C--for housing and breeding of small animals.
D--primate research holding and breeding, and primate cage washing.

Building 14E

History: Building 14E was constructed to house monkeys for polio research.

Initiating legislation	June 29, 1945.
Construction begun	September 1955.
Construction completed	January 1956.
Occupancy by NIH	February 1956.
Cost of original construction	$446,900
Total cost of building (cost of original construction plus cost of changes and improvements)	471,000
Gross area: See Buildings 14A-D.	

Space allocations: See Buildings 14A-D.

Present use: South end--central animal surgery. North end--small animal genetic monitoring, disease investigation, and nutritional studies.

Building 14F

History: Building 14F was constructed for animal housing and breeding. From 1957 to 1963 it was used for temporary office space and was called Building T-18.

Initiating legislation	July 1956.
Construction begun	December 1956.
Construction completed	September 1957.
Occupancy by NIH	September 1957.
Cost of original construction	$549,517
Total cost of building (cost of original construction plus cost of changes and improvements)	$4,432,000
Gross area: See Buildings 14A-D.	

Space allocations: See Buildings 14A-D.

Present use: Stated above.

Building 14G

History: Building 14G was constructed for animal housing and breeding. From 1957 to 1963 it was used for temporary office space and was called Building T-19.

Initiating legislation	July 1956.
Construction begun	December 1956.
Construction completed	September 1957.
Occupancy by NIH	September 1957.
Cost of original construction	$549,517
Total cost of building (cost of original construction plus cost of changes and improvements)	$710,000
Gross area: See Buildings 14A-D.	

Space allocations: See Buildings14A-D.

Present use: Houses the World Health Organization Genetic Repository for Rodents.

Building 14H

History: Building 14H was constructed for animal cage washing facilities.

Construction completed	September 1982.
Cost of original construction	$504,000
Total cost of building (cost of original construction plus cost of changes and improvements)	$504,000

Space allocations: see Bldgs. 14A-D.

Present use: Stated above.

Building T-14

History: Building T-14 was constructed for general warehouse space.

Construction costs	$82,000
Gross area (sq. ft.)	4,000
Space allocations (sq. ft.)	
General Service	4,000
Total	4,000

Present use: Storage.

Building 15A

History: Building 15A was formerly the private residence of Helen Woodward Wilson. She donated it to NIH on September 30, 1938, along with a 14.4-acre tract of land.

Cost of original construction	$9,000 est.
Total cost of building (cost of original construction plus cost of changes and improvements)	$9,000
Gross area (sq. ft.)	3,006

Present use: Office.

Buildings 15B-G

History: Buildings 15B-G are duplex housing units built as officers' quarters.

Initiating legislation	June 1938.
Construction begun	December 1938.
Construction completed	January 1940.
Occupancy by NIH	January 1940.
Cost of original construction	$38,600 each $231,600 total
Total cost of building (cost of original construction plus cost of changes and improvements)	$43,000 each $258,000 total
Gross area (sq. ft.)(Each building contains two housing units)	48,384 total

Present use: Officers' quarters.

Buildings 15H and I

History: Buildings 15H and I are single housing units constructed as officers' quarters.

Initiating legislation	June 1938.
Construction begun	December 1938.
Construction completed	January 1940.
Occupancy by NIH	January 1940.
Cost of original construction	$38,600 each $77,200 total
Total cost of building (cost of original construction plus cost of changes and improvements)	$131,000
Gross area (sq. ft.)	6,006 each 12,012 total

Present use: Officers' quarters.

Building 15K

History: Building 15K, the Wilson House, was formerly the residence of Helen Woodward and Luke I. Wilson. It was donated to NIH on March 17, 1942, along with 10.87 acres of land.

Cornerstone laid	1926.
Cost of original construction	$62,500 est.
Total cost of building (cost of original construction plus cost of changes and improvements)	$65,000
Gross area (sq. ft.)	11,670
Space allocations (sq. ft.)	
Office	4,592
Lab	141
Lab Support	797
Patient Care	1,184
General Service	2,643
Public Area	1,899
Total	11,236

Present use: Child Research Branch, NIMH.

Buildings 15L-1 and L-2

History: Buildings 15L-I were formerly the residence of Ruth F. and Luke W. Wilson and the caretakers' residence, respectively. They were acquired in the purchase of the Ruth Wilson estate (2.2409 acres) for $1,100,000 on August 5, 1993.

Gross area (sq. ft.) L-1	1,008
Gross area (sq. ft.) L-2	1,864

Present use: Electrical power vault.

Building 16

History: Building 16, "Stone House," was formerly the residence of G. Freeland Peter and Lulie Whitlock Peter. It was acquired in the purchase of the Peter estate (47.9 acres) for $505,000 on February 14, 1949.

Cornerstone laid	1930.
Occupancy by NIH	Dec. 20, 1950.
Cost of original construction	$133,500 est.
Total cost of building (cost of original construction plus cost of changes and improvements)	$661,000
Gross area (sq. ft.)	17,476
Space allocations (sq. ft.)	
Office	3,334
General Service	3,495
Public Area	8,970
Total	15,799

Present use: Office and conference space.

Building 16A

History: Building 16A, the John E. Fogarty International Center, was the residence of the Peter estate caretaker. It was acquired in the Peter estate purchase on February 14, 1949.

Occupancy by NIH	Dec. 20, 1950.
Cost of original construction	$16,000 est.
Total cost of building (cost of original construction plus cost of changes and improvements)	$77,000
Gross area (sq. ft.)	4,868
Space allocation (sq. ft.)	
Office	1,965
General Service	1,185
Public Area	926
Total	4,076

Present use: Office space, conference space, and International Visitors Center.

Buildings 17 and 17A

History: Buildings 17 and 17A were constructed to house the 13.2 kv switchgear and associated equipment necessary for power services to the NIH reservation. The buildings were designed and constructed, and are owned by Potomac Electric.

Construction completed	September 1951
Cost	$397,000
Gross area (sq. ft.)	7,651
Space allocation (sq. ft.)	
General Service	7,168
Public Area	54
Total	7,222

Present use: Electrical power vault.

Building 18

History: Physiology Section, NICHD

Cost of original construction	$328,448
Total cost plus improvements	$545,000
Gross area (sq. ft.)	4,880
Space allocations (sq. ft.)	
Office	151
Lab	2,923
Lab Support	422
General Service	294
Public Area	483
Total	4,273

Building 20

History: Building 20 was constructed as an apartment building for occupancy by certain NIH personnel.

Initiating legislation	September 1950.
Construction begun	September 1952.
Construction completed	November 1953.
Occupancy by NIH	January 1954.
Cost of original construction	$971,973
Total cost of building (cost of original construction plus cost of changes and improvements)	$1,010,000
Gross area (sq. ft.)	66,880
Space allocations (sq. ft.)	
Office	98
General Service	48,190
Public Area	11,249
Total	59,537

Present use: Apartment building.

Building 21

History: Building 21, formerly called Building T-3, was constructed to provide a segregated area for radioisotope use.

Initiating legislation	June 22, 1948.
Construction begun	November 1948.
Construction completed	December 1949.
Occupancy by NIH	June 1950.
Cost of original construction	$397,648
Total cost of building (cost of original construction plus cost of changes and improvements)	$1,010,000
Gross area (sq. ft.)	22,483
Space allocations (sq. ft.)	
Office	3,273
Lab	7,553
Lab Support	907
General Service	3,964
Public Area	3,940
Total	19,637

Present use: Segregated working area for use of radioisotopes, especially for the preparation of "tagged" compounds and their dilution to levels at which they can be safely handled in other laboratory areas.

Building 22

History: Building 22 was built to house grounds maintenance staff and equipment.

Initiating legislation	September 1950 and August 1951.
Construction begun	December 1951.
Construction completed	September 1952.
Occupancy by NIH	October 1952.
Cost of original construction	$178,524
Total cost of building (cost of original construction plus cost of changes and improvements)	$210,000
Gross area (sq. ft.)	16,842
Space allocations (sq. ft.)	
Office	1,840
General Service	13,819
Public Area	211
Total	15,870

Present use: Space for grounds maintenance staff and equipment.

Building T-23

History:-- Building T-23 was constructed as a storage facility for sand.

Construction completed	1986.
Cost of original construction.	$164,000
Total cost of building (cost of original construction plus cost of changes and improvements .	$164,000
Gross area (sq. ft.)	5,376

Space Allocations: See Bldg. 22 above.

Present use: Storage.

Building 25

History: Building 25 was constructed as a chemical storage area.

Initiating legislation	June 1949.
Construction completed	November 1953.
Cost of original construction	$85,842
Total cost of building (cost of original construction plus cost of changes and improvements)	$212,000
Gross area (sq. ft.)	8,012
Space allocations (sq. ft.)	
Office	78
General Service	5,560
Total	5,638

Present use: Chemical storage.

Building 26

History: "Building 26," was a fenced-in area. A building was erected in 1954 as a temporary chemical disposal plant. In August 1958 a permanent facility was constructed. Further improvements were made in August 1960.

Construction begun	1954.
Construction completed	1954.
Occupancy by NIH	
Cost of original construction	$5,725
Total cost of building (cost of original construction plus cost of changes and improvements)	$33,000
Gross area (sq. ft.)	151

Present use: Demolished: replaced by T-26.

Buildings 28, 28A-D

History: Building 28 was constructed to house the dog kennels and animal hospital.

Initiating legislation	June 1949.
Construction begun	September 1951 (Wing B and Building 28).
	January 1957 (Wings A, C, and D).
Construction completed	November 1953 (Wing B and Building 28).
	January 1958 (Wings A, C, and D).
Occupancy by NIH	February 1954 (Wing B and Building 28).
	February 1958 (Wings A, C, and D).
Cost of original construction	$687,869
Total cost of building (cost of original construction plus cost of changes and improvements)	$713,192
Gross area (sq. ft.)	37,596
Space allocations (sq. ft.)	
Office	1,791
Lab	3,867
Lab Support	437
Animal	16,620
General Service	1,241
Public Area	7,194
Total	31,150

Present use: 28--offices and labs for comparative medicine unit; 28A--offices and labs for comparative pathology section; 28B-D--long-term holding for large animals.

Building 29

History: Building 29 was built to provide laboratory and office space for the Division of Biologics Standards (now Center for Biologics Evaluation and Research, FDA).

Initiating legislation	1956.
Construction begun	May 26, 1958.
Construction completed	July 21, 1960.
Occupancy by NIH	Aug. 29, 1960.
Cost of original construction	$3,258,000
Total cost of building (cost of original construction plus cost of changes and improvements)	$3,272,000
Gross area (sq. ft.)	87,888
Space allocations (sq. ft.)	
Office	11,986
Lab	19,463
Lab Support	5,944
Animal	1,000
General Service	18,014
Public Area	16,265
Total	72,722

Present use: Stated above.

Building 29A

History: Building 29A was authorized to provide an increase in laboratory and office space for the Division of Biologics Standards (now CBER, FDA).

Initiating legislation	October 11, 1963.
Construction begun	March 16, 1965.
Construction completed	September 1968.
Cost of original construction	$4,771,000
Total cost of building (cost of original construction plus cost of changes and improvements)	$5,055,000
Gross area (sq. ft.)	109,772
Space allocations (sq. ft.)	
Office	6,490
Lab	15,331
Lab Support	9,935
Animal	8,657
General Service	20,852
Public Area	28,532
Total	89,797

Present use: Stated above.

Building 30

History: Building 30 was built to provide laboratory and office space for NIDR.

Initiating legislation	July 31, 1956.
Construction begun	Mar. 24, 1959.
Cornerstone laid	Sept. 21, 1960.
Construction completed	July 27, 1961.
Occupancy by NIH	May 18, 1961.
Cost of original construction	$3,447,000
Total cost of building (cost of original construction plus cost of changes and improvements)	$3,476,000
Gross area (sq. ft.)	92,601
Space allocations (sq. ft.)	
Office	9,511
Lab	20,954
Lab Support	6,891

Animal	4,703
General Service	14,708
Public Area	19,768
Total	76,535

Present use: Stated above.

Building 31

History: Building 31, the Claude D. Pepper Bldg., was constructed to provide office space for most institute directors and their immediate staffs, supporting central services for this area, and additional conference space for study sections, councils, other consultant groups, and NIH staff. Bldg. T-6 was razed in 1961 to make room for a parking lot for Bldg. 31, and Building 15L was razed in 1962 to make room for Bldg. 31.

Initiating legislation	July 31, 1956.
Construction begun	October 1959.
Cornerstone laid	Oct. 31, 1961.
Construction completed	April 1962.
Occupancy by NIH	Oct. 20, 1961.
Cost of original construction	$8,216,000
Total cost of building (cost of original construction plus cost of changes and improvements)	$14,606,000
Gross area (sq. ft.)	578,760
Space allocations (sq. ft.)	
Office	355,877
Patient Care	2,293
General Service	52,798
Public Area	127,649
Total	538,437

Present use: Stated above.

Building 32

History: Building 32 was constructed for use in NIMH investigations of biology and the biochemistry of medicinal plants.

Construction begun	July 28, 1958.
Construction completed	Oct. 26, 1959.
Cost of original construction	$121,000
Total cost of building (cost of original construction plus cost of changes and improvements)	$170,000
Gross area (sq. ft.)	4,910
Space allocations (sq. ft.)	
Lab	3,249
Lab Support	532
General Service	404
Public Area	160
Total	4,345

Present use: Stated above.

Building 34

History: Building 34 was constructed to house additional chillers for the central air conditioning system.

Initiating legislation	August 1962.
Construction begun	January 1967.
Construction completed	October 1968.
Occupancy by NIH	November 1968.
Cost of original construction	$4,629,827
Total cost of building (cost of original construction plus cost of changes and improvements)	$6,829,827
Gross area (sq. ft.)	46,660
Space allocations (sq. ft.)	
General Service	30,528
Public Area	1,414
Total	31,942

Present use: Stated above.

Building 35

History: Building 35 was constructed to provide a cafeteria to support personnel occupying facilities in the southwestern portion of the NIH reservation.

Initiating legislation	October 1963.
Construction begun	September 1965.
Construction completed	November 1968.
Occupancy by NIH	February 1969.
Cost of original construction	$878,000
Total cost of building (cost of original construction plus cost of changes and improvements)	$888,000
Gross area (sq. ft.)	46,735
Space allocations (sq. ft.)	
Office	4,719
Lab	1,098
Lab Support	4,030
General Service	22,133
Public Area	13,484
Total	45,464

Present use: Stated above.

Building 36

History: Building 36, named for Lowell P. Weicker, was constructed to provide NIMH and NINDS with laboratory and office space.

Initiating legislation	October 1963.
Construction begun	September 1965.
Construction completed	November 1968.
Occupancy by NIH	February 1969.
Cost of original construction	$11,592,000
Total cost of building (cost of original construction plus cost of changes and improvements)	$13,465,000
Gross area (sq. ft.)	237,984
Space allocations (sq. ft.)	
Office	22,883
Lab	66,376
Lab Support	17,559
Animal	5,439
General Service	50,506
Public Area	41,450
Total	204,213

Present use: Research.

Building 37

History: Building 37 was constructed to provide the National Cancer Institute with laboratory and office space.

Initiating legislation	October 1963.
Construction begun	September 1965.
Construction completed	November 1968.
Occupancy by NIH	February 1969.
Cost of original construction	$9,905,000
Total cost of building (cost of original construction plus cost of changes and improvements)	$9,936,000
Gross area (sq. ft.)	262,588
Space allocations (sq. ft.)	
Office	24,378
Lab	75,673
Lab Support	18,662
Animal	4,076
General Service	55,279
Public Area	57,513
Total	235,581

Present use: Stated above.

Building 38

History: Building 38 was constructed to house the National Library of Medicine, consisting of the largest collection of medical literature, and facilities for biomedical communications.

Initiating legislation	Aug. 3, 1956.
Construction begun	June 15, 1959.
Cornerstone laid.	Dec. 14, 1961.
Construction completed	Apr. 30, 1962.
Occupancy by NIH	Mar. 2, 1962.
Cost of original construction	$6,412,000
Total cost of building (cost of original construction plus cost of changes and improvements)	$6,416,000
Gross area (sq. ft.)	234,555
Space allocations (sq. ft.)	
Office	176,120
General Service	15,265
Public Area	26,844
Total	218,229

Present use: Stated above.

Building 38A

History: Building 38A was constructed to house the offices of the Lister Hill National Center for Biomedical Communications. The National Medical Audiovisuals Center transferred its headquarters here from Atlanta, Ga., and the Fogarty International Center occupies one floor.

Construction completed	June 1981.
Cost of original construction	$14,457,000
Total cost of building (cost of original construction plus cost of changes and improvements)	$14,630,000
Gross area (sq. ft.)	212,000
Space allocations (sq. ft.)	
Office	112,875
General Service	27,111
Public Area	47,811
Total	187,794

Present use: Stated above.

Building T-39

History: Two trailers were purchased as part of the Building 10 renovations. When renovations were completed, they were relocated to their present site to be used as a Fitness Center for NIH employees and families of the Clinical Center patients.

Total cost of building	$9,580
Total Area	4,946

Building 41

History: Building 41 was constructed to provide the National Cancer Institute with a facility designed for control and containment of biohazards associated with virus studies related to cancer research.

Initiating legislation	September 1965.
Construction begun	July 1966.
Construction completed	April 1969.
Occupancy by NIH	May 1969.
Cost of original construction	$3,507,000
Total cost of building (cost of original construction plus cost of changes and improvements)	$3,636,000
Gross area (sq. ft.)	124,208
Space allocations (sq. ft.)	
Office	10,699
Lab	12,408
Lab Support	4,290
Animal	2,215
Patient Care	490
General Service	37,425
Public Area	14,046
Total	81,543

Present use: Stated above.

Building T-41

History: Building T-41 was constructed to provide containment labs for the Division of Safety.

Cost of original construction plus cost of changes and improvements	$241,000
Gross area (sq. ft.)	3,556
Space allocations (sq. ft.)	
Lab	741
Lab Support	90
Animal	229
General Service	1,702
Public Area	690
Total	3,412

Present use: Containment labs.

Building 45

History: The William H. Natcher Building is the gateway to the NIH campus. This first of two intended phases includes office space for 600 extramural staff, a 1,000-seat auditorium, nine conference rooms, a 300 seat cafeteria, and below-grade parking for 450 vehicles. There are not immediate plans to build a second phase.

Initiating legislation	Fiscal year 1989.
Construction begun	October 1, 1992.
Construction completed	Dec. 22, 1994.
Occupancy by NIH	Dec. 23, 1994.
Original cost of building	$49,900,000
Cost plus improvements	$49,900,000
Gross area (sq. ft.)	460,000
Space allocations (sq. ft.)	
Office	173,000
Lab	
General Services	
Public Area	72,000
Parking	215,000
Total	460,000

Building 46

History: Building 46 was constructed to provide additional electrical service to the NIH reservation. It houses 13.2 kw switchgear and associated equipment. The building was designed and constructed and is owned by Potomac Electric.

Total cost of building	$80,000
Gross area (sq. ft.)	13,412
Space allocations (sq. ft.)	
General Service	9,942
Public Area	792
Total	10,734

Present use: Electrical power vault.

Building T-46

History: T-46, also called childkind, was constructed as an infant/toddler day care center for 2 year olds. Childkind is a licensed day-care center established in 1983 by Suburban Hospital which accepts children 2 months to 3 years old.

Cost of original construction	$333,000
Total cost of building (cost of original construction plus cost of changes and improvements)	$333,000
Gross area (sq. ft.)	3,000
Space allocations (sq. ft.)	
Office	686
Patient Care	1,410
General Service	93
Public Area	213
Total	2,402

Building 49

History: This facility was constructed to support research pertaining to child health and neurological disorders. It contains laboratory and animal research spaces, as well as support offices and meeting rooms.

Initiating legislation	December 1984
Construction begun	May 1, 1989.
Construction completed	Sept. 15, 1982.
Occupancy by NIH	Dec. 1, 1992.
Original cost of building	$59,517,000
Cost plus improvements	$59,517,000
Gross area (sq. ft.)	264,000
Space allocations (sq. ft.):	
Office	12,120
Lab	81,200
Lab support	8,400
Animal areas	52,128
General Services	46,574
Public Area	63,578
Total	264,000

Building 52

History: Building 52 was constructed to house equipment for power service for NIH. The building was designed and constructed and is owned by Potomac Electric.

Construction completed	1965.
Original cost of construction	$80,000
Gross area (sq. ft.)	672

Present use: Electrical power vault.

Building 53

History: Building 53 was constructed to house equipment for power service for NIH. The building was designed and constructed and is owned by Potomac Electric.

Construction completed	1963.
Original cost of construction	$300,000
Gross area (sq. ft.)	1,800

Present use: Electrical power vault.

Building 54

History: Building 54 was constructed to house equipment for power service for NIH. The building was designed and constructed and is owned by Potomac Electric.

Construction completed	1958.
Original cost of construction	$80,000
Gross area (sq. ft.)	168

Present use: Electrical power vault.

Building 58

History: Building 58 was built to store hazardous and flammable materials (oil tanks).

Construction completed	Oct. 20, 1977
Original cost of construction	$7,000
Space allocations (sq. ft.)	
Storage	57

Present use: Storage.

Building 60

History: Building 60, also known as the Convent, was constructed in 1923 to house the Sisters of the Visitation of Washington. The Mary Woodard Lasker Center for Health Research and Education houses the Hughes Research Scholars Program of the Hughes Medical Institute.

Original cost of building	$4,503,000
Cost plus improvements	$13,712,000
Gross area (sq. ft.)	88,720
Space allocations (sq. ft.)	
Office	8,414
Lab	1,341
General Services	34,826
Public Area	22,726
Total	67,839

Building 61

History:-- The "cottage," an attendant structure to Building 60, was built in 1923 and was housing for the Convent priest and a caretaker. It now serves management staff of the Hughes Medical Institute (Bldg. 60).

Original cost of building (includes 61A)	$62,000
Gross Area (sq. ft.)	2,244
Space allocations (sq. ft.)	
General Services	2,244
Total	2,244

Present use: Office.

Building 61A

History: Garage

Construction completed	1980.
Floors	1.5 stories.
Original cost of building	$60,000
Gross area (sq. ft.)	900

Building 62

History: Building 62, the Children's Inn at NIH, was constructed via private donations to be a "home away from home" for chronically ill children and their families, while the children are being treated at NIH.

Construction completed	June 1990
Cost of original construction	$5,000,000
Gross area (sq. ft.)	32,000

Present use: Housing.

Building 82

History: R.A. Bloch International Cancer Center was donated to NIH, December 16, 1982. The center serves as a computer library for physicians throughout the country.

Original cost of building	$1,400,000
Gross area (sq. ft.)	15,620
Space allocations (sq. ft.)	
Office	8,504
General Services	1,255
Public Area	4,724
Total	14,483

Present use: Office.

Building 104

History: This facility replaced aging and inadequate temporary buildings for small ungulates. Designed to meet AAALAC standards, it has an automated waste disposal system addressing environmental concerns posed by the disposition of fecal waste.

Initiating legislation	
Construction begun	Nov. 3, 1993.
Construction completed	March 12, 1996.
Occupancy by NIH	March 13, 1996.
Original cost of building	$2,269,400
Cost plus improvements	$2,662,495
Gross area (sq. ft.)	11,235

Space allocations (sq. ft.)	
Office	12,120
Animal areas	8,812
Lab	98
Lab support	183
General Services	256
Public Area	775
Total	10,124

Building 132

History: In 1987 Congress decided to make the NIH Animal Research Facility a state-of-the-art model for the industry. Building 132 is an indoor-outdoor facility to house large research primates.

Construction begun	April 21, 1994.
Construction completed	Oct. 12, 1995.
Occupancy by NIH	Oct. 20, 1995.
Original cost of building	$857,000
Cost plus improvements	1,185,623
Gross area (sq. ft.)	5,000
Space allocations (sq. ft.)	
Office	156
Lab	
Lab support	
Animal areas	3,405
General Services	520
Public Area	440
Total	4,521

Multi-Level Parking-6

History: Building MLP-6 was constructed to provide parking spaces for occupants of Buildings 35, 36 and 37.

Construction begun	July 1969.
Construction completed	July 1971.
Cost of original construction	$1,751,000
Total cost of building (cost of original construction plus cost of changes and improvements)	$1,886,000
Gross area (sq. ft.)	267,624
Space allocations (sq. ft.)	
Parking spaces	800

Multi-Level Parking-7

History: MLP-7 was built to provide additional parking for employees in Buildings 38 and 38A.

Construction completed	May 1980.
Cost of original construction	$1,430,000
Total cost of building (cost of original construction plus cost of changes and improvements)	$1,650,000
Gross area (sq. ft.)	156,000
Space allocations (sq.ft.)	
Parking spaces	371

Multi-Level Parking-8

History: This facility was constructed to service the parking of the occupants of Buildings 49 and 29B.

Initiating legislation	December 1984
Construction begun	July 1, 1992.
Construction completed	Dec.15, 1993.
Occupancy by NIH	Dec.15, 1993.
Cost of original construction	$9,840,180
Total cost of building (cost of original construction plus cost of changes and improvements)	$10,351,760
Gross area (sq. ft.)	464,600
Space allocations (sq. ft.)	
Parking spaces	1,573

Acquisition of Land

Method and source of acquisition	Date acquired	Number of	Original esti-

Summary Data on Buildings

Building	Date of completion	Cost of original construction	Total cost[1]	Gross floor area (sq. ft.)
1	December 1938	$ 680,746	$ 865,000	95,948
2	December 1938	327,996	682,000	47,979
T-2	1951	2,000	2,000	495
3	December 1938	327,996	791,000	48,285
4	May 1941	554,573	14,151,000	103,157
5	April 1941	554,573	997,000	71,735
6	September 1939	659,761	1,831,000	74,196
6A	December 1976	833,448	2,471,000	21,720
6B	August 1990	8,462,000	8,462,000	51,142
7	May 1947	1,192,634	1,335,000	49,972
8	December 1945	199,614	5,931,000	58,097
8A	November 1986	9,426,000	14,278,698	40,702
9	February 1943	197,451	810,000	37,682
10	August 1955	30,418,308	154,413,000	2,805,296
10A	January 1963	2,112,563	2,165,000	44,704
11	March 1954	[2]6,240,000	[2]8,220,000	[2]185,782
12	October 1950	897,842	1,950,000	56,010
12A	September 1965	1,559,564	1,563,000	70,623
12B	June 1979	2,180,000	2,180,000	36,936
13	October 1952	3,324,232	5,382,000	227,620
14A	November 1953	1,688,359	1,881,000	74,639
14B	November 1953	579,000	579,000	26,312
14C	November 1953	579,000	579,000	26,312
14D	November 1953	645,509	779,000	29,328
14E	January 1956	446,900	471,000	26,650
14F	September 1957	549,517	4,432,000	27,905
14G	September 1957	549,517	710,000	26,388
14H	August 8, 1962	504,415	504,000	8,440
T-14	October 1978	82,000	82,000	4,000
15A	September 1938	9,000	9,000	3,006
15B1, B2	January 1940	38,600	43,000	8,064
15C1, C2	January 1940	38,600	43,000	8,064
15D1, D2	January 1940	38,600	43,000	8,064
15E1, E2	January 1940	38,600	71,000	8,064
15F1, F2	January 1940	38,600	43,000	8,064
15G1, G2	January 1940	38,600	43,000	8,064
15H	January 1940	38,600	43,000	6,006
15I	January 1940	38,600	88,000	6,006
15K	March 1942	62,500	65,000	11,670
15L-1	.....	.....	.....	1,003
15L-2	.....	.....	.....	1,864
16	February 1949	133,500	551,000	17,476
16A	February 1949	16,000	77,000	4,783
17*	Owned by Pepco	.....	397,000	7,651
18	August 1973	328,448	545,000	4,800
20	November 1953	971,973	1,010,000	66,880
21	December 1949	397,643	1,010,000	22,483
22	September 1952	178,524	210,000	15,810
T-23	1986	164,000	164,000	5,376
25	November 1953	95,842	212,000	8,012
26	1954	5,725	33,000	151
28	November 1953	658,000	658,000	30,030
28A	November 1953	55,000	55,000	7,546
29	July 1960	3,258,000	3,272,000	87,898
29A	September 1968	4,771,000	5,055,000	109,772
30	July 1961	3,447,000	3,476,000	92,601
31	April 1962	8,216,000	14,606,000	578,760
32A	October 1959	121,000	170,000	4,910
34	June 1968	2,400,000	6,829,827	46,680
35	November 1968	878,000	893,000	46,735
36	November 1968	11,592,000	13,465,000	237,934
37	November 1968	9,905,000	9,936,000	262,588
38	April 1962	6,412,000	6,416,000	234,555
38A	June 1981	14,457,000	14,630,000	212,000
T-39	May 31, 1985	9,500	9,500	4,946
41	April 1969	3,507,000	3,636,000	124,208
T-41	December 1980	241,000	241,000	3,526
46*	July 26, 1969	80,000	80,000	13,412
T-46	1987	333,000	333,000	3,000
52*	August 1965	80,000	80,000	672
53*	June 1963	304,000	304,000	1,800
54*	January 1958	80,000	80,000	168
58	October 1977	7,000	7,000	57
60	December 1983	4,503,000	13,712,000	88,700
61[3]	December 1983	62,000	62,000	2,224
61[3]	December 1983	(included in 61)	60,000	900
62	June 1990	5,000,000	5,000,000	32,000
82	donated			
	December 1982	1,400,000	1,400,000	15,620
MLP6	April 1971	1,751,000	1,886,000	267,624
MLP7A	May 1980	1,430,000	1,650,000	156,000

[1]Includes cost of original construction plus cost of changes and improvements.
[2]Includes 11, 11A, 11B and 11C.
[3]Purchased as part of Convent, Bldg 60.
*Transformer vaults.

Summary Data on Buildings--NIH Animal Center

Building	Date of completion	Cost of original construction	Total cost	Gross floor area (sq. ft.)
T-1	May 1960	$ 17,500	$ 18,000	4,864
T-2	May 1960	5,000	5,000	4,060
T-5	July 1960	1,666	4,000	2,200
T-6	May 1960	3,500	8,000	1,472
T-7	1960	1,000	1,000	300
T-8	February 1962	118,944	349,424	20,754
T-10	January 1968	26,000	26,000	1,920
T-11	November 1967	114,916	146,000	1,024
T-12	February 1975	6,000	6,000	1,456
T-13	February 1975	9,000	9,000	2,080
T-14	August 1979	173,000	173,000	6,000
T-15	1976	40,000	40,000	1,200
T-16	1978	40,000	40,000	1,200
T-18	1983	175,000	175,000	2,177
T-21	.....	.....	.....	720
T-22	November 1988	24,271	24,271	980
T-20	.....	10,000	10,000	1,728
T-24	1984	5,000	5,000	600
T-25A	1989	1,000	1,000	140
T-25B	1989	1,000	1,000	140
T-25C	.....	1,000	1,000	140
T-25	.....	500	500	72
100	January 1967	500,000	500,000	58,837
101	January 1967	623,000	623,000	10,640
102	January 1967	1,060,000	1,060,000	54,500
103	June 1972	836,684	860,000	22,018
107	July 1972	477,000	477,000	772
110	June 1972	297,046	318,000	7,817
110A	January 1989	1,440,000	1,560,525	7,000
111	June 1972	176,738	198,000	4,651
112	February 1968	123,074	146,000	8,282
115	June 1974	24,000	24,000	345
116	January 1967	31,000	31,000	2,400
117	January 1967	31,000	31,000	2,400
127	February 1968	91,000	91,000	1,456
128	September 1967	108,000	108,000	1,620
130	April 1977	29,000	29,000	1,020
131	December 1968	12,000	12,000	286
Reservoir	January 1967			
Water fowl habitat	June 1972	36,115	36,115	[4]

[4]3 acres.

Method and source of acquisition	Date acquired	Number of acres	Original estimated value or actual cost	Buildings now located on parcel
National Institutes of Health				
Bethesda, Md.				
Donated by Helen Woodward Wilson and Luke I. Wilson. Consideration $10.	Deed dated 8-10-35; recorded 9-11-35.	44.956	[1]$74,932	1, 2, 3, 4, 5, 7, 8, 9, 10 (part), 17, 21.
Donated by Helen Woodward Wilson Consideration $10.	Deed dated 5-28-38; recorded 6-20-38.	10.65	[1]17,670	6, 15D, 15E, 15G.
Donated by Helen Woodward Wilson Consideration $1.	Deed dated 9-30-38; recorded 10-1-38.	14.437	[1]24,055	15A, 15B, 15C, 15F, 15H, 15I.
Donated by Helen Woodward Wilson	Deed dated 9-27-40; recorded 9-27-40.	11.583	[1]19,304	31.
Donated by Helen Woodward Wilson Consideration $5.	Deed dated 3-17-42; recorded 3-28-42.	10.87	[1]18,120	15K.
Purchased from Sisters of Visitation	Condemnation judgment issued on declaration of taking 9-23-48. Receipt of final payment acknowledged 6-28-49.	50.1461	173,058	10 (part), 10A, 20.
Purchased from G. Freeland Peter and Lulie Whitlock Peter	Deed dated 2-14-49.	47.9028	505,000	11-11A (part), 11B-D, 12, 12A, 12B, 13 (part), 14B-D (part), 14F-H (part), 16, 16A, 17A, 22, T-22, 25, 26.
Purchased from Town & Country Golf Club, Inc.	Deed dated 2-11-49; recorded 2-14-49.	115.84	600,000	11-11A (part), 13 (part), 14A, 14B-D (part), 14E, 14F-H (part), 14T, 18, 28A-D, 29, 29A, 30, 31, 32, 34, 35, 36, 37, 38, 38A, T-39, 41, 41T, 46, T-46, MLP-6, MLP-7A, 52, 53, 54.
Donated by Richard and Annette Bloch, Mr. and Mrs. Kenneth Jonsson, Alan I. Kay, Abe and Irene Pollin, Mr. and Mrs. J. Allan Sheehan, the Wald Foundation--in memory of Alex Wald, and other donors to the NCI Gift Fund.	December 16, 1982	2.8	1,400,000	82
Purchased Convent of Sisters of Visitation of Washington, D.C	November 16, 1983	11.0	4,500,000	60, 61, 61A.
Purchased from Ruth F. Wilson estate	Deed dated 8-5-93; recorded 8-10-93	2.2409	1,100,000	15L-1, 15L-2.
Field Stations				
NIH Animal Center, Poolesville, Md.				
Purchased from Harold E. Luber, Rhoda Luber and Isador Bril	Deed dated 5-6-60; recorded 5-11-60.	498.98	108,300	100, 101, 102, 103, 107, 110, 110A, 111, 112, 115, 116, 117, 127, 128, 129, 130, 131, T-1, T-2, T-5, T-6, T-7, T-8, T-10, T-11, T-12, T-13, T-14, T-15, T-16, T-19, T-21, T-22, T-24.
Purchased from Bernard N. Siegel	Civil No. 15332 judgment on the declaration of taking. Filed 2-24-64. Final settlement 4-11-67.	13.894	9,267	None.
Gerontology Research Center, Nathan W. Shock Laboratory, Baltimore, Md.				
Donated by Baltimore City	Deed dated 12-6-62; recorded 2-1-63.	4.945	[2]99,000	Gerontology facility valued at $7,890,691 with 210,000 sq. ft.
Rocky Mountain Laboratory, Hamilton, Mont.				
Quit Deed from State of Montana (Parcel A)	Deed dated 12-17-31; recorded 1-27-32.	2.70		
Quit Deed from Valley Mercantile Company (dissolved) (Parcel)	Deed dated 9-23-37	0.06		
Purchased from Valley Mercantile Company (Parcel B)	Deed dated 6-9-34	1.29		
Purchased from City of Hamilton (Parcel D)	Deed dated 10-5-37	0.75		
Purchased from William A. Bower (Parcel E)	Deed dated 3-11-39	27.76		
Purchased from Wm. & Anna Grimes (Parcel F)	Deed dated 3-24-39	0.64		
Total		33.20	$86,423	Buildings valued at $2,680,229 with 143,876 sq. ft.
Puerto Rico				
Sabana Seca				
Transferred from Department of the Navy	Transferred 6-14-67	270		[2]358,861 (8 buildings valued at $307,748 with 11,769 sq. ft., roads $16,600, land $75,181.)

		acres	mated value or actual cost	Buildings now located on parcel
Research Triangle Park, N.C.				
Donated by the Research Triangle Foundation of North Carolina	Deed dated 6-26-67; recorded 9-28-67.	376.8		Land valued at $16,900,000
Leased property	Buildings leased or owned by U.S. Government on leased property.	30.3		17 buildings valued at $11,800,000 with 100,000 sq. ft.
Frederick Cancer Research Facilities Frederick, Md.				
Transferred from U.S. Army	Transferred 9-30-77	68.63		59 buildings (valued at $27,317,212 with 792,634 sq. ft., roads, $235,500 and land, $28,499.)
Perrine, Fla.	Transferred 7-1-83	58.5		3 buildings (valued at $1,190,000 and land, $2,295,000.
New Iberia, La.	Transferred 9-72	27.29		1 building, 1 shed, 42 large corncribs (valued at $925,000 and land, $2,610,350 for a total of $3,535,350.)

[1]Estimated value obtained from Montgomery County assessment records.
[2]Estimated value.

The R. E. Dyer Lectures

Estimated Cost[1] of Facilities Serving NIH Buildings

Facility	Cost
Fences	$
Water distribution systems	128,045
Chilled water distribution system	9,515,700
Gas distribution system	35,252
Compressed air distribution system	10,480
Electrical distribution system	2,233,853
Steam distribution system	649,600
Sanitary sewer system	218,748
Storm sewer system	465,021
Chemical disposal	37,327
Surface areas:	
Roadways and related bridges	130,000
Sidewalks and related bridges	142,000
Parking areas	953,000
Tennis courts	
Total	$14,669,386

[1]Actual cost of facilities was used when available. However, the construction cost of a building or group of buildings included the facilities serving those buildings, in which case cost was estimated at prices applicable at the time of construction, and the estimated cost of facility was deducted from the cost of the building.
Source: DES PCB.

Estimated Cost of Facilities Serving NIH Animal Center Buildings

Facility	Cost
Fences	$
Water distribution system, including hydrants and wells	160,900
Water storage tower	73,550
Chilled water distribution system	65,000
Well houses and 4 wells	18,092
Electrical distribution system	431,709
Steam distribution system	215,527
Sanitary sewer system	700,990
Storm sewer system	132,194
Surface areas:	
Roadways and related ridges	20,500
Total	$ 1,818,462

Utilities[1]

(Fiscal year 1996)

Utility	Cost
Heating (fuel oil)	$ 6,712,380
Water	5,614,976
Electricity	20,506,724
Gas (natural)	3,891,155
Propane	24,734
Deionized water	13,473
Telecommunications (includes telephone, data and teletype equipment charges, commercial toll charges, FTS service, field stations, FAX, LAN's, construct digital switch, and reimbursable charges)	47,863,175
Total	$ 84,626,617

[1]Utility costs for the NIH reservation at Bethesda, Md., and the NIH Animal Center, Poolesville, Md.
Sources: FEB, DES Telecommunications Branch, DAS.

NIH Leased Facilities

(As of Sept. 30, 1997)

Federal Building, 7550 Wisconsin Avenue, Bethesda, Md.
Total leased area ..... 103,544 sq. ft.
Use ..... Office.

NIEHS Warehouse, Durham Raleigh Rd., Research Triangle Park, N.C.
Total leased area ..... 22,470 sq. ft.
Use ..... Warehouse.

Executive Plaza, 6120 & 6130 Executive South, Rockville, Md.
Total leased area ..... 260,500 sq. ft.
Use ..... Office.

Twinbrook No. 1, 5640 Fishers La., Rockville, Md.
Total leased area ..... 9,727 sq. ft.
Use ..... Laboratory, Office.

Research Commons, 79 Alexander Dr., Triangle Park, N.C.
Total leased area ..... 10,707 sq. ft.
Use ..... Office.

Triangle Service Center, Inc., Research Triangle Park, N.C.
Total leased area ..... 42,096 sq. ft.
Use ..... Animal, Laboratory, Office.

National Capital Area Council, -- Boy Scouts of America, 9190 Wisconsin Ave., Bethesda, Md.
Total leased area ..... 6,244 sq. ft.
Use ..... Clinic.

Park Building, 12420 Parklawn Drive, Rockville, Md.
Total leased area ..... 19,745 sq. ft.
Use ..... Laboratory, Office.

Solar Bldg., 6003 Executive Blvd., Rockville, Md.
Total leased area ..... 98,969 sq. ft.
Use ..... Office.

Waltham Federal Center, --Waltham, Mass.
Total leased area ..... 300 sq. ft.
Use ..... Storage.

Twinbrook No. 2, 12441 Parklawn Dr., Rockville, Md.
Total leased area ..... 49,685 sq. ft.
Use ..... Laboratory, Office.

8601 Old Georgetown Road ,Bethesda, Md.
Total leased area ..... 3,098 sq. ft.
Use ..... Clinic.

5 Research Court, Rockville, Md.
Total leased area ..... 43,950 sq. ft.
Use ..... Laboratory.

Gateway, 7201 Wisconsin Ave., Bethesda, Md.
Total leased area ..... 34,703 sq. ft.
Use ..... Office.

6100 Executive Blvd., Rockville, Md.
Total leased area ..... 104,575 sq. ft.
Use ..... Office.

9610 Medical Center Dr., Rockville, Md.
Total leased area ..... 12,717 sq. ft.
Use ..... Laboratory.

Flow Building, 12501 Washington Av., Rockville, Md.
Total leased area ..... 23,128 sq. ft.
Use ..... Laboratory, Office.

G Building, 5510 Nathan Shock Dr., Baltimore, Md.
Total leased area ..... 9,769 sq. ft.
Use ..... Laboratory, Animal.

Triad Building, 333 Cassell Dr., Baltimore, Md.
Total leased area ..... 10,444 sq. ft.
Use ..... Laboratory, Animal.

ARC Building C, 4940 Eastern Av., Baltimore, Md.
Total leased area ..... 100,000 sq. ft.
Use ..... Laboratory, Office.

Commercial Park West Bldg., 2327 Englert Dr., Durham, N.C.
Total leased area ..... 10,047 sq. ft.
Use ..... Office.

Willco Bldg., Rockville, Md.
Total leased area ..... 41,430 sq. ft.
Use ..... Office.

Gaither Distribution Center, 16050 Industrial Dr., Gaithersburg, Md.
Total leased area ..... 148,771 sq. ft.
Use ..... Warehouse.

6011 Executive Blvd., Rockville, Md.
Total leased area ..... 16,995 sq. ft.
Use ..... Office.

301 N. Stonestreet Ave., Rockville, Md.
Total leased area ..... 48,159 sq. ft.
Use ..... Office, light industrial.

Rockledge Center I & II Buildings, 6701-6705 Rockledge Dr., Bethesda, Md.
Total leased area ..... 250,306 sq. ft.
Use ..... Office.

Twinbrook Metro Plaza, 12300 Twinbrook Pkwy, Rockville, Md.
Total leased area ..... 5,775 sq. ft.
Use ..... Clinic.

Part 6
Field Units

Gerontology Research Center, NIA
Baltimore, Md.

The Gerontology Research Center, initially part of the National Heart Institute, was transferred to the National Institute of Child Health and Human Development in December 1965 and to the new National Institute on Aging in July 1975. It is the setting for the bulk of the NIA intramural research programs.

With the transfer of this center, aging and research training activities of NIH, except neurosciences, were consolidated in NIA.

Located on the grounds of the Johns Hopkins Bayview Medical Center, GRC's laboratories emphasize investigation of the basic biological mechanisms of aging description and interpretation of age changes in the various organ systems of human beings and characterization and explanation of overall changes in performance and behavior which accompany the aging process. Its programs encompass a longitudinal study of some 1,100 healthy men and women, ranging in age from the twenties to the nineties. These volunteers come to Baltimore every 2 years for 2½ days of testing to measure individual age changes.

A multimillion-dollar Gerontology Research Center building was completed and opened in June 1968. The facilities and resources available at this center are the most comprehensive in the country committed to research in aging. The center serves as a regional and national focal point for research in aging, and training in gerontology and geriatrics.

Rocky Mountain Laboratories, NIAID
Hamilton, Mont.

The earliest studies of Rocky Mountain spotted fever were begun at this laboratory in 1902. It was formally established as a PHS field station in 1921. Although the Rocky Mountain Laboratory remains a center for the study of medically important tick-borne diseases and diseases transmissible from animals to man, a recent reorganization has diversified the laboratory focusing research on the basic cellular level.

In March 1979 three new laboratories were established at the RML facility: the Laboratory of Microbial Structure and Function, the Laboratory of Persistent Viral Diseases, and the Laboratory of Pathobiology. In 1990 the latter was renamed the Laboratory of Vectors and Pathogens, and a new Laboratory of Intracellular Parasites was established. Scientists in these laboratories conduct studies on the natural history and epidemiology of sexually transmitted bacterial diseases, slow virus diseases, rickettsial diseases such as Rocky Mountain spotted fever and Lyme disease. RML investigators are also carrying out research at the molecular level on the problems of host-microbe relationships, as well as developing new diagnostic techniques and vaccines for a variety of infectious diseases.

NIH Animal Center, NCRR
Poolesville, Md.

The Veterinary Resources Program operates a specialized laboratory animal center situated on 513 acres of farmland located 8 miles southwest of Poolesville, Md., near the Potomac River. The cost of the land, purchased in 1960, was $146,689. A construction program, ultimately to provide permanent buildings and associated facilities costing $18 million, began in 1963. The first phase was completed in May 1965 and included a farm animal building, a kennel building, and a powerplant, together with necessary water, sewers, electric power, steam, chilled water, and paved access roads. Two dwellings were also constructed for resident personnel. A building for research holding as well as quarantine and conditioning of nonhuman primates was completed in May 1971. Also finished were buildings being used by the National Institute of Mental Health for its Laboratory of Brain Evolution and Behavior.

The Animal Center is a major extension of animal holding and production facilities at Bethesda. Programs of the institutes include studies of animal behavior, conduct of immunologic procedures and sampling, and surgical investigation in larger animals. The size and character of the animal population varies in response to changes in research programs. The species kept at the NIH Animal Center (in descending order of population size) are nonhuman primates, dogs, sheep, swine, cats, goats, birds, burros, horses, and cattle.

Part 7
Lectures and Nobel Laureates

To honor Dr. Rolla Eugene Dyer, former NIH director, the R. E. Dyer Lectureship was founded when he retired in September 1950. Lectureship awards are made for outstanding contributions to medical or biological knowledge, and the recipient chooses his subject. The following lectures have been given.

June 21, 1951
"Genetic Control of Metabolism"
George W. Beadle

October 29, 1952
"The Virus and the Cell"
Sir F. MacFarlane Burnet

October 22, 1953
"The Gold-Headed Cane in the Laboratory"
Rene J. Dubos

November 17, 1954
"Recent Observations on the Behavior of Tissue Culture of Certain Viruses Pathogenic for Man"
John Franklin Enders

January 31, 1956
"The Properdin System"
Louis Pillemer

February 19, 1957
"The Natural History of Plague and Psittacosis""
Karl F. Meyer

November 5, 1957
"Influenza: History, Epidemiology and Speculation"
Richard E. Shope

December 16, 1958
"Microbial Persistence and Latency"
Walsh McDermott

December 1, 1959
"Immunofluorescence"
Albert H. Coons

November 15, 1960
"Epidemiologic Models in Vector-Borne Disease Studies"
George Macdonald

January 10, 1962
"Messages in Macromolecules"
Rollin D. Hotchkiss

April 24, 1963
"How Does a Virus Work"
Salvador E. Luria

April 29, 1964
"The Malignant Transformation of Cells by Viruses"
Harry Rubin

April 7, 1965
"The Territory of Epidemiology"
Alexander D. Langmuir

April 27, 1966
"Viral Oncogenesis or Subversion at the Cellular Level"
Karl Habel

April 26, 1967
"Development and Involution of Lymphoid Tissue and Immunologic Capacities"
Robert Alan Good

April 24, 1968
"Test-tube Studies of a Self-Duplicating RNA Molecule"
Sol Spiegelman

April 9, 1969
"Viral and Cellular Interactions: The Mechanisms of Actions of Supraoptimal Temperature on the Development of Poliovirus"
André Lwoff

December 17, 1969
"Cell Selection and Cooperation in the Immune Response"
Baruj Benacerraf

May 12, 1971
"Mechanism of Cell Transformation by DNA and RNA Tumor Viruses"
Maurice Green

April 19, 1972
"The Inflammatory Response: Appreciation of Amplification and Control Mechanisms"
K. Frank Austen

January 24, 1973
"Influenza: The Last of the Great Plagues--Genetic Approaches to the Understanding and Control of an Infectious Disease"
Edwin K. Kilbourne

February 6, 1974
"The Replication and Possible Origin of RNA Viruses With a DNA Polymerase"
Howard M. Temin

November 6, 1974
"Kuru"
D. Carleton Gajdusek

September 29, 1976
"Selective Expression of *I* Region Genes in Lymphocyte Subpopulations"
Hugh O. McDevitt

May 31, 1978
"Influenza Virus: Recent Insights and Prospects for Effective Control"
Robert M. Chanock

October 18, 1978
"Gene Transfer in Mammalian Cells"
Frank Ruddle

March 14, 1979
"Structural and Genetic Approaches to the Study of Antibody Complementarity"
Elvin A. Kabat

February 25, 1981
"Somatic Variation in Immunoglobulin Production by Mouse Myeloma Cells"
Matthew D. Scharff

May 12, 1982
"The Three-Dimensional Structure of the Antibody Molecule: Specificity and Diversity"
Michael Potter, David Davies

December 14, 1983
"Human Tumor Viruses: The Search for Some Is Over"
Robert C. Gallo

May 1, 1985
"Malaria: Cell Surface Proteins as Receptors and Immunogens"
Louis H. Miller

April 23, 1986
"The Immunoglobulin Gene Superfamily and Biological Instrumentation"
Leroy E. Hood

March 11, 1987
"Molecular Basis of Viral Virulence"
Bernard N. Fields

May 18, 1988
"Mechanism of Peptide Hormone Signalling: An Immunological Gene Model"
Marian E. Koshland

February 14, 1990
"Petroviruses: Where did They Come From, and Where Are They Going?"
Malcolm A. Martin

May 7, 1991
"A Comparative Analysis of T Cell Development"
Max D. Cooper

April 14, 1992
"The Alpha Beta T Cell Repertoire in Health and Disease"
Philippa Marrack

January 4, 1995
"Macromolecular Associations and Signal Transduction"
Henry Metzger

NIH Lectures

The NIH Lecture series was established to facilitate interchange of information and to give appropriate recognition for outstanding scientific accomplishment. Since January 1953, the various institutes and the Office of the Director have sponsored lectures. The series has been planned to recur each year, with the lectures published and distributed to scientific libraries, universities, medical schools, and other appropriate depositories. Lectures are open to the scientific staff at NIH and at other medical, teaching, and research institutions in the Washington, D.C., area. As part of the NIH Lecture series, an annual G. Burroughs Mider Lectureship Award was established in 1968 in honor of the first NIH director of laboratories and clinics, to be presented by a member of the NIH intramural staff in "recognition and appreciation of outstanding contributions to biomedical research." An asterisk (*) indicates a Mider Lecture. The following lectures have been given.

January 21, 1953
"Tricarboxylic Acid Cycle: Enzymatic Mechanisms"
Severo Ochoa

September 24, 1953

"Enzymatic Analysis of the Structure of Starch and Glycogen"
Carl F. Cori

September 30, 1954
"The Natural History of Changing One"s Job"
Alan Gregg

December 16, 1954
"Avirulent Strains of Poliomyelitis Virus--Segregation, Characterization, Role in Nature, and Potential Usefulness for Human Immunization"
Albert B. Sabin

May 31, 1955
"Some Recent Developments Concerning the Chemical Transmission of Nervous Effects"
Sir Henry Hallett Dale

May 1, 1957
"The Nature of Molecular Disease"
Linus Pauling

January 22, 1958
"Relation of Physical Science to Life Science: Communication Theory"
W. O. Baker

May 14, 1958
"Bioenergetics"
Albert Szent-Gyorgyi

October 7, 1958
"The Energy Exchanges Involved in Muscular Contraction and Nerve Conduction"
Archibald Vivian Hill

May 5, 1959
"The Biochemical Evolution of Vision"
George Wald

October 13, 1959
"Biosynthesis of Deoxyribonucleic Acid (DNA)"
Arthur Kornberg

February 9, 1960
"Biosynthesis in Human Cell Cultures"
Harry Eagle

April 26, 1960
"From Fish to Philosopher"
Homer W. Smith

May 18, 1960
"The Biologist Examines the Mind and Behavior"
Seymour S. Kety

October 4, 1960
"Conscious Experience--What the Brain Records and Where"
Wilder Penfield

December 14, 1960
"An Enzymatic Approach to Nucleic Acid Chemistry"
Leon A. Heppel

January 25, 1961
"Inquiries Concerning the Fine Structure of Protein Molecules"
John T. Edsall

March 15, 1961
"Viruses, Common Colds and Cancer"
Robert J. Huebner

November 15, 1961
"Endocrine Aspects of the Cancer Problem"
Roy Hertz

February 28, 1962
"Relationship Between Structure and Host Reactive Properties of Microorganisms"
Edgar Ribi

April 25, 1962
"Photosynthesis"
Melvin Calvin

October 17, 1962
"Status of Transuranium Elements"
Glenn T. Seaborg

December 12, 1962
"Intercellular Infection and the Carrier State"
Joseph E. Smadel

February 27, 1963
"The History and Natural History of Gout"
DeWitt Stetten, Jr.

September 5, 1963
"Cardiovascular Surgery--Past and Present""
Alfred Blalock

December 4, 1963
"On the Nature of the RNA Code"
Marshall W. Nirenberg

February 5, 1964
"Studies in the Sociology of Science"
Robert E. Merton

February 19, 1964
"Controlling Elements and Regulatory Circuits in Cellular Metabolism"
Jacques Monod

October 20, 1964
"Some Biological Implications of Protein Structure"
Christian B. Anfinsen

December 15, 1964
"Research in Education"
Jerome Wiesner

January 13, 1965
"Giant Nerve Fibres"
Alan L. Hodgkin

October 20, 1965
"Tissue Remodeling Mechanisms in Amphibian Metamorphosis"
Jerome Gross

December 8, 1965
"Tissue Transplantation: Past, Present and Future"
Rupert E. Billingham

February 9, 1966
"Quantitative Measures of Size and Significance and Relatedness of Scientific Literature"
Derek de Solla Price

November 2, 1966
"The Cellular Regulation of Branched Biosynthetic Pathways"
Earl R. Stadtman

December 7, 1966
"The Natural History of Some Small Brains"
Caryl Parker Haskins

February 8, 1967
"Recent Studies on Microsomes"
George E. Palade

October 25, 1967
"The Pineal Gland, a Biological Clock"
Julius Axelrod

December 13, 1967
"Developmental Biology: The Richness of New Opportunity"
James D. Ebert

February 21, 1968
"Operant Conditioning and the Management of Human Behavior"
Burrhus F. Skinner

October 30, 1968
"On the Synthesis and Functions of Glutamine and Asparigine"
Alton Meister

December 11, 1968*
"Control of Gene Activity in Higher Organisms"
Gordon M. Tomkins

February 12, 1969
"The Role of Mathematical Models in Sciences"
Mark Kac

March 11, 1970*
"Tumor Antigens: Their Origins, Characteristics and Significance"
Lloyd W. Law

April 22, 1970
"Genetic Dissection of Visual Behavior in Drosophila"
Seymour Benzer

October 21, 1970
"Viewing Living Synapses and Exploration of the Chemosensitivity of the Neuronal Surface"
Stephen William Kuffler

December 2, 1970
"Fructose Diphosphatase and the Control of Gluconegenesis"
Bernard L. Horecker

December 16, 1970*
"Genetic Mismanagement of Complex Lipids"
Roscoe O. Brady

October 7, 1971
"The Analysis of Malignancy by Cell Fusion"
Henry Harris

January 19, 1972
"The Replication of Single-Stranded DNA Bacteriophages: Facts and Riddles"
Robert L. Sinsheimer

February 9, 1972*
"Survival Mechanisms of the Triune Brain: Some Hopeful Aspects"
Paul D. MacLean

March 15, 1972
"Science and Trans-Science"
Alvin M. Weinberg

October 25, 1972
"Tensile Water"
Per F. Scholander

November 8, 1972
"Behavior of Chimpanzees and Their Natural Habitat"
Jane Goodall

March 14, 1973*
"Genetic Factors in the Transmission and Expression of Murine Leukemia Virus"
Wallace P. Rowe

April 11, 1973
"The Hormones of the Hypothalamus"
Roger Guillemin

October 17, 1973
"The Changing Significance of Territoriality in Human Societies"
Margaret Mead

November 7, 1973*
"Cyclic AMP and the Transformation of Cells"
Ira H. Pastan

December 12, 1973
"Probing Into Immunological Phenomena: From Molecule to Cell"
Michael Sela

March 20, 1974
"Some Phases of Oxidative Hydroxylation of Steroids in the Animal Organism"
Percy Julian

April 24, 1974
"The Prostaglandins-Bioregulators With Clinical Implications"
Sune Bergström

October 9, 1974*
"Inherited Lysosomal Disorders Studied in Cell Culture"
Elizabeth Neufeld

March 26, 1975

"Ion Transport in Reconstituted Systems and in Cancer Cells"
Efraim Racker

April 9, 1975
"Visual Deprivation and Its Effects on the Monkey Striate Cortex"
Torsten N. Wiesel

September 10, 1975*
"Collagen: Its Chemistry, Structure, and Function"
Karl A. Piez

November 17, 1976
"Dissections and Reconstruction of the SV40 Genome"
Paul Berg

December 8, 1976
"Cell Surface Modulation"
Gerald Edelman

March 2, 1977
"Early Man"
Mary Leakey

May 18, 1977*
"Monkey Business: Sequences in the Monkey Genome and Their Interaction With Simian Virus 40 DNA"
Maxine F. Singer

November 2, 1977*
"A Close and Surprising Look at the Mammalian Genome"
Philip Leder

March 29, 1978
"Cellular Insights Into Behavior and Learning"
Eric Kandel

May 10, 1978
"Total Synthesis of a Biologically Functional Gene"
Har Gobind Khorana

September 13, 1978*
"Receptor Disorders in Man"
Jesse Roth

December 6, 1978
"Turning Cancer Cells Into Mice"
Beatrice Mintz

May 2, 1979
"Gene Amplication and Methotrexate Resistance in Cultured Mammalian Cells"
Robert T. Schimke

June 13, 1979
"In Rodin's Studio"
Albert Elsen

September 12, 1979
"Drugs, Neurotransmitters, and the Brain"
Solomon H. Snyder

October 17, 1979*
"Regulation of Cyclic Nucleotide Metabolism"
Martha Vaughan

November 28, 1979
"The Structure and Evolution of Genes"
Walter Gilbert

February 27, 1980*
"The Control of the Immune Response: Regulatory Cellular Interactions and the Control of Lymphocyte Differentiation"
Thomas Waldmann

May 7, 1980
"Hepatitis B Virus and the Pathogenesis and Prevention of Cancer of the Liver"
Baruch S. Blumberg

October 1, 1980
"Mutational Analysis of a Viral Replicon"
Daniel Nathans

December 10, 1980*
"Metabolic Mapping of Local Functional Activity in the Central Nervous System"
Louis Sokoloff

May 27, 1981
"The Current Status of the Hepatic Membrane Receptor for Desialylated Serum Glycoproteins"
Gilbert Ashwell

December 2, 1981
"Cell Surface Receptors for Plasma Lipoproteins: Implications for Biology and Medicine"
Joseph L. Goldstein

September 15, 1982*
"Living With Lymphocytes, or B Lymphocytes and How They Grow"
William E. Paul

October 27, 1982
"Information Processing in a Simple Sensory System: Bacterial Chemotaxis"
Daniel E. Koshland, Jr.

November 17, 1982
"Autoantibodies as Probes for Small Ribonucleoproteins From Eukaryotes"
Joan A. Steitz

January 25, 1984
"Charge Distribution, Electrostatic Fields, and Enzyme Function"
Frederic M. Richards

March 21, 1984
"Cancer Genes Come of Age"
J. Michael Bishop

April 18, 1984*
"Movement, Mood and Memory: Linked Functions in the Mammalian Brain"
Edward V. Evarts

September 12, 1984*
"Enhancers: Regulatory Elements in Eukaryotic Gene Expression"
George Khoury

November 7, 1984
"Neuronal Replacement in Adulthood and Its Possible Relation to Learning"
Fernando Nottebohm

November 28, 1984
"Gene Expression in Developing and Adult Neurons"
Richard Axel

December 5, 1984
"Managing the Deficit"
Alice Rivlin

December 12, 1984
"Twenty Years A" Growing"
S. Dillon Ripley

December 4, 1985*
"Biochemical Regulation of Actinomycin-Dependent Cell Motility"
Edward D. Korn

March 5, 1986*
"Why Is DNA Supercoiled?"
Martin Gellert

May 19, 1986
"Misplacing Genes"
Philip Leder

June 4, 1986
"Insights into the Genetics of Thalassemia"
Yuet Wai Kan

January 14, 1987
"Vaccinia Virus: From Jenner to Genetic Engineering"
Bernard Moss

February 11, 1987*
"Molecular Embryology: New Approaches to Old Questions"
Igor B. Dawid

May 6, 1987
"Tracking the Causes of Diabetes Mellitus: From Viruses to Autoimmunity"
Abner Louis Notkins

September 23, 1987
"Inositol Lipids and Intracellular Communication"
Michael J. Berridge

June 22, 1988*
"Basement Membranes: Key Determinants of Differentiation and Their Role in Cancer Metastasis"
George Martin

November 2, 1988
"RNA as an Enzyme"
Thomas Cech

November 15, 1989*
"Switching Globin Genes On and Off: Chromatin Structure and Gene Expression"
Gary Felsenfeld

November 14, 1990
"Dystrophin Abnormalities in Neuromuscular Disease"
Louis M, Kunkel

January 16, 1991*
"Memory Circuits"
Mortimer Mishkin

February 13, 1991
"Mechanisms of Short-term and Long-term Memory"
Daniel E. Koshland, Jr.

April 3, 1991*
"Gene Sharing: Lens Crystallins, Enzymes, and Stress Proteins"
Joram Piatigorsky

May 23, 1991
"Molecular Genetics of Cancer Suppression"
Wen-Hwa Lee

June 13, 1991
"The Adrenergic Receptors"
Robert J. Lefkowitz

November 19, 1991
"Hematopoietic Stem Cells: Biological and Clinical Potentials"
Irving L. Weissman

January 22, 1992
"Molecular Analysis of Resistance to Anti-Cancer Drugs"
Michael M. Gottesman

March 25, 1992*
"Human Gene Therapy"
W. French Anderson, R. Michael Blaese, Steven A. Rosenberg

May 6, 1992
"Splicing of Nuclear Precursors to Messenger RNAs"
Phillip A. Sharp

May 21, 1992
"Creating Mice With Targetted Disruptions in Proto-oncogenes and Homeobox Genes"
Mario R. Capecchi

June 1, 1994
"Genetics of Breast Cancer"
Mary-Claire King

June 8, 1994
"The Health of the Spirit"
Jane Alexander

January 18, 1995*
"Brain Maps for Eye Movements"

Robert H. Wurtz

May 17, 1995
"Brain Waves and Brain Wiring"
Carla J. Schatz

April 25, 1995
"To See Ourselves as Others See Us: The Artist Looks at the Doctor"
Sherwin B. Nuland

May 24, 1995
"Alterinf Telomerase RNA: Enzymatic and Cellular Consequences"
Elizabeth H. Blackburn

November 1, 1995*
"DNA Replication Fidelity, Mismatch Repair, and Genome Stability"
Thomas A. Kunkel

The Jules Freund Lectures

The Jules Freund Lecture series, established in 1961, was given annually until 1974 in honor of Dr. Jules Freund, first chief of the Laboratory of Immunology, NIAID.

November 15, 1961
"Studies of Hypersensitivity to Simple Chemical Allergens"
Merrill W. Chase

October 17, 1962
"Chemical Constitution and Immunological Specificity of Polysaccharides"
Michael Heidelberger

October 7, 1963
"Autosensitization in Animals and Man"
Ernest Witebsky

October 7, 1964
"Pleuropneumonia-like Organisms and L-forms of Bacteria"
Louis L. Dienes

September 29, 1965
"Mechanisms of Intracellular Infection"
Rene Jules Dubos

October 13, 1966
"Problems of Antibody Biosynthesis"
Felix Haurowitz

October 20, 1967
"Immunochemical Analysis of Tissue Constituents"
Pierre Grabar

November 6, 1968
"Whither the Search for Viral Etiology of Human Cancer?"
Albert Sabin

November 3, 1969
"Blood Group A, B, H, and Le Substances--Their Chemistry and the Nature of Their Reaction With Antibodies and Other Specific Hemagglutinins"
Elvin A. Kabat

October 19, 1970
"Serum, pH, and the Contact Inhibition of Normal Human Cells"
Harry Eagle

November 18, 1971
"Myeloma Proteins as Antibodies and Tumor-Specific Antigens"
Herman N. Eisen

November 17, 1972
"Mycoplasmas as Candidates for Vascular Pathogenicity"
Lewis Thomas

November 26, 1974
"The Task of Seeing the Virus and Host as Non-Separate Realities"
Hilary Koprowski

The Kinyoun Lectures

The Kinyoun Lecture series was established by the National Institute of Allergy and Infectious Diseases in 1979 to honor Dr. Joseph J. Kinyoun who, in 1887, established the small Laboratory of Hygiene at the Marine Hospital on Staten Island, the predecessor of the National Institutes of Health. NIAID is the direct lineal descendent of the Laboratory of Hygiene within the NIH. These lectures will, for the most part, emphasize the interdependence of infection and immunity.

April 24, 1979
"The Role of Complement in Natural Resistance to Infections"
Hans J. Muller Eberhard

May 8, 1979
"Cell-Mediated Immunity to Intracellular Parasites and Polymorphic Major Transplantation Antigens"
Rolf M. Zinkernagel

October 9, 1979
"Host Proteases and Virus Virulence: The Unkindest Cut"
Purnell W. Choppin

November 27, 1979
"Transplantation Experiments in Nature and Their Biological Significance"
Rupert Billingham

March 5, 1980
"Fatal Infectious Mononucleosis and Polyclonal B Cell Lymphoma"
Dorothy Horstman

May 5, 1980
"The Molecular Cloning of *E. Coli* Enterotoxin Genes"
Stanley Falkow

December 19, 1980
"Antibody Genes and Strategies for Their Expressions"
Leroy Hood

April 3, 1981
"Murine SLE: A Model for Autoimmunity"
Frank J. Dixon

December 3, 1981
"Gene Expression in Heterospecific Hosts: Strategies and Surprises"
Stanley N. Cohen

May 14, 1984
"Murine Major Histocompatibility Complex: Polymorphism, Diversity, Complexity"
Stanley G. Nathenson

April 10, 1987
"Regulation of Immunity by Class II MHC Antigens"
Hugh D. McDevitt

November 20, 1990
"Immunology of a Third-World Disease"
Barry R. Bloom

November 21, 1991
"Cell-Mediated Immunity: From Bench to Bedside"
Zanvil A. Cohen

September 1, 1993
"Lymphocyte Differentiation Pathways: Changing Paradigms"
Max D. Cooper

October 20, 1994
"Antibodies as Carriers of Toxins and as Agonists in Cancer Therapy"
Ellen S. Vitetta

November 3, 1995
"Mutational Analysis of Lymphocyte Differentiation and VDJ Recombination"
Frederick W. Alt

DeWitt Stetten, Jr. Lecture

The DeWitt Stetten, Jr. Lecture was established by the National Institute of General Medical Sciences in 1982 and is presented annually in honor of Dr. Stetten, who was the third NIGMS director.

October 13, 1982
"A Molecular Analysis of Genes That Determine Developmental Pathways"
David S. Hogness

October 5, 1983
"Left-Handed Z-DNA and the Regulation of Transcription"
Alexander Rich

October 31, 1984
"Cellular Signaling: What Does the Structure of the Acetylcholine Receptor Tell Us About Its Function?"
Robert M. Stroud

October 30, 1985
"The Molecular Basis of Differential Gene Activity"
Donald D. Brown

October 8, 1986
"Heat Shock: Cellular Response to Environmental Stresses"
Mary Lou Pardue

October 7, 1987
DNA-Protein Interactions in the Control of Gene Expression
"The *trp* Repressor: The Chemical Details of a Genetic Switch"
Paul B. Sigler
"How Proteins See DNA and Turn Genes On and Off"
Mark S. Ptashne
"What DNA Viruses Are Telling Us About Genetic Regulation in Animal Cells"
Steven L. McKnight

October 12, 1988
"Sequence-Specific Recognition of DNA: A Synthetic Approach"
Peter B. Dervan

October 18, 1989
"The Control of Timing and Spatial Organization During Cellular Differentiation"
Lucy Shapiro

November 7, 1990
"Synthesis of Telomeres"
Elizabeth H. Blackburn

October 23, 1991
"The Biochemical Machinery Regulating the Cell Division Cycle"
Marc W. Kirschner

October 28, 1992
From Basic Research to Biotechnology
"RNA as an Enzyme: From Chemistry to Biotechnology"
Thomas R. Cech
"Catalytic Antibodies"
Peter G. Schultz
"Cellular Biotechnology: Engineering Metabolism for Enhanced Productivity and New Products"
James E. Bailey

October 20, 1993
"Spliceosome: A Dynamic Ribonucleoprotein"
Christine Guthrie

October 19, 1994
"A Chemical Approach to Understanding and Controlling Signal Transduction"
Stuart L. Schreiber

October 18, 1995
"Design of Proteins and Drugs"
Peter S. Kim

Marjorie Guthrie Lecture in Genetics

The Marjorie Guthrie Lecture in Genetics was established by the National Institute of Neurological and Communicative Disorders and Stroke and the National Institute of General Medical Sciences in 1983.

May 11, 1983
"Illumination of Disease Processes Through Molecular Genetics"
David Baltimore

April 19, 1984
"Molecular Approaches to the Characterization of Neuronal Function"
Floyd E. Bloom

April 2, 1985
"Recent Studies in Huntington"s Disease"
Joseph B. Martin

April 10, 1986
"Genes, Neurons, and Behavior in Drosophila"
Seymour Benzer

June 10, 1987
"The Long and Short of Long-Term Memory"
Eric R. Kandel

Seymour J.Kreshover Lecture

The National Institute of Dental Research Lecture series was established in 1983 to recognize outstanding scientific accomplishment in basic and clinical research and to honor distinguished scientists who have made important contributions in areas of dental research. In 1984 the lecture was named for former NIDR director, Seymour J. Kreshover, D.D.S., M.D., Ph.D.

September 22, 1983
"The Promotion and Inhibition of Collagen-Breakdown in Synovial Tissue"
Dame Honor B. Fell

September 17, 1984
"Genetic Analysis of the Virulence of Streptococcus Mutans: Prospects for an Anticaries Vaccine"
Roy Curtiss III

September 10, 1985
"Molecular Factors Influencing Neutrophil Defects in Periodontal Disease"
Robert J. Genco

September 24, 1986
"The Role of Saliva in Maintaining Oral Homeostasis"
Irwin Mandel

September 22, 1987
"Gene Regulation in the Development of Oral Tissues"
Harold C. Slavkin

September 26, 1988
"Bacterial Adhesion to Oral Tissues: A Model for Infectious Diseases"
Ronald J. Gibbons

June 13, 1989
"Pathogens, Probes and Perceptions: The Story of Multidisciplinary Oral Aids Research"
Deborah and John Greenspan

May 30, 1990
"The Sense of Taste: New Directions for Dentistry"
Linda Bartoshuk

June 4, 1991
"Memroy Mechanisms and Pain"
Ronald Melzack

June 16, 1992
"Muscosal Immunology: Expectations for the 90s"
Jiri Mestecky

June 15, 1993
"Molecular Genetics and Craniofacial Development"
Robert Williamson

January 22, 1996
"The Life and Dealth of the Cranial Neural Crest"
Andrew Lumsden

June 11, 1997
"Molecular Mechanisms of Bone Resorption"
Roland Baron

NIH Nobel PrizeWinners

Nobel Laureates

Laureate	Field	Year	Supporting institute(s)
Edward B. Lewis, U.S.A. (shared with C. Nusslein-Volhard, Germany, and E.F. Wieschaus, U.S.A.)	Physiology or medicine	1995	NICHD, NIGMS
Eric F. Wieschaus, U.S.A. (shared with E.B. Lewis, U.S.A., and C. Nusslein-Volhard, Germany)	..do	1995	NICHD
Alfred G. Gilman, U.S.A. (shared with M. Rodbell, U.S.A.)	..do	1994	NIGMS, NINDS
Martin Rodbell, U.S.A. (shared with A.G. Gilman, U.S.A.)	..do	1994	NIEHS, NIDDK
George A. Olah, U.S.A.	Chemistry	1994	NCI, NIGMS
Phillip A. Sharp, U.S.A. (shared with R. Roberts, U.K.)	Physiology or medicine	1993	NIGMS, NCI, NIAID, DRS, NCRR
Richard Roberts, U.K. (shared with P.A. Sharp, U.S.A.)	..do	1993	NCRR, NLM, NCHGR, NCI, NIGMS
Kary B. Mullis, U.S.A. (shared with M. Smith, Canada)	Chemistry	1993	NHLBI, NIAID, NIGMS
Michael Smith, Canada (shared with K.B. Mullis, U.S.A.)	..do	1993	NIGMS
Robert W. Fogel, U.S.A.	Economics	1993	NIA
Edwin G. Krebs, U.S.A (shared with E.H. Fisher, U.S.A.)	Physiology or medicine	1992	NIDDK, NIGMS, NIAMS
Edmond H. Fisher, U.S.A. (shared with E.G. Krebs, U.S.A.)	..do	1992	NIDDK, NIGMS, NIAMS
Gary Becker, U.S.A.	Economics	1992	NICHD
Elias J. Corey, U.S.A.	Chemistry	1990	NIGMS, NCRR, NCI, NHLBI, NIAID
E. Donnall Thomas, U.S.A. (shared with J.E. Murray, U.S.A.)	Physiology or medicine	1990	NCI, NIAID, NIDDK
Joseph E. Murray, U.S.A. (shared with E.D. Thomas, U.S.A.)	..do	1990	NHLBI, NIAID
Sidney Altman, U.S.A. (shared with T. Cech, U.S.A.)	Chemistry	1989	NIGMS, NICHD
Thomas Cech, U.S.A. (shared with S. Altman, U.S.A.)	..do	1989	NIGMS, NCI
J. Michael Bishop, U.S.A (shared with H.E. Varmus, U.S.A.)	Physiology or medicine	1989	NCI
Harold E. Varmus, U.S.A. (shared with J.M. Bishop, U.S.A.)	..do	1989	NCI, NIAID
Susumu Tonegawa, Japan	..do	1987	NIAID
Donald J. Cram, U.S.A. (shared with C.J. Pederson, U.S.A., and Jean-Marie Lehn, France)	Chemistry	1987	NIGMS
Stanley Cohen, U.S.A. (shared with R. Levi-Montalcini, U.S.A./Italy)	Physiology or medicine	1986	NICHD, NIGMS
Rita Levi-Montalcini, U.S.A./Italy (shared with S. Cohen, U.S.A.)	..do	1986	NIMH, NINDS
Herbert A. Hauptman, U.S.A. (shared with J. Karle, U.S.A.)	Chemistry	1985	NIGMS, NIADDK, NHLBI, DRR
Michael S. Brown, U.S.A. (shared with J.L. Goldstein, U.S.A.)	Physiology or medicine	1985	NHLBI, NIGMS, DRR
Joseph L. Goldstein, U.S.A. (shared with M.S. Brown, U.S.A.)	..do	1985	NHLBI, NIGMS, DRR
R. Bruce Merrifield, U.S.A.	Chemistry	1984	NIDDK
Henry Taube, U.S.A	..do	1983	NIGMS
Sune Bergstrom, Sweden (shared with J. R. Vane, U.K. and B. Samuelsson, Sweden)	Physiology or medicine	1982	NHLBI, NLM, NICHD
John R. Vane, U.K. (shared with S. Bergstrom and B. Samuelsson, Sweden)	..do	1982	DRG, NIGMS, NIMH
Aaron Klug, U.K.	Chemistry	1982	NIAID
Roald Hoffmann, U.S.A. (shared with K. Fukui, Japan)	..do	1981	NIGMS
David H. Hubel, U.S.A. (shared with T. N. Wiesel, U.S.A./Sweden, and R. W. Sperry, U.S.A.)	Physiology or medicine	1981	NEI, NIGMS, NINDS, DRR
Torsten N. Wiesel, U.S.A./Sweden (shared with D. H. Hubel and R. W. Sperry, U.S.A.)	..do	1981	NEI, DRR, NINDS
Paul Berg, U.S.A. (shared with W. Gilbert, U.S.A., and F. Sanger, U.K.)	Chemistry	1980	NIGMS, NCI
Walter Gilbert, U.S.A. (shared with P. Berg, U.S.A., and F. Sanger, U.K.)	..do	1980	NIGMS, NIDDK
Baruj Benacerraf, U.S.A. (shared with G. D. Snell, U.S.A., and J. Dausset, France)	Physiology or medicine	1980	NIAID, NCI
George D. Snell, U.S.A. (shared with B. Benacerraf, U.S.A., and J. Dausset, France)	..do	1980	NIAID, NCI
Jean Dausset, France (shared with B. Benacerraf and G. D. Snell, U.S.A.)	..do	1980	NIAID, NCI
Herbert C. Brown, U.S.A. (shared with G. Wittig, W. Germany)	Chemistry	1979	NIGMS
Hamilton O. Smith, U.S.A. (shared with D. Nathans, U.S.A., and W. Arber, Switzerland)	Physiology or medicine	1978	NIGMS, NIAID
Daniel Nathans, U.S.A. (shared with H. O. Smith, U.S.A., and W. Arber, Switzerland)	..do	1978	NIGMS, NCI
Roger C. L. Guillemin, U.S.A. (shared with A. V. Schally and R. S. Yalow, U.S.A.)	..do	1977	NIDDK, NICHD, DRR
Andrew V. Schally, U.S.A. (shared with R. C. L. Guillemin and R. S. Yalow, U.S.A.)	..do	1977	NIDDK, NICHD, NIGMS
D. Carleton Gajdusek,[1] U.S.A. (shared with B. S. Blumberg, U.S.A.)	..do	1976	NINDS
Baruch S. Blumberg, U.S.A. (shared with D. C. Gajdusek, U.S.A.)	..do	1976	NHLBI, NCI
William N. Lipscomb, U.S.A	Chemistry	1976	NIGMS, DRG
David Baltimore, U.S.A. (shared with R. Dulbecco and H. M. Temin, U.S.A.)	Physiology or medicine	1975	NIAID, NCI
Renato Dulbecco, U.S.A. (shared with D. Baltimore and H. M. Temin, U.S.A.)	..do	1975	NIAID, NCI
Howard M. Temin, U.S.A. (shared with D. Baltimore and R. Dulbecco, U.S.A.)	..do	1975	NCI
Albert Claude, Belgium (shared with C. de Duve, Belgium, and G. E. Palade, U.S.A.)	..do	1974	NCI
George E. Palade, U.S.A. (shared with C. de Duve and A. Claude, Belgium)	..do	1974	NHLBI, NIGMS
Christian de Duve, Belgium (shared with A. Claude, Belgium, and G. E. Palade, U.S.A.)	..do	1974	NICHD, NIGMS, NHLBI, NIA
Gerald M. Edelman, U.S.A. (shared with R. R. Porter, U.K.)	..do	1972	NIDDK, NIAID, NICHD
Rodney R. Porter, U.K. (shared with G. M. Edelman, U.S.A.)	..do	1972	NIAID
Christian B. Anfinsen,[1] U.S.A. (shared with S. Moore and W. H. Stein, U.S.A.)	Chemistry	1972	NHLBI, NIDDK
Stanford Moore, U.S.A. (shared with C. B. Anfinsen and W. H. Stein, U.S.A.)	..do	1972	NIGMS, NINDS
William H. Stein, U.S.A. (shared with C. B. Anfinsen and S. Moore, U.S.A.)	..do	1972	NIGMS
Earl W. Sutherland, Jr., U.S.A	Physiology or medicine	1971	NIGMS, NHLBI, NIDDK
Julius Axelrod,[1] U.S.A. (shared with B. Katz, U.K., and U. von Euler, Sweden)	..do	1970	NHLBI, NIMH
Ulf von Euler, Sweden (shared with J. Axelrod, U.S.A., and B. Katz, U.K.)	..do	1970	NINDS
Luis Leloir, Argentina	Chemistry	1970	NIGMS, NIAID
Max Delbruck, U.S.A. (shared with A. D. Hershey and S. Luria, U.S.A.)	Physiology or medicine	1969	NIGMS
Alfred D. Hershey, U.S.A. (shared with M. Delbruck and S. Luria, U.S.A.)	..do	1969	NIGMS, NCI, NICHD
Salvador Luria, U.S.A. (shared with M. Delbruck and A. D. Hershey, U.S.A.)	..do	1969	NIAID, NIGMS, NCI
Robert W. Holley, U.S.A. (shared with H. G. Khorana and M. W. Nirenberg, U.S.A.)	..do	1968	NIGMS, NCI
H. Gobind Khorana, U.S.A. (shared with R. W. Holley and M. W. Nirenberg, U.S.A.)	..do	1968	NIGMS, NCI, NIAID
Marshall W. Nirenberg,[1] U.S.A. (shared with R. W. Holley and H. G. Khorana, U.S.A.)	..do	1968	NHLBI
Lars Onsager, U.S.A.	Chemistry	1968	NIGMS
Haldan K. Hartline, U.S.A. (shared with G. Wald, U.S.A., and R. Granit, Sweden)	Physiology or medicine	1967	NINDS, NEI
George Wald, U.S.A. (shared with H. K. Hartline, U.S.A., and R. Granit, Sweden)	..do	1967	NINDS, NEI
Charles B. Huggins, U.S.A. (shared with P. Rous, U.S.A.)	Physiology or medicine	1966	NCI, NIDDK, NIGMS
Jacques L. Monod, France (shared with F. Jacob and A. Lwoff, France)	..do	1965	NIAID
Robert B. Woodward, U.S.A.	Chemistry	1965	NIGMS, NHLBI, DRG, NIDDK
Konrad Bloch, U.S.A. (shared with F. Lynen, Germany)	Physiology or medicine	1964	NIGMS, NHLBI, DRG
James D. Watson, U.S.A. (shared with F. H. C. Crick and M. H. F. Wilkins, U.K.)	..do	1962	NIGMS, NIDDK, NCI, DRR, NIAID
John C. Kendrew, U.K. (shared with M. F. Perutz, U.K.)	Chemistry	1962	NIDDK
Melvin Calvin, U.S.A.	..do	1961	DRG, NCI
Peter B. Medawar, U.K. (shared with F. M. Burnet, Australia)	Physiology or medicine	1960	NIAID
Arthur Kornberg, U.S.A. (shared with S. Ochoa, U.S.A.)	..do	1959	NIGMS, NIAID, NCI, NIDDK, NIA
Severo Ochoa, U.S.A. (shared with A. Kornberg, U.S.A.)	..do	1959	NIDDK, NIGMS, NCI, DRG
George W. Beadle, U.S.A. (shared with J. Lederberg and E. L. Tatum, U.S.A.)	..do	1958	NIGMS, NHLBI
Joshua Lederberg, U.S.A. (shared with G. W. Beadle and E. L. Tatum, U.S.A.)	..do	1958	NIGMS, NIAID, NINDS, NICHD, DRR, NCI
Edward L. Tatum, U.S.A. (shared with G. W. Beadle and J. Lederberg, U.S.A.)	..do	1958	NIGMS, NCI
Dickinson W. Richards, Jr., U.S.A. (shared with A. Cournand, U.S.A., and W. Forssmann, Germany)	..do	1956	NIDDK, NCI, NHLBI, NIGMS
Vincent du Vigneaud, U.S.A.	Chemistry	1955	NHLBI, NCI, NIGMS, DRG
Thomas H. Weller, U.S.A. (shared with J. F. Enders and F. C. Robbins, U.S.A.)	Physiology or medicine	1954	NIAID, NIGMS
Linus C. Pauling, U.S.A.	Chemistry	1954	NIGMS, NHLBI, DRG, NIAID, NCI
Fritz A. Lipmann, U.S.A. (shared with H. A. Krebs, U.K.)	Physiology or medicine	1953	NIGMS, NCI
Philip S. Hench, U.S.A. (shared with E. C. Kendall, U.S.A., and T. Reichstein, Switzerland)	..do	1950	DRG, NIGMS
E. O. Lawrence, U.S.A.	Physics	1939	NCI

[1] Signifies NIH scientists.

1968--Dr. Marshall W. Nirenberg, National Heart, Lung, and Blood Institute, shared the Nobel Prize in Physiology or Medicine for discovering the key to deciphering the genetic code. Dr. Nirenberg and two other researchers, working independently, with whom he shared the prize, made major advances in understanding the chemical mechanisms by which genetic language or information is translated into various proteins that determine the nature and characteristics of all living things. Dr. Nirenberg was the first NIH Nobelist and also the first Federal employee to receive a Nobel Prize.

1970--Dr. Julius Axelrod, National Institute of Mental Health--shared the Nobel Prize in Physiology or Medicine with two scientists from England and Sweden--for independent research into the chemistry of nerve transmission. The three were cited for their "discoveries concerning the humoral transmitters in the nerve terminals and the mechanisms for their storage, release and inactivation." Specifically, Dr. Axelrod found an enzyme that terminates the action of the nerve transmitter, noradrenaline. He also demonstrated that some antidepressant drugs act by preventing the reuptake of noradrenaline and thus prolong its action in the brain.

1972--Dr. Christian B. Anfinsen--formerly with the National Institute of Arthritis, Metabolism, and Digestive Diseases--won the Nobel Prize in Chemistry for his work "on ribonuclease, especially concerning the connection between the amino acid sequence and the biologically active conformation." Dr. Anfinsen provided the first clue to the structure of ribonuclease by demonstrating that it is comprised of a single polypeptide chain. He and his colleagues at Rockefeller University (with whom he shared the prize) demonstrated that the information required to fold the polypeptide chain of ribonuclease into the specific three-dimensional form of the active enzyme resides in the sequence of amino acids. Therefore, it became clear that this protein could be synthesized in the laboratory by joining the proper amino acids in the correct order and then allowing the chain of amino acids to fold spontaneously. This led to the first synthesis of an enzyme from chemicals in the laboratory. Such studies are basic to an understanding of normal life processes as well as of inherited metabolic diseases.

1976--Dr. D. Carleton Gajdusek, National Institute of Neurological Disorders and Stroke, shared the Nobel Prize in Physiology or Medicine with Dr. Baruch S. Blumberg, of the Institute for Cancer Research in Philadelphia. They won the award for their discoveries concerning new mechanisms for the origin and dissemination of infectious diseases. Dr. Blumberg was at NIH (with the National Institute of Arthritis and Metabolic Diseases) in the 1960's, and did part of his prizewinning research at NIH.

1994--Dr. Martin Rodbell, National Institute of Environmental Health Sciences, shared the Nobel Prize in Physiology or Medicine with Dr. G. Alfred Gilman of the University of Texas Southwestern Medical Center in Dallas, Texas. Dr. Rodbell discovered in 1970 that signal transmission requires a cellular molecule called GTP. In 1977 Dr. Gillman identified the proteins to which GTP binds and named them "G proteins." They are a family of proteins bound to the cell surface membranes that serve as intermediaries between incoming signals and cellular proteins that respond to these signals. Dr. Rodbell conducted this research while an intramural scientist with the National Institute of Arthritis and Metabolic Diseases (now NIDDK).