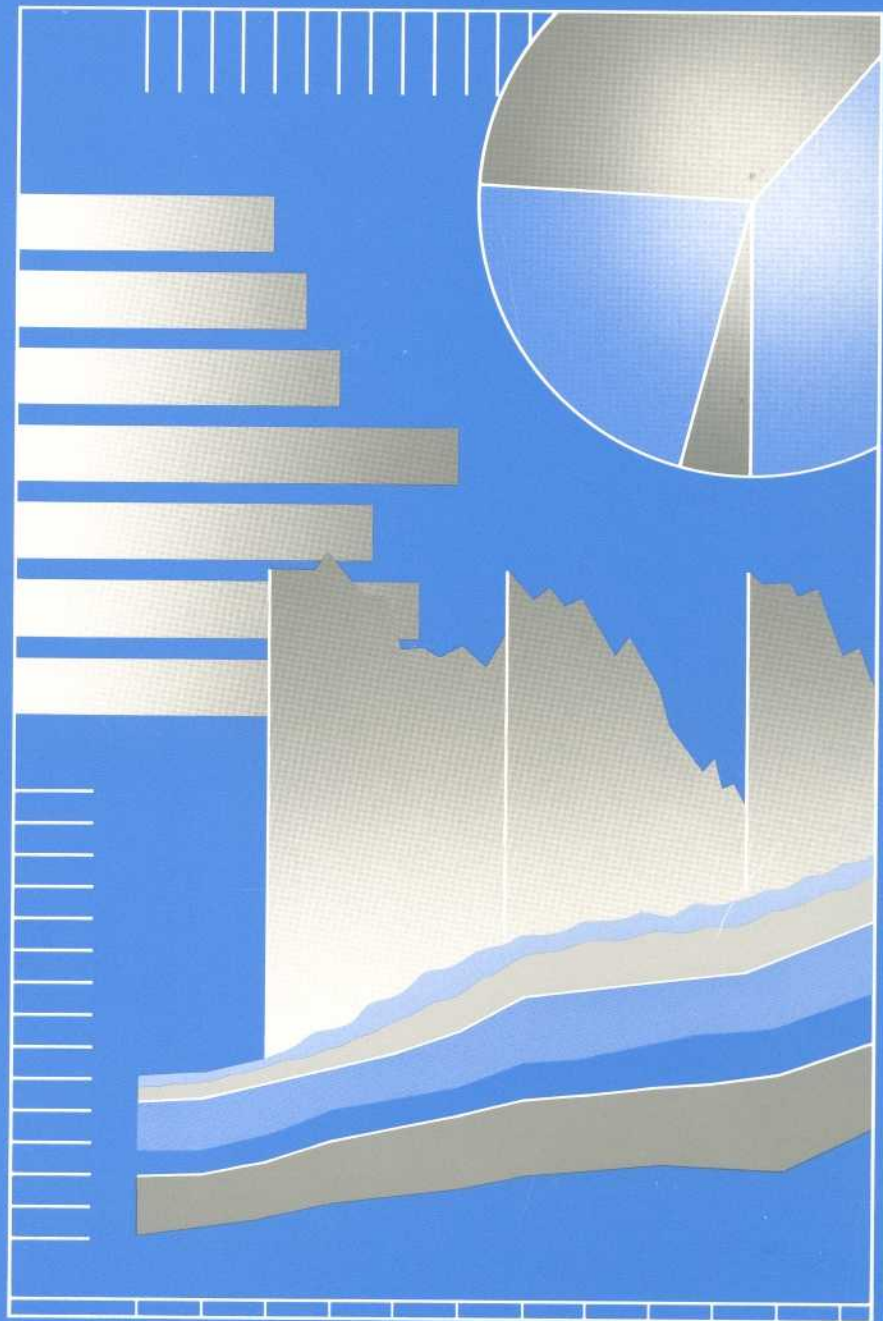


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NCI

FACT BOOK

National
Cancer
Institute



1988

U.S. DEPARTMENT
OF HEALTH AND
HUMAN SERVICES

Public Health
Service

National
Institutes of
Health

Extramural
Programs

Historical Trends

NCI

FACT BOOK

National
Cancer
Institute

For Administrative Use

1988

U.S. DEPARTMENT
OF HEALTH AND
HUMAN SERVICES

Public Health
Service

National
Institutes of
Health

The information set forth in this publication is compiled and amended annually by the financial management staff of the National Cancer Institute and is intended primarily for use by members of the Institute, principal advisory groups to the Institute and others involved in the administration and management of the National Cancer Program. Questions regarding any of the information contained herein may be directed to the Financial Manager, National Cancer Institute, 9000 Rockville Pike, Bethesda, Maryland 20892.

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Year 2000 Goals and Objectives

The National Cancer Institute has established a goal to reduce the United States cancer mortality rate by 50 percent by the year 2000. The ability to meet this goal is based on the knowledge that: (1) smoking is directly responsible for some 30 percent of all cancer deaths; (2) diet and nutrition may be related to 35 percent or more of cancer deaths; (3) screening for breast and cervical cancer has been proven effective in reducing mortality; (4) widespread application of state-of-the-art cancer treatment could reduce the mortality rate for some sites as much as 25 percent; and (5) gains in early detection, diagnosis, and treatment methodologies will continue over the next decade, thereby contributing to an improved five year survival rate and reduced cancer mortality.

The following is an outline of the cancer prevention and control objectives:

Control Area	Brief Rationale	Year 2000 Objective
Prevention/Smoking	The causal relationship between smoking and cancer has been scientifically established.	Reduce the percentage of adults and youths who smoke to 15 percent or less.
Prevention/Diet	Research indicates that high-fat and low-fiber consumption may increase the risk for various cancers. In 1983 NAS reviewed research on diet and cancer and recommended a reduction in fat; more recent studies led NCI to recommend an increase in fiber. Research is underway to verify the causal relationship and to test the impact on cancer incidence.	Reduce average consumption of fat from 40 percent to 30 percent or less of total calories. Increase average consumption of fiber from 8 to 12 grams per day to 20 to 30 grams per day.
Early Detection and Screening/Breast	The effectiveness of breast cancer screening in reducing mortality has been scientifically established in randomized trials.	Increase the percentage of women ages 40 or more who have annual physical breast exam from 80% to 90% and 11% for mammography to 80%.
Early Detection and Screening/Cervical	The effectiveness of cervical screening has been shown to reduce mortality in large populations.	Increase the percentage of women who have a Pap smear at least every 3 years to 86% from 75%.
Early Detection and Screening/Rectum/Colon	The effectiveness of screening for colon and rectal cancers with digital rectal exam, stool blood and proctoscope is under continued study. Case control and mathematic modeling studies indicate mortality reduction with regular sigmoidoscopy examination. Encourage routine application of guidelines.	Increase the percentage who have digital rectal exam from 53% to 76%, stool blood from 48% to 75% and proctoscope from 18% to 48%.
Early Detection and Screening/Oral Cancer	Screening for early oral cancer is economical and effective. Can be performed by Dentists as well as physicians.	High risk group is readily identified and can be targeted.
Early Detection and Screening/Testicular Cancer	Early Detection is simple. Early treatment produces excellent survival.	All males over 20 years should manually examine testes for lumps or signs of cancer.

Control Area	Brief Rationale	Year 2000 Objective
Early Detection and Screening/ Melanoma	The effectiveness of screening the skin has been shown in other countries to reduce mortality by 20%. Educational effort planned.	Increase the percentage examined for early melanoma. Every person should have skin examined annually. High risk group can be identified.
Early Detection and Screening/Prostate	Second leading cause of cancer death in males. Early detection trials are in planning stages using ultrasound as a new diagnostic modality.	All males over 60 years should be regularly examined for early prostate cancer. Increase the utilization of new diagnostic method.
Treatment/Transfer of Research Results to Practice	NCI review of clinical trial and SEER data indicates that, for certain cancer sites, mortality in SEER is greater than mortality experienced in clinical trials.	Increase adoption of state-of-the-art treatment, including improved treatment of micrometastases.

Significant Initiatives In 1988

Division of Cancer Biology and Diagnosis

Autocrine Motility Factor

Metastasis, or the spread of a tumor from its primary site, is the major cause of death in patients with cancer. Investigators at the NCI have identified a protein known as autocrine motility factor (AMF) which appears to play an important role in the invasive process by stimulating the movement of tumor cells. This factor has been shown to be produced by human breast cancer, colon cancer, and melanoma and the molecular pathway through which it exerts its effects on tumor cell motility has recently been identified. A specific inhibitor of this pathway has now been developed which arrests tumor cell movement. Oral administration of this compound to animals bearing tumors has consistently demonstrated the prevention of new metastasis formation and inhibition of the growth of established metastases. Clinical trials using the AMF inhibitor are planned for 1989.

AMF has also been found to be secreted into the urine of patients with transitional cell cancer of the bladder. A strong correlation was found between the level of AMF and tumor grade, stage of invasion, and recurrence. This finding is being further explored, and may prove to be a useful adjunct in the early detection of the recurrence of bladder cancer.

Colony Stimulating Factors

Colony stimulating factors (CSFs) offers one of the most exciting applications of recombinant DNA technology. CSFs are hormones involved in control of the production of blood elements in the bone marrow. During the past year, scientists have begun to unravel the effects of newly-identified CSFs on normal bone marrow. Similar to growth factors which stimulate cancer cells to proliferate, these biologicals appear to be able to regulate the division of normal bone marrow elements.

CSFs are being investigated with great interest in the expectation that they can be used to reconstitute the immune system after it has been suppressed by cancer chemotherapy or AIDS. These new hormones, used in combination with conventional therapies and bone marrow transplantation, may result in more effective treatment with reduced side effects for both cancer and AIDS.

Division of Cancer Treatment

Anti-HIV Drug Screening Assay

NCI is developing a comprehensive intramural program for the identification and development of anti-HIV therapies. This effort includes basic research in the development of targeted antiviral compounds, the identification of natural products and the synthesis of novel compounds with anti-HIV activity. In order to identify active compounds, a high capacity anti-HIV drug screening assay has been set up in the Developmental Therapeutics Program. This screen will soon have the capacity to test up to 10,000 compounds per year, and will serve as a resource for the entire extramural community, including both academic institutions and the private sector, in addition to the NIH.

Pediatric AIDS Research

The Pediatric Branch is investigating the use of azidothymidine (AZT) and other anti-HIV drugs as a treatment for children with AIDS. Dramatic improvement was seen in thirteen children who had previously displayed neurological symptoms prior to treatment. These patients also demonstrated an increase in appetite and weight gain, as well as improvements in a number of other medical abnormalities. This study demonstrates that AZT is beneficial for children with symptomatic HIV infection, and is a first step in identifying the best way to administer this drug to children.

Adoptive Immunotherapy

Work in the field of adoptive immunotherapy has expanded to include the development of treatment courses with tumor infiltrating lymphocytes (TILs) and interleukin-2 (IL-2). When given in conjunction with the drug cyclophosphamide, this treatment approach has yielded an objective response rate of greater than 50% for patients with metastatic malignant melanoma. Standard chemotherapy would only be expected to yield a 20% response rate in these patients. Current efforts in this area include defining the spectrum of the anti-tumor activity of TIL cell therapy and the use of genetic engineering technology to develop a new generation of even more potent TIL cells.

Division of Cancer Etiology

Dietary Mutagens

NCI research in the area of diet, nutrition and cancer has been expanded to include laboratory and epidemiologic studies on dietary mutagens. A family of mutagenic compounds has been discovered in certain cooked foods and some have been shown to cause cancer in rodents. One of the most potent rodent carcinogens, known as IQ, has also been found to be carcinogenic in non-human primates. Although the amounts of these compounds in cooked foods are very small, it is possible that they could play a role as one of the vast number of substances that act as initiators in the multi-step process that culminates in the development of cancer. For this reason, the formation of these mutagens and carcinogens during the cooking process should be reduced or avoided in order to minimize the potential risk that these chemicals may pose.

Radon and Lung Cancer Risk

NCI research activities have intensified to evaluate the possible link between indoor radon and lung cancer risk. Radon is a radioactive gas that comes from the decay of uranium found throughout the earth's crust. Because radon can concentrate in homes, especially when tightly insulated, it is possible that a significant proportion of lung cancers may be attributable to residential exposures.

NCI, in collaboration with the New Jersey Department of Health, is monitoring radon levels in the homes of 800 women who developed lung cancer and 800 controls. New Jersey is a high risk area because of its proximity to Reading Prong, a uranium-rich belt of land. A similar study in Missouri began this year with non-smoking women identified from state tumor registry files. In Stockholm, Sweden, studies were initiated because of the composition of the geologic base and the high radium content of building material. NCI studies in China are assessing lung cancer risk associated with radon and other pollutants in a stable population. Together, these studies will provide information on lung cancer risk related to indoor radon gas, as well as determine whether other exposures, such as cigarette smoking, enhance the risk.

Division of Cancer Prevention and Control

Nutrition

In collaboration with Giant Food Inc., a regional supermarket chain in the Washington-Baltimore area, NCI has begun a four-year consumer education program entitled *EAT FOR HEALTH*. The study is designed to inform consumers about nutrition, health promotion, and cancer risk reduction and to test the effectiveness of a supermarket nutrition education program. Sales data on several thousand items are being tracked in selected test and comparison stores to determine the impact of the education interventions on purchasing behavior related to foods associated with potential cancer risk.

NCI has established an intramural research laboratory for nutrition. The laboratory will provide an intramural resource for the highest quality nutrition research related to cancer. Its objective is to fill the gap between basic nutritional research and human applications by fostering a multidisciplinary scientific approach.

Prevention Highlights: Meeting the Year 2000 Objectives Fiscal Year 1988

Key Dates

- 1970-1979—Basic research contributed new knowledge of cancer process including the finding that cancer is multi-staged and that there are at least two distinct stages—initiation and promotion.
- 1980—Establishment of a new division, forerunner of the Division of Cancer Prevention and Control.
- 1981-1982—NCI developed new strategy that focused on cancer prevention and applied research.
- 1983—Year 2000 Goals were established which are based on prevention, early detection, and widespread application of the latest treatment results.

Cancer Network

In 1988, NCI's Cancer Network included the following:

- Cancer Information System (CIS)—a national toll free telephone service that provides immediate answers to cancer-related questions from cancer patients, families, the public and health professionals.
- Cancer Centers—a program of cancer research centers across the country which significantly contributes to progress in basic research, clinical studies, education, and cancer prevention and control.
- Community Clinical Oncology Program—a program involving community physicians in clinical trials research on cancer treatment, prevention, and control.
- Physicians Data Query (PDQ)—an on-line computer system that provides state-of-the-art information on cancer detection, diagnosis and treatment.
- Cooperative Group Outreach Program (CGOP)—designed to increase patient enrollment in clinical trials and to upgrade the skills of community physicians and other health professionals.
- Surveillance, Epidemiology, and End Results (SEER) Program—population-based cancer registries that permit the monitoring of cancer incidence, mortality and survival, and is a key tool for assessing the progress against cancer.

Prevention Trials

- Since 1982 chemoprevention studies (studies that seek to identify agents which may inhibit cancer from developing or recurring) have initially reviewed over 600 agents. Thirteen of these agents, which include vitamins, minerals, and other natural and synthetic substances, have been tested in clinical trials in humans.
- Two current trials are studying diet modification as a means of preventing recurring breast cancer and colon cancer. A pilot study demonstrated the feasibility of conducting a large-scale chemoprevention effort overseas with Chinese tin miners who are at extremely high risk of lung cancer.
- A Prevention Clinical Trials Branch has been established to coordinate Phase III cancer prevention trials.

Agency Coordination

Formal mechanisms for the exchange of information and coordination among the NCI and other health and environmental agencies include:

- NCI staff representation on the National Toxicology Program Executive Committee of the National Institute of Environmental Health Sciences whose mission is the study of the toxicity of chemical and physical agents present in the environment.

Smoking

- The Director of the NCI chairs the Subcommittee on Research Needs of The Committee to Coordinate Environmental Health and Related Programs (CCEHRP) which addresses matters seeking to measure scientific risk assessment and management.
- The Smoking, Tobacco and Cancer Program (STCP) supports 60 large scale prevention and cessation clinical trials targeted toward smokers who are adolescents, women and in ethnic minority and populations and smokeless tobacco users.
- Implementation of Commit, a large community intervention trial, begun in 11 paired North American communities. It will emphasize the reduction of smoking in people who are heavy smokers.
- Epidemiologists have completed several new projects focused on clarifying the cancer risks associated with various smokeless tobaccos, including snuff, chewing tobacco and exposure to passive smoking.

Nutrition

- The NCI/Giant Food Inc. Supermarket Study is underway. This study will evaluate the effects of shelf labeling, in-store information and advertising on shopping practices and dietary behavior. The impact of identifying low-fat and high-fiber food will be measured.
- An intramural research laboratory of nutrition is in place. This laboratory will provide leadership in basic research, clinical nutrition, epidemiology, and human metabolism.

Occupational Cancer

An association between non-Hodgkin's lymphoma and exposure to pesticides, especially the chemical phenoxyacetic acid (2,4-D), was found in an NCI study of Kansas farmers. Preliminary data from an on-going case-control study in Iowa and Minnesota showed an increased risk for chronic lymphatic leukemia and non-Hodgkin's lymphoma among farmers using various pesticides. An excess of leukemia was also found among agricultural extension agents who are exposed to pesticides while conducting demonstration projects.

Screening and Early Detection

- Primary care physicians are integrating cancer prevention and control interventions into their usual office practice in two studies. These activities include smoking cessation and diet modification counseling, and screening for cancers of the breast, cervix, colon, rectum, and prostate.
- A program has been initiated to develop strategies for achieving a significant reduction in cancer morbidity and mortality through early detection. Promising methods of surveillance, research, and intervention have been identified for support and evaluation. Collaborative programs have been developed with major national medical organizations to identify and address research gaps and to increase the use of the state-of-the-art early detection methodologies within the practicing medical community.

Information and Public Awareness

- To obtain broad-based community input concerning national progress against cancer, NCI and its National Cancer Advisory Board are conducting a series of regional public participation hearings across the country.
- Through the Partners in Prevention (PIP) network, Cancer Prevention Awareness Program, NCI is stimulating community based programs in smoking, nutrition, and early detection. Currently about 2,000 representatives of national, regional and local organizations are members of the network.

**Prevention Funding
A Comparison
FY 1979 vs FY 1988**

(Dollars in Millions)

	FY 1979		FY 1988		79/88 Percent Change
	Amount	Percent of Total NCI	Amount	Percent of Total NCI	
Research Activities					
Cancer Prevention [Prevention and Control]	\$252.1 [\$16.0]	27.6% [1.8]	\$448.5 [41.0]	30.5% [2.8]	77.9% [156.3]
Detection and Diagnosis	55.9	6.1	102.7	7.0	83.7
Treatment	297.5	32.5	468.5	31.9	57.5
Cancer Biology	127.5	13.9	270.3	18.4	112.0
Total, Research	733.0	80.2	1,290.0	87.9	76.0
Total, NCI	914.0	100.0	1,468.4	100.0	60.7

Prevention Activities

Epidemiology	\$44.1	4.8%	\$86.7	5.9%	96.6%
Chemical and Physical Carcinogenesis*	82.3	9.0	152.6	10.4	85.4
Biological Carcinogenesis	110.5	12.1	145.0	9.9	31.2
Smoking	12.8	1.4	39.6	2.7	209.4
Nutrition **	25.3	2.8	59.6	4.1	134.8

* The National Toxicology Program (NTP) transferred to the National Institute of Environmental Health Sciences (NIEHS) in FY 1982 at a level of \$47.9 million and 95 positions.

** Includes \$39.7 from the research budget as well as nutrition-related research in tumor biology, epidemiology, carcinogenesis and other programs.

Directory of Personnel

	Direct-in Dialing
<i>Director</i>	
Dr. Samuel Broder*	<i>Building 31</i> 11-A-48..... 496-5615
<i>Special Assistant</i>	
Dr. Joyce O'Shaughnessy.....	<i>Building 31</i> 11-A-19..... 496-3505
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Ms. Maxine I. Richardson	<i>Building 31</i> 10-A-33..... 496-6266
<hr/>	
<i>Acting Deputy Director</i>	
Dr. Maryann Roper*	<i>Building 31</i> 11-A-48..... 496-1927
<hr/>	
<i>Assistant Director</i>	
Dr. Elliott Stonehill.....	<i>Building 31</i> 11-A-29..... 496-1148
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<i>Assistant Director For Program Operations and Planning</i>	
Ms. Iris Schneider*	<i>Building 31</i> 11-A-48..... 496-5534
<i>Planning Officer</i>	
Ms. Judith Whalen	<i>Building 31</i> 11-A-19..... 496-5515
<i>Legislative Analyst/Congressional Liaison</i>	
Dr. Mary Knipmeyer	<i>Building 31</i> 10-A-32..... 496-5217
<hr/>	
<i>Associate Director for Prevention</i>	
Dr. Peter Greenwald*	<i>Building 31</i> 10-A-52..... 496-6616
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<i>Associate Director for Cancer Communications</i>	
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<i>Chief, Information Resources Branch</i>	
Ms. Nancy Brun	<i>Building 31</i> 10-A-30..... 496-4394
<i>Chief, Reports and Inquiries Branch</i>	
Ms. Eleanor Nealon	<i>Building 31</i> 10-A-31..... 496-6631
<i>Chief, Information Projects Branch (vacant)</i>	
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<i>Associate Director, International Cancer Information Center</i>	
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<i>Chief, Computer Communications Branch</i>	
Mr. Nicholas V. Martin.....	<i>Building 82</i> 219..... 496-8880
<i>Chief, Publications Branch</i>	
Mr. Robin Atkiss.....	<i>Building 82</i> 235..... 496-1997
<i>Chief, International Cancer Research DataBank Branch</i>	
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*NCI Executive Committee Members

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<i>Chief, Financial Management Branch</i>	<i>Building 31</i>
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<i>Chief, Grants Administration Branch</i>	<i>Executive Plaza South</i>
Mr. Leo F. Buscher, Jr.....	216..... 496-7753
<i>Chief, Extramural Financial Data Branch</i>	<i>Executive Plaza South</i>
Ms. Mary C. Cushing	643..... 496-7660
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<i>Director, Office of Laboratory Animal Science</i>	<i>Building 31</i>
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Dr. Werner Kirsten*	427..... FTS-8-978-5096
<i>Frederick Cancer Research Facility General Manager/Project Officer</i>	<i>Frederick, Maryland Building</i>
Dr. Cedric W. Long.....	427..... FTS-8-978-1108
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Mr. Mark Kochevar	11-A-11..... 496-6556

*NCI Executive Committee Members

Directory of Personnel

**Direct-in
Dialing**

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Dr. Alan S. Rabson*	3-A-03	496-4345
<i>Administrative Officer</i>		<i>Building 31</i>
Mr. Larry D. Willhite	3-A-05	496-3381
<i>Director, Division of Cancer Treatment</i>		<i>Building 31</i>
Dr. Bruce Chabner*	3-A-52	496-4291
<i>Administrative Officer</i>		<i>Building 31</i>
Mr. Lawrence J. Ray	3-A-50	496-2775
<i>Director, Division of Extramural Activities</i>		<i>Building 31</i>
Mrs. Barbara Bynum*	10-A-03	496-5147
<i>Administrative Officer</i>		<i>Building 31</i>
Mr. Stephen M. Hazen	10-A-10	496-5915
<i>Director, Division of Cancer Prevention and Control</i>		<i>Building 31</i>
Dr. Peter Greenwald*	10-A-52	496-6616
<i>Administrative Officer</i>		<i>Building 31</i>
Mr. Nicholas Olimpio	10-A-50	496-9606

*NCI Executive Committee Members

National Cancer Institute Leadership

President's Cancer Panel

Armand Hammer, M.D. Chairman (1990)
Occidental International Corporation
Washington, D.C. 20006

William P. Longmire, Jr., M.D. (1988)
Veteran's Administration
Los Angeles, California 90073

John A. Montgomery, Ph.D. (1989)
Southern Research Institute
Birmingham, Alabama 35255

Executive Secretary
Elliott Stonehill, Ph.D.

Director's Biography

Dr. Samuel Broder

Dr. Samuel Broder was named Director of the National Cancer Institute by President Reagan on December 22, 1988 and sworn in on January 10, 1989. Dr. Broder is a medical oncologist whose major research interest is clinical immunology, with special attention to the relationship between immune abnormalities and neoplastic diseases.

Before becoming Director, Dr. Broder had been since 1981 Associate Director for the Clinical Oncology Program in NCI's Division of Cancer Treatment. He came to NCI as a clinical associate in the Metabolism Branch of the Division of Cancer Biology and Diagnosis in 1972. In 1975, he became an investigator in the Medicine Branch, DCT, and returned to the Metabolism Branch as a senior investigator.

Dr. Broder's research has centered on the biology of the immune system with emphasis on abnormal immunoregulation in cancer, and on the relationship between cancer and immunodeficiency states. Dr. Broder and his co-workers identified certain types of suppressor cells which induced immune impairment in some cancer patients. He and his co-workers also identified and characterized neoplasms which arose from helper and suppressor cells. In addition to his cancer research, Dr. Broder and his co-workers have worked on drug development, taking drugs from the test tube to patients, for the treatment of AIDS and related disorders. Such drugs include AZT, ddC, ddI and related drugs in the dideoxynucleoside family, used alone and in combination.

Dr. Broder obtained his undergraduate and medical degrees from the University of Michigan. His internship and residency were at Stanford University. He is board certified in Internal Medicine and in Medical Oncology. As NCI Director, Dr. Broder administers a staff of over 2,000 and a budget of approximately \$1.5 billion.

Former Directors of The National Cancer Institute

Dr. Vincent T. DeVita, Jr., M.D.
January 1980 – June 1980 (Acting)
July 1980 – August 1988

Dr. DeVita joined NCI in 1963 as a clinical associate in the Laboratory of Chemical Pharmacology. He served NCI as head of the Solid Tumor Service, Chief of the Medicine Branch, Director of the Division of Cancer Treatment and Clinical Director prior to his appointment as Director of NCI. In September 1988, Dr. DeVita resigned as NCI Director to become Physician-in-Chief at Memorial Sloan-Kettering Cancer Center.

Dr. Arthur Canfield Upton, M.D.
July 1977 – December 1979

Prior to his tenure as NCI Director, Dr. Upton served as Dean of the School of Basic Health Sciences at the State University of New York at Stony Brook.

Dr. Frank Joseph Rauscher, Jr., Ph.D
May 1972 – October 1976

Dr. Rauscher served as Scientific Director for Etiology, NCI, prior to his appointment as Director of NCI in 1972.

Dr. Carl Gwin Baker, M.D.
November 1969 – July 1970 (Acting)
July 1970 – April 1972

During his tenure with PHS, Dr. Baker served as Scientific Director for Etiology, NCI, and as Acting Director of NCI prior to his appointment as Director in July 1970.

Dr. Kenneth Milo Endicott, M.D.
July 1960 – November 1969

Dr. Endicott served as Chief of the Cancer Chemotherapy National Service Center, PHS, and as Associate Director, NIH, prior to being appointed Director, NCI in July 1960.

Dr. John Roderick Heller, M.D.
May 1948 – June 1960

Dr. Heller joined PHS in 1934 and became Chief of the Venereal Disease Division prior to his appointment as Director of NCI in 1948.

Dr. Leonard Andrew Scheele, M.D.
July 1947 – April 1948

Dr. Scheele served in various capacities during his tenure with PHS prior to his appointment as Assistant Chief and, subsequently, Director of NCI in July 1947.

Dr. Roscoe Roy Spencer, M.D.
August 1943 – July 1947

Dr. Spencer became NCI's first Assistant Chief and, subsequently, was appointed Director of the Institute in 1943.

Dr. Carl Voegtlin, Ph.D.
January 1938 – July 1943

Dr. Voegtlin served as Professor of Pharmacology and Chief of the Division of Pharmacy at the Hygienic Laboratory prior to becoming the first Director of NCI in 1938.

National Cancer Advisory Board

Appointees	Expiration of Appointment	Appointees	Expiration of Appointment	Appointees	Expiration of Appointment
Dr. David Korn, <i>Chairman</i> <i>Stanford University</i> <i>Stanford, California</i>	1990	Dr. Gertrude B. Elion <i>Burroughs Wellcome Company</i> <i>Research Triangle Park, North Carolina</i>	1990	Mrs. Irene S. Pollin <i>The Washington Hospital Center</i> <i>Bethesda, Maryland</i>	1992
Dr. Erwin P. Bettinghaus <i>Michigan State University</i> <i>East Lansing, Michigan</i>	1994	Dr. Bernard Fisher <i>University of Pittsburgh</i> <i>Pittsburgh, Pennsylvania</i>	1992	Dr. Louise C. Strong <i>M.D. Anderson Hospital and Tumor Institute</i> <i>Houston, Texas</i>	1990
Dr. Roswell K. Boutwell <i>University of Wisconsin</i> <i>Madison, Wisconsin</i>	1990	Dr. Phillip Frost <i>The IVAX Corporation</i> <i>Miami, Florida</i>	1992	Dr. Howard M. Temin <i>University of Wisconsin</i> <i>Madison, Wisconsin</i>	1994
Dr. David G. Bragg <i>University of Utah School of Medicine</i> <i>Salt Lake City, Utah</i>	1994	Mr. Louis V. Gerstner, Jr. <i>American Express Company</i> <i>New York, New York</i>	1994	Dr. Samuel A. Wells, Jr. <i>Washington University</i> <i>St. Louis, Missouri</i>	1994
Mrs. Nancy G. Brinker <i>Susan G. Komen Foundation</i> <i>Dallas, Texas</i>	1992	Dr. Walter Lawrence, Jr. <i>Virginia Commonwealth University</i> <i>Richmond, Virginia</i>	1994		
Mrs. Helene G. Brown <i>Jonsson Comprehensive Cancer Center</i> <i>Los Angeles, California</i>	1990	Dr. Enrico Mihich <i>Roswell Park Memorial Institute</i> <i>Buffalo, New York</i>	1990		
Dr. John R. Durant <i>Univ. of Alabama in Birmingham</i> <i>Birmingham, Alabama</i>	1992				

Ex Officio Members

The Honorable Louis W. Sullivan, M.D.
Secretary for Health and Human Services

The Honorable Elizabeth H. Dole
Secretary of Labor
Washington, DC

Dr. William R. Graham
Office of Science and Technology Policy
Washington, DC

Ms. Ann Graham
Consumer Product Safety Commission
Washington, DC

Dr. John Gronvall
Veterans Administration
Washington, DC

The Honorable William E. Mayer
Department of Defense
Washington, DC

Dr. J. Donald Millar
National Institute for Occupational Safety and Health
Atlanta, Georgia

Dr. David P. Rall
National Institute of Environmental Health Sciences
Research Triangle Park, North Carolina

Mr. William K. Reilly
Environmental Protection Agency
Washington, DC

Dr. Robert W. Wood
Department of Energy
Washington, DC

Dr. James B. Wyngaarden
National Institutes of Health
Bethesda, Maryland

Dr. Frank E. Young
Food and Drug Administration
Rockville, Maryland

Alternates to Ex Officio Members

Dr. Beverly J. Berger
Office of Science and Technology Policy
Washington, DC

Dr. Dorothy A. Canter
National Institute of Environmental Health Sciences
Bethesda, Maryland

Dr. William Farland
Environmental Protection Agency
Washington, DC

Dr. Richard J. Greene
Veterans Administration
Washington, DC

Dr. John R. Johnson
Food and Drug Administration
Rockville, Maryland

Mr. Richard A. Lemen
National Institute for Occupational Safety and Health
Washington, DC

Dr. James S. Robertson
Department of Energy
Washington, DC

Dr. Andrew Ulsamer
Consumer Product Safety Commission
Bethesda, Maryland

Dr. Ralph E. Yodaiken
Department of Labor
Washington, DC

Vice Admiral James A. Zimble
Office of Chief of Naval Operations
Washington, DC

Division Boards of Scientific Counselors

Division of Cancer Biology and Diagnosis	Arnold J. Levine, Ph.D., <i>Chairperson</i>	1990	Leon A. Heppel, M.D., Ph.D.	1991
			Kathryn V. Holmes, Ph.D.	1990
			Richard G. Lynch, M.D.	1991
	Eugene A. Bauer, M.D.	1992	Richard S. Metzgar, Ph.D.	1990
	Stephen B. Baylin, M.D.	1989	Harold L. Moses, M.D.	1991
	George I. Bell, Ph.D.	1989	Howard K. Schachman, Ph.D.	1992
	Susan E. Cullen, Ph.D.	1990	Sandra L. White, Ph.D.	1989
Vittorio Defendi, M.D.	1990			
Division of Cancer Treatment	John E. Niederhuber, M.D., <i>Chairperson</i>	1990	Susan B. Horwitz, Ph.D.	1990
			William M. Hryniuk, M.D.	1991
			Robert C. Jackson, Ph.D.	1988
	Charles M. Balch, M.D.	1991	John H. Kersey, M.D.	1988
	Yung-chi Cheng, Ph.D.	1990	John Mendelsohn, M.D.	1990
	James D. Cox, M.D.	1991	Charles E. Putman, M.D.	1989
	Lawrence H. Einhorn, M.D.	1989	Ralph A. Reisfeld, Ph.D.	1988
	Emil Frei, III, M.D.	1990	Geraldine Schechter, M.D.	1989
	Mark T. Groudine, M.D., Ph.D.	1990	Robert T. Schimke, M.D.	1989
	William R. Hendee, Ph.D.	1990	H. Rodney Withers, M.D., D.Sc.	1989
Division of Cancer Etiology	Hilary Koprowski, M.D., <i>Chairperson</i>	1990	Dietrich Hoffmann, Ph.D.	1988
			William T. London, M.D.	1989
			Peter N. Magee, M.D.	1988
	Anna D. Barker, Ph.D.	1990	Maureen T. O'Berg, Ph.D.	1988
	William F. Benedict, M.D.	1989	Roy Shore, Ph.D.	1989
	Janet S. Butel, Ph.D.	1989	Moyses Szklo, Ph.D.	1990
	George W. Casarett, Ph.D.	1990	George F. Vande Woude	1989
	Allan H. Conney, Ph.D.	1991	Noel S. Weiss, M.D.	1989
	Pelayo Correa, M.D.	1991	Alice S. Whittemore, Ph.D.	1990
	Myron Essex, Ph.D.	1991	Mimi C. Yu, Ph.D.	1988
Lawrence Fischer, Ph.D.	1990			
Division of Cancer Prevention and Control	Paul F. Engstrom, M.D., <i>Chairperson</i>	1989	James L. Gaylor, Ph.D.	1991
			Donald M. Hayes, M.D.	1989
			James F. Holland, M.D.	1991
	Edward Bresnick, Ph.D.	1991	Donald C. Iverson, Ph.D.	1990
	C. Wayne Callaway, M.D.	1992	Mary-Claire King, Ph.D.	1989
	Philip T. Cole, M.D.	1990	Shirley B. Lansky, M.D.	1992
	William A. Darity, Ph.D.	1990	Donald B. McCormick, Ph.D.	1992
	Johanna T. Dwyer, D.Sc.	1989	Robert J. McKenna, M.D.	1989
	Virginia L. Ernster, Ph.D.	1990	Frank L. Meyskens, Jr., M.D.	1990
	Lloyd K. Everson, M.D.	1990	Kenneth E. Warner, Ph.D.	1989

**Frederick Cancer
Research Facility Committee**

FCRF Advisory Committee	Dante G. Scarpelli, M.D., Ph.D., <i>Chairperson</i>	1989
	J. Thomas August, M.D.	1991
	Carlo M. Croce, M.D.	1989
	Terri Grodzicker, Ph.D.	1988
	Barton F. Haynes, M.D.	1989
	Nancy H. Hopkins, Ph.D.	1989
	Tony Hunter, Ph.D.	1989
	Alexandra M. Levine, M.D.	1991
	Paul C. Zamecnik, M.D.	1988
Ad Hoc BSC Representatives	Stephen B. Baylin, M.D. (DCBD)	1989
	Dietrich Hoffman, Ph.D. (DCE)	1988
	Geraldine Schechter, M.D. (DCT)	1989
Ex Officio Member of NCAB	Enrico Mihich, M.D.	1990

Executive Committee Members

Dr. Samuel Broder
Director

Dr. Maryann Roper
Acting Deputy Director

Mr. Philip Amoruso
Associate Director for Administrative Management

Dr. Richard Adamson
Director, Division of Cancer Etiology

Mrs. Barbara Bynum
Director, Division of Extramural Activities

Dr. Bruce Chabner
Director, Division of Cancer Treatment

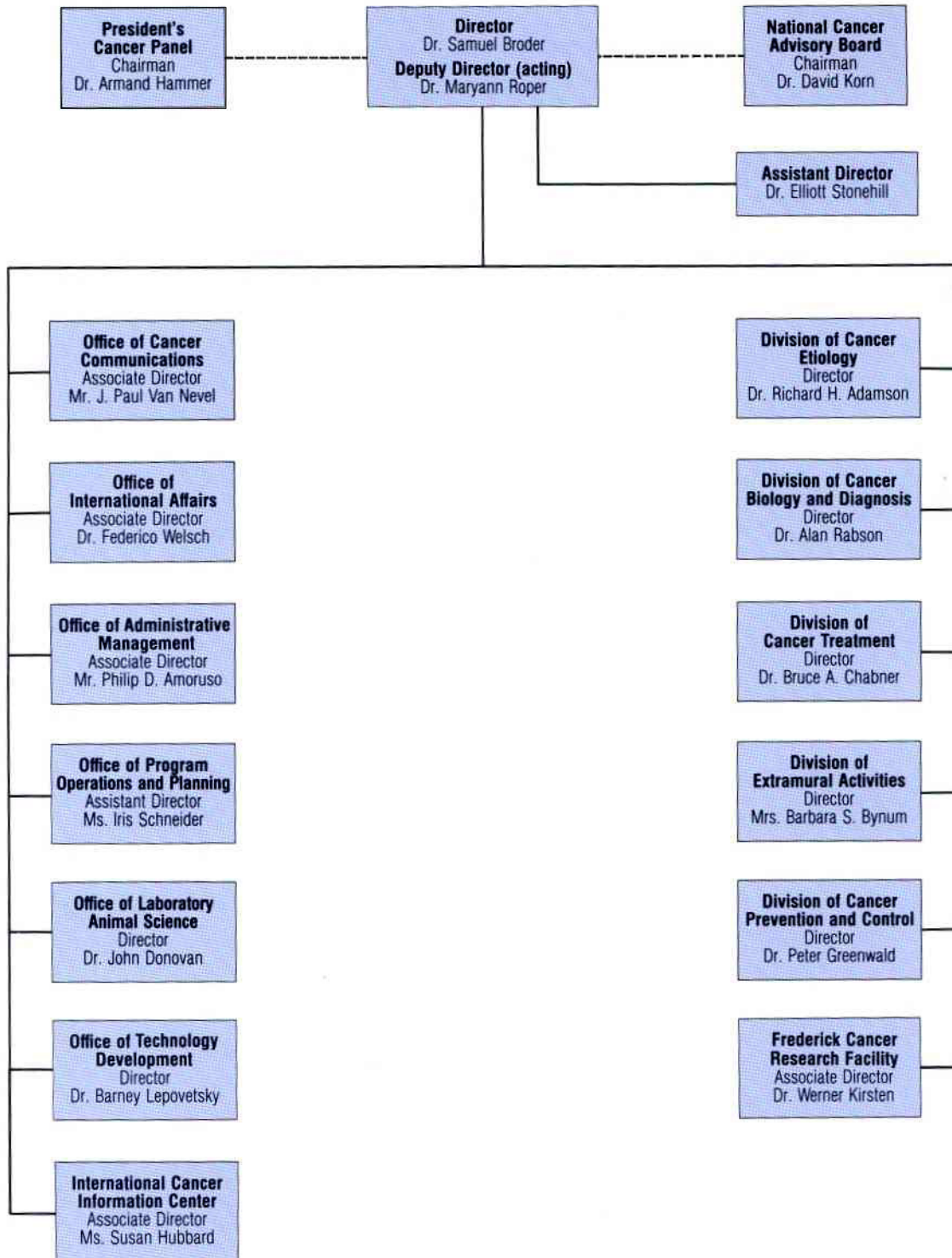
Dr. Peter Greenwald
Director, Division of Cancer Prevention and Control

Dr. Werner Kirsten
*Associate Director, National Cancer Institute Frederick
Cancer Research Facility*

Dr. Alan Rabson
Director, Division of Cancer Biology and Diagnosis

Ms. Iris Schneider
Executive Secretary

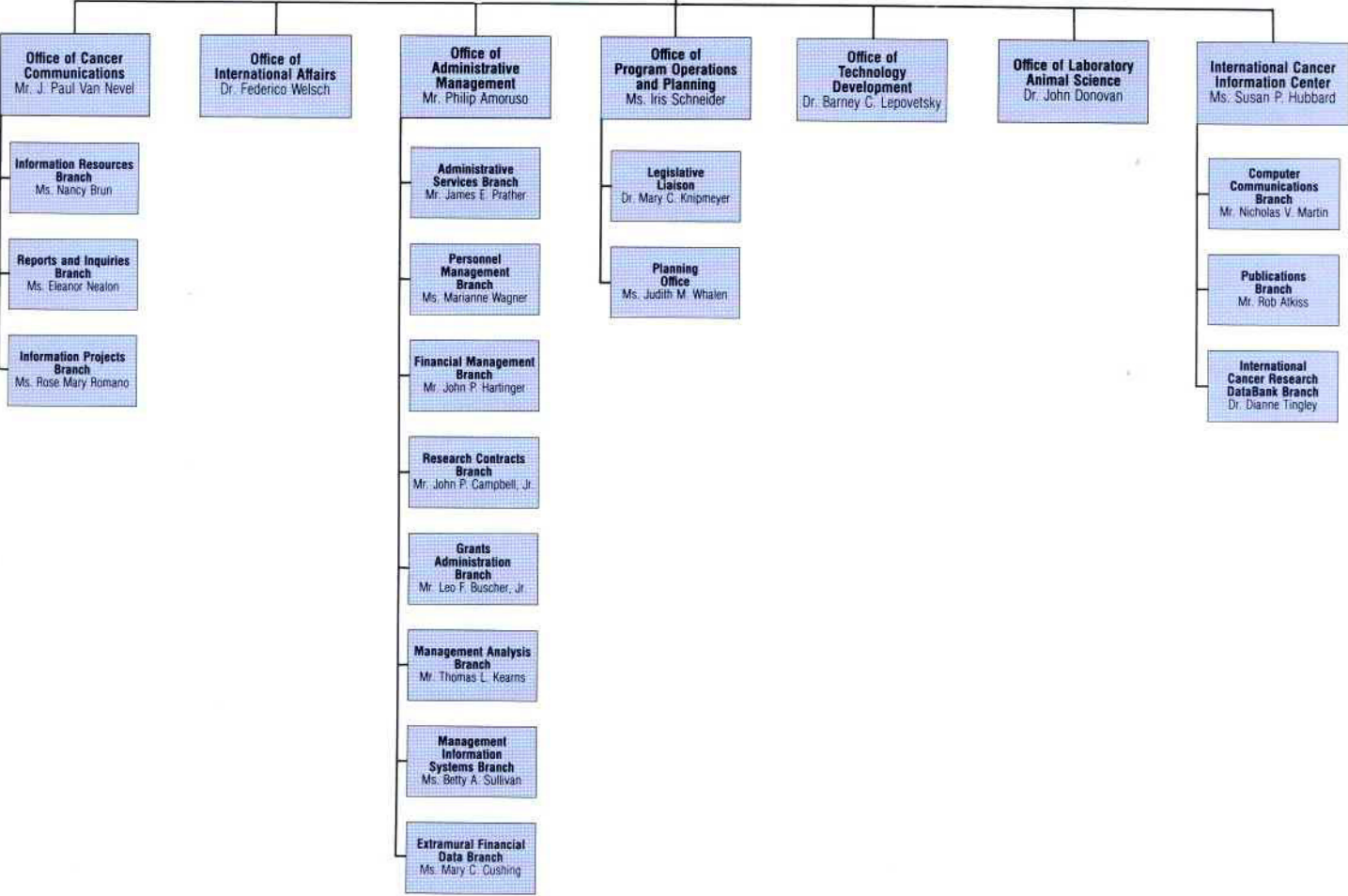
National Cancer Institute Organization

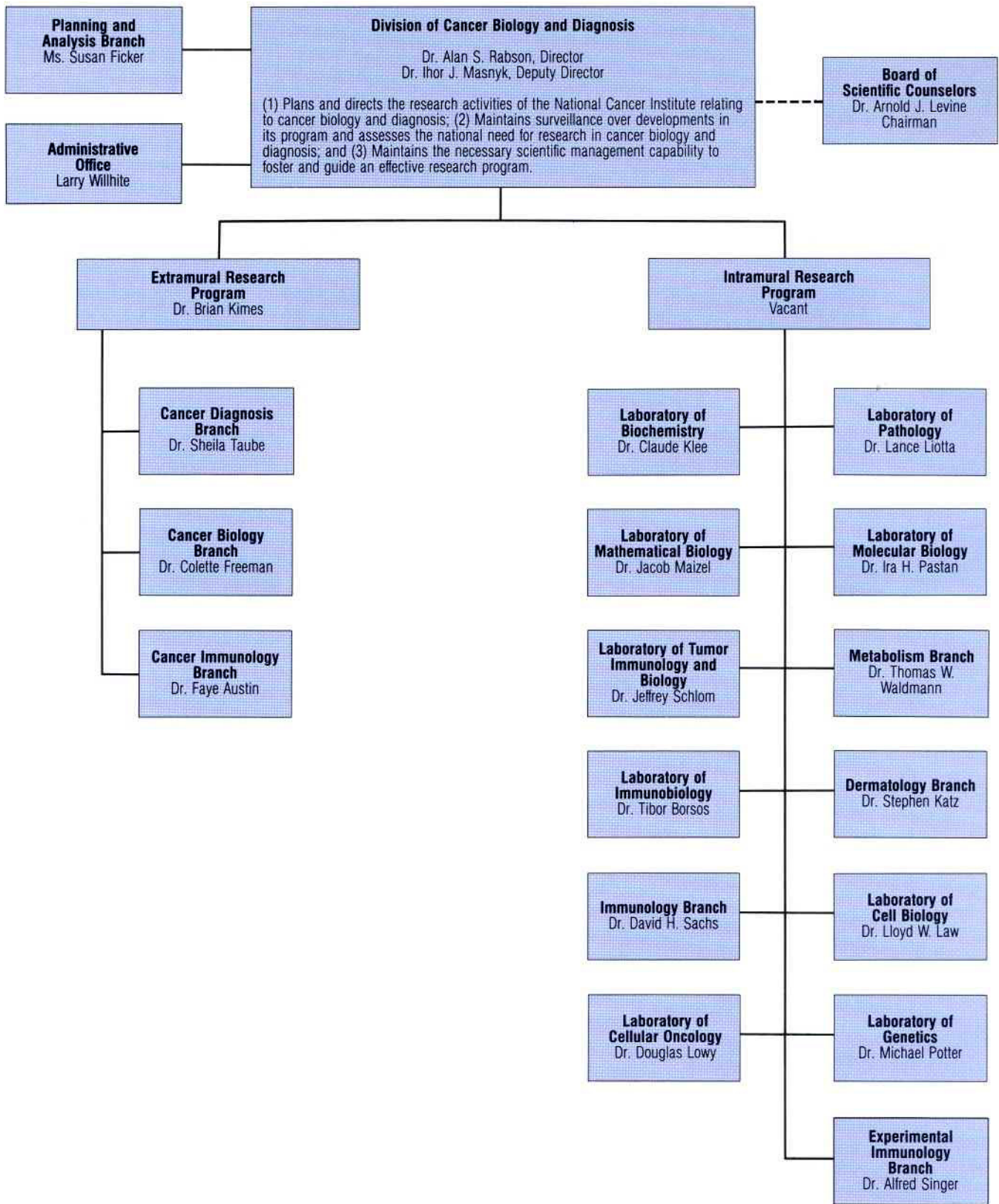


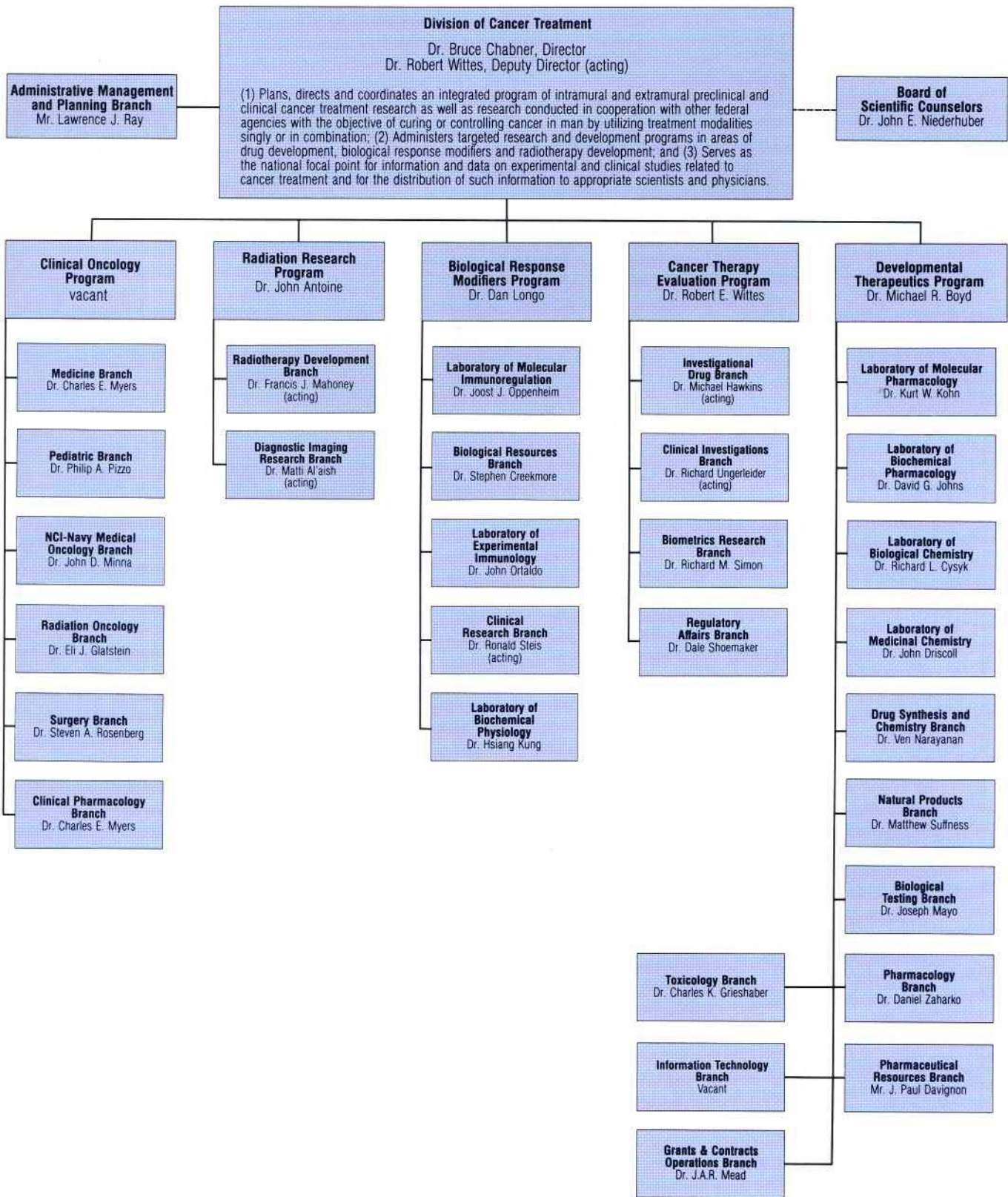
Office of the Director
 Dr. Samuel Broder, Director
 Dr. Maryann Roper, Deputy Director (acting)

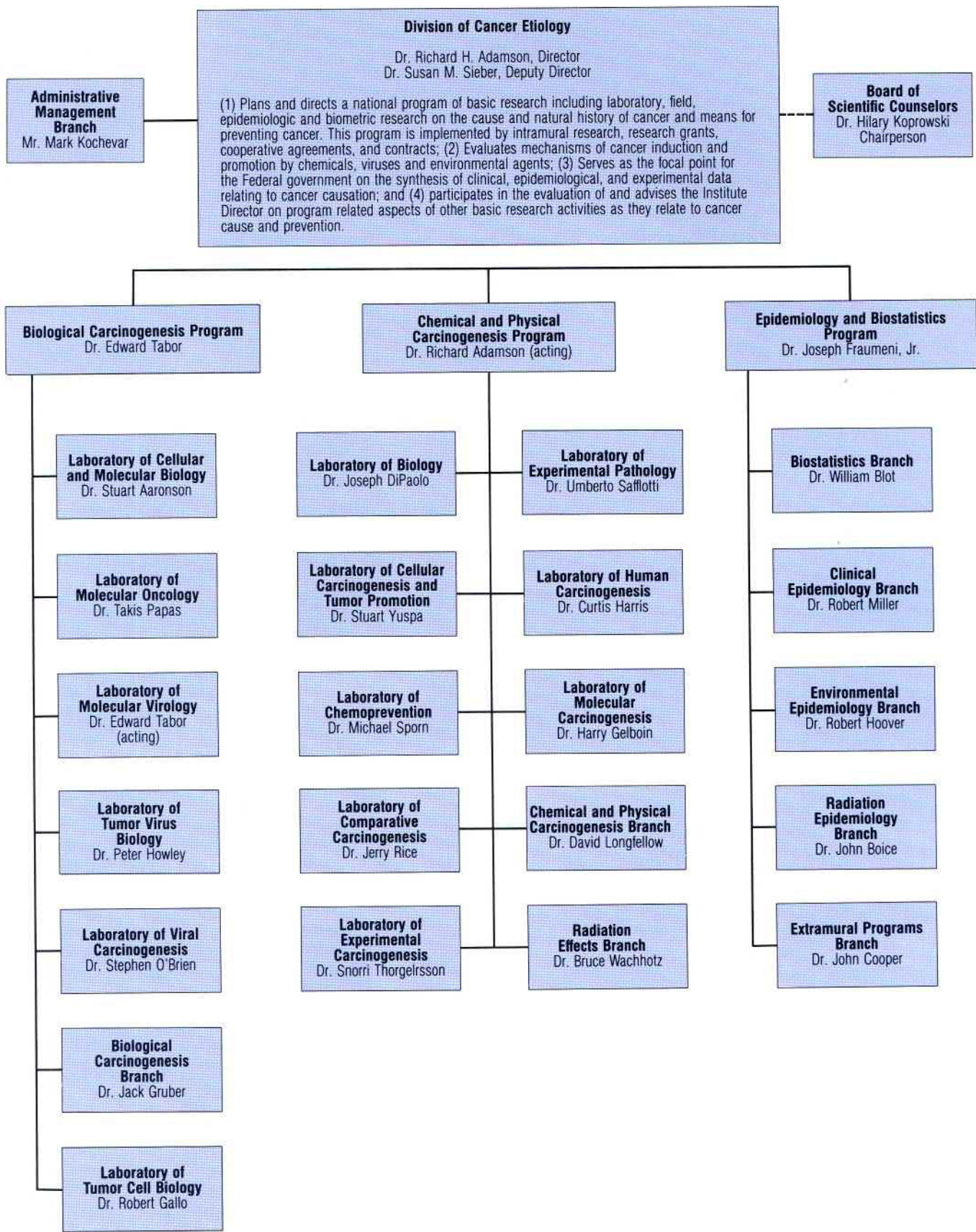
(1) Serves as the focal point for the National Cancer Program; (2) Develops a National Cancer Plan and monitors implementation of the Plan; (3) Directs and coordinates the Institute's programs and activities, and (4) Develops and provides policy guidance and staff direction to the Institute's programs in areas such as program coordination, program planning, clinical care and administrative management.

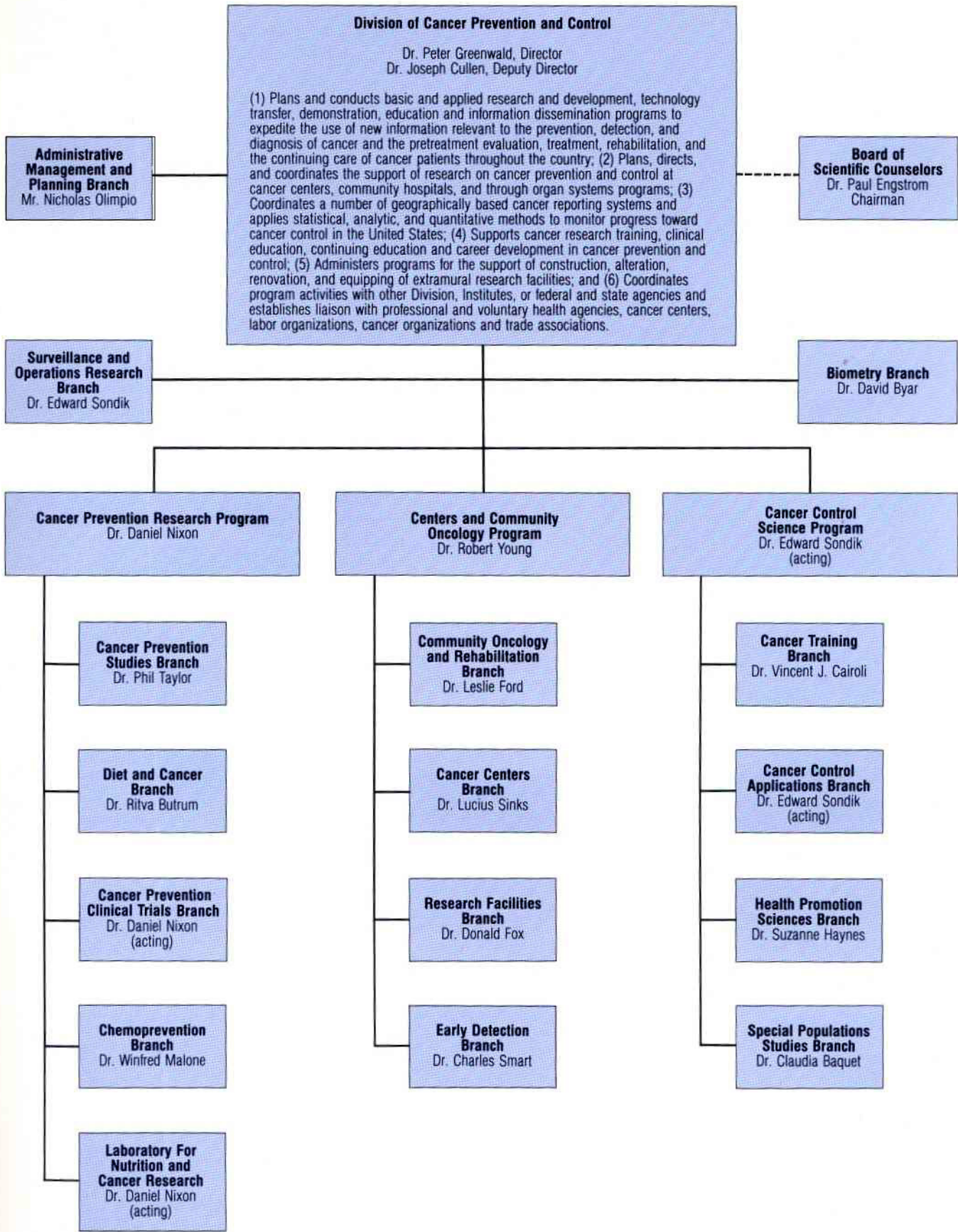
EEO Officer
 Ms. Maxine I. Richardson







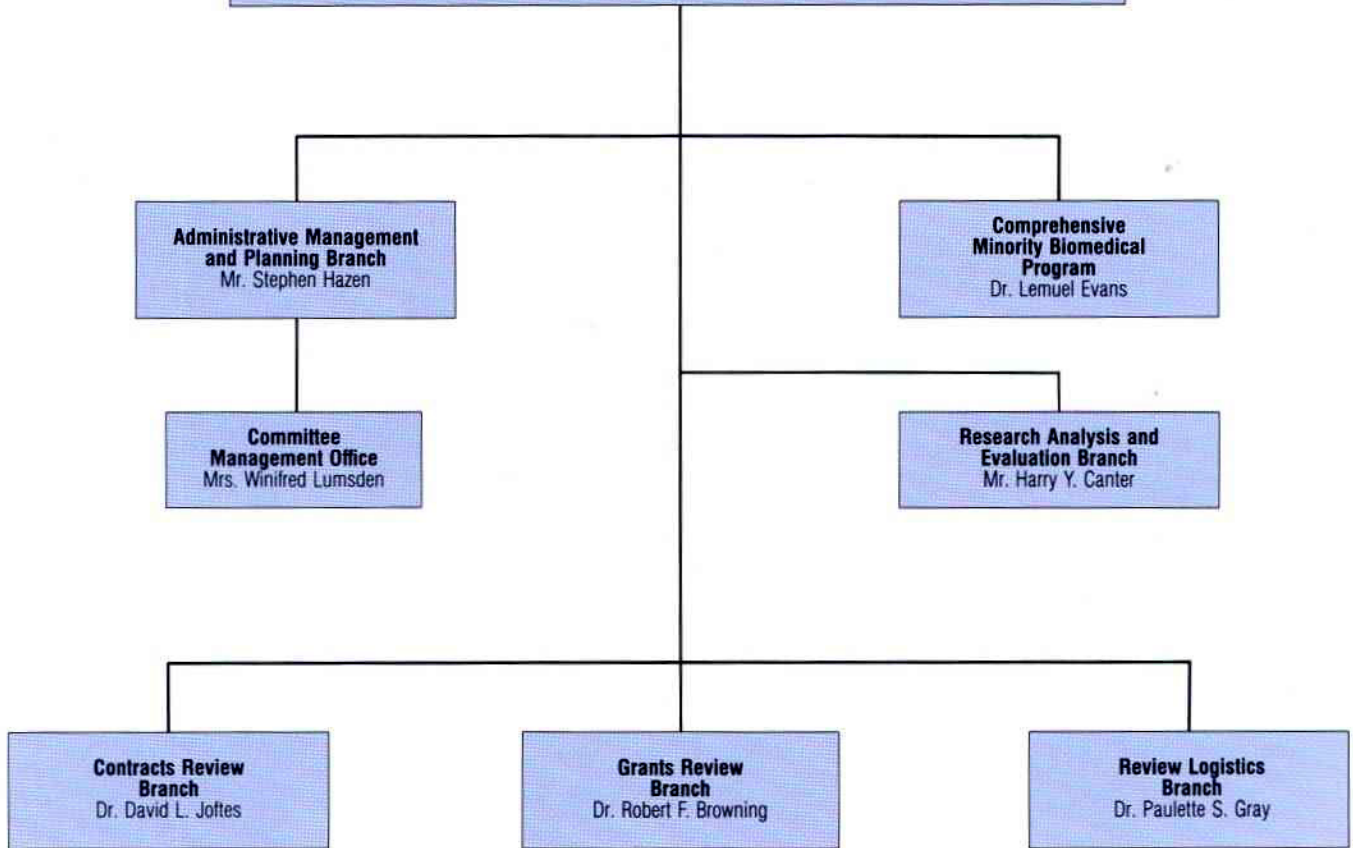




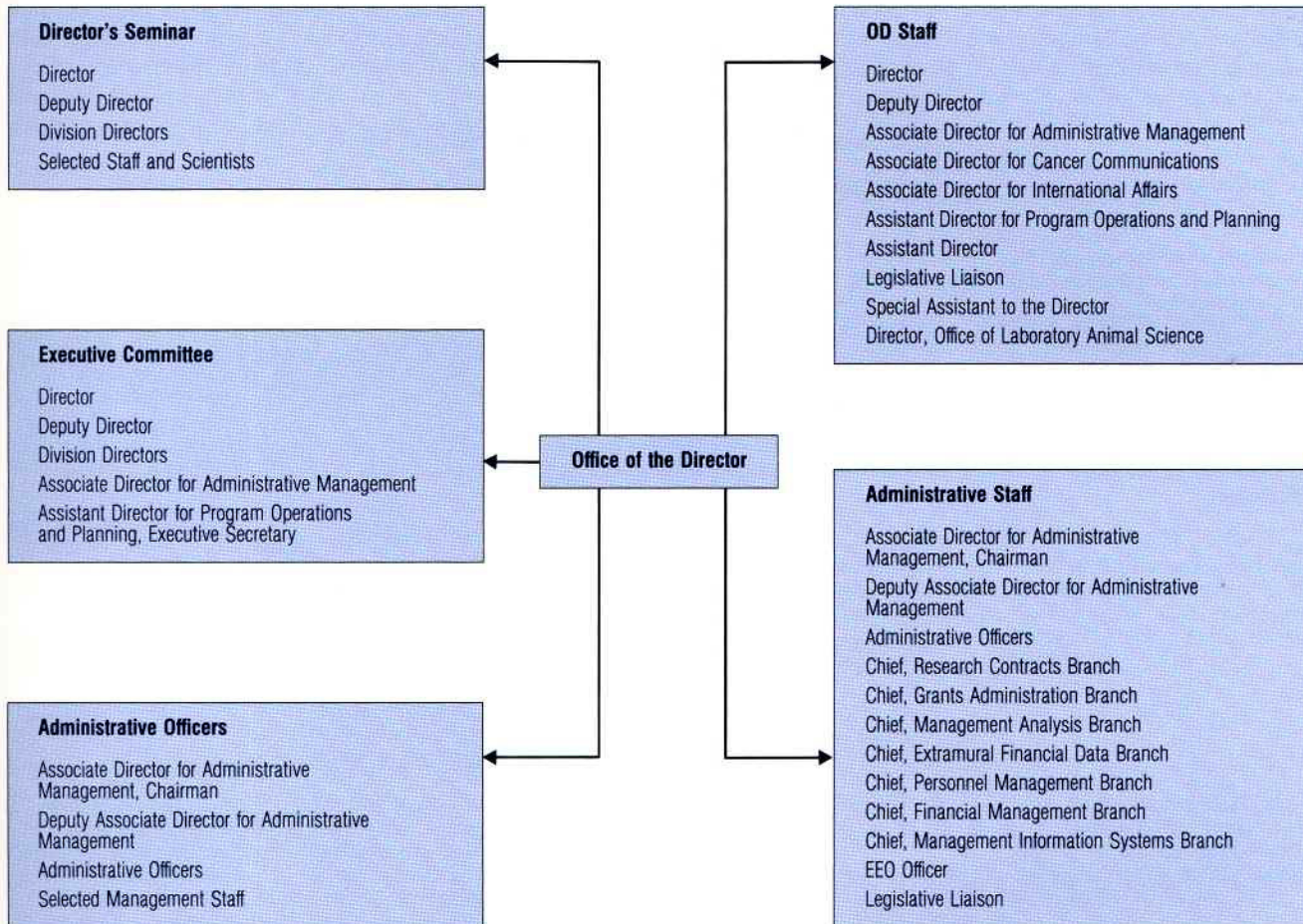
Division of Extramural Activities

Mrs. Barbara S. Bynum, Director
Dr. Paul C. Rambaut, Deputy Director

(1) Administers and directs the Institute's grant and contract review and processing activities; (2) Provides initial technical and scientific merit review of grants and contracts for the institute; (3) Represents the Institute on overall NIH extramural and collaborative program policy committees, coordinates such policy within NCI, and develops and recommends NCI policies and procedures as related to the review of grants and contracts; (4) Coordinates the Institute's review of research grant and training programs with the National Cancer Advisory Board; (5) Coordinates the implementation of committee management policies within the Institute and provides the Institute's staff support for the National Cancer Advisory Board; (6) Coordinates program planning and evaluation in the extramural area; (7) Provides scientific reports and analyses to the Institute's grant and contract programs; and (8) Coordinates and administers the Institute's participation in minority research and training efforts.



Information Flow for Program Implementation Within the NCI



NCI Intramural Review Process

Board of Scientific Counselors

BSC Approves Site Visit Schedule

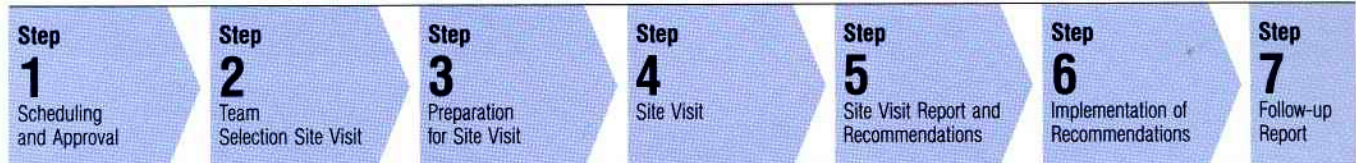
Chairman, BSC Selects Site Visit Chairman

Site Visit Chairman Selects Site Visit Team

BSC Site Visit Team Reviews Material Prepared by Division

BSC Site Visit Team Inspects and Reviews Laboratory

Site Visit Team Prepares Report and presents it to BSC. After Review and Approval, BSC. Transmits Final Recommendations to the Division Director.



NCI Divisions

Division Prepares Proposed Site Visit Schedule

Division Prepares Background Material on Laboratory to be Site Visited and Sends to Site Visit Team

Site Visit Preparation by Laboratory

Division Implements Recommendations Contained in Site Visit Report

Division Prepares Report to BSC on Actions Taken

Research Positions at the National Cancer Institute¹

The National Cancer Institute recognizes that one of the most valuable resources to be drawn upon in the fight against cancer is the wealth of scientific talent available in the U.S. and around the world. In an effort to attract and maintain the highest quality scientific staff, two personnel

systems are used: the U.S. Civil Service System and the PHS Commissioned Corps. In addition, the Staff Fellowship Program and the NIH Visiting Program have been designed to meet special needs. Other special programs are available for those who qualify.

Position	Eligibility	Annual Salary	Mechanism of Entry
I. Civil Service			
A. Civil Service (tenured)	Appropriate advanced education, experience and knowledge needed by NCI to conduct its programs.	Minimum starting Ph. D.—\$41,121 Physicians—\$48,162 Maximum \$75,500	Office of Personnel Management Contact Director or Laboratory Chief in area of interest or the NCI Personnel Office.
II. Special Appointment of Experts and Consultants			
A. Special Appointment of Experts and Consultants (non-tenured appointment which can be extended up to 4 years)	Applicants shall possess outstanding experience and ability as to justify recognition as authorities in their particular fields of activity.	Equivalent to the salary range of GS-13 and above—Maximum \$75,500	Recommendation by Division Directors. Final approval rests with the Director, NCI.
III. Medical Staff Fellows			
A. Medical Staff Fellows	Appointment for 2 or 3 years with an additional 1-year extension for an initial 2-year appointment. Graduate of accredited medical or osteopathic school and completion of internship. Completion of 2 or 3 years of clinical training beyond the M.D. degree and demonstrated outstanding ability to conduct successfully, preestablished programs in both clinical and laboratory research.	\$32,000-\$36,000	Apply to the Medical Staff Fellowship Program Office, National Institutes of Health, Clinical Center, Building 10, Room IC292, Bethesda, MD 20892.
B. Medical Staff Fellows in Pharmacology (PRAT Fellows). For physicians committed to research careers in pharmacological sciences, or clinical pharmacology.	Appointment for 2 or 3 years with an additional 1-year extension for an initial 2-year appointment. Graduate of accredited medical or osteopathic school and completion of internship. Completion of 2 or 3 years of clinical training beyond the M.D. degree and demonstrated outstanding ability to conduct successfully, preestablished programs in both clinical and laboratory research.	\$32,000-\$36,000	Apply to the Medical Staff Fellowship Program Office, National Institutes of Health, Clinical Center, Building 10, Room IC292, Bethesda, MD 20892.
IV. Visiting Program (limited tenure)²			
A. Visiting Fellow (maximum 3 years)	1-3 years postdoctoral experience or training.	Entrance stipend \$20,000-\$23,000	Contact Director or Laboratory Chief in area of interest.
B. Visiting Associate (1 year with renewals to end of project)	3+ years postdoctoral experience or training with appropriate knowledge needed by NCI.	\$24,000-\$45,000	Contact Director or Laboratory Chief in area of interest.
C. Visiting Scientist (duration of project)	6+ years postdoctoral experience with appropriate specific experience and knowledge needed.	\$34,580-\$75,500	Contact Director or Laboratory Chief in area of interest.
V. Staff Fellowships			
A. Staff Fellowship	Physician or other doctoral degree equivalent (awarded within last 5 years) and who has less than 7 years of relevant research experience. U.S. citizen or non-citizen eligible for naturalization within 4 years. Maximum 7 year appointment.	Staff Fellows Physicians \$24,000-\$36,588 Other Doctorates \$20,000-\$38,753 Senior Staff Fellows Physicians \$28,000-\$50,744 Other Doctorates \$24,000-\$43,452	Contact Director or Laboratory Chief in area of interest or the NCI Personnel Office.

¹Does not necessarily indicate that positions are currently available at the National Cancer Institute.

²Under most circumstances, the various visiting programs are limited to non-citizens.

Position	Eligibility	Annual Salary	Mechanism of Entry
VI. Civil Service Summer Employment Programs			
A. Summer Clerical Program	Must be 18 years of age or older (16 if high school graduate). Noncitizens may compete provided they have permanent visa status and are from countries allied with the U.S.	GS-1 through GS-4 Grade is based on education and/or experience.	Apply to NIH on or before March 15.
B. Summer Undergraduate Program	Students majoring in biological and/or physical sciences or related field, or applicants with appropriate experience. Noncitizens may compete provided they have permanent visa status and are from countries allied with the U.S.	GS-1 through GS-4 Grade is based on education and/or experience.	Apply to NIH by March 15.
C. Summer Graduate Program	College graduate, graduate student planning to attend graduate school, faculty member or equivalent experience and/or education. Noncitizens may compete provided they have permanent visa status and are from countries allied with the U.S.	GS-5 through GS-12. For some occupations superior scholastic work may qualify for a higher grade level.	Apply to NIH by March 15.
D. Summer Employment for Needy Youth	Educationally and economically disadvantaged youths in their formative years (must have reached 16th birthday). Disabled students are not required to meet economic criteria. Noncitizens may compete provided they have permanent visa status and are from countries allied with the U.S.	Federal minimum wage.	Register with the local office of the State Employment service and apply to NCI.
E. Summer Employment Program for Native Americans Under the Job Training Partnership Act	Participants must be Native American or of Native American descent and unemployed, under-employed, or economically disadvantaged. Must reside within the states of Tennessee, Kentucky, or the District of Columbia.	Paid by the United South and Eastern Tribes, Inc. (USET) depending on education and experience.	Apply to USET for referral to NCI.
VII. Special Programs			
A. Guest Researcher sponsored by organization other than NIH, PHS	Usually a scientist, engineer or other scientifically trained specialist who would benefit from the use of NCI facilities in furthering his/her research. Cannot perform services for NCI.	Established by sponsoring organization	Contact Director or Laboratory Chief in area of interest; also apply to sponsoring agency, e.g., American Cancer Society, Eleanor Roosevelt Cancer Foundation, Leukemia Society of America, Inc., etc.
B. COSTEP Program (operates year-round). Maximum 120 days per 12-month period.	U.S. citizen. Must have completed one year of study in a medical, dental or veterinary school, or a minimum of two years of baccalaureate program in a health-related field such as engineering, nursing, pharmacy, etc. May be enrolled in a master's or doctoral program in a health-related field (designated by the Assistant Secretary for Health). Physical requirements of PHS Commissioned Corps. Plans to return to college.	Pay and allowance of a Junior Assistant Health Service Officer	Apply to COSTEP, Commissioned Personnel Operations Division, Parklawn Building, 5600 Fishers Lane, Rockville, MD 20857.
C. Fogarty International Scholars in Residence Program.	International reputation, productivity, demonstrated ability in biomedical field.	\$60,000 for 1 year	Recommendation to Fogarty Center by Institute Director or any senior tenured member of the NIH scientific staff.
D. Stay-in-School Program	Economically disadvantaged students who are attending accredited schools on a full-time or substantially full-time basis, and are in good academic standing. (Must have reached 16th birthday.) Disabled students are not required to meet economic criteria.	Salary is commensurate with duties assigned and student's education and/or experience.	Register with the local office of the state employment service and apply to NCI. No deadline required for applying. However, no new appointments are made between May 1 to August 30.

Position	Eligibility	Annual Salary	Mechanism of Entry
E. The Federal Junior Fellowship Program	Graduating high school senior in a public or private school in the Metro Wash., D.C. area. Must be in upper 10% of graduating class, have applied for admission to an accredited college or university and need financial assistance to attend school. Must be a U.S. citizen or a native of American Samoa or Swains Island.	GS-1 through GS-4.	Nominations are submitted directly to the Office of Personnel Management by high school principals or counselors.

VIII. Other Training Programs

A. Cancer Prevention Fellowship Program (Three-year non-tenured civil service position).	1) M.D./D.O., or accredited doctoral degree in a discipline related to cancer prevention and control research; biomedical, medical, nutritional, public health or behavioral sciences, 2) academic professional excellence supported by official transcripts and four letters of reference, and 3) United States citizenship or be a resident alien eligible for citizenship within four years.	First year for an M.D. or D.O. \$26,000-\$35,000 for Ph.D. \$18,000-\$31,000.	Program Coordinator, CPFP, Executive Plaza South, Room T41D, Bethesda, Maryland 20892.
B. Biotechnology Fellow	Physicians with little or no experience or training in fundamental research, but with an interest in biotechnology including its application to prevention and new treatment and diagnostic techniques, would be eligible. Ph.D. scientists with little or no experience or training in clinically related programs but with an interest in clinical applications of fundamental research methodology related to biotechnology would also be eligible. Typically, these candidates will have less than three years post-doctoral experience. The Biotechnology Training Program is established for United States citizens, or resident aliens who will be eligible for U.S. citizenship within four years.	First year Ph.D. \$19,000-\$25,000 Physicians \$30,000-\$34,000	Contact Division Director or Laboratory Chief in area of interest.
C. Cancer Nurse Training Program	Applications will be accepted from graduates of NLN accredited baccalaureate nursing programs. Each candidate must submit academic transcripts demonstrating a minimum of a "B" average in undergraduate work, three references regarding their academic and clinical capability, a letter describing their interest in the program, and a Personal Qualification Statement, SF-171. The program is also available to all new graduate applicants to the Cancer Nursing Service; some may not be aware of the program prior to their contact with Clinical Center.	Stipends for the program will be \$1,700 per month.	Contact the Division of Cancer Treatment.
D. Student Research Training Program	The review and selection of candidates, as well as the day-to-day administration of the fellowships, will be the responsibility of each Division's Administrative Office. Must be bona-fide high school, college, medical school, or graduate student. Must be 16 years of age, must have a cumulative GPA of 2.75 or above, must be either a U.S. citizen or resident alien. The length of the training fellowships may vary from 2 to 6 months, not to exceed 6 months during any one 12-month period.	Stipends are based on education and experience at a pay range of \$802-\$1,872 per month.	Contact Division Director or Laboratory Chief in area of interest. Application deadlines are March 1 for spring/summer months and September 1 for fall/winter months.
E. Special Volunteer Program	Volunteer service may be accepted for direct patient care, clerical assignments, technical assistance, or any other activities necessary to carry out the authorized functions of the NCI. Applicants must be at least 16 years of age.	N/A	Contact the NCI Personnel Office.

Position	Eligibility	Annual Salary	Mechanism of Entry
F. General Fellowship Program	M.D., Ph.D. or equivalent degrees as well as pre-doctoral candidates pursuing graduate work with the aim of achieving a doctoral degree. U.S. citizens, permanent residents, or foreign citizens are eligible.	Salary is commensurate with duties assigned and candidate's education and/or experience.	Contact Division Director or Laboratory Chief in area of interest.
G. Cancer Epidemiology and Biostatistics Training Program	M.D.s and Ph.D.s with an interest in and an aptitude for epidemiology and/or biostatistical research in cancer. Ph.D. candidates in approved doctoral programs in epidemiology or biostatistics whose research would be the source of their dissertation. Master's level scientists whose degree is in a discipline related to epidemiology or biostatistics. Must be U.S. citizen or resident alien who will be eligible for U.S. citizenship within four years.	Starting salary: M.D. \$27,000 Ph.D. \$19,000 Master's level \$17,000	Contact the Administrative Office of the Division of Cancer Etiology.
H. Intramural Research Training Award (IRTA)	Appointments for 1 or 2 years with a maximum of 3 years to candidates with physician or other doctoral degree in the biomedical, behavioral or related sciences and 3 or fewer years of relevant postdoctoral research experience	\$24,000-\$27,000	Contact Director or Laboratory Chief in area of interest.

Highlights of Selected Training Mechanisms

Biotechnology Training Program

Why Needed:

- To provide training in fundamental sciences and clinical disciplines for physicians and Ph.D. scientists.
- To enhance cancer clinical programs through the rapid transfer and application of new techniques and fundamental knowledge leading to state-of-the-art prevention, diagnosis and treatment of cancer.
- To maintain a significant level of support for training in those disciplines related to biotechnology.

Program Provisions:

- Training assignments in modern biotechnology will emphasize the application of recombinant DNA and hybridoma technology to cancer clinical programs; emphasis also is in the areas of nutrition, clinical pharmacology, viral oncology, and biochemical and clinical epidemiology as clinical disciplines.
- The program is supervised by the Senior Scientific Coordinating Committee (the Executive Committee is currently serving in this role).
- Each candidate will have a training plan. Candidates and training plans will be approved by the Division Director and SSCC.
- Fellowships are from six months to two years, with the potential for an extension of up to a maximum of three years.
- Fellowships are not subject to employment ceilings and there are no service/payback provisions.
- The program is limited to citizens or resident aliens eligible for citizenship.
- Candidates may apply to the NCI laboratory or branch that offers a program that best meets their training needs.

Cancer Prevention Fellowship Program

Why Needed:

- To increase the number of scientists highly qualified to conduct cancer prevention and control intervention research in order to fully realize the potential for major reductions in cancer rates.

Program Provisions:

- Allows for doctoral level scientists from a variety of academic disciplines to be exposed to a number of educational experiences in cancer prevention and control.
- Fellows spend the first four months of their three-year program in an academic course that covers all aspects of cancer prevention and control. For the next 20 months participants are assigned to one of the Division's operational branches where they engage in specific research projects and also receive exposure to the daily management and administration of federal research programs. For the last 12 months, Fellows are assigned to a field research project at either a cancer center, major NCI research grantee/contractor, or a public health department.
- Interested candidates may apply to Ms. Barbara Redding, Division of Cancer Prevention and Control.

Cancer Nurse Training Program *Why Needed:*

- To offer a comprehensive perspective on current oncology practice and its implications in nursing.
- To meet the special needs of cancer patients and their families which demand a high level of nursing practices in meeting both the physical and psychological requirements of the patients.

Program Provisions:

- The program is offered as a clinical traineeship in oncology to new nursing graduates.
- Traineeships are nine months in duration emphasizing both theoretical and practical aspects of cancer nursing and including classroom instruction as well as on-the-job training.
- The program is planning on a class of at least 15 trainees beginning each September.
- The curriculum will cover philosophy of cancer nursing, pathophysiology of cancer, epidemiology, diagnosis and staging, prevention/detection, psychosocial needs of the cancer patient and family, the child with cancer, current treatment modalities, specific cancers/major sites/current research, cancer nursing research, and issues in cancer care such as ambulatory care, use of current technology, aging, ethical dilemmas, costs of care, and hospice program.
- Candidates may apply to the Nurse Recruiter, Department of Nursing and will be reviewed and selected by a Candidate Selection Committee. Final approval is by the Director, DCT.

Cancer Statistics

Number of Deaths for the Five Leading Cancer Sites By Age Group and Sex

All Ages		Under 15		15-34		35-54		55-74		75+	
Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Lung	Breast	Leukemia	Leukemia	Leukemia	Breast	Lung	Breast	Lung	Lung	Lung	Colon & Rectum
83,754	40,090	418	296	681	646	8,912	8,256	53,699	24,289	20,976	14,981
Colon & Rectum	Lung	Brain & CNS	Brain & CNS	Brain & CNS	Leukemia	Colon & Rectum	Lung	Colon & Rectum	Breast	Prostate	Breast
28,152	38,641	230	192	444	490	2,277	4,950	15,008	20,160	15,132	11,026
Prostate	Colon & Rectum	Endocrine	Endocrine	Non-Hodgkin's Lymphomas	Cervix	Pancreas	Colon & Rectum	Prostate	Colon & Rectum	Colon & Rectum	Lung
25,940	29,434	119	74	431	310	1,170	1,911	10,488	12,359	10,676	9,266
Pancreas	Pancreas	Non-Hodgkin's Lymphomas	Bone	Hodgkin's Disease	Brain & CNS	Brain & CNS	Ovary	Pancreas	Ovary	Pancreas	Pancreas
11,541	11,558	64	41	301	321	1,272	1,649	6,652	6,259	3,672	5,211
Leukemia	Ovary	Soft Tissue	Kidney	Melanoma Skin	Non-Hodgkin's Lymphoma	Non-Hodgkin's Lymphoma	Cervix	Stomach	Pancreas	Bladder	Leukemia
9,542	11,357	50	36	300	199	1,184	1,347	4,485	5,542	3,380	3,362

Source: Mortality tape (1985) from National Center for Health Statistics.

Relationship of Cancer to Leading Causes of Death in the United States

Rank	Cause	Number of Deaths	Death Rate per 100,000 Population	Percent of Total Deaths
	ALL CAUSES	2,086,440	873.9	100.0
1	Diseases of Heart	771,169	323.0	37.0
2	CANCER	461,563	193.3	22.1
3	Stroke	153,050	64.1	7.3
4	Accidents	93,457	39.1	4.5
5	Bronchitis, Emphysema & Asthma	74,662	31.3	3.6
6	Pneumonia & Influenza	67,615	28.3	3.2
7	Diabetes Mellitus	36,969	15.5	1.8
8	Suicide	29,453	12.3	1.4
9	Cirrhosis of Liver	26,767	11.2	1.3
10	Atherosclerosis	23,926	10.0	1.1
11	Nephritis & Nephrosis	21,349	8.9	1.0
12	Homicide	19,893	8.3	1.0
13	Diseases of Infancy	19,246	8.1	0.9
14	Septicemia & Pyemia	17,182	7.2	0.8
15	Congenital Anomalies	12,783	5.4	0.6
	Other & Ill-defined	257,356	107.8	12.3

Source: National Center for Health Statistics, 1985.

**Estimated New Cancer
Cases and Deaths
By Sex For All Sites
1988***

	Estimated New Cases			Estimated Deaths		
	Total	Male	Female	Total	Male	Female
All Sites	985,000*	495,000*	490,000*	494,000	263,000	231,000
Buccal Cavity & Pharynx (ORAL)	30,200	20,500	9,700	9,050	6,000	3,050
Lip	4,300	3,800	500	125	100	25
Tongue	5,800	3,800	2,000	2,100	1,300	700
Mouth	11,800	7,100	4,700	2,725	1,700	1,025
Pharynx	8,300	5,800	2,500	4,200	2,900	1,300
Digestive Organs	227,500	115,500	112,000	122,350	63,150	59,200
Esophagus	9,800	6,900	2,900	9,100	6,600	2,500
Stomach	24,800	15,000	9,800	14,400	8,500	5,900
Small Intestine	2,500	1,300	1,200	800	400	400
Large Intestine } (COLON-RECTUM)	105,000	49,000	56,000	53,500	25,500	28,000
Rectum	42,000	22,000	20,000	8,000	4,100	3,900
Liver & Biliary Passages	14,000	7,100	6,900	10,900	5,500	5,400
Pancreas	27,000	13,000	14,000	24,500	12,000	12,500
Other & Unspecified Digestive	2,400	1,200	1,200	1,150	550	600
Respiratory System	168,300	112,800	55,500	144,250	97,000	47,250
Larynx	12,200	9,900	2,300	3,800	3,100	700
LUNG	152,000	100,000	52,000	139,000	93,000	46,000
Other & Unspecified Respiratory	4,100	2,900	1,200	1,450	900	550
Bone	2,100	1,200	900	1,300	700	600
Connective Tissue	5,500	3,000	2,500	2,900	1,400	1,500
SKIN	27,300**	14,600**	12,700**	7,800†	4,800	3,000
BREAST	135,900***	900***	135,000***	42,300	300	42,000
Genital Organs	176,500***	105,800	70,700***	51,700	28,600	23,100
Cervix Uteri } (UTERUS)	12,900***	—	12,900***	7,000	—	7,000
Corpus, Endometrium	34,000	—	34,000	3,000	—	3,000
Ovary	19,000	—	19,000	12,000	—	12,000
Other & Unspecified Genital, Female	4,800	—	4,800	1,100	—	1,100
Prostate	99,000	99,000	—	28,000	28,000	—
Testis	5,600	5,600	—	350	350	—
Other & Unspecified Genital, Male	1,200	1,200	—	250	250	—
Urinary Organs	68,900	48,100	20,800	20,000	12,800	7,200
Bladder	46,400	34,000	12,400	10,400	7,000	3,400
Kidney & Other Urinary	22,500	14,100	8,400	9,600	5,800	3,800
Eye	1,900	1,000	900	300	150	150
Brain & Central Nervous System	14,700	8,100	6,600	10,900	6,000	4,900
Endocrine Glands	12,100	3,600	8,500	1,850	800	1,050
Thyroid	11,000	3,000	8,000	1,100	400	700
Other Endocrine	1,100	600	500	750	400	350
Leukemias	26,900	15,000	11,900	18,100	9,800	8,300
Lymphocytic Leukemia	13,000	7,400	5,600	7,000	3,900	3,100
Granulocytic Leukemia	13,000	7,100	5,900	10,600	5,600	5,000
Monocytic Leukemia	900	500	400	500	300	200
Other Blood & Lymph Tissues	50,700	26,400	24,300	26,200	13,500	12,700
Hodgkin's Disease	7,400	4,200	3,200	1,500	900	600
Multiple Myeloma	11,600	6,000	5,600	8,200	4,100	4,100
Other Lymphomas	31,700	16,200	15,500	16,500	8,500	8,000
All Other & Unspecified Sites	36,500	18,500	18,000	35,000	18,000	17,000

NOTE: The estimates of new cancer cases are offered as a rough guide and should not be regarded as definitive. Especially note that year-to-year changes may only represent improvements in the basic data. ACS six major sites appear in boldface caps.

* Carcinoma in situ and non-melanoma skin cancers are not included in totals. Carcinoma in situ of the uterine cervix accounts for more than 50,000 new cases annually, and carcinoma in situ of the female breast accounts for more than 5,000 new cases annually. Non-melanoma skin cancer accounts for more than 500,000 new cases annually.

** Melanoma only

*** Invasive cancer only.

† Melanoma 5,800; other skin 2,000

INCIDENCE ESTIMATES ARE BASED ON RATES FROM NCI SEER PROGRAM 1982-1984

The Cost of Cancer

The annual cost of cancer is calculated in three components: the direct cost of care for patients with cancer; the cost of the productivity lost while persons are away from their work in connection with treatment or disability, so-called morbidity costs; and the value of lost productivity due to premature mortality. Detailed costs by specific cancer site are not available at the present time. However, it is possible to estimate the total cost of the disease through national figures on health care expenditures, from the results of surveys on morbidity, and from statistics on mortality.

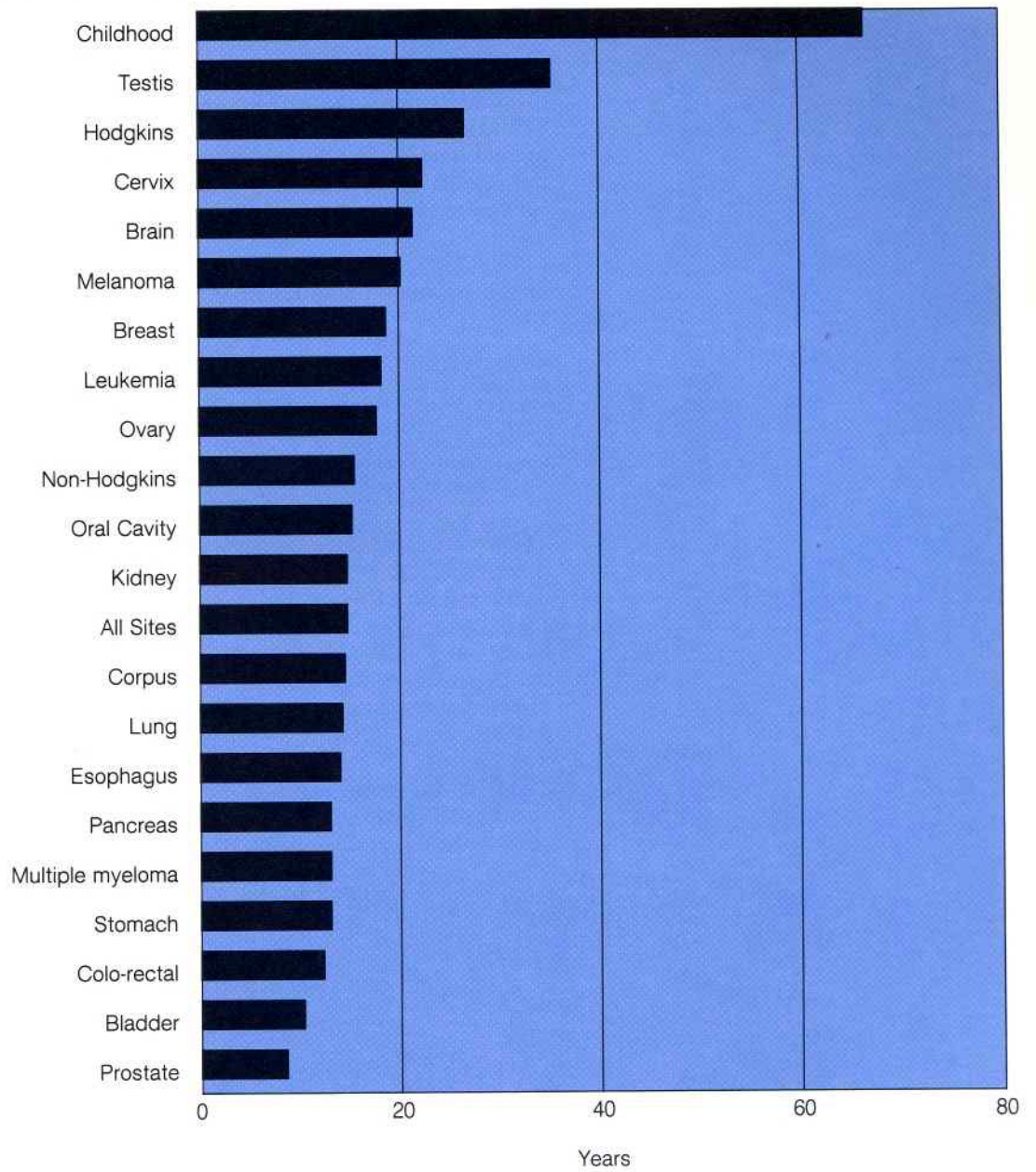
The most recent figures for the annual cost of cancer have been supplied by the National Center for Health Statistics. These figures are as follows for 1985:

All Costs in Millions	Total Cost	Direct Cost	Morbidity Cost	Mortality Cost
All Cancers	\$ 71,534	\$ 21,763	\$ 8,620	\$ 41,151
All Health Care	\$722,560	\$371,400	\$119,220	\$231,940
Percent Relationship of Cancer to Total	10%	6%	7%	18%

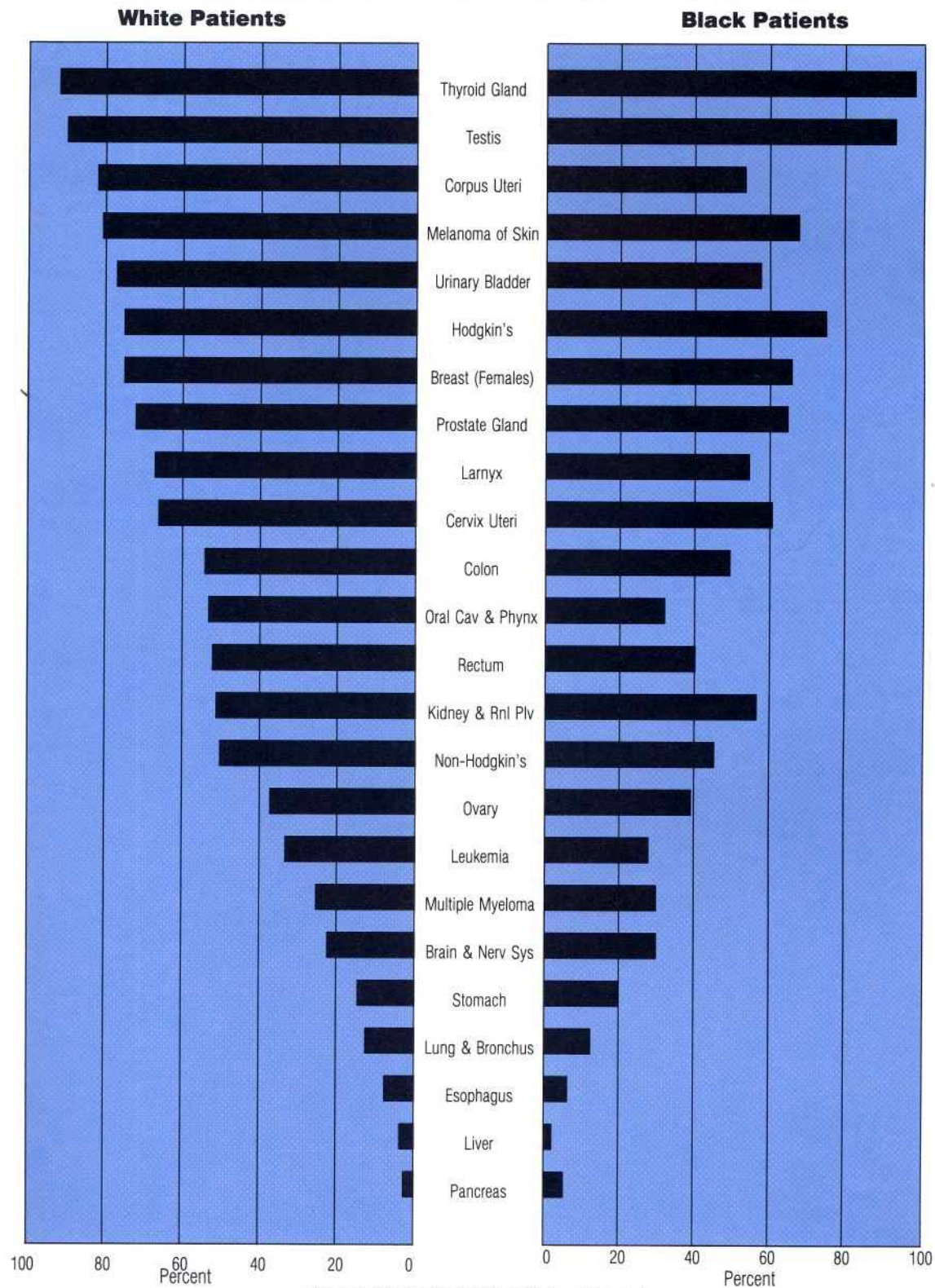
The figures show that cancer accounts for 10 percent of the total cost of disease in the United States and that its share of the total cost of premature death is about 18 percent of all causes of death. Mortality costs are computed as the loss of expected lifetime earnings of the decedent, which is relatively low for persons over age 65. Some 58 percent of all cancer deaths occur in persons 65 and over. (In these figures the future earnings were discounted at a rate of four percent to account for the time value of fiscal resources.)

The following table—Average Years of Life Lost Per Person Due to Cancer Deaths, All Races, Both Sexes, 1984—reflects site-specific information supporting the data presented on this page.

**Average Years of Life Lost
Per Person Due To Cancer Deaths,
All Races, Both Sexes, 1984**

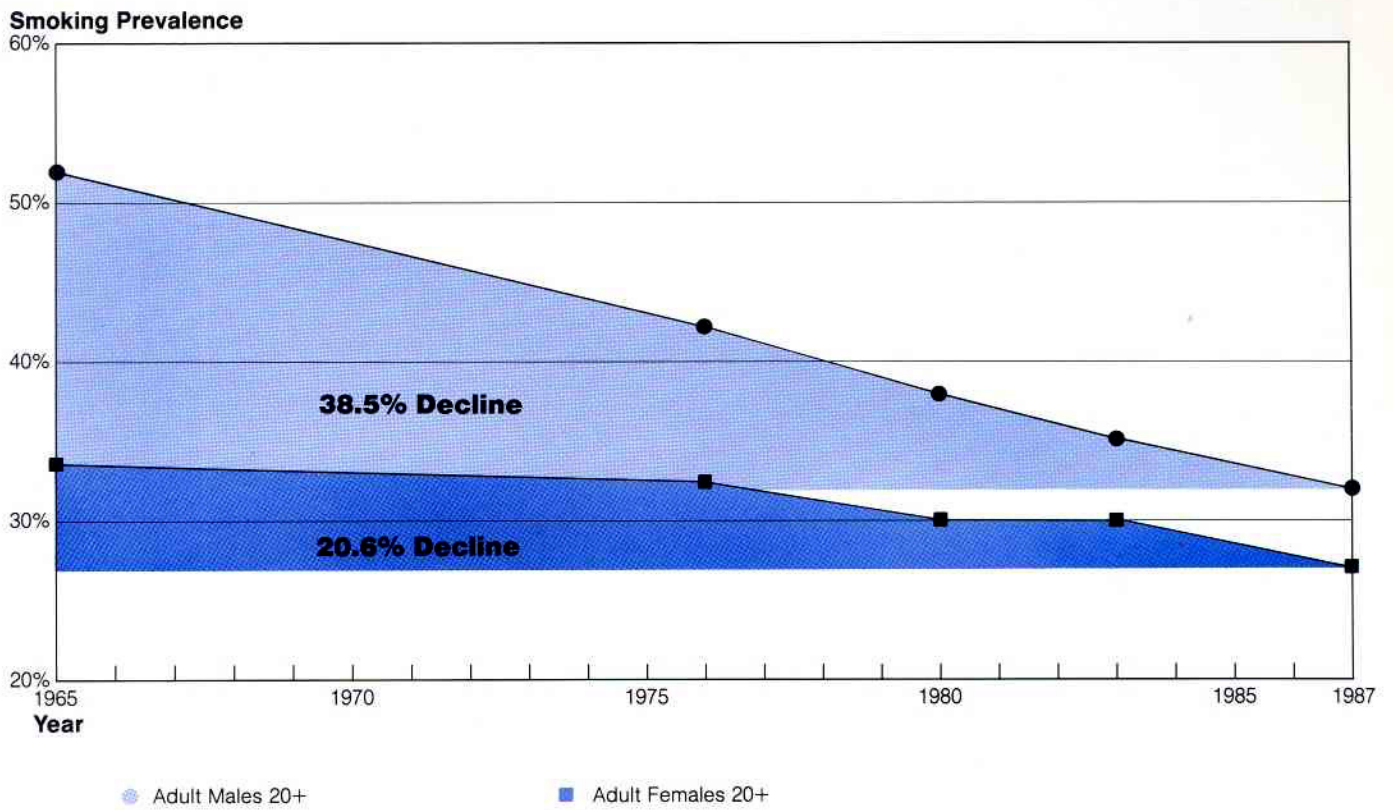


**Survival Rates by
Cancer Site:
White versus Black Patients**



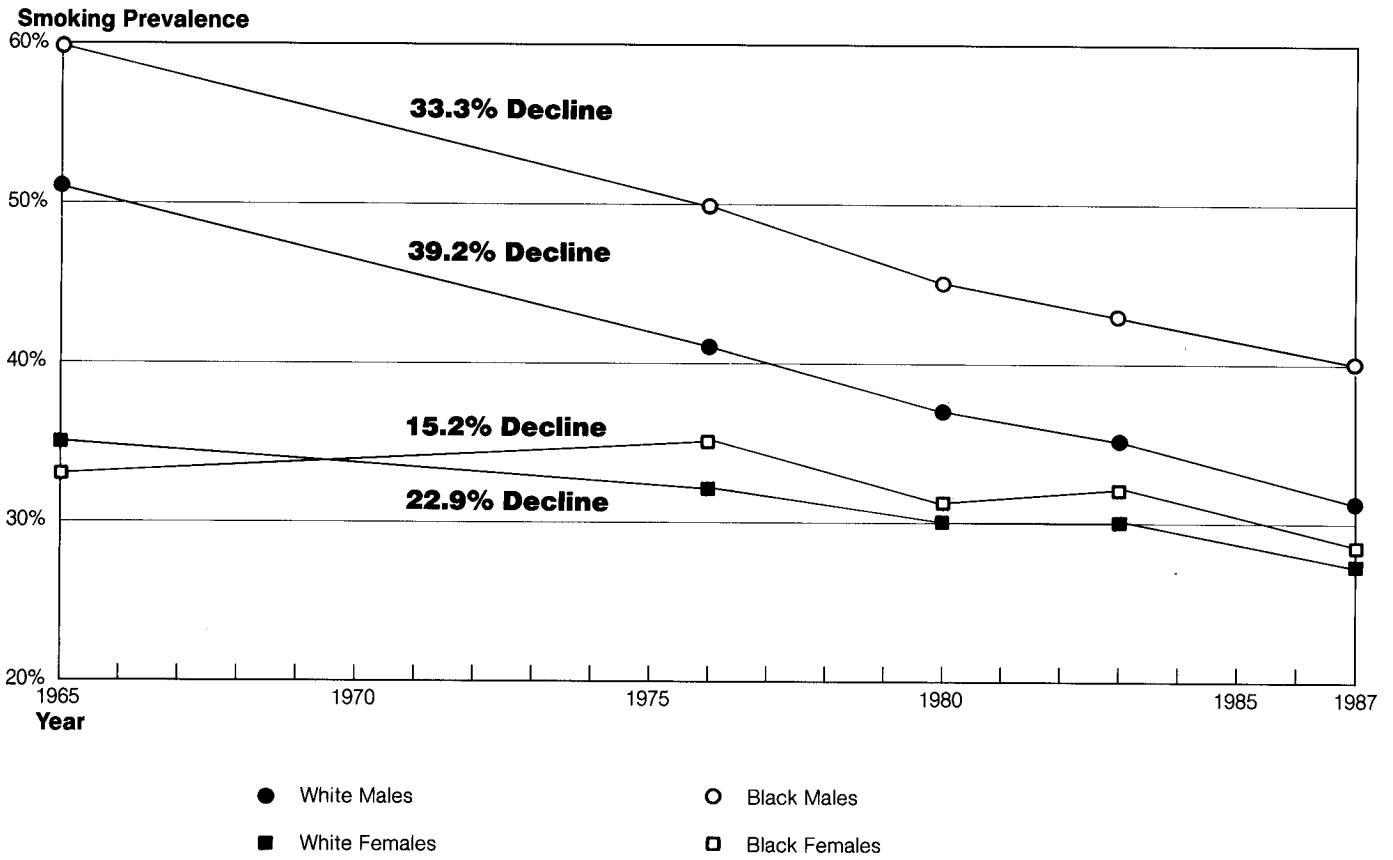
Five Year Relative Survival Rates (Male and Female)
(Data from SEER 1980—1985)

Prevalence of Cigarette Smoking Among Adult Males and Females



Age-adjusted to US 1970 Population

Prevalence of Cigarette Smoking Among Black and White Adults



Age-adjusted to US 1970 Population

Major Steps In Budget Formulation and Review Process

	January	February	March	April	May	June	July	August	September	October	November	December
NCI STAFF¹	NCI Director's Meeting—establish budget policy for upcoming fiscal year; review operating plans for current fiscal year Submit Congressional Justification for next fiscal year		Formulation of Preliminary Budget for two years in the future for both the By-Pass Budget, which is submitted directly to the President, and the budget submitted within the Administration's guidelines Congressional testimony by Director, NCI			NCI Director's Meeting—establish specific division levels for upcoming fiscal year		Formulation of By-Pass Budget Formulation of budget within Administration guidelines		Formulation of President's Budget		
NCAB²					Review and revise Preliminary Budget for two fiscal years in future				Review By-Pass Budget Submitted Directly to President	Division presentations of program activity for fiscal year just completed		
BSC³	Review operating plans for current fiscal year and policies from NCI Director's Meeting					Review and advise on implementation of divisional programs				Annual Division Budget Review current and upcoming year		

¹Executive Committee and key administrative staff

²National Cancer Advisory Board—Presidential appointees

³Board of Scientific Counselors—outside NCI peer review bodies for each of four operating divisions

**NCI Budget—
Fiscal Year 1988**

(Dollars in Thousands)

A. Actual Obligations Resulting From Appropriated Funds:

FY 1988 Appropriation	\$1,469,327
Less:	
Travel Reduction	(839)
Lapse	(53)

ACTUAL NCI OBLIGATIONS **1.468.435**

B. Reimbursable Obligations:

Major Components—

- Acquired Immune Deficiency Syndrome (AIDS):
 - Office of the Director, NIH 1,041
 - National Institute of Allergy and Infectious Diseases 3,530
 - Department of the Army 100
- Academic Research Enhancement
 - Award from Office of the Director, NIH 720
- Other Reimbursements 687

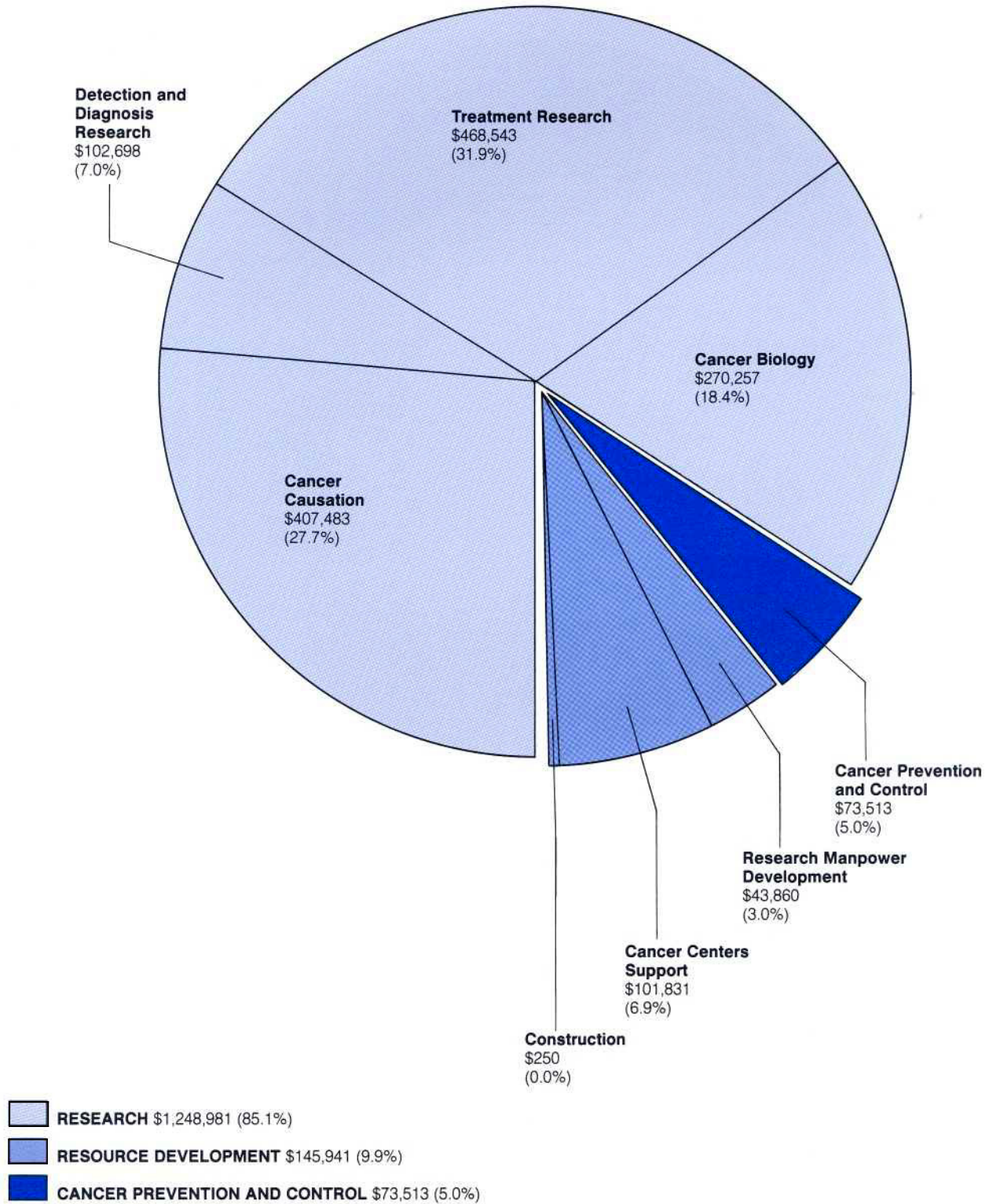
Reimbursements 6,078

C. Total NCI Obligations: **\$1,474,513**

**NCI Program Structure
Fiscal Year 1988**

(Dollars in Thousands)

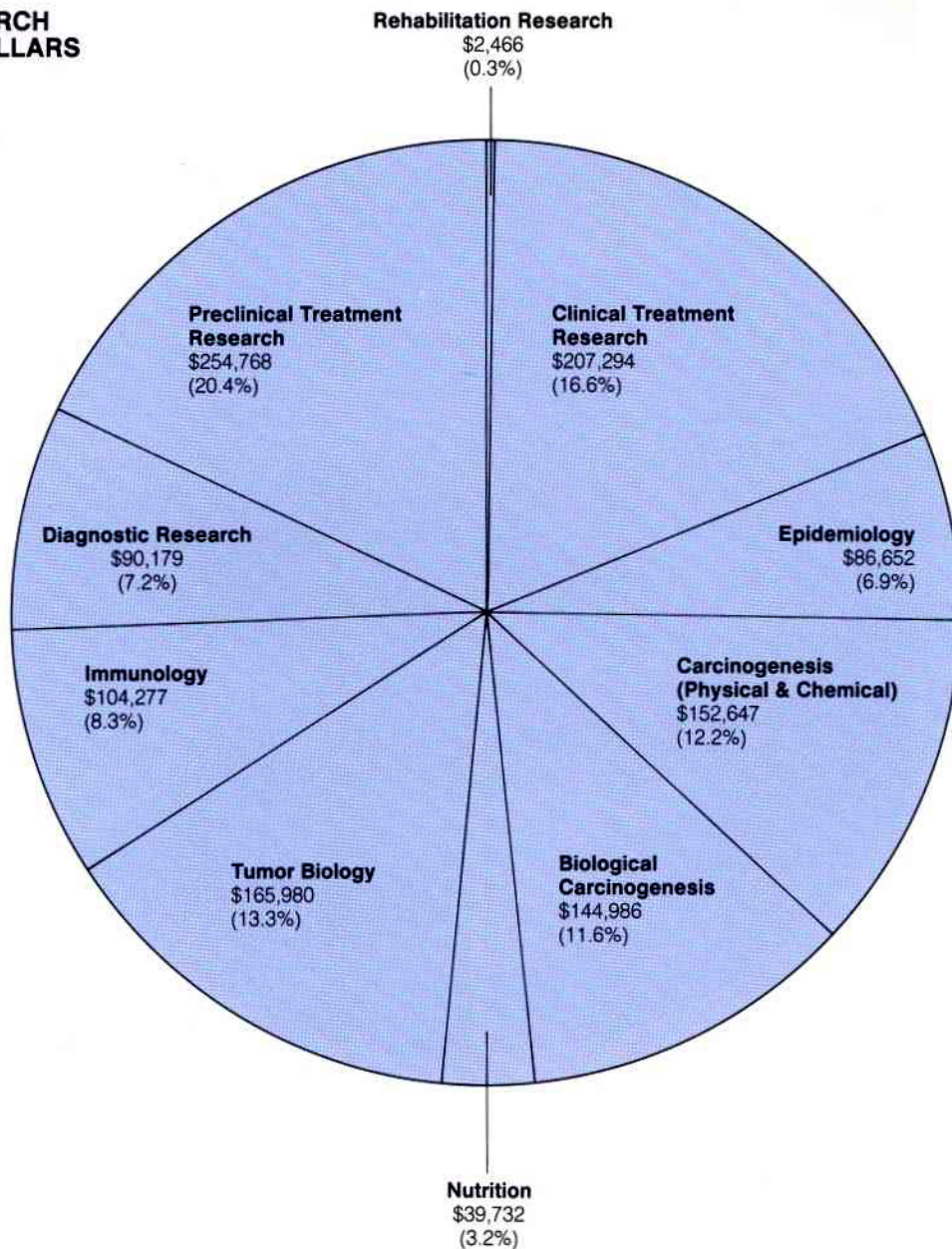
TOTAL DOLLARS
\$1,468,435



**NCI Research Programs
Fiscal Year 1988**

(Dollars in Thousands)

**TOTAL RESEARCH
PROGRAM DOLLARS**
\$1,248,981

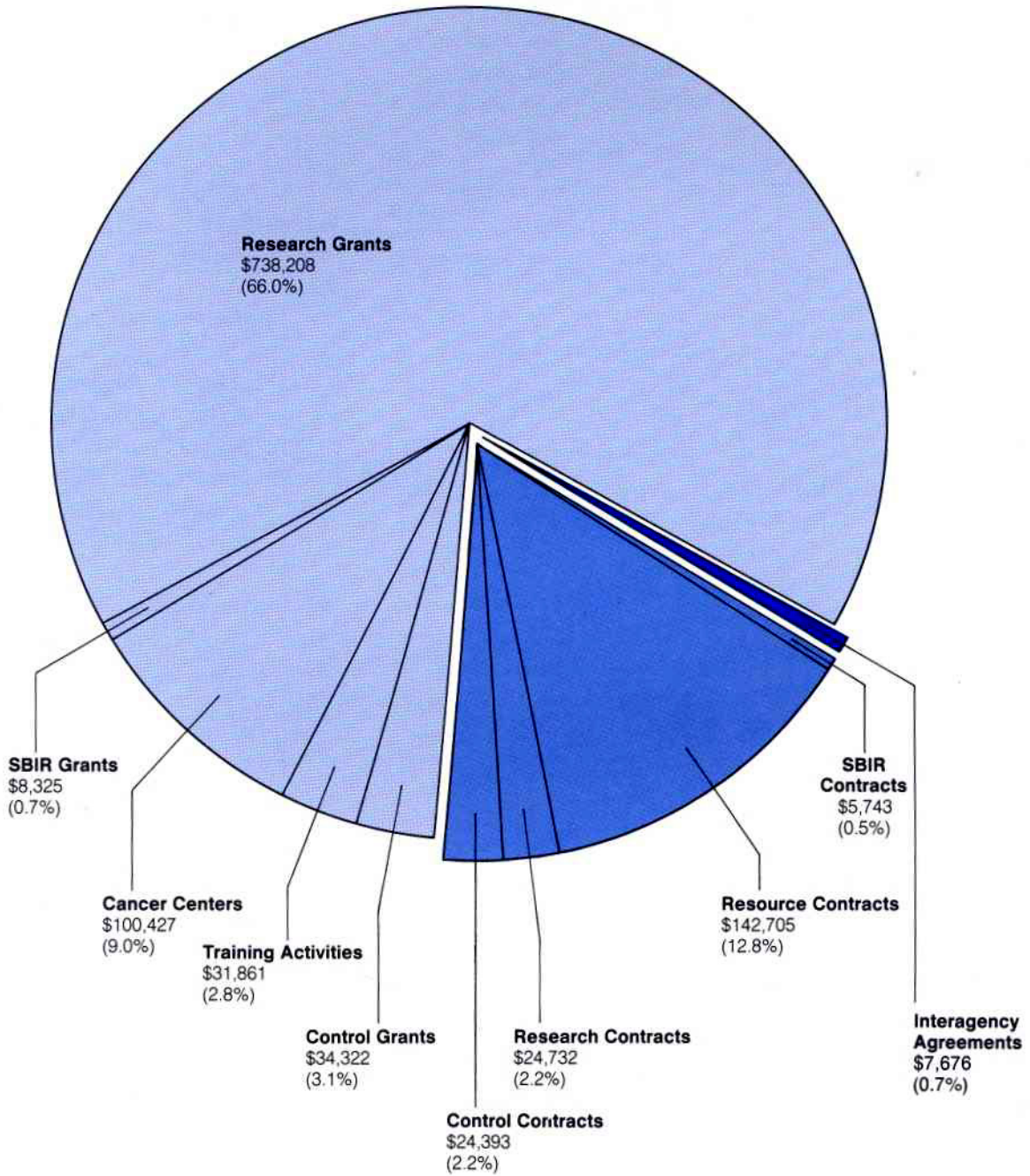


Research Programs	Dollars (Thousands)	Percent of Total
Research Programs	\$1,248,981	85.1
Resource Development		
Cancer Centers	101,831	6.9
Research Manpower Development	43,860	3.0
Construction	250	0.0
Cancer Prevention and Control	73,513	5.0
Total NCI	\$1,468,435	100.0

**NCI Extramural Funds
Fiscal Year 1988**

(Dollars in Thousands)

TOTAL EXTRAMURAL
\$1,118,392



- GRANTS** \$913,143 (81.6%)
- CONTRACTS** \$197,573 (17.7%)
- INTERAGENCY AGREEMENTS** \$7,676 (0.7%)

TOTAL INTRAMURAL/RMS \$350,043
TOTAL NCI \$1,468,435

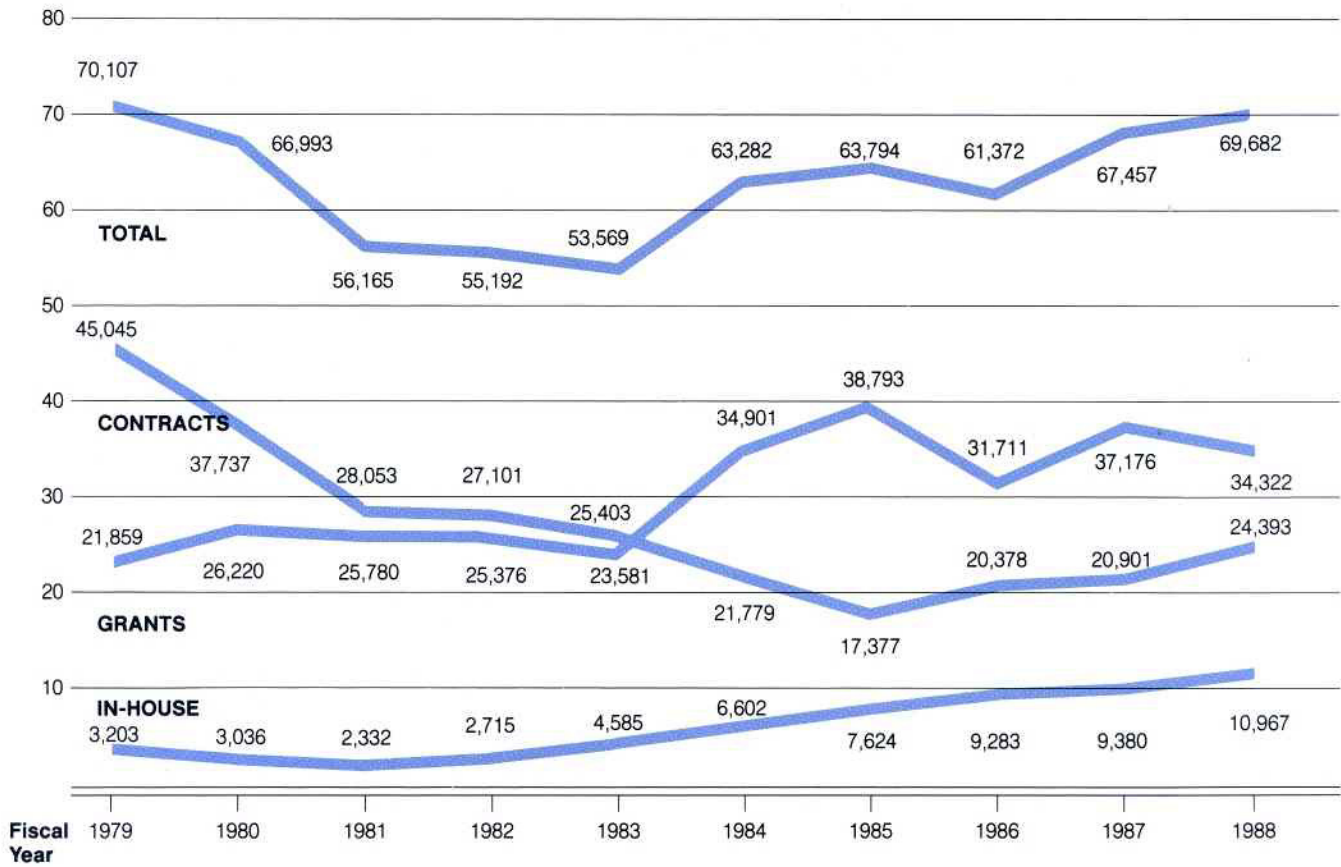
**Total NCI Dollars
by Mechanism
Fiscal Year 1988**

(Dollars in Thousands)

Amount	Mechanism	Percent of Total	Amount	Mechanism	Percent of Total
Research Project Grants			Training Program		
\$367,475	Traditional	25.0%	28,696	NRSA Institutional	2.0%
170,119	Program Projects	11.6	3,165	NRSA Individual	0.2
1,213	New Investigators	0.1	31,861	Total	2.2
15,713	First Awards	1.1	Research and Development Contracts		
24,114	Merit Awards	1.6	167,437	Research and Resource Contracts	11.4
8,325	SBIR Grants	0.6	7,676	Interagency Agreements	0.5
45,227	Outstanding Investigator	3.1	5,743	SBIR Contracts	0.4
14,727	RFAs	1.0	180,856	Total	12.3
18,490	Coop Agreements	1.3	Cancer Prevention and Control		
665,403	Total	45.3		Grants	
Cancer Centers Grants			1,225	Rehabilitation	0.1
100,427	Center Core Grants	6.8	33,097	Cancer Control	2.3
Other Research Grants			34,322	Subtotal Grants	2.3
3,178	Instrumentation Grants	0.2	24,393	Contracts	1.7
822	National Organ Systems Program	0.1	10,967	Inhouse	0.7
344	Conference Grants	0.0	69,682	Total	4.7
59,308	Clinical Coop Group	4.0	Inhouse		
984	Small Grants	0.1	268,251	Intramural Research	18.3
3,039	Comp. Min. Bio. Supp. Prog.	0.2	70,825	Research Management and Support	4.8
4,091	Scientific Evaluation	0.3	339,076	Total	23.1
1,742	Cancer Education Program	0.1	Total		
	Research Career Programs		\$1,468,435	NCI	100.0%
2,800	RCDA	0.2			
67	RCA	0.0			
814	Phys. Invest. Awds.	0.1			
668	Preventive Oncology	0.0			
3,273	Clin. Invest. Awds.	0.2			
7,622	Sub-Total Careers	0.5			
81,130	Total	5.5			
Total					
846,960	Research Grants	57.7%			

**Cancer Prevention and Control Obligations by Mechanism
Fiscal Year 1979–1988**

(Dollars in Thousands)

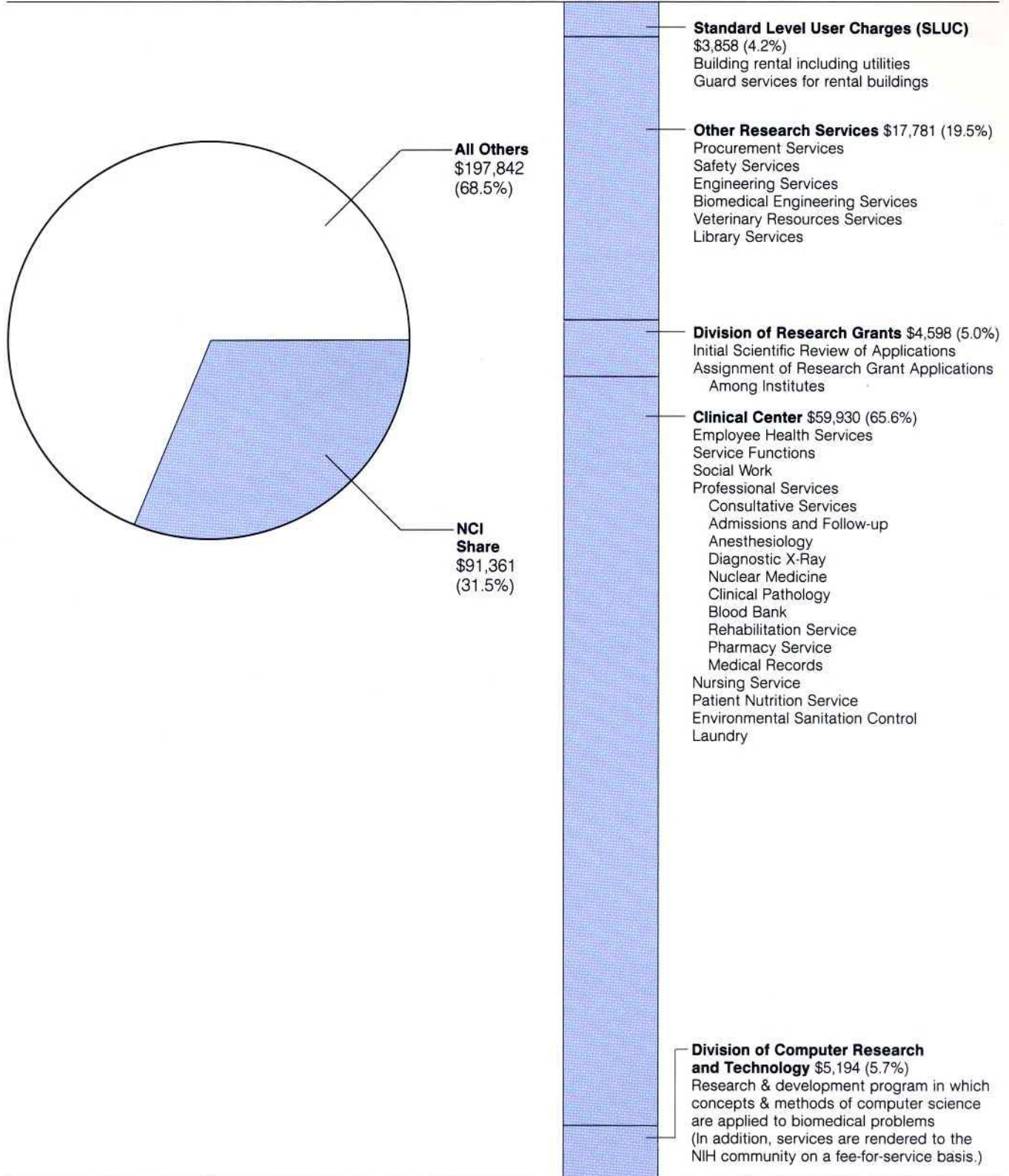


**Reimbursement to NIH
Management Fund
Fiscal Year 1988**

(Dollars in Thousands)

TOTAL NIH SERVICES
\$289,203

**DISTRIBUTION OF
NCI SERVICES \$91,361**



The Management Fund provides for the financing of certain common research support services and administrative activities which are required in the operations of NIH.

**Status of Unconditional
Gift Fund
Fiscal Year 1988***(Dollars in Thousands)*

Funds Available	Regular	\$ 417
	Special	2,297
	Total	\$2,714

Activities Funded	Patient Emergency Fund	\$ 25
	Medical Staff Quarters	77
	Conference Support	10
	Fellowships	6
	Research Equipment	45
	Official Entertainment	14
	Research Support for Breast Cancer LAK, and AIDS	2,028
	Total	2,205

Balance		\$509
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AIDS

Acquired Immunodeficiency Syndrome (AIDS) Key Discoveries

The National Cancer Institute has assumed a leading role in Acquired Immunodeficiency Syndrome (AIDS) research since the disease was first recognized in 1981. Because of the research programs and administrative mechanisms already in place, investigators were able to rapidly apply existing methods in drug screening and advances in cancer virus research technology to study AIDS. Key discoveries by NCI investigators include:

- Isolation of HTLV-III (now called human immunodeficiency virus or HIV), a retrovirus, which was found to be the primary cause of AIDS.
- Development, testing and successful clinical trials of the drug azidothymidine (AZT), confirming its effectiveness as an anti-retroviral agent against AIDS.
- Many new compounds have been identified which are active against the AIDS virus in tissue culture experiments. These compounds include both synthetic drugs and natural products. Several of these will soon be entering the initial phases of development. Two additional drugs, dideoxycytidine and dideoxyadenosine, are currently in early clinical trials and show promise as anti-retroviral agents.
- AZT has been shown to be very effective in children with AIDS. All children which had neurological symptoms due to the AIDS virus showed significant improvement.
- The recent isolation and purification of the reverse transcriptase from HIV, which is the viral enzyme that assembles DNA based on the directions it "reads" from a viral RNA blueprint. This step is critical in allowing the AIDS virus to establish itself in causing infection. This discovery, therefore, has important implications for anti-retroviral drug development.
- Increased understanding of how the growth of the AIDS virus is controlled. In particular, scientists have learned that the *tat* gene can trigger the AIDS virus to replicate at an increased rate. Thus, manipulation of the *tat* gene could lead to control of the growth of the virus.
- Recent improvement in the screening technique through a laboratory procedure that amplifies the HIV. This provides a much more sensitive test for the AIDS virus, and may permit its detection and intervention much earlier.
- An analysis of cofactors that may influence the manifestation of clinical AIDS that showed that the single most important predictor among antibody-positive individuals is the level of the helper T-cell count. The lower the count, the higher the attack rate of clinical AIDS.
- Demonstration that the AIDS virus gains access to target tissues via the T4 cell surface molecule, and that entry of the virus occurs preferentially in activated cells. Monocytes/macrophages have also been identified as target cells for HIV infection.
- Isolation of a human virus similar to the one that naturally infects the African Green Monkey and is closely related to the HIV virus. This new virus, called HTLV-IV has led to a series of studies and unique models of infections of non-human primates and man by HTLV-related viruses. They are important for a better understanding of the biology and transmission of this family of viruses, and in establishing the origin and a vaccine for AIDS.
- Demonstration that prevention of a common, spontaneous retrovirus-induced immunosuppressive disease in rhesus monkeys (Simian Acquired Immunodeficiency, SAIDS) is now possible through vaccination.
- The use of the anticancer drug, Trimetrexate, and the finding that it is effective in treating *Pneumocystis carinii* pneumonia. This pneumonia afflicts more than 40 percent of AIDS patients and is often the immediate cause of death.
- A multi-center study of male hemophiliacs has identified more precisely predictors for an increased risk of developing AIDS, particularly a decline in certain lymphocytes, the appearance of HIV antigen, and increased levels of alpha-interferon. The decline in immunity is associated with an increase in infectivity of female spouses. This represents a major risk factor in the sexual transmission of HIV.

**Acquired Immunodeficiency
Syndrome (AIDS)
Funding by Functional Category
Fiscal Year 1988**

(Dollars in thousands)

1. Pathogenesis and Clinical Manifestations:		
a) Epidemiological Studies		\$11,013
b) Virology		9,135
c) Surveillance		76
d) Etiologic Agent and Co-factors		5,327
e) Immunologic Studies		7,152
f) Simian AIDS/Animal Models		2,896
g) Psychosocial Factors		142
Subtotal		<u>35,741</u>
2. Therapeutics:		
a) Studies of Therapeutic Intervention		21,942
b) Drug Purchases and Distribution/Drug Screening		14,987
Subtotal		<u>36,929</u>
3. Vaccine Development and Evaluation		12,537
4. Public Health Control Measures:		
a) Information/Education		22
b) Prevention of Transfusion-related AIDS		289
c) Development and Evaluation of Blood Tests		871
Subtotal		<u>1,182</u>
5. Patient Care and Health Care Needs:		
a) Treatment Demonstration Projects		0
b) Bioethics and Biosafety		0
Subtotal		<u>0</u>
6. Multidisciplinary		3,555
Total, NCI		\$89,944

**Acquired Immunodeficiency
Syndrome (AIDS)
Funding by Activity
Fiscal Year 1988**

(Dollars in Thousands)

	Amount
By Mechanism:	
Research Project Grants	\$ 8,142
Cancer Center Grants	3,555
R&D Contracts	43,728
Intramural Research	31,960
Research Management and Support	2,559
Total, NCI	<u>89,944</u>

	Amount
By Research Program:	
Causation Research	\$44,681
Detection and Diagnosis Research	379
Treatment Research	38,472
Cancer Biology	2,857
Total Research	<u>86,389</u>
Resource Development Cancer Center Grants	<u>3,555</u>
Total, NCI	<u>89,944</u>

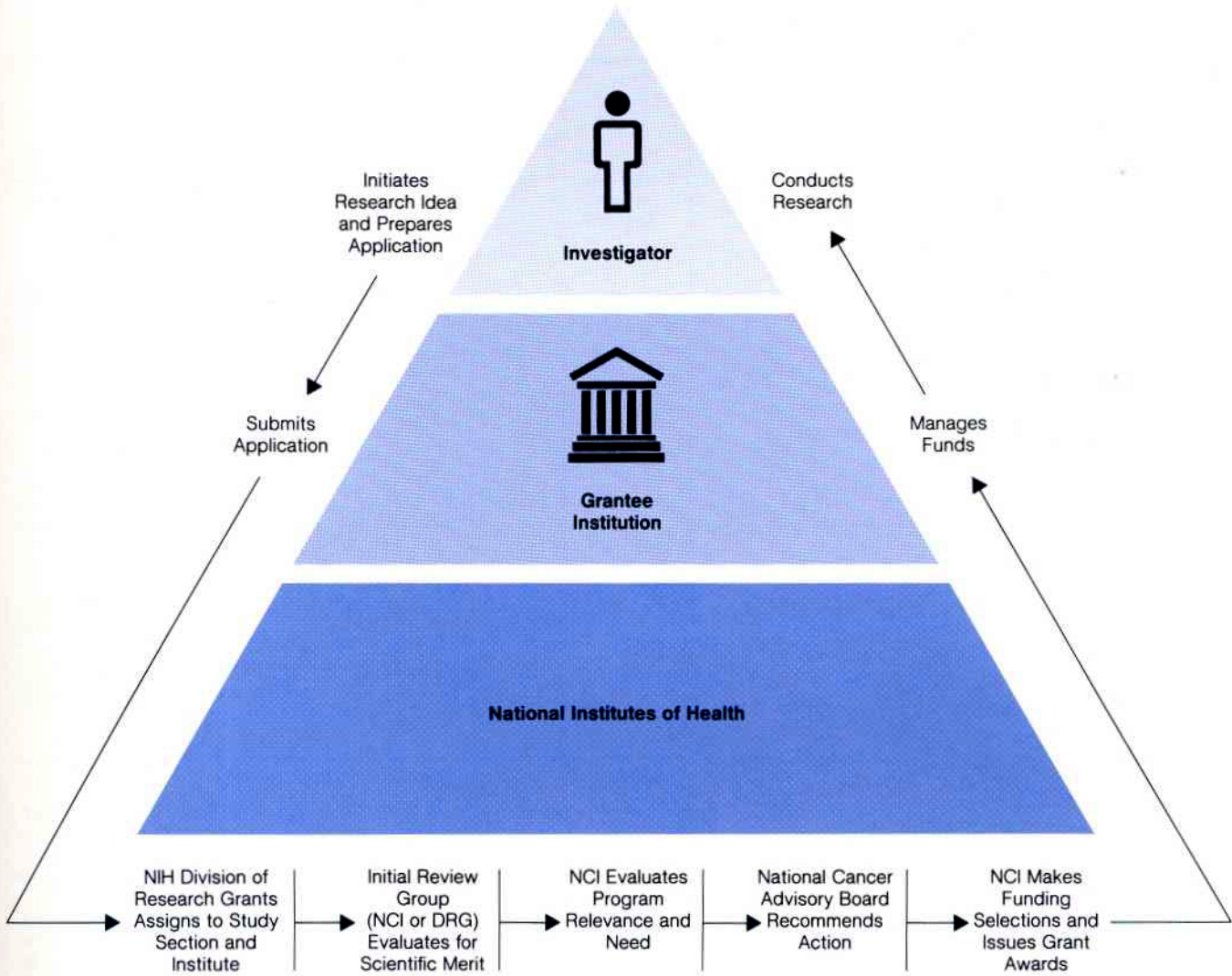
	Amount
By Division:	
Division of Cancer Biology	\$2,857
Division of Cancer Treatment	34,017
Division of Cancer Etiology	30,890
Division of Cancer Prevention and Control	3,555
Frederick Cancer Research Facility	12,530
Division of Extramural Activities	560
Office of the Director	1,717
NIH Management Fund*	3,818
Total, NCI	<u>89,944</u>

*Reflects support costs associated with NCI's activities at the NIH Clinical Center.

**Acquired Immunodeficiency
Syndrome (AIDS)
Funding History
Fiscal Years 1982-1988***(Dollars in Thousands)*

Fiscal Year	NCI Amount	NIH Amount	% NCI To NIH
1982	\$2,406	\$3,355	72%
1983	9,790	21,668	45%
1984	16,627	44,121	38%
1985	26,874	63,737	42%
1986	45,050	134,667	33%
1987	63,755	260,907	24%
1988	89,944	473,285	19%

NCI Grants Process

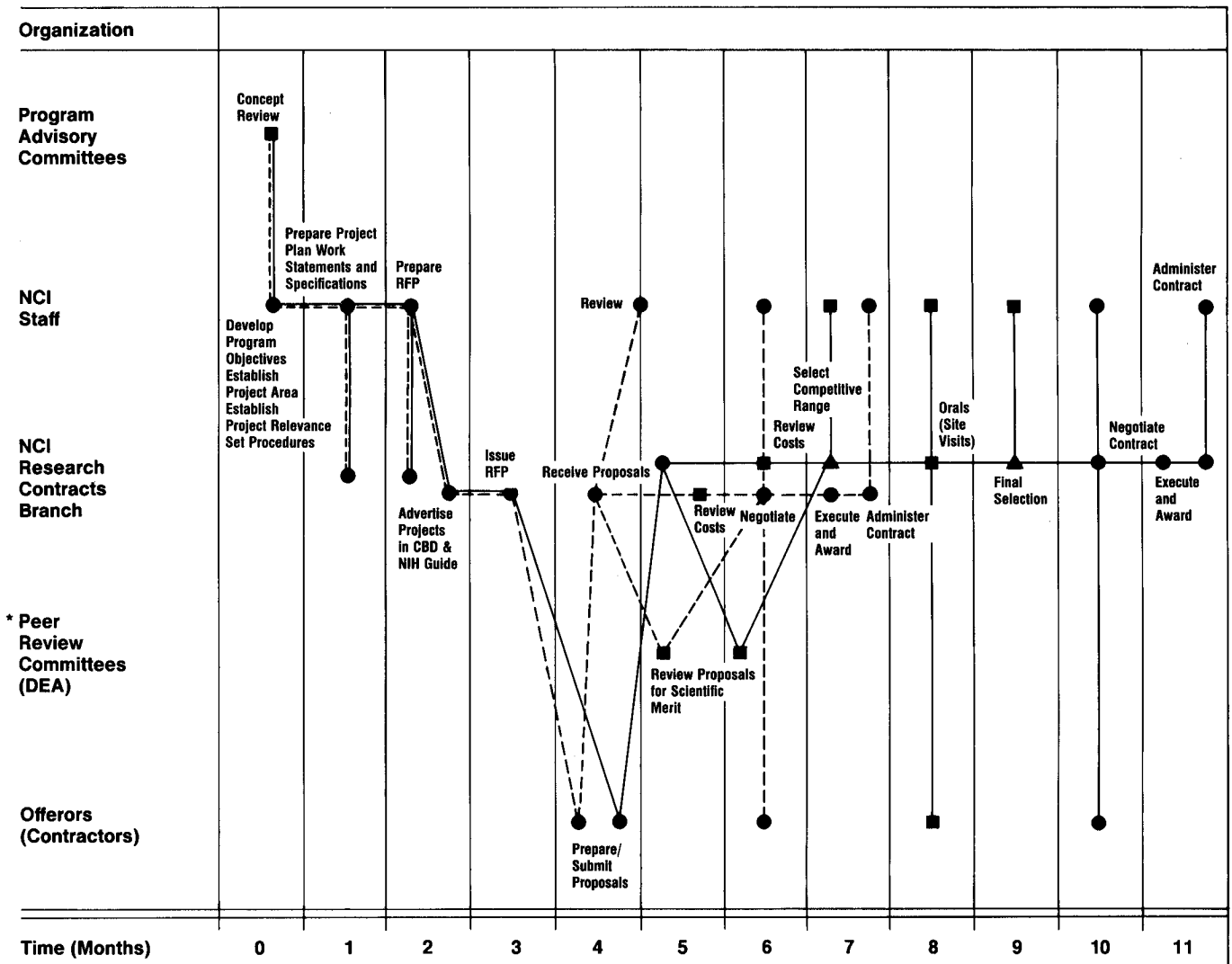


NCI Request for Application (RFA): The Process

Major Event	Time Elapsed (Months)	Division	Office of the Director, NCI/Division of Extramural Activities	Board of Scientific Counselors	National Cancer Advisory Board (NCAB)	Division of Research Grants (DRG)/Office of Extramural Research (OER)	Applicant	
Preparation and Release	1	<ul style="list-style-type: none"> Present Idea 	<ul style="list-style-type: none"> Proper Funding Mechanism Determined Approval of Concept by Executive Committee 					
	2			<ul style="list-style-type: none"> Concept Review Approval 				
	3							
	4	<ul style="list-style-type: none"> Develop RFA 		<ul style="list-style-type: none"> Review/Clearance of RFA Proposal 			<ul style="list-style-type: none"> Clearance by DRG, NIH Acceptance by OER/NIH 	
	5					<ul style="list-style-type: none"> Publication Scheduled by OER/NIH Published in <i>NIH Guide To Grants and Contracts</i> 	<ul style="list-style-type: none"> Prepare Application — Letter of Intent may be required 	
Review and Award	8					<ul style="list-style-type: none"> Receipt of Applications by DRG 		
	13		<ul style="list-style-type: none"> Initial Review Completed DEA, NCI 					
	14				<ul style="list-style-type: none"> NCAB Review 			
	15		<ul style="list-style-type: none"> Funding Decisions 					
	16							
	17						<ul style="list-style-type: none"> Award 	

NOTE: RFAs for AIDS research follow an expedited review and award process.

NCI Contract Award Process—Under Cancer Act of 1971



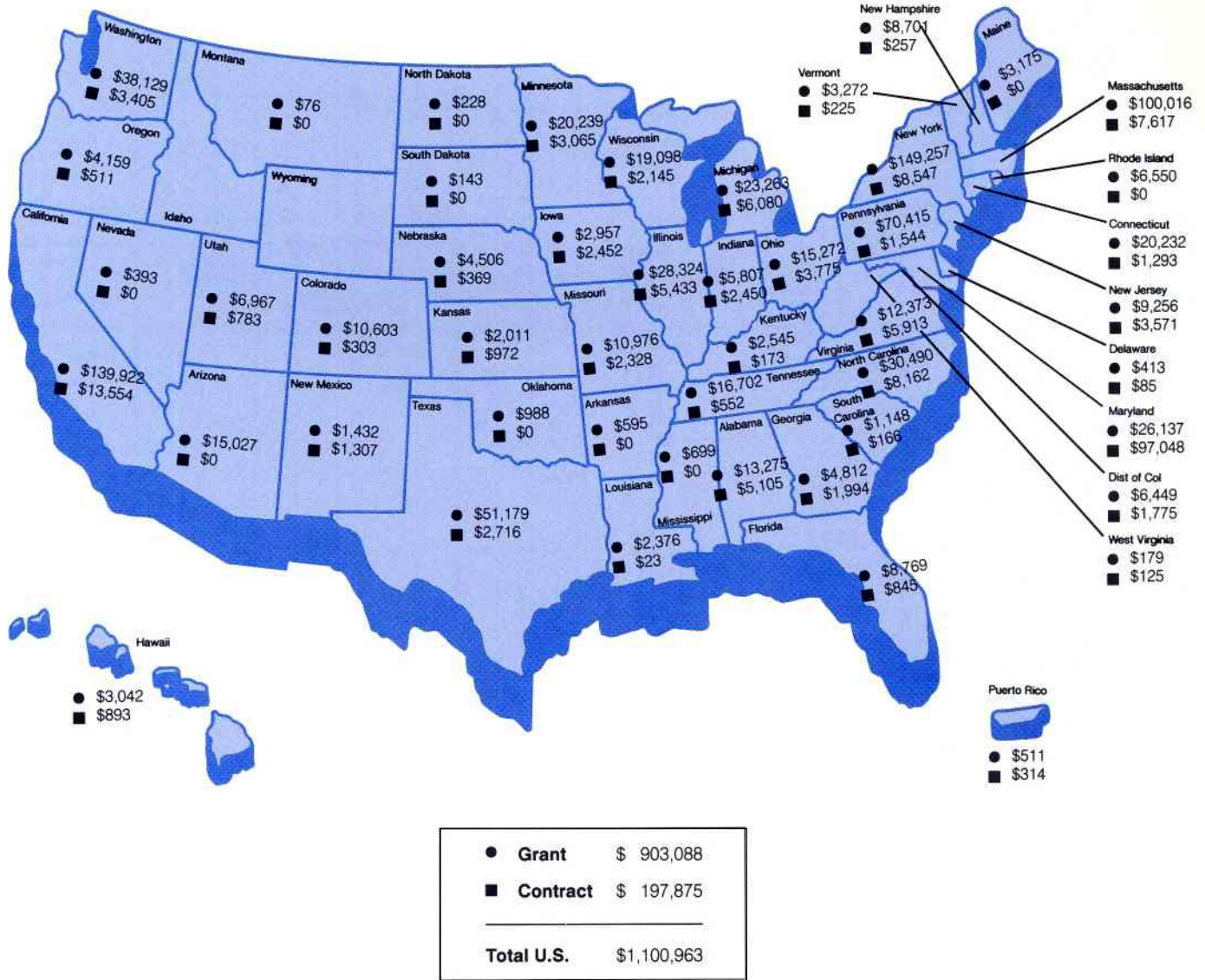
Note: Simultaneous Activities By More Than One Organization Indicate Cooperative Efforts

Legend:

- Operation
- Review
- ▲ Decision
- Normal Competitive Flow
- - - Non-Competitive Contracts
- * Ad-Hoc Committees May Be Used
Includes Non-Government Employees

NCI Grant and Contract Awards by State Fiscal Year 1988

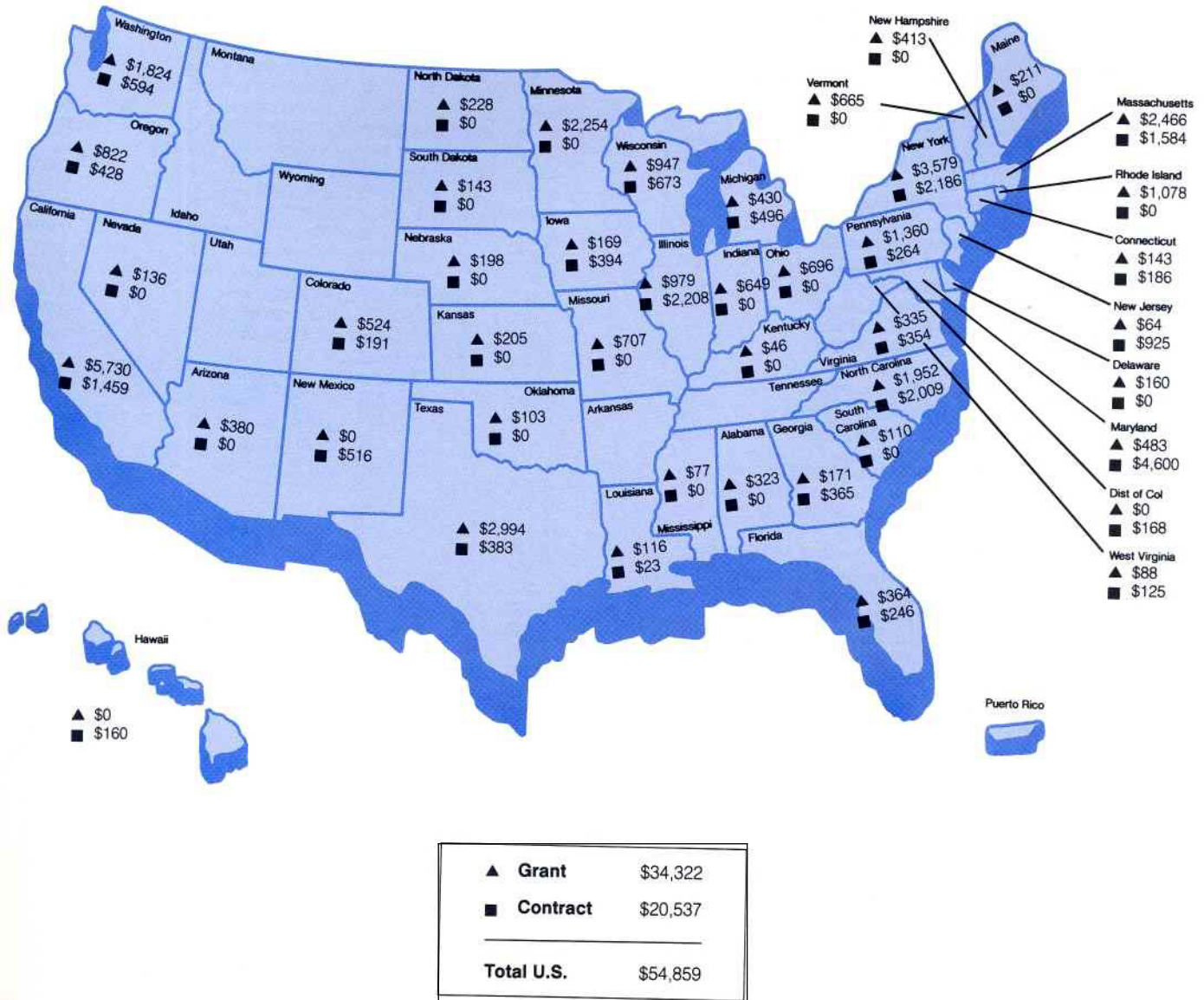
(Dollars in Thousands)



Note Contract figures exclude foreign contracts: \$7,374; Grant figures exclude foreign grants: \$5,965, and Scientific Evaluation: \$4,091.

NCI Cancer Prevention and Control Grant and Contract Awards by State Fiscal Year 1988

(Dollars in Thousands)



Note: Contract figures exclude foreign contracts: \$3,856; Grant figures exclude foreign grants: \$0.

**Institutions Receiving
More than \$3,000,000
in NCI Support
Fiscal Year 1988**

(Dollars in Thousands)

State	Institution	Grants	Contracts	Construction	Total NCI
Alabama	University of Alabama System	\$8,869	\$143	\$0	\$9,012
	Southern Research Institute	3,402	4,957	0	8,359
Arizona	University of Arizona	13,508	0	0	13,508
California	University of California	59,657	3,844	0	63,501
	University of Southern California	16,014	442	0	16,456
	Stanford University	16,335	0	0	16,335
	Scripps Clinic and Research Foundation	7,023	0	0	7,023
	Salk Institute for Biological Studies	5,777	0	0	5,777
	La Jolla Cancer Research Foundation	5,389	0	0	5,389
	Kaiser Foundation Research Institute	4,739	487	0	5,226
	Northern California Cancer Center	2,969	1,769	0	4,738
	SRI International	2,455	2,231	0	4,686
Colorado	University of Colorado System	5,400	0	0	5,400
	Colorado State University	3,475	0	0	3,475
Connecticut	Yale University	18,494	186	0	18,680
Dist. of Col.	U.S. Department of the Army, Ft. Detrick	0	5,207	0	5,207
Finland	National Public Health Institute	0	3,171	0	3,171
Florida	University of Miami	4,497	323	0	4,820
	University of Florida	3,571	15	0	3,586
Georgia	Emory University	2,589	1,557	0	4,146
Hawaii	University of Hawaii System	2,602	892	0	3,494
Illinois	University of Chicago	13,202	19	0	13,221
	University of Illinois	4,807	1,691	0	6,498
	Illinois Cancer Council	3,447	179	0	3,626
	Northwestern University	3,103	140	0	3,243
Indiana	Indiana University	3,088	240	0	3,328
Iowa	University of Iowa	2,450	2,452	0	4,902
Maryland	Program Resources, Inc.	0	41,809	0	41,809
	Johns Hopkins University	20,706	562	0	21,268
	Bionetics Research, Inc.	0	13,578	0	13,578
	Westat, Inc.	0	7,520	0	7,520
	Information Management Services	0	4,163	0	4,163
	University of Maryland System	3,004	979	0	3,983
Massachusetts	Dana-Farber Cancer Institute	24,881	220	0	25,101
	Harvard University	14,679	0	0	14,679
	Massachusetts Institute of Technology	10,150	9	0	10,159
	Massachusetts General Hospital	7,354	0	0	7,354
	Brigham and Women's Hospital	7,082	0	0	7,082
	University of Massachusetts	4,483	1,224	0	5,707
	New England Medical Center Hospitals, Inc.	3,639	828	0	4,467
	Tufts University	4,075	0	0	4,075
	Boston University	3,690	0	0	3,690
	University of Michigan	10,723	160	0	10,883
Michigan	Wayne State University	6,183	0	0	6,183
	Michigan Cancer Foundation	2,180	2,520	0	4,700
	University of Minnesota	11,103	2,117	0	13,220
Minnesota	Mayo Foundation	8,407	948	0	9,355
	Washington University	7,065	129	0	7,194
Nebraska	University of Nebraska System	4,003	369	0	4,372
New Hampshire	Dartmouth College	8,701	0	0	8,701
New Jersey	Princeton University	3,416	0	0	3,416
New York	Memorial Sloan-Kettering Cancer Center	29,232	1,312	0	30,544
	Columbia University	16,808	0	0	16,808
	New York State Dept of Health	15,143	606	0	15,749
	American Health Foundation	10,700	1,157	0	11,857
	Yeshiva University	11,320	0	0	11,320
	University of Rochester	11,210	0	0	11,210
	New York University	11,040	0	0	11,040
	State University of New York	8,102	337	0	8,439
	Cold Spring Harbor Laboratory	7,932	0	0	7,932
	Cornell University	4,894	588	0	5,482
	Rockefeller University	4,524	0	0	4,524
	Mount Sinai School of Medicine	4,497	0	0	4,497

(continued on next page)

**Institutions Receiving
More than \$3,000,000
in NCI Support
Fiscal Year 1988**

(Dollars in Thousands)

State	Institution	Grants	Contracts	Construction	Total NCI
North Carolina	Duke University	14,936	0	0	14,936
	University of North Carolina	12,536	1,003	0	13,539
	Research Triangle Institute	174	5,923	0	6,097
Ohio	Ohio State University	5,230	861	0	6,091
	Case Western Reserve University	3,954	0	0	3,954
Oregon	Oregon State University	3,320	0	0	3,320
Pennsylvania	Wistar Institute of Anatomy and Biology	11,488	0	0	11,488
	University of Pittsburgh	10,472	635	0	11,107
	University of Pennsylvania	10,599	0	0	10,599
	Institute for Cancer Research	9,327	0	0	9,327
	Fox Chase Cancer Center	6,721	264	0	6,985
	Pennsylvania State University	6,060	0	0	6,060
Rhode Island	Temple University	4,658	0	0	4,658
Rhode Island	Brown University	3,281	0	0	3,281
	Tennessee	St. Jude Children's Research Hospital	8,251	0	0
Texas	Vanderbilt University	5,367	0	0	5,367
	University of Texas System	38,216	2,918	0	41,134
	Baylor College of Medicine	5,209	0	0	5,209
	Cancer Therapy & Res. Ctr., San Antonio	4,565	0	0	4,565
Utah	University of Utah	6,666	783	0	7,449
Vermont	University of Vermont & St. Agric. College	3,140	225	0	3,365
Virginia	University of Virginia	4,254	0	0	4,254
	American College of Radiology	3,095	614	0	3,709
	Hazleton Laboratories Corporation	0	3,652	0	3,652
Washington	Fred Hutchinson Cancer Research Center	26,671	1,964	0	28,635
	University of Washington	8,107	641	0	8,748
Wisconsin	University of Wisconsin System	16,805	1,510	0	18,315
	Total	\$750,890	\$132,073	\$0	\$882,963
	Percent of Total Awarded Above	85.0%	15.0%	0.0%	100.0%
	Total NCI Fiscal Year 1988 Obligations	\$1,468,435			
	Percent of Total NCI Obligations	51.1%	9.0%	0.0%	60.1%

**Distribution of
NCI Contracts
Fiscal Year 1988**

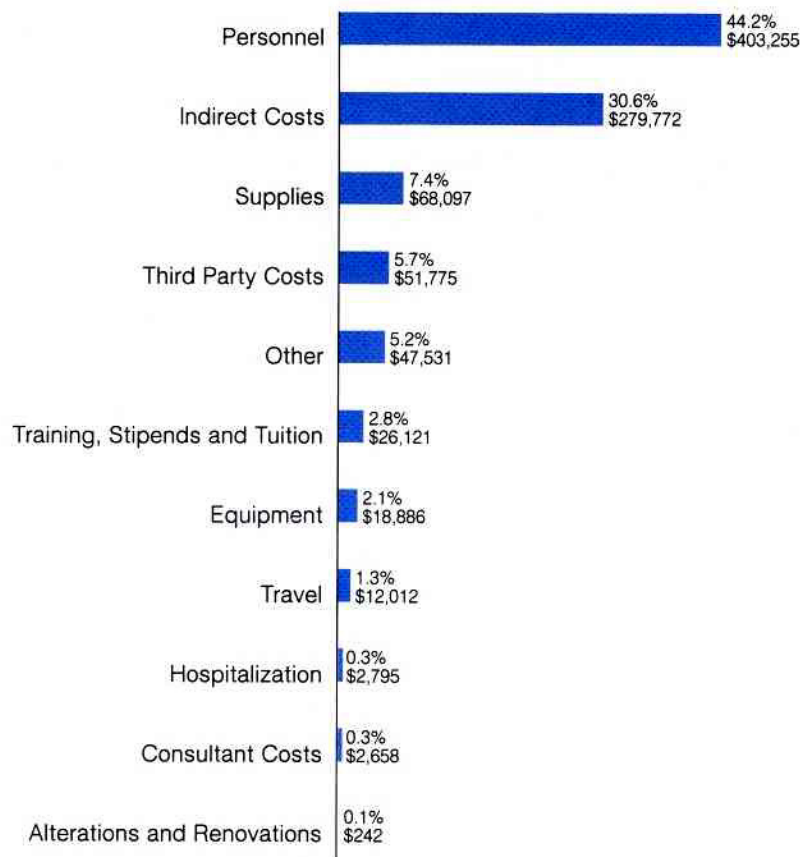
Fiscal Year 1988 Contracts by Division				
Percent of Total No. of Contracts	Number of Contracts	NCI Program Area	Thousands of Dollars	Percent of Total Dollars
3.3%	14	Division of Cancer Biology and Diagnosis	5,109	2.5%
45.9%	194	Division of Cancer Treatment	74,955	36.5%
25.3%	107	Division of Cancer Etiology	36,321	17.7%
24.3%	103	Division of Cancer Prevention and Control	41,549	20.2%
1.2%	5	Office of the Director	47,315	23.1%
100.0%	423		\$205,249	100.0%

Fiscal Year 1988 Contracts by Type of Institution				
Percent of Total No. of Contracts	Number of Contracts	Type of Institution	Thousands of Dollars	Percent of Total Dollars
40.7%	172	Profit Making	116,357	56.7%
24.1%	102	Academic	33,615	16.4%
20.8%	88	Non-Profit	34,993	17.0%
7.3%	31	Federal Government	9,801	4.8%
1.9%	8		3,109	1.5%
5.2%	22	Foreign	7,374	3.6%
100.0%	423		\$205,249	100.0%

Note: Excludes contracts that are not in direct support of research or control, such as Construction, and Reimbursable contracts.

**Distribution of
NCI Grant Dollar
Fiscal Year 1988**

(Dollars in Thousands)



**NCI Foreign Research
Grants and Contracts
Fiscal Year 1988**

(Dollars in Thousands)

Country	Number Grants	Grant \$	Number Contracts	Contract \$	Total Dollars Awarded	Percent of Total Dollars Awarded
Australia	5	\$380	1	\$72	\$452	3.4%
Belgium *	0	274	1	300	574	4.4
Canada	29	2,334	4	838	3,172	23.9
China	1	19	3	1,233	1,252	9.5
Denmark	0	0	1	67	67	0.5
Finland	1	42	1	3,171	3,213	24.2
France	6	1,022	0	0	1,022	7.7
Ghana	0	0	1	45	45	0.4
India	1	5	0	0	5	0.0
Israel	5	478	2	120	598	4.5
Italy	1	318	0	0	318	2.4
Jamaica	0	0	1	318	318	2.4
Japan	0	0	1	188	188	1.4
Sweden	7	600	2	130	730	5.5
Switzerland	1	43	0	0	43	0.3
Tanzania	0	0	1	80	80	0.6
Trinidad	0	0	1	389	389	2.9
United Kingdom	4	373	1	352	725	5.5
Yugoslavia	0	0	1	71	71	0.5
Total Foreign	61	5,888	22	7,374	13,262	100.0%

Note: Excludes Manpower Grants: Canada-\$20; Germany, Federal Rep.-\$26; Israel-\$25; United Kingdom-\$6

*Administrative Supplement

Selected Minority Focused Activities Fiscal Year 1988

Objectives:

- Reduce cancer incidence, morbidity and mortality in minority populations by increasing their involvement in the planning and implementation of intervention programs.
- Increase the number of minority patients involved in NCI-supported clinical trials in order to improve survival and cure rates in these populations.
- Enhance the intervention capabilities of minority researchers and influence them to develop careers as cancer investigators.
- Heighten awareness about cancer risk and prevention.
- Pursue basic research intended to understand the etiology and biology of cancer in defined minority populations.

Strategy:

The National Cancer Institute (NCI) has developed mechanisms to broaden participation by minority institutes and individuals in cancer-related research and training activities. It seeks to enhance the effectiveness of cancer treatment and control programs in reaching the minority community and other historically underserved segments of the general population, through the following:

Comprehensive Minority Biomedical Program

(CMBP)—Promotes broadened participation by minorities in cancer related research and training through minority-focused programmatic efforts which cross divisional lines within the Institute:

- **Minority Satellite Supplement Award:**
A special initiative designed to expand the number of minority patients in clinical trials and treatment programs. Thirteen Supplemental awards, involving seventeen satellites were made in 1988.
- **Minority Investigator Supplement:**
Provides supplemental funds to NCI grantees who support minority researchers in their projects. Thirteen investigators were supported in 1988.
- **Minority Access to Research Careers:**
Provides fellowships to minority students to pursue training related to cancer research.
- **Minority Biomedical Research Support:**
Through co-funding with other Institutes, NCI provides support for specific cancer-related projects at participating minority institutions.
- **Support for Meeting Attendance:**
Encourages participation in annual meetings by providing travel support through the American Association of Cancer Research.
- **Prevention Awareness:**
Initiates, with the Office of Cancer Communications, model strategies for the dissemination of cancer information to the black population by utilizing minority institutions, especially Historically Black Colleges.

**Selected Minority
Focused Activities
Fiscal Year 1988**

**Cancer Control Intervention
Research**

- Primary prevention of cancer in blacks by identifying the long term effectiveness of smoking prevention or cessation intervention programs.
- Identification and remedy of key factors that contribute to avoidable mortality for specific cancer sites in the black population.
- Establishment of a Research Network for the Black Population to stimulate research on important scientific and social issues relevant to this population.
- Increased data collection efforts on cancer in Hispanics.
- Development of a Hispanic Cancer Control intervention research program.
- Development of an intervention research program on the Native American population (American Indian, Alaskan Native, Native Hawaiian) focusing on avoidable mortality and primary prevention (smoking/smokeless tobacco) for cancer.
- A series of six regional meetings were conducted by the National Black Leadership Initiative on Cancer to develop a plan to stimulate black community involvement to support the NCI's year 2000 goals.

Appropriations of the NCI 1938-1989

13.4%
\$2,675,362,720

1938 through 1966	\$1,331,538,220
1967.....	175,656,000
1968.....	183,356,000
1969.....	185,149,500
1970.....	190,486,000
1971.....	230,383,000
1972.....	378,794,000

86.6%
\$17,233,067,500

1973.....	492,205,000
1974.....	551,191,500
1975.....	691,666,000 ¹
1976.....	761,727,000
"TQ".....	152,901,000 ²
1977.....	815,000,000
1978.....	872,388,000 ³
1979.....	937,129,000
1980.....	1,000,000,000 ⁴
1981.....	989,355,000 ⁵
1982.....	986,617,000 ⁶
1983.....	987,642,000 ⁷
1984.....	1,081,581,000 ⁸
1985.....	1,183,806,000
1986.....	1,264,159,000 ⁹
1987.....	1,402,837,000 ¹⁰
1988.....	1,469,327,000 ¹¹
1989.....	1,593,536,000 ¹²

Total
(1938-1989) \$19,908,430,220

Transition Quarter ("TQ")—July 1, 1976 through September 30, 1976. The Interim Period in the changing of the Federal Fiscal Year from July 1 through June 30 to October 1 through September 30.

¹Includes \$18,163,000 for training funds provided by Continuing Resolution.

²Includes \$3,201,000 for training funds provided by Continuing Resolution.

³Includes \$20,129,000 for training funds provided by Continuing Resolution.

⁴1980 appropriation authorized under a Continuing Resolution.

⁵Reflects 1981 rescission of \$11,975,000.

⁶Amount included in Continuing Resolution. Includes \$47,988,000 transferred to the National Institute of Environmental Health Sciences for the National Toxicology Program.

⁷Appropriated under Continuing Resolution and Supplemental Appropriation Bill.

⁸Includes \$23,861,000 for training funds provided by a Continuing Resolution and \$4,278,000 in a Supplemental Appropriation Bill.

⁹Includes \$6,000,000 from a Supplemental Appropriation Bill.

¹⁰Authorized under Omnibus Continuing Resolution.

¹¹Authorized under Omnibus Continuing Resolution.

¹²Appropriation prior to reduction contained in G.P. 517 (-\$19,122,000) and G.P. 215 (-\$2,535,000) and P.L. 100-436, Section 213, (-\$1,013,000).

**NCI Budget History
by Mechanism
Selected Fiscal Years
1972, 1980, 1988**

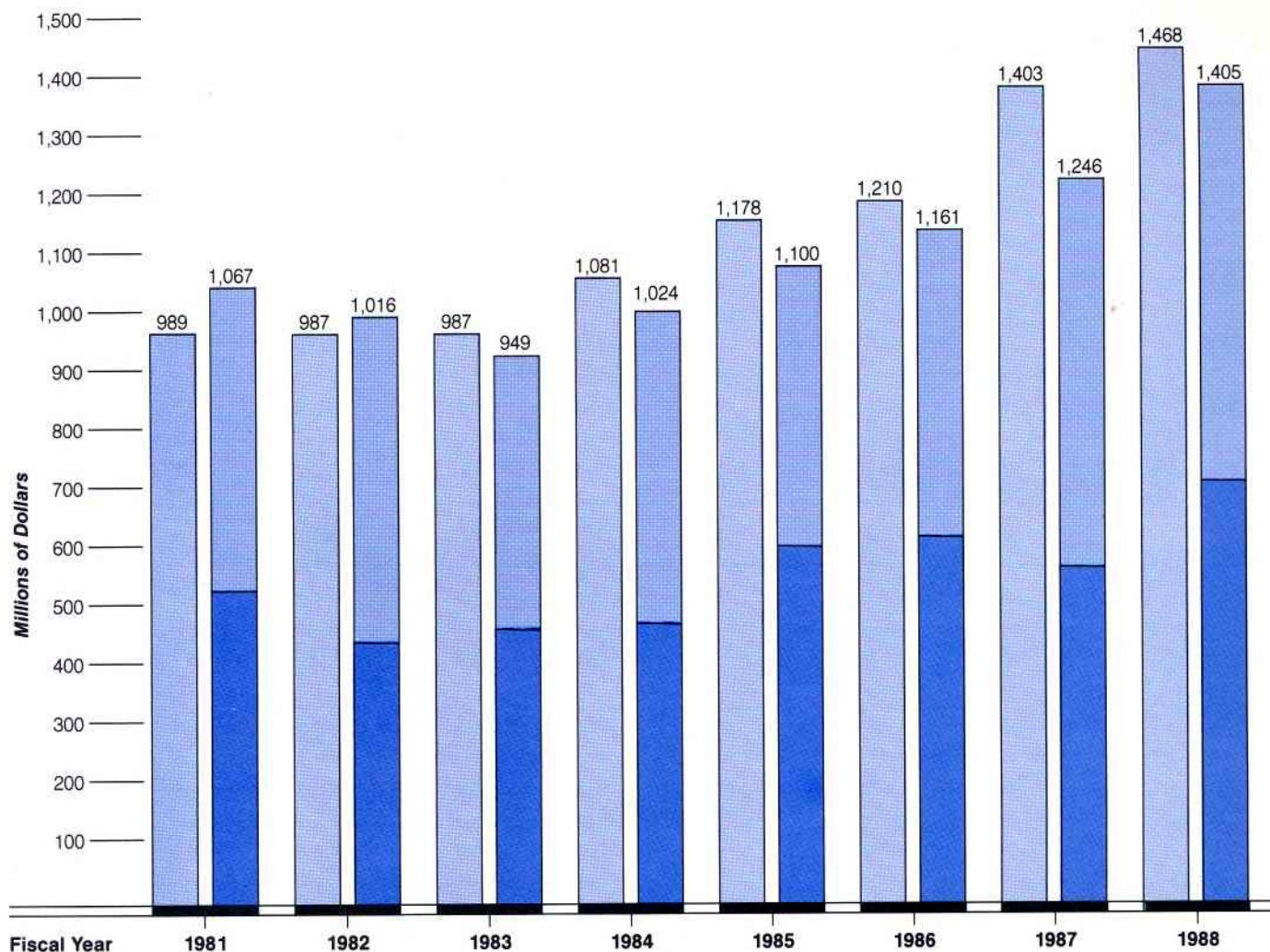
(Dollars in Thousands)

	1972 Actual		1980 Actual		1988 Actual	
	Dollars	Percent of Total	Dollars	Percent of Total	Dollars	Percent of Total
Group I—Investigator Initiated:						
Regular Research Grants	60,073	19.0	216,081	30.9	408,740	38.6
Small Grants	—	—	—	—	984	0.1
Clinical Cooperative Groups	10,102	3.2	36,884	5.3	59,308	5.6
Program Projects—PO1's	39,260	12.4	104,643	14.9	170,119	16.1
Clinical Education Program	—	—	10,906	1.6	1,742	0.2
Research Career Program	2,026	0.6	5,014	0.7	7,622	0.7
Fellowships and Training	18,395	5.8	27,260	3.9	31,861	3.0
Organ Site	638	0.2	17,554	2.5	—	—
Cancer Centers-Core Support	10,090	3.2	67,421	9.6	100,427	9.5
Other Center Support Grants	1,089	0.3	591	0.1	—	—
Cooperative Agreements	—	—	—	—	18,490	1.7
Minority Biomedical Support	—	—	1,980	0.3	3,039	0.3
Organ Systems	—	—	—	—	822	0.1
Outstanding Investigator Grant	—	—	—	—	45,227	4.3
First Awards	—	—	—	—	15,713	1.5
<i>Subtotal</i> (Small Business Grants)	141,673	44.7	488,334	69.8	864,094 (8,325)	81.5 (0.8)
Group II—Co-Initiated:						
RFAs	—	—	6,683	1.0	14,727	1.4
Research Contracts	46,802	14.8	55,265	7.8	32,749	3.1
<i>Subtotal</i> (Small Business Contracts)	46,802	14.8	61,948	8.8	47,476 (5,743)	4.5 (0.5)
Group III—NCI Initiated						
Resource Support Contracts	63,194	20.0	115,425	16.5	140,431	13.3
Interagency Agreements	12,053	3.8	18,740	2.7	7,676	0.7
<i>Subtotal</i>	75,247	23.8	134,165	19.2	148,107	14.0
Group IV—Other Resources						
Planning Grants	1,698	0.5	221	0.0	—	—
Construction Grants	47,004	14.9	10,814	1.5	—	—
Construction Contracts	3,999	1.3	4,618	0.7	—	—
<i>Subtotal</i>	52,701	16.7	15,653	2.2	—	—
Total	316,423	100.0	700,100	100.0	1,059,677	100.0
% Total NCI		84.3		73.1		72.2
In-House Research	25,696	6.8	98,665	10.3	175,291	11.9
Management & Support	33,246	8.9	95,735	10.0	174,752	11.9
(NIH Management Fund)	(12,910)	(3.4)	(39,549)	(4.1)	(91,361)	(6.2)
Cancer Control (Grants & Contracts)	—	—	63,663	6.6	58,715	4.0
<i>Subtotal</i>	58,942	15.7	258,063	26.9	408,758	27.8
Total NCI	375,365	100.0	958,163	100.0	1,468,435	100.0
Transfers:						
Diagnostic Radiation	(2,800)	(0.8)	(3,611)	(0.4)	—	—
National Toxicology Program	—	—	(43,495)	(4.5)	—	—

Comparison of Dollars, Positions and Space Fiscal Years 1971–1988

	Dollars			Positions			Space		
	Obligations (\$000's)	Percent of Increase Over Base Year	Percent of Increase Over Prior Year	Actual Full-Time Permanent Employees	Percent of Increase Over Base Year	Percent of Increase Over Prior Year	Allocated Space (Square Feet)*	Percent of Increase Over Base Year	Percent of Increase Over Prior Year
1971	232,855	Base Year	—	1426	Base Year	—	321,230	Base Year	—
1972	378,636	62.6	62.6	1665	16.8	16.8	329,587	2.6	2.6
1973	431,245	85.2	13.9	1736	21.7	4.3	357,972	11.4	8.6
1974	581,149	149.6	34.8	1805	26.6	4.0	381,436	18.7	6.6
1975	699,320	200.3	20.3	1849	29.7	2.4	382,485	19.1	0.3
1976	760,751	226.7	8.8	1955	37.1	5.7	387,324	20.6	1.3
1977	814,957	250.0	7.1	1986	39.3	1.6	428,285	33.3	10.6
1978	872,369	274.6	7.0	1969	38.1	-0.9	491,725	53.1	14.8
1979	936,969	302.4	7.4	1973	38.4	0.2	493,156	53.5	0.3
1980	998,047	328.6	6.5	1837	28.8	-6.9	467,730	45.6	-5.2
1981	989,338	324.9	-0.9	1815	27.3	-1.2	472,633	47.1	1.0
1982	986,564	323.7	-0.3	1703	19.4	-6.2	477,782	48.7	1.1
1983	986,811	323.8	0.02	1731	21.4	1.6	484,093	50.7	1.3
1984	1,081,460	364.4	9.6	1698	19.1	-1.9	466,890	45.3	-3.6
1985	1,177,853	405.8	8.9	1596	11.9	-6.0	466,890	45.3	.0
1986	1,210,284	419.8	2.8	1573	10.3	-1.4	465,790	45.0	-2
1987	1,402,790	502.4	5.9	1642	15.2	4.4	465,790	45.0	0
1988	1,468,435	530.6	4.7	1708	2.6	4.0	458,556	42.8	-1.6

National Cancer Institute Obligations and Outlays, Fiscal Years 1981-1988



Obligations

Outlays Current Year Funds
 Prior Year Funds

Obligations: Orders placed, grants and contracts awarded, salaries earned and similar financial transactions which legally utilize or reserve an appropriation for expenditure.

Outlays: Payments (cash or checks) made from current or prior year appropriations.

**NCI Total Research
Projects
Fiscal Years 1982-1988**

(Dollars in Thousands)

Fiscal Year	Type Awarded	Requested		Recommended		Awarded		Percent Funded ¹
		Number	Amount	Number	Amount	Number	Amount	
1982	Competing ²							
	New	2,187	\$308,153	1,784	\$189,245	434	\$47,224	24.3
	Renewal	730	174,573	706	117,099	323	50,186	45.7
	Board Supplement	28	2,266	24	1,289	4	86	16.7
	Subtotal	2,945	\$484,992	2,514	\$307,633	761	\$97,496	30.3
	Noncompeting					1,797	260,853	
	Total					2,558	\$358,349	
1983	Competing ²							
	New	2,229	\$323,572	1,844	\$215,945	529	\$55,316	28.7
	Renewal	783	160,881	763	113,664	358	56,698	46.9
	Board Supplement	23	2,492	15	727	3	110	20.0
	Subtotal	3,035	\$486,945	2,622	\$330,336	890	\$112,124	33.9
	Noncompeting					1,923	294,019	
	Total					2,813	\$406,143	
1984	Competing							
	New	2,113	\$310,433	1,773	\$207,996	558	\$68,376	31.5
	Renewal	774	179,764	745	135,253	416	90,140	55.8
	Board Supplement	13	1,766	11	788	3	105	27.3
	Subtotal	2,900	\$491,963	2,529	\$344,037	977	\$158,621	38.6
	Noncompeting					1,869	302,626	
	Total					2,846	\$461,247	
1985	Competing							
	New	2,400	\$398,621	2,042	\$282,590	599	\$83,691	29.3
	Renewal	782	183,483	758	140,472	416	84,708	54.9
	Board Supplement	19	1,659	13	850	2	65	15.4
	Subtotal	3,201	\$583,763	2,813	\$423,912	1,017	\$168,464	36.2
	Noncompeting					1,964	348,011	
	Total					2,981	\$516,475	
1986	Competing ²							
	New	2,354	\$392,028	1,997	\$277,698	564	\$84,470	28.2
	Renewal	787	198,814	765	160,021	385	77,012	50.3
	Board Supplement	12	775	10	366	1	14	10.0
	Subtotal	3,153	\$591,617	2,772	\$438,085	950	\$161,496	34.3
	Noncompeting					2,111	397,664	
	Total					3,061	\$559,160	
1987	Competing ²							
	New	2,034	\$390,474	1,782	\$292,044	557	\$97,643	31.3
	Renewal	898	241,189	882	195,014	504	120,550	57.1
	Board Supplement	7	731	7	429	0	0	0
	Subtotal	2,939	\$632,394	2,671	\$487,487	1,061	\$218,193	39.7
	Noncompeting					2,042	424,960	
	Total					3,103	\$643,153	
1988	Competing ²							
	New	2,167	\$419,638	1,857	\$316,789	470	\$83,083	25.3
	Renewal	951	262,675	932	226,227	506	122,229	54.3
	Board Supplement	15	1,717	12	1,404	3	66	25.0
	Subtotal	3,133	\$684,030	2,801	\$544,420	979	\$205,378	35.0
	Noncompeting					2,078	460,025	
	Total					3,057	\$665,403	

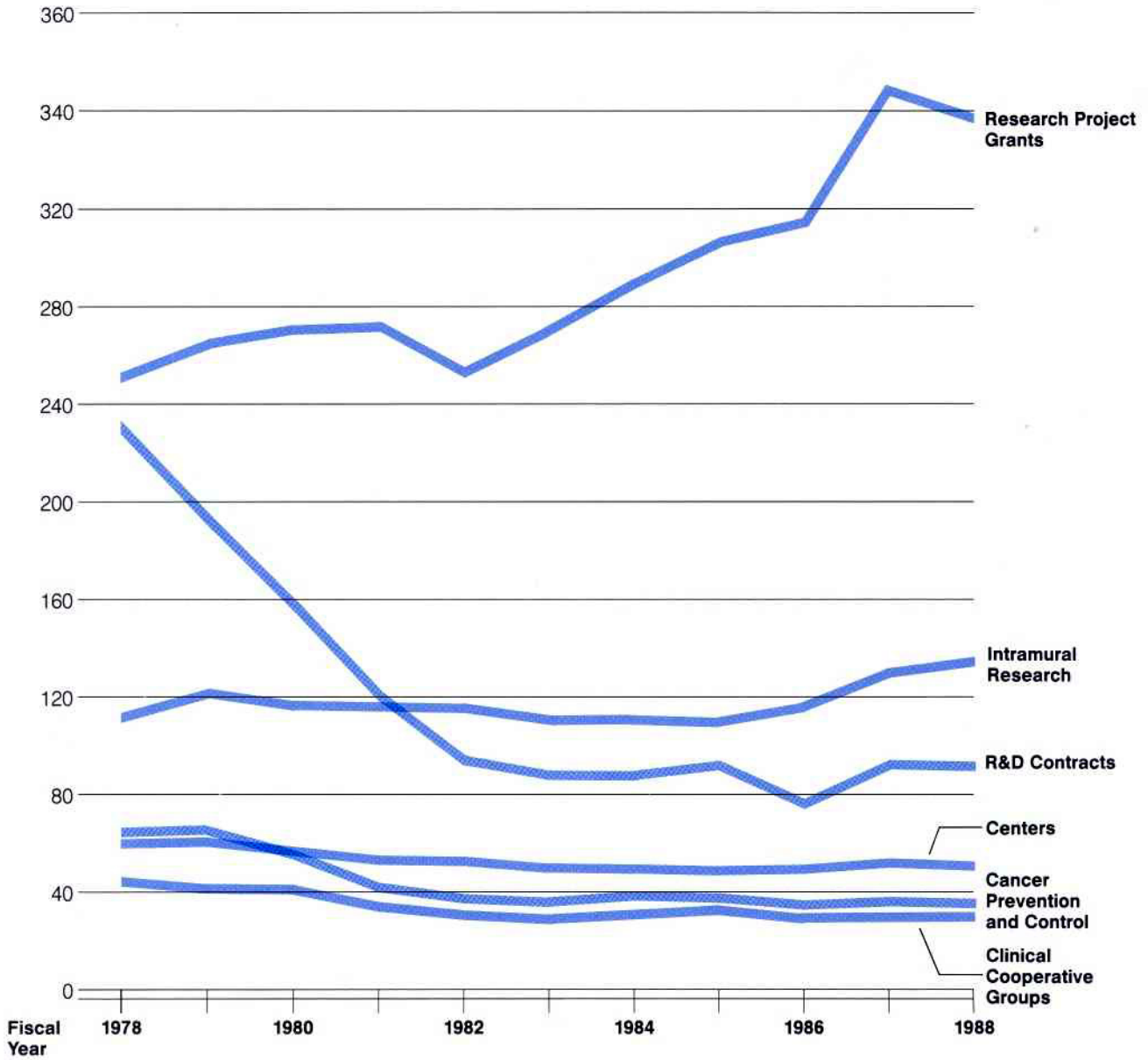
Note: Includes R01 traditional grants, P01 program projects, R23 new investigator research awards, R29 First Awards, R35 Outstanding Investigator Grants, R37 MERIT awards, U01 Cooperative agreement awards, R01 and U01 awards of RFA's and R43/R44 Small Business Innovative Research awards.

¹ Percent Funded; Number Awarded ÷ Number Recommended

² Because of fiscal restraints, grants were awarded below recommended levels.

**Constant Dollar Trends
Obligations By Mechanism
Fiscal Years 1978-1988**

(Dollars in Millions)



1978 Constant Dollars

NATIONAL
CANCER
INSTITUTE
