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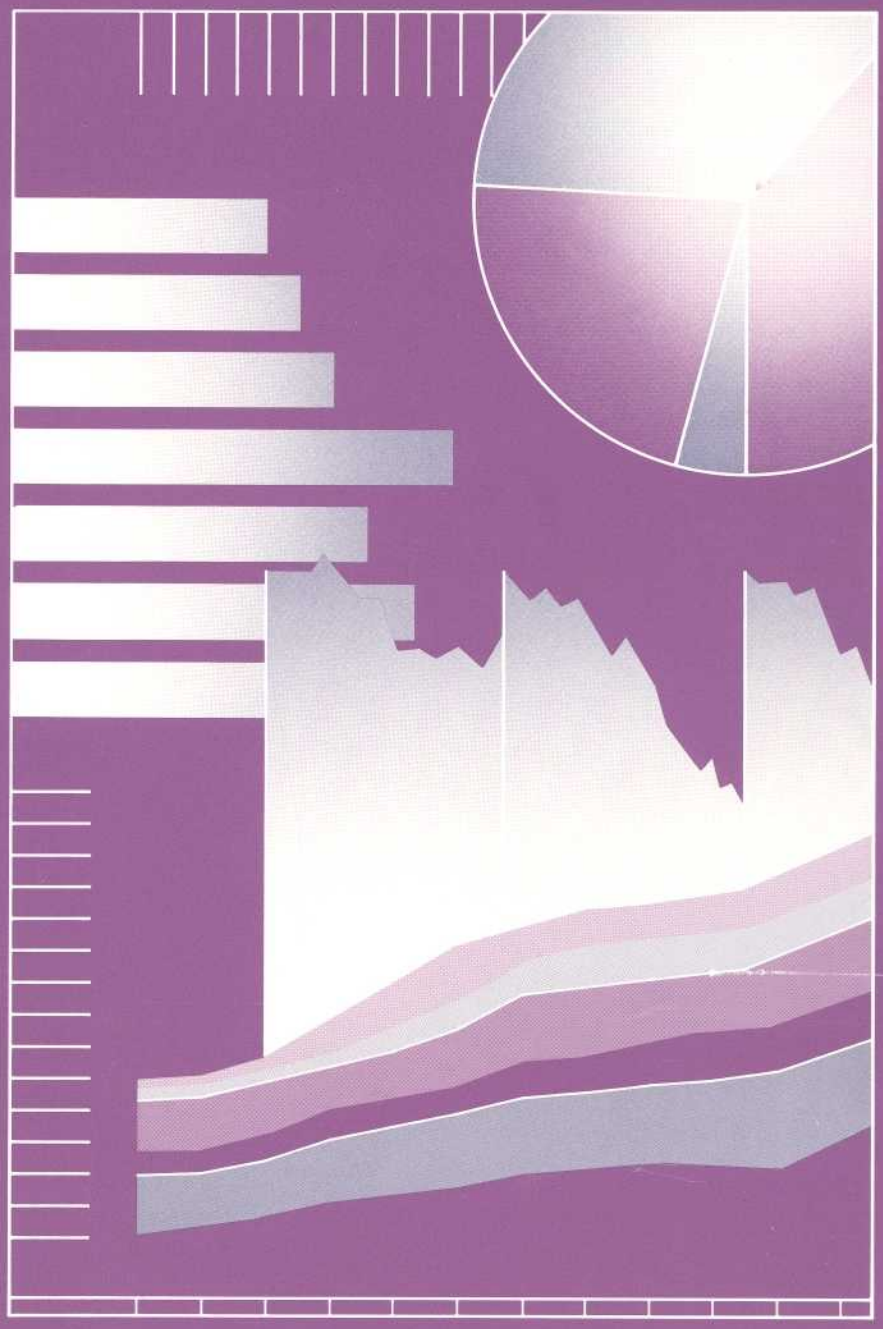

1990

U.S. DEPARTMENT
OF HEALTH AND
HUMAN SERVICES

Public Health
Service

National
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Health

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For Administrative Use

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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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Significant Initiatives In 1990

Division of Cancer Biology, Diagnosis and Centers

Cancer Metastasis

Cancer kills the patient primarily due to tumor cells that escape from the primary tumor, invade adjacent tissue and blood vessels, travel through the circulatory system to distant organs, and initiate a secondary tumor; this process is called metastasis. Over the past year, scientists at the National Cancer Institute have made three basic discoveries which provide completely new strategies for potentially inhibiting cancer invasion metastasis formation and growth.

A tumor suppressor gene, termed NM23, has been identified that appears to be associated with the metastatic process. In cancer cells the defective NM23 gene produces a defective NM23 protein that leads to a disorganized state which permits the development of metastasis. The introduction of the normal NM23 gene into cancer cells prevents them from forming metastases in animal models. A new form of therapy can be envisioned in which the NM23 protein will reverse the tumor cell deficiency, inhibiting cancer metastasis, but having little toxic effect on normal cells which already produce NM23.

A second discovery involves a naturally occurring human protein which suppresses tumor cell enzymes required for invasion. The complete structure of the new protein, called TIMP-2, and its gene has been elucidated. One molecule of TIMP-2 can bind very tightly to one molecule of a tumor cell destructive enzyme, called collagenase, abolishing its activity. Abnormal production of collagenase is necessary for tumor cell invasion and growth of new blood vessels to nourish the metastasis. Administration of genetically engineered TIMP-2 is a new form of cancer therapy which is now being tested in animal models. Low toxicity is expected since TIMP-2 is made by normal cells but may be deficient in cancer cells.

A new anti-cancer agent has been developed based on molecular studies of tumor cell migration. A specific biochemical pathway was found to be required for motility and growth of cancer cells. Following a unique screening approach to identify novel compounds which inhibit this pathway, a carboxyaminoimidazole (CAI) was identified as a potent inhibitor of tumor growth and metastasis. CAI was found to be effective in more than 30 different types of cancer including ovarian cancer, breast cancer, colon cancer, prostate cancer, childhood cancer, leukemia and melanoma. CAI was approved for clinical development by the NCI Decision Network. Phase I clinical trials using CAI are scheduled to begin in early 1991.

New Comprehensive Guidelines for Cancer Centers

On January 1, 1990, the NCI issued new guidelines that redefined the concept of an NCI-designated comprehensive cancer center. In order to receive this designation, a clinical cancer center with an active Cancer Center Support Grant award must provide evidence that it meets eight criteria for comprehensiveness, including the important requirement for community service and outreach. To meet this requirement, a cancer center must demonstrate that it maintains productive outreach efforts in the community it serves, and that it conducts programs of cancer prevention and control relevant to the special needs of the populations within the community with disproportionate cancer incidence and mortality. Since the revised guidelines were issued, eight cancer centers which had previously been designated as comprehensive under the old guidelines and five centers which had never been so designated, received approval of their applications for comprehensive status. These approvals increased the number of comprehensive cancer centers from 19 to 24. Cancer centers have enthusiastically responded to the revised guidelines, demonstrating their readiness and ability to meet all eight criteria for comprehensive status.

Division of Cancer Treatment

Gene Transfer Trial of Adoptive Immunotherapy
In May, 1989, in an attempt to "activate" TIL cells so that they become even more effective in killing tumor cells, scientists from NCI and the National Heart, Lung and Blood Institute began the first clinical trial in which a foreign gene transfected into a human cell was given to a patient. This preliminary study involved the transduction of the neomycin resistance gene (neo) into TIL cells in order to monitor their traffic throughout the body and, thus, help scientists better understand how these cells work in cancer therapy. This landmark study, the first approved study to introduce foreign genes into humans, showed that retroviral gene insertion is a feasible and safe approach to introducing foreign genes into humans.

Human Gene Therapy
The first gene therapy trial designed to infuse tumor infiltrating lymphocytes (TILS) containing the inserted human gene for tumor necrosis factor (TNF) into patients with advanced melanoma is slated to begin shortly. The TNF gene was selected for this trial because it has shown dramatic cancer cell-killing potential in mice. In order for both to maximize the cancer cell-killing potential of TNF and to minimize the anticipated toxic effects of TNF in humans, scientists intend to target these transfected TILS in a tumor specific manner, thus sparing normal cells from TNF toxicity.

This human gene therapy trial is designed to both determine the safety of administering TNF to humans and improve TIL/IL-2 therapy. The implications of this study are far-reaching; this new approach may eventually have applications to the treatment of a variety of cancers as well as provide new avenues for the treatment of a variety of diseases caused by the inactivity or lack of certain genes, i.e., sickle cell anemia, cystic fibrosis, and alpha-1 antitrypsinase deficiency, among others. The development of "gene therapy" is one of the most promising and exciting frontiers in medicine as we enter the 1990s.

Tumor Suppressor Genes
It has recently been discovered that recessive oncogenes (also called tumor suppressor genes) are important in the pathogenesis of common human tumors. p53 is one such recessive oncogene located on human chromosome region 17p13. Recent studies of lung, colon and breast cancer indicate that mutations in this gene are frequent. Techniques have been developed starting with small amounts of tumor RNA which allow us to search for mutations in the coding region of the p53 gene. Similar levels of mutation were found using colon and breast cancer cells. The high frequency of these mutations make the p53 gene a likely site of abnormalities in early molecular screening studies and prevention trials. In addition, the mutant proteins become targets for new methods of immunodetection or immunotherapy.

Taxol
Taxol is a new chemotherapeutic agent with a unique mechanism of action which has shown promising activity in women with ovarian cancer. Taxol is not yet commercially available, and there are very limited supplies of the drug. Currently the only source of the drug is from a western yew *Taxus brevifolia*, which is itself in restricted supply. Attempts are currently underway to commercially grow the trees, as well as to develop alternative sources of the drug or active analogues. A Cooperative Research and Development Agreement (CRADA) is being developed with Bristol-Myers Squibb Company to coordinate efforts related to procurement and all other preclinical and clinical activities needed to move this agent to the market as rapidly as possible.

Clinical Strategies to Overcome Drug Resistance
Resistance to chemotherapeutic agents, or the ability of cells to escape the toxic effects of these agents, remains one of the greatest obstacles to complete tumor eradication and long-term disease-free survival from cancer. One of the most intensively studied examples of this phenomenon is multi-drug resistance which is characterized by the development of resistance by cancer cells to a wide variety of structurally and functionally diverse drugs after exposure to any one of them. It is now known that multi-drug resistance (mdr) is caused by the increased expression of the mdr gene and overactivity of a drug pump, termed P-170 or p-glycoprotein, in the cancer cell. A number of common drugs, such as verapamil, quinidine, amiodarone, cyclosporin A, and the phenothiazines, are able to block the function of this pump, resulting in a reversal of multi-drug resistance in laboratory experiments. In order to stimulate further research in drug resistance, NCI recently funded seven clinical research grants to study therapeutic correlates of drug resistance and conduct clinical trials with agents to reverse clinical drug resistance.

Screening
Based on extensive developmental work carried out over the last several years, routine anticancer screening of new agents was initiated in FY 1990, utilizing a panel of about 60 human tumor cell lines growing in culture. About 20,000 synthetic compounds and natural product extracts will be evaluated annually. Materials demonstrating tumor type specificity and/or other desirable characteristics will be evaluated in the sensitive tumors grown in immunologically deficient mice prior to consideration for development as clinical candidates.

Screening of potential anti-AIDS drugs has been carried out in HIV-infected cells in culture at a rate of about 20,000 synthetic compounds and natural product extracts annually, many of which are those being tested in the anticancer screens mentioned above, as well as others selected specifically for the AIDS screen. A number of materials are undergoing further evaluation to select those worthy of development for clinical trials. To facilitate the rapid evaluation and development of potential anti-AIDS drugs, a new branch, the Antiviral Evaluations Branch, has been established.

Division of Cancer Etiology

Dietary Mutagens
A number of chemicals known as aminoimidazoazaarenes (AIAs) have been purified from cooked ground beef, a major protein source in the western diet. All but one, PhIP, characterized to date, are very potent mutagens in a bacterial assay system known as the Ames test. PhIP is a relatively weak mutagen, but it is present in ten-fold greater concentrations in cooked beef than any of the other AIAs, and is the most potent AIA in mutagenicity studies utilizing mammalian cells rather than bacteria.

Thus far only three of the AIAs, referred to as IQ, MeIQ and MeIQx, have been evaluated in long-term rodent bioassays, and all three have been found to induce a variety of tumors including tumors of the liver and gastrointestinal system. The toxic effects of this group of chemicals is thought to be based on their metabolism to reactive forms which can react with DNA to form complexes known as adducts. Synthesis of several reactive metabolites of IQ have now been accomplished. Synthesis and characterization of the major DNA-IQ adducts and examination of DNA-IQ adducts in rodents and non-human primates is underway. The role of specific cytochrome P-450s in

Community Clinical Oncology Program
The NCI's Community Clinical Oncology Program (CCOP) affords community physicians and their patients the opportunity to participate in NCI-approved cancer treatment and cancer prevention and control clinical trials. In the last year, the CCOPs entered approximately 5,300 patients to NCI-approved treatment trials and almost 6,000 patients or subjects participated in cancer control studies. Fifty-one community programs are currently funded. Under the new Minority-Based CCOP initiative, 12 additional awards were made in 1990, each of which draws more than 50 percent of new cancer patients from minority groups.

Division of Extramural Activities

Cancer Centers and Cancer Control in Minority Populations
Through the Comprehensive Minority Biomedical Program (CMBP) Cancer Centers Minority Enhancement awards, the National Cancer Institute seeks to expand minority involvement in cancer control research. Under these awards cancer centers in Arizona, California and North Carolina promote the participation of minority groups in cancer control research by broadening their operational base to facilitate the expansion of cancer control efforts in early detection, prevention and screening. This expansion in cancer control efforts would also include pretreatment evaluation, treatment, continuing care and rehabilitation, and the increased involvement of primary care providers to minority populations.

CMBP in conjunction with these Centers is providing a progress report that includes a series of recommendations related to more effective utilization of NCI-supported cancer centers in the inclusion of minority populations.

New Initiatives for Underrepresented Minorities
Through the NIH-wide Initiatives for Underrepresented Minorities in Biomedical Research Program Announcement, the Comprehensive Minority Biomedical Program has expanded support to minority individuals who are pursuing careers in the biomedical research sciences. This program involves the Minority Investigator Supplement, Minority Undergraduates Student and the Minority Graduate Research Assistant supplements. The intent of these supplements is to provide support to minority scientists and students so as to influence a greater number of minority individuals to develop their research capabilities and pursue independent careers as cancer research investigators.

NIH Training Opportunities
The Summer Training Supplement is an extension of the Minority Access to Research Careers (MARC) program and provides increased training opportunities for MARC scholars by way of short-term intramural laboratory training at the NCI.

Office of the Director

Health Communication Internship/Fellowship Program
To increase the number of persons trained in cancer communications, this program provides a variety of training experiences for graduate-level students in health communications. Fellows are located in various parts of the Office of Cancer Communications, where they work with staff members on health education projects, science writing, or medical librarianship.

Prevention Highlights: Meeting the Year 2000 Objectives

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 Goal was established which is based on prevention, early detection, and widespread application of the latest treatment results.

Cancer Network

In 1990, NCI's Cancer Network included the following:

- Cancer Information Service (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 (CCOP)—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 evaluate agents which may inhibit cancer from developing or recurring) have initially reviewed over 1,000 agents. Twenty of these agents, which include vitamins, minerals and other natural and synthetic substances, have been tested in clinical trials in humans.
- A randomized dietary intervention trial will assess the impact of dietary modification on the incidence of cancer among women. The overall objective is to determine whether a low-fat dietary pattern, designed to reduce total fat and saturated fat intake and to increase the intake of fruits, vegetables and grain products, can decrease the incidence of breast and colorectal cancers in post-menopausal women. The trial will also assess the effect of a low-fat eating pattern on blood lipids and steroid hormones. The study will enroll 24,000 women, ages 50 to 69 years, at 12 locations across the United States.
- Current trials are studying diet modification as a means of preventing recurring breast cancer, colon cancer, and skin cancer.

- A colon polyp trial with the major objective of determining whether an experimental large bowel cancer "risk reduction" diet (low fat, high fiber, vegetable- and fruit-enriched) will decrease the recurrence rate of large bowel adenomatous polyps. This will be a multi-center randomized controlled trial involving 2,000 men and women. The study has two secondary objectives: (1) to investigate the relationship between the dietary intervention and several putative intermediate endpoints in large bowel carcinogenesis, and (2) to evaluate the correspondence between these intermediate endpoints and subsequent neoplasia (adenoma formation).

- Current trials are studying the worksite as a channel for cancer prevention activities, especially smoking cessation, screening and diet modification strategies.

Agency Coordination

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

- Representation by the Director, Division of Cancer Etiology, 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.

- The Division of Cancer Etiology (DCE) maintains interagency agreements with the U.S. Environmental Protection Agency and the National Institute for Occupational Safety and Health through which collaborative studies on environmental and occupational carcinogenesis are carried out. In addition to managing and serving as project officers on these interagency agreements, DCE staff interface with state agencies, industrial and trade organizations, academic institutions and professional societies, serving a primary role in dissemination of information on environmental problems and industrial exposures in carcinogenesis.

- The Director of the Division of Cancer Etiology is the NCI representative to The Committee to Coordinate Environmental Health and Related Programs (CCEHRP) which coordinates environmental risk assessment and other activities among the agencies.

- Representation by the Director, Division of Cancer Prevention and Control, on the National Institutes of Health Nutrition Coordinating Committee.

Smoking

- The Smoking, Tobacco and Cancer Program (STCP) supports 60 large-scale prevention and cessation clinical trials targeted toward smokers who are adolescents, women, in ethnic and minority populations, and smokeless tobacco users. Strategies being tested include use of physicians and dentists as interveners, media interventions and self-help.

- Implementation of the Community Intervention Trial for Heavy Smokers (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, exposure to passive smoking, and interventions with other agents.

- Physicians are being trained nationwide in the smoking cessation techniques described in the NCI manual *How to Help Your Patients Stop Smoking.*

- ASSIST, American Stop Smoking Intervention Study, a joint undertaking with the American Cancer Society, is being initiated to support community coalitions in 15 to 20 states to demonstrate the effectiveness in public health settings of implementing findings from previous NCI tobacco use reduction sponsored research.

Nutrition

- The NCI/Giant Food Inc. Supermarket Study to evaluate the effects of shelf labeling, in-store information and advertising on shopping practices and dietary behavior has been completed. Analysis now underway will show the impact of the interventions.

- Studies are being initiated to identify and evaluate potential biochemical/biological markers of dietary intake and adherence.

- Studies are being implemented to quantify levels of potential anticarcinogens in soybeans and soy products and to evaluate their absorption and metabolism in humans.

- A fruit and vegetable phytochemical cancer prevention program has been implemented to obtain a better understanding of the role of fruit and vegetable consumption in cancer prevention.

- An intramural research laboratory of nutrition is in place. This laboratory will provide leadership in basic research, clinical nutrition and human metabolism.

Occupational Cancer

Although smoking is undoubtedly the predominant cause of lung cancer, the risk of this cancer may also be related to some occupational exposures. One study found that mortality from lung cancer was elevated among workers employed in a plant producing chromium pigments. In a study of Chinese iron ore miners, the risk of lung cancer among underground miners exposed to radon and silica was four times that of above-ground miners. A study in Missouri found that the occupational risks of lung cancer varied by histologic type. Adenocarcinoma of the lung was elevated among furniture workers, plumbers, printers, and electricians, while squamous-cell cancer of the lung was excessive among fire fighters, brick masons and roofers.

Worksite Health Promotion

The worksite is an important channel for intervening on cancer risk factors such as smoking, diet or early detection. A large worksite program was launched this year in four areas of the United States to develop a test intervention designed to change the cancer risk factors noted. Both individual and environmental changes will be tested on this important program.

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 to develop strategies for achieving a significant reduction in cancer morbidity and mortality through early detection is ongoing. 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. As a result of interorganizational cooperative efforts, NCI Working Guidelines for Early Cancer Detection have been developed and are currently in press. Furthermore, the scope of early detection interests and research has been expanded to include biologic prognostic indicators as intermediate endpoints in evaluating the efficacy of specific early detection measures.

- Two primary care intervention studies are in the final completion stage, and have demonstrated that increased screening for cancers of the breast, colon, etc., can be achieved by implementing either computerized or chart-based flow sheets into the primary care office. A program to disseminate these techniques to a wider range of primary care physicians called "Prescribe for Health" is currently being launched, using medical intermediaries as the intervening channel.

- A large program of six grants to increase breast cancer screening in community settings is nearing its successful completion. Baseline results showed that physician referral and lack of knowledge on the part of women were key barriers for mammography referral. The comprehensive interventions using media, physician education, low cost screening, and patient education has resulted in significant increases in mammography rates in those communities receiving the program.

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. About 2,000 representatives of national, regional and local organizations are members of the network.

Year 2000 Goal 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 Objectives
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 1982 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 an 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 exams from 53% to 76%, stool blood exams from 48% to 75% and proctoscope from 18% to 48%.
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 groups can be identified.
Early Detection and Screening/Prostate	Second leading cause of cancer death in males. Early detection trials are in planning stages using digital rectal exams and Prostate Specific Antigen.	All males over 60 years should be regularly examined for early prostate cancer.

Control Area	Brief Rationale	Year 2000 Objective
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.
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.

Public Information Dissemination

As part of its legislated mission, the National Cancer Institute actively supports cancer information dissemination activities. NCI works to ensure that the public, as well as the primary-care physician, is afforded easy access to up-to-date information regarding cancer prevention, detection and diagnosis, and treatment measures.

The NCI devoted over $90 million in 1990 to the furtherance of its Information Dissemination activities. This included efforts in behavior modification studies, e.g., smoking and breast screening, as well as activities specifically directed towards professional and public audiences. The Physician Data Query (PDQ) system is a database containing treatment recommendations and summary information on all active clinical trials supported by NCI. A sub-system lists physicians and organizations that provide cancer care.

The Cancer Information Service (CIS), known to the public as 1-800-4-CANCER, is staffed by health professionals equipped to respond to public inquiries regarding cancer; often the PDQ system will be consulted. Over one-half of the callers receive a publication or other written material as a result of this service. Heightened public interest in specific cancer risk factors (i.e., Alar, radon, asbestos), results in a flood of calls to this toll-free number.

The CIS consists of a nationwide network of 22 regional offices, 18 of which receive direct NCI funding. In addition to providing direct response to the public, the field offices support NCI's major outreach activities and conduct cancer education programs to meet specific local and regional needs. For example, in support of NCI's mammography initiative in 1990, the CIS launched a major coordinated nationwide media campaign.

In addition to individual mailings of pamphlets/brochures by the local network offices of the Publication Ordering Service, the NCI widely distributes bulk volumes of pamphlets/brochures to hospitals, supermarkets, physician organizations, etc., for subsequent distribution to the public.

Pamphlets/Brochures Distributed

	CIS Inquiries	Publication Ordering Service Calls	Total Literature Distributed	PDQ Searches
FY 1990	531,000	171,000	20,000,000	18,000

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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 later 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 rapidly 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 is credited with accelerating the development of AZT, the first drug to be found effective in treating AIDS patients and to be approved by the FDA. He has made rapid technology transfer to all segments of society a major theme of his Directorship.

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.

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

Executive Secretary

Mrs. Barbara S. Bynum
National Cancer Institute, NIH
Bethesda, Maryland

Ex Officio Members

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

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

Mr. J. Thomas Ratchford
Office of Science and Technology Policy
Washington, DC

Ms. Ann Graham
Consumer Product Safety Commission
Washington, DC

Dr. John Gronvall
Department of Veterans' Affairs
Washington, DC

Mr. David Newhall, III
Department of Defense
Washington, DC

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

Dr. David G. Hoel (Acting)
National Institute of Environmental Health Sciences
Research Triangle Park, North Carolina

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

Dr. David J. Galas
Department of Energy
Washington, DC

Dr. William F. Raub (Acting)
National Institutes of Health
Bethesda, Maryland

Mr. James A. Benson (Acting)
Food and Drug Administration
Rockville, Maryland

Alternates to Ex Officio Members

Ms. Rachael Levinson
Office of Science and Technology Policy
Washington, DC

Dr. Miriam R. Davis
National Institute of Environmental Health Sciences
Bethesda, Maryland

Dr. William Farland
Environmental Protection Agency
Washington, DC

Dr. Richard J. Greene
Department of Veterans' Affairs
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
Bureau of Medicine and Surgery, Dept. of the Navy
Washington, DC

Division Boards of Scientific Counselors

Division of Cancer Biology, Diagnosis and Centers

Arnold J. Levine, Ph.D., *Chairperson*	1991	Albert F. LoBuglio, M.D.	1994
		Richard G. Lynch, M.D.	1991
		O. Ross McIntyre, M.D.	1994
Eugene A. Bauer, M.D.	1992	Harold L. Moses, M.D.	1991
Judith L. Campbell, Ph.D.	1993	Albert H. Owens, Jr., M.D.	1993
Vittorio Defendi, M.D.	1991	Howard K. Schachman, Ph.D.	1992
Walter Eckhart, Ph.D.	1992	R. Babu Venkataraghavan, Ph.D.	1993
Leon A. Heppel, M.D., Ph.D.	1991	Noel L. Warner, Ph.D.	1993
Margaret L. Kripke, Ph.D.	1993	Carolyn D. Whitfield, Ph.D.	1993

Division of Cancer Treatment

John E. Niederhuber, M.D., *Chairperson*	1991	Mark T. Groudine, M.D., Ph.D.	1991
		William R. Hendee, Ph.D.	1990
		Susan B. Horwitz, Ph.D.	1990
Robert L. Baehner	1992	William M. Hryniuk, M.D.	1992
Charles M. Balch, M.D.	1991	Frank M. Huennekens, Ph.D.	1991
Paul P. Carbone, M.D.	1993	Ronald Levy, M.D.	1993
Yung-chi Cheng, Ph.D.	1990	John Mendelsohn, M.D.	1990
James D. Cox, M.D.	1991	JoAnne Stubbe, Ph.D.	1993
Phillip Crews, Ph.D.	1993	Ralph R. Weichselbaum, M.D.	1993
Emil Frei, III, M.D.	1990		

Division of Cancer Etiology

Hilary Koprowski, M.D., *Chairperson*	1990	James S. Felton, Ph.D.	1992
		Lawrence Fischer, Ph.D.	1990
		Stephen S. Hecht, Ph.D.	1991
Marcel A. Baluda, Ph.D.	1993	Abraham M. Nomura, M.D.	1992
Anna D. Barker, Ph.D.	1990	David Schottenfeld, M.D.	1992
Webster Cavanee, Ph.D.	1992	Roy Shore, Ph.D.	1991
Allan H. Conney, Ph.D.	1991	Moyses Szklo, Ph.D.	1990
Pelayo Correa, M.D.	1991	Alice S. Whittemore, Ph.D.	1990
Myron Essex, Ph.D.	1991		

Division of Cancer Prevention and Control

Frank L. Meyskens, Jr., M.D., *Chairperson*	1990	Harmon J. Eyre, M.D.	1993
		Lloyd K. Everson, M.D.	1990
		James L. Gaylor, Ph.D.	1991
Sister Mary Madonna Ashton, M.S.	1993	M. Alfred Haynes, M.D., M.P.H.	1993
		James F. Holland, M.D.	1991
Edward Bresnick, Ph.D.	1991	Rumaldo Zapata Juarez, Ph.D.	1993
Philip T. Cole, M.D., Dr. P.H.	1990	Shirley B. Lansky, M.D.	1992
William Darity, Ph.D.	1990	Donald B. McCormick, Ph.D.	1992
Carol N. D'Onofrio, Dr. P.H.	1993	Michael Pertschuk, J.D.	1993
Virginia L. Ernster, Ph.D.	1990	Ross L. Prentice, Ph.D.	1993

Frederick Cancer Research and Development Center Committee

FCRDC Advisory Committee	Edward B. Ziff, Ph.D. *Chairperson*	1992
	J. Thomas August, M.D.	1991
	Renato Baserga, M.D.	1992
	Carmia G. Borek, Ph.D.	1992
	James R. Broach, Ph.D.	1992
	Donald R. Helinsky, Ph.D.	1994
	Phyllis J. Kanki, D.V.M., D.Sci.	1993
	Alexandra M. Levine, M.D.	1991
	Frank Lilly, Ph.D.	1992
	Raymond W. Ruddon, Jr., M.D., Ph.D.	1993
	Steven R. Tannanbaum, Ph.D.	1993
Ad Hoc BSC Representatives	R. Babu Venkataraghavan, Ph.D. (DCBDC)	1993
	Marcel A. Baluda, Ph.D. (DCE)	1993
	James L. Gaylor, Ph.D. (DCPC)	1991
	Ralph R. Weichselbaum, M.D. (DCT)	1993
Ex Officio Member of NCAB	vacant	

Executive Committee Members

Dr. Samuel Broder
Director

Dr. Daniel C. Idhe
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

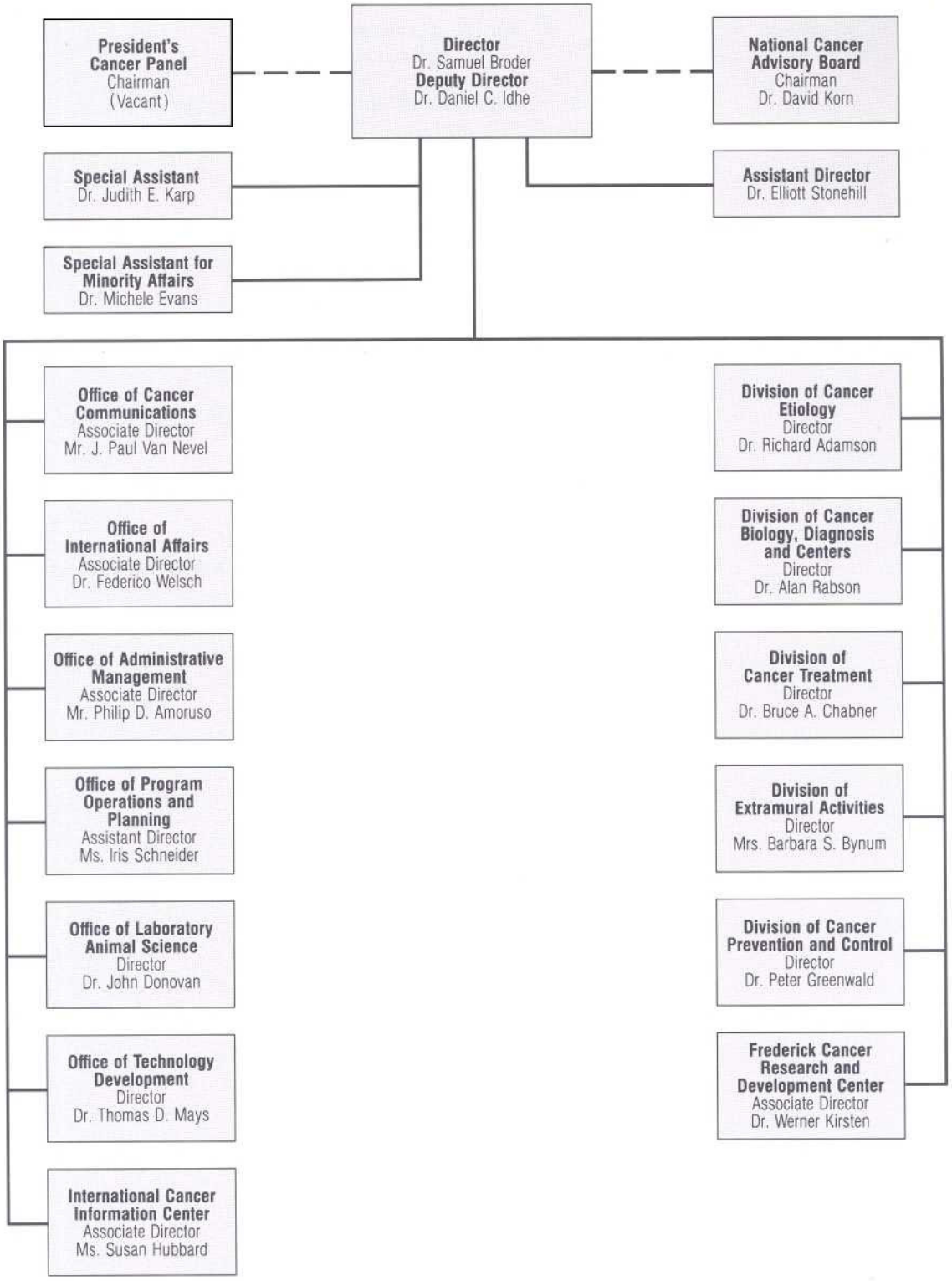
Dr. Peter Greenwald
Director, Division of Cancer Prevention and Control

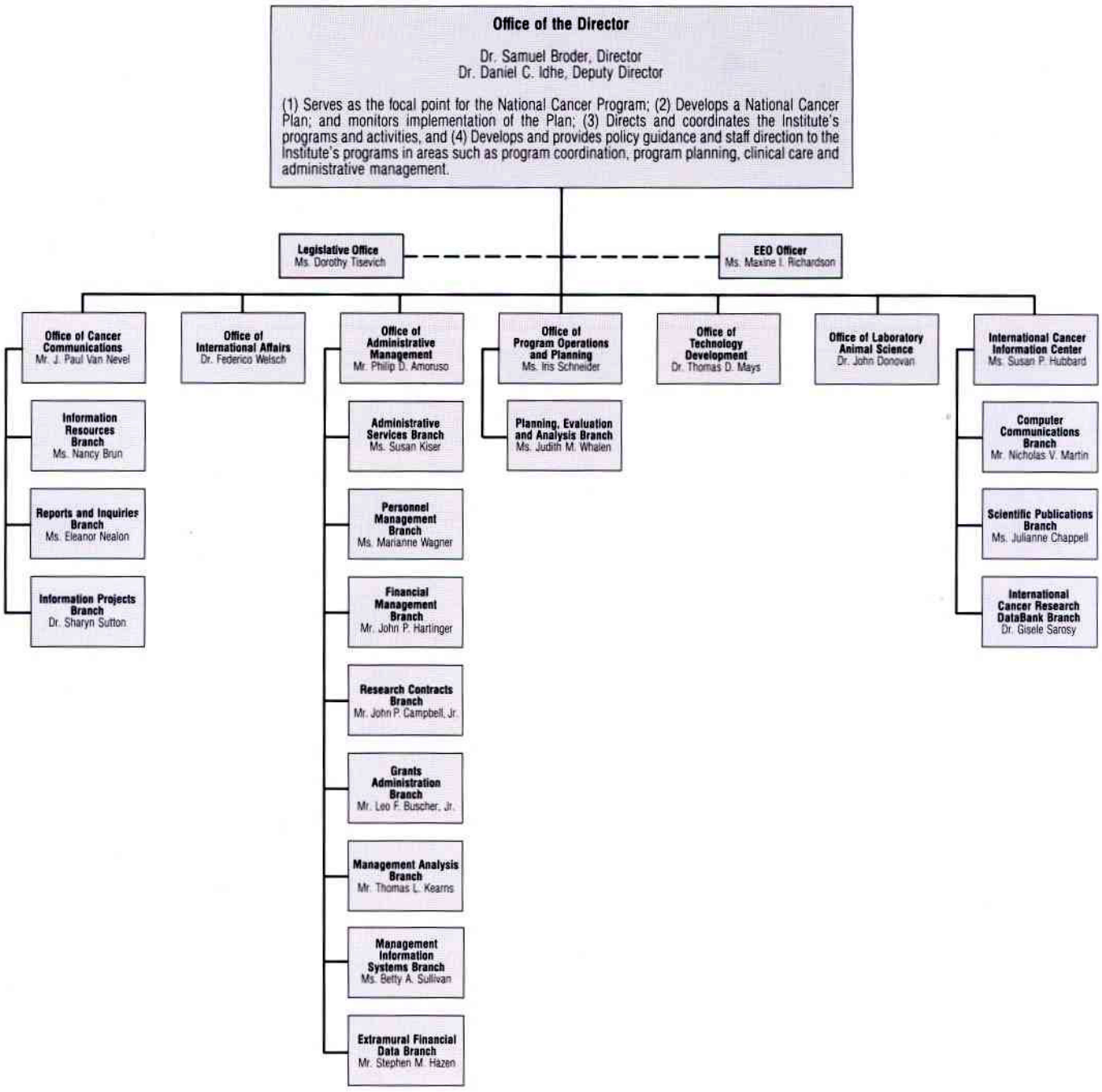
Dr. Werner Kirsten
Associate Director, National Cancer Institute Frederick Cancer Research and Development Center

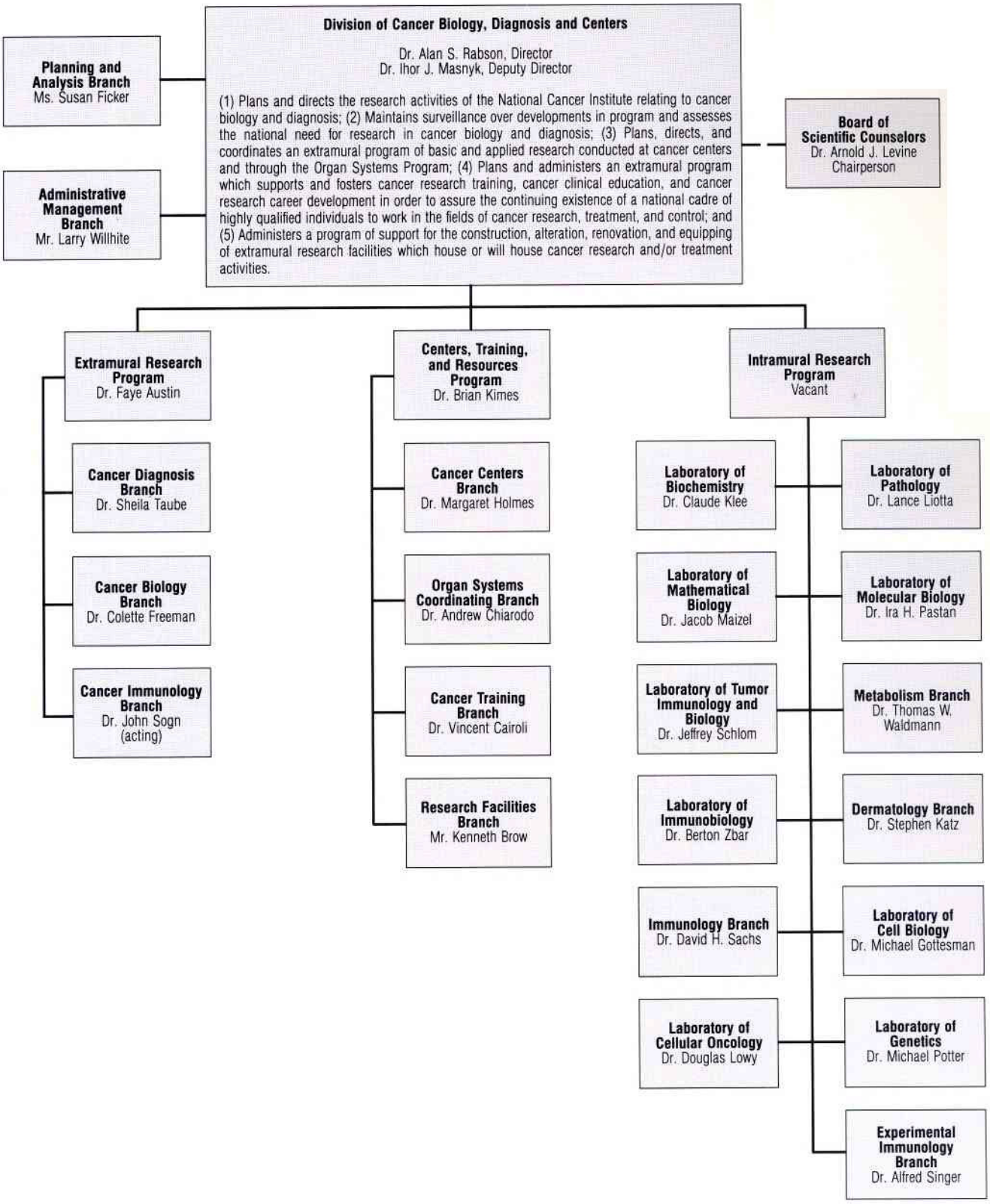
Dr. Alan Rabson
Director, Division of Cancer Biology, Diagnosis and Centers

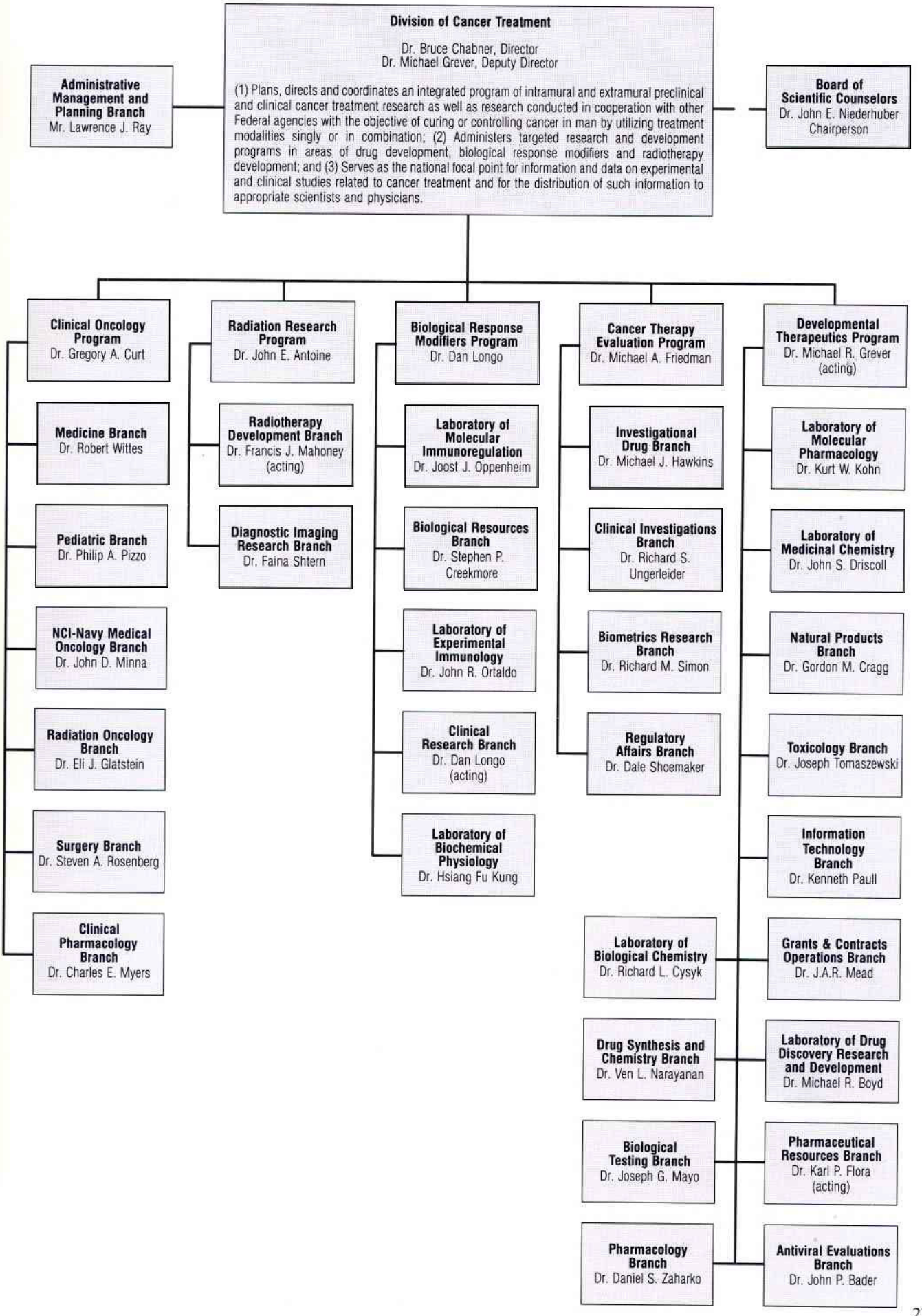
Ms. Iris Schneider
Executive Secretary

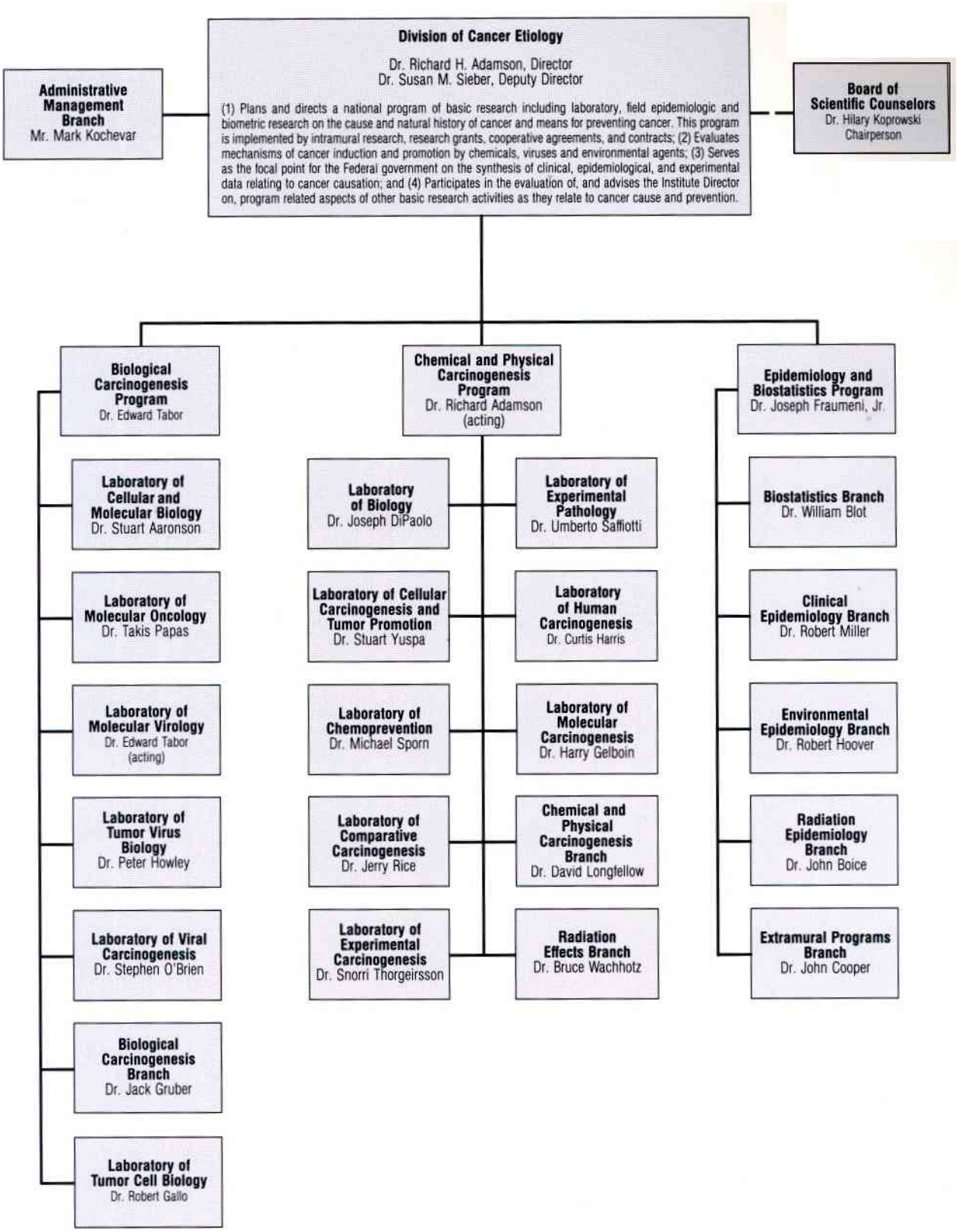
National Cancer Institute Organization

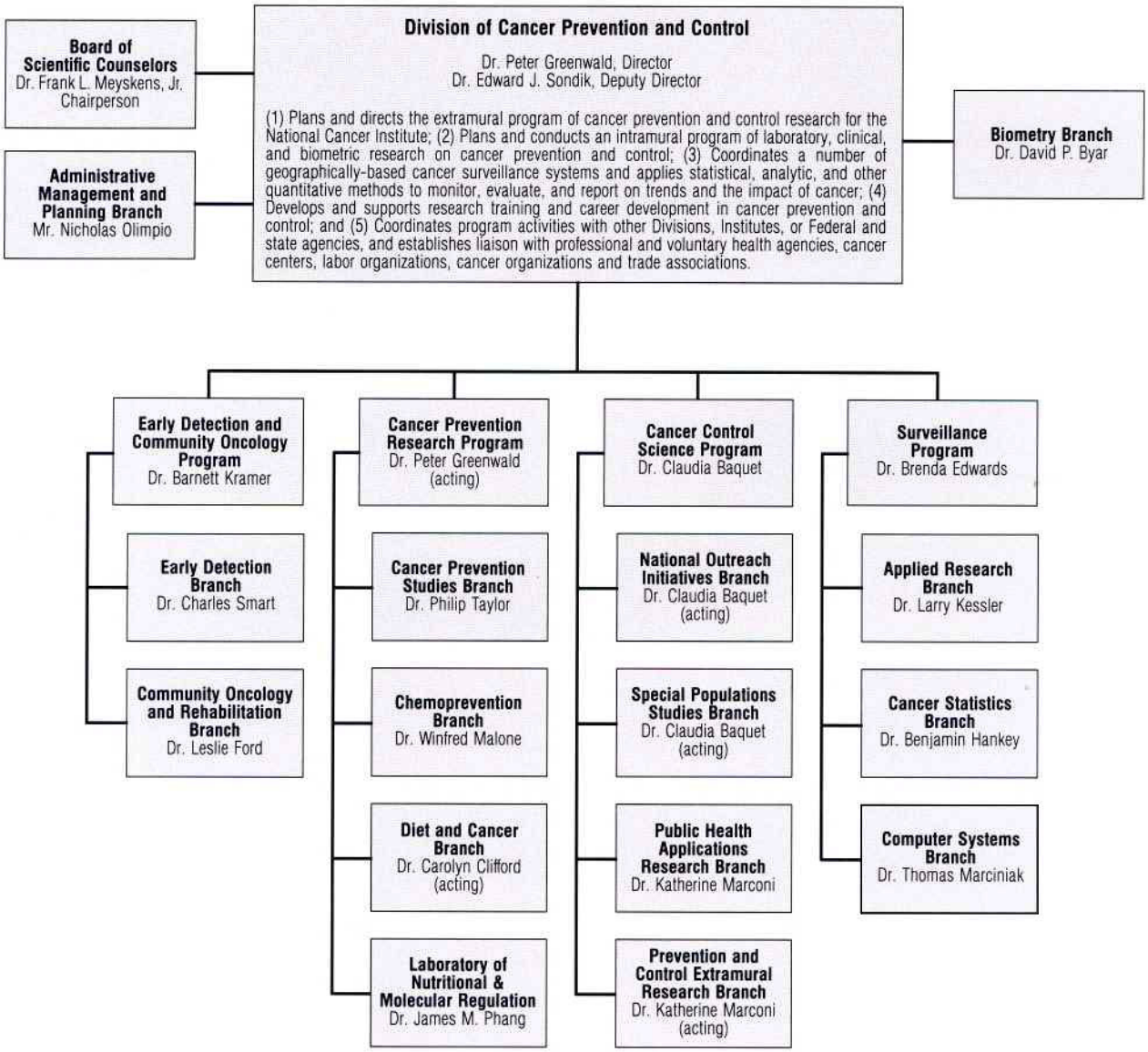


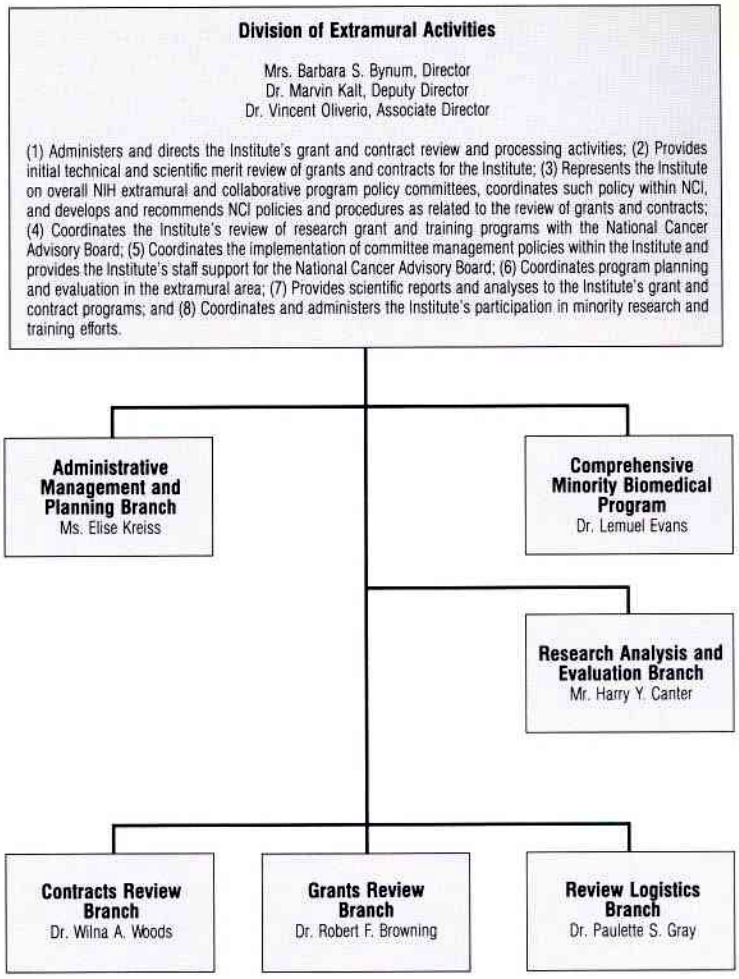

Office of the Director
Dr. Samuel Broder, Director
Dr. Daniel C. Idhe, Deputy Director
(1) Serves as the focal point for the National Cancer Program; (2) Develops a National Cancer Plan; and monitors implementation of the Plan; (3) Directs and coordinates the Institute's programs and activities, and (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.
Legislative Office
Ms. Dorothy Tisevich
EEO Officer
Ms. Maxine I. Richardson
Office of Cancer Communications
Mr. J. Paul Van Nevel
Information Resources Branch
Ms. Nancy Brun
Reports and Inquiries Branch
Ms. Eleanor Nealon
Information Projects Branch
Dr. Sharyn Sutton
Office of International Affairs
Dr. Federico Welsch
Office of Administrative Management
Mr. Philip D. Amoruso
Administrative Services Branch
Ms. Susan Kiser
Personnel Management Branch
Ms. Marianne Wagner
Financial Management Branch
Mr. John P. Hartinger
Research Contracts Branch
Mr. John P. Campbell, Jr.
Grants Administration Branch
Mr. Leo F. Buscher, Jr.
Management Analysis Branch
Mr. Thomas L. Kearns
Management Information Systems Branch
Ms. Betty A. Sullivan
Extramural Financial Data Branch
Mr. Stephen M. Hazen
Office of Program Operations and Planning
Ms. Iris Schneider
Planning, Evaluation and Analysis Branch
Ms. Judith M. Whalen
Office of Technology Development
Dr. Thomas D. Mays
Office of Laboratory Animal Science
Dr. John Donovan
International Cancer Information Center
Ms. Susan P. Hubbard
Computer Communications Branch
Mr. Nicholas V. Martin
Scientific Publications Branch
Ms. Julianne Chappell
International Cancer Research DataBank Branch
Dr. Gisele Sarosy


Division of Cancer Biology, Diagnosis and Centers
Dr. Alan S. Rabson, Director
Dr. Ihor J. Masnyk, Deputy Director
(1) Plans and directs the research activities of the National Cancer Institute relating to cancer biology and diagnosis; (2) Maintains surveillance over developments in program and assesses the national need for research in cancer biology and diagnosis; (3) Plans, directs, and coordinates an extramural program of basic and applied research conducted at cancer centers and through the Organ Systems Program; (4) Plans and administers an extramural program which supports and fosters cancer research training, cancer clinical education, and cancer research career development in order to assure the continuing existence of a national cadre of highly qualified individuals to work in the fields of cancer research, treatment, and control; and (5) Administers a program of support for the construction, alteration, renovation, and equipping of extramural research facilities which house or will house cancer research and/or treatment activities.
Planning and Analysis Branch
Ms. Susan Ficker
Administrative Management Branch
Mr. Larry Willhite
Board of Scientific Counselors
Dr. Arnold J. Levine
Chairperson
Extramural Research Program
Dr. Faye Austin
Cancer Diagnosis Branch
Dr. Sheila Taube
Cancer Biology Branch
Dr. Colette Freeman
Cancer Immunology Branch
Dr. John Sogn
(acting)
Centers, Training, and Resources Program
Dr. Brian Kimes
Cancer Centers Branch
Dr. Margaret Holmes
Organ Systems Coordinating Branch
Dr. Andrew Chiarodo
Cancer Training Branch
Dr. Vincent Cairoli
Research Facilities Branch
Mr. Kenneth Brow
Intramural Research Program
Vacant
Laboratory of Biochemistry
Dr. Claude Klee
Laboratory of Mathematical Biology
Dr. Jacob Maizel
Laboratory of Tumor Immunology and Biology
Dr. Jeffrey Schlom
Laboratory of Immunobiology
Dr. Berton Zbar
Immunology Branch
Dr. David H. Sachs
Laboratory of Cellular Oncology
Dr. Douglas Lowy
Laboratory of Pathology
Dr. Lance Liotta
Laboratory of Molecular Biology
Dr. Ira H. Pastan
Metabolism Branch
Dr. Thomas W. Waldmann
Dermatology Branch
Dr. Stephen Katz
Laboratory of Cell Biology
Dr. Michael Gottesman
Laboratory of Genetics
Dr. Michael Potter
Experimental Immunology Branch
Dr. Alfred Singer

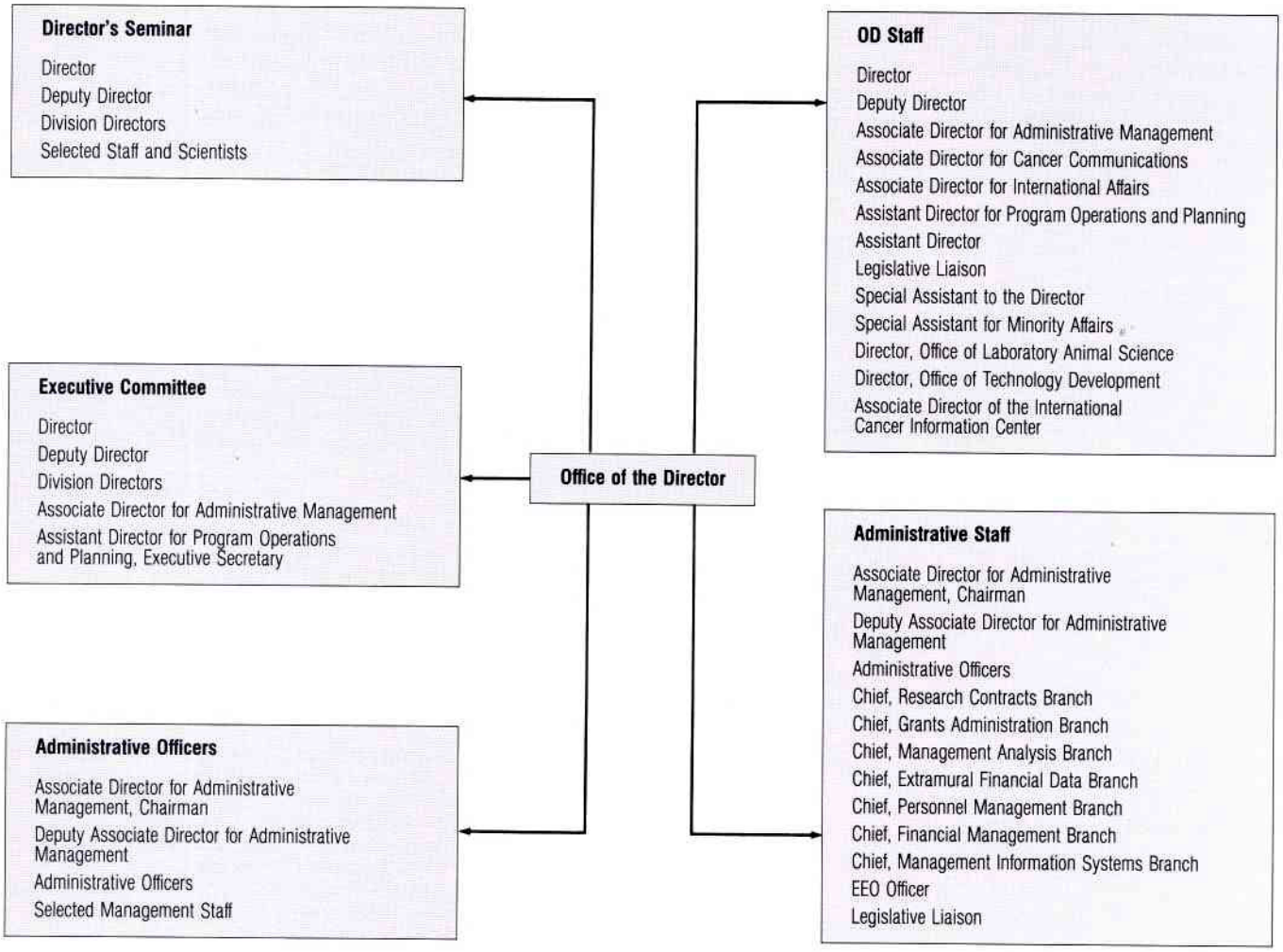

Division of Cancer Treatment
Dr. Bruce Chabner, Director
Dr. Michael Grever, Deputy Director
(1) Plans, directs and coordinates an integrated program of intramural and extramural preclinical and clinical cancer treatment research as well as research conducted in cooperation with other Federal agencies with the objective of curing or controlling cancer in man by utilizing treatment modalities singly or in combination; (2) Administers targeted research and development programs in areas of drug development, biological response modifiers and radiotherapy development; and (3) Serves as the national focal point for information and data on experimental and clinical studies related to cancer treatment and for the distribution of such information to appropriate scientists and physicians.
Administrative Management and Planning Branch
Mr. Lawrence J. Ray
Board of Scientific Counselors
Dr. John E. Niederhuber
Chairperson
Clinical Oncology Program
Dr. Gregory A. Curt
Medicine Branch
Dr. Robert Wittes
Pediatric Branch
Dr. Philip A. Pizzo
NCI-Navy Medical Oncology Branch
Dr. John D. Minna
Radiation Oncology Branch
Dr. Eli J. Glatstein
Surgery Branch
Dr. Steven A. Rosenberg
Clinical Pharmacology Branch
Dr. Charles E. Myers
Radiation Research Program
Dr. John E. Antoine
Radiotherapy Development Branch
Dr. Francis J. Mahoney
(acting)
Diagnostic Imaging Research Branch
Dr. Faina Shtern
Biological Response Modifiers Program
Dr. Dan Longo
Laboratory of Molecular Immunoregulation
Dr. Joost J. Oppenheim
Biological Resources Branch
Dr. Stephen P. Creekmore
Laboratory of Experimental Immunology
Dr. John R. Ortaldo
Clinical Research Branch
Dr. Dan Longo
(acting)
Laboratory of Biochemical Physiology
Dr. Hsiang Fu Kung
Cancer Therapy Evaluation Program
Dr. Michael A. Friedman
Investigational Drug Branch
Dr. Michael J. Hawkins
Clinical Investigations Branch
Dr. Richard S. Ungerleider
Biometrics Research Branch
Dr. Richard M. Simon
Regulatory Affairs Branch
Dr. Dale Shoemaker
Developmental Therapeutics Program
Dr. Michael R. Grever
(acting)
Laboratory of Molecular Pharmacology
Dr. Kurt W. Kohn
Laboratory of Medicinal Chemistry
Dr. John S. Driscoll
Natural Products Branch
Dr. Gordon M. Cragg
Toxicology Branch
Dr. Joseph Tomaszewski
Information Technology Branch
Dr. Kenneth Paull
Laboratory of Biological Chemistry
Dr. Richard L. Cysyk
Grants & Contracts Operations Branch
Dr. J.A.R. Mead
Drug Synthesis and Chemistry Branch
Dr. Ven L. Narayanan
Laboratory of Drug Discovery Research and Development
Dr. Michael R. Boyd
Biological Testing Branch
Dr. Joseph G. Mayo
Pharmaceutical Resources Branch
Dr. Karl P. Flora
(acting)
Pharmacology Branch
Dr. Daniel S. Zaharko
Antiviral Evaluations Branch
Dr. John P. Bader


Division of Cancer Etiology
Dr. Richard H. Adamson, Director
Dr. Susan M. Sieber, Deputy Director
(1) Plans and directs a national program of basic research including laboratory, field epidemiologic and biometric research on the cause and natural history of cancer and means for preventing cancer. This program is implemented by intramural research, research grants, cooperative agreements, and contracts; (2) Evaluates mechanisms of cancer induction and promotion by chemicals, viruses and environmental agents; (3) Serves as the focal point for the Federal government on the synthesis of clinical, epidemiological, and experimental data relating to cancer causation; and (4) Participates in the evaluation of, and advises the Institute Director on, program related aspects of other basic research activities as they relate to cancer cause and prevention.
Administrative Management Branch
Mr. Mark Kochevar
Board of Scientific Counselors
Dr. Hilary Koprowski
Chairperson
Biological Carcinogenesis Program
Dr. Edward Tabor
Laboratory of Cellular and Molecular Biology
Dr. Stuart Aaronson
Laboratory of Molecular Oncology
Dr. Takis Papas
Laboratory of Molecular Virology
Dr. Edward Tabor
(acting)
Laboratory of Tumor Virus Biology
Dr. Peter Howley
Laboratory of Viral Carcinogenesis
Dr. Stephen O'Brien
Biological Carcinogenesis Branch
Dr. Jack Gruber
Laboratory of Tumor Cell Biology
Dr. Robert Gallo
Chemical and Physical Carcinogenesis Program
Dr. Richard Adamson
(acting)
Laboratory of Biology
Dr. Joseph DiPaolo
Laboratory of Cellular Carcinogenesis and Tumor Promotion
Dr. Stuart Yuspa
Laboratory of Chemoprevention
Dr. Michael Sporn
Laboratory of Comparative Carcinogenesis
Dr. Jerry Rice
Laboratory of Experimental Carcinogenesis
Dr. Snorri Thorgeirsson
Laboratory of Experimental Pathology
Dr. Umberto Saffiotti
Laboratory of Human Carcinogenesis
Dr. Curtis Harris
Laboratory of Molecular Carcinogenesis
Dr. Harry Gelboin
Chemical and Physical Carcinogenesis Branch
Dr. David Longfellow
Radiation Effects Branch
Dr. Bruce Wachhotz
Epidemiology and Biostatistics Program
Dr. Joseph Fraumeni, Jr.
Biostatistics Branch
Dr. William Blot
Clinical Epidemiology Branch
Dr. Robert Miller
Environmental Epidemiology Branch
Dr. Robert Hoover
Radiation Epidemiology Branch
Dr. John Boice
Extramural Programs Branch
Dr. John Cooper


Board of Scientific Counselors
Dr. Frank L. Meyskens, Jr.
Chairperson
Administrative Management and Planning Branch
Mr. Nicholas Olimpio
Division of Cancer Prevention and Control
Dr. Peter Greenwald, Director
Dr. Edward J. Sondik, Deputy Director
(1) Plans and directs the extramural program of cancer prevention and control research for the National Cancer Institute; (2) Plans and conducts an intramural program of laboratory, clinical, and biometric research on cancer prevention and control; (3) Coordinates a number of geographically-based cancer surveillance systems and applies statistical, analytic, and other quantitative methods to monitor, evaluate, and report on trends and the impact of cancer; (4) Develops and supports research training and career development in cancer prevention and control; and (5) Coordinates program activities with other Divisions, Institutes, or Federal and state agencies, and establishes liaison with professional and voluntary health agencies, cancer centers, labor organizations, cancer organizations and trade associations.
Biometry Branch
Dr. David P. Byar
Early Detection and Community Oncology Program
Dr. Barnett Kramer
Early Detection Branch
Dr. Charles Smart
Community Oncology and Rehabilitation Branch
Dr. Leslie Ford
Cancer Prevention Research Program
Dr. Peter Greenwald (acting)
Cancer Prevention Studies Branch
Dr. Philip Taylor
Chemoprevention Branch
Dr. Winfred Malone
Diet and Cancer Branch
Dr. Carolyn Clifford (acting)
Laboratory of Nutritional & Molecular Regulation
Dr. James M. Phang
Cancer Control Science Program
Dr. Claudia Baquet
National Outreach Initiatives Branch
Dr. Claudia Baquet (acting)
Special Populations Studies Branch
Dr. Claudia Baquet (acting)
Public Health Applications Research Branch
Dr. Katherine Marconi
Prevention and Control Extramural Research Branch
Dr. Katherine Marconi (acting)
Surveillance Program
Dr. Brenda Edwards
Applied Research Branch
Dr. Larry Kessler
Cancer Statistics Branch
Dr. Benjamin Hankey
Computer Systems Branch
Dr. Thomas Marciniak


Division of Extramural Activities
Mrs. Barbara S. Bynum, Director
Dr. Marvin Kalt, Deputy Director
Dr. Vincent Oliverio, Associate 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.
Administrative Management and Planning Branch
Ms. Elise Kreiss
Comprehensive Minority Biomedical Program
Dr. Lemuel Evans
Research Analysis and Evaluation Branch
Mr. Harry Y. Canter
Contracts Review Branch
Dr. Wilna A. Woods
Grants Review Branch
Dr. Robert F. Browning
Review Logistics Branch
Dr. Paulette S. Gray

Information Flow for Program Implementation



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.		
Step 1 Scheduling and Approval	**Step 2** Team Selection Site Visit	**Step 3** Preparation for Site Visit	**Step 4** Site Visit	**Step 5** Site Visit Report and Recommendations	**Step 6** Implementation of Recommendations	**Step 7** Follow-up Report
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 Institute[1]

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.—$42,600 Physicians—$51,942 Maximum $78,200	Office of Personnel Management; Contact Division 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 $78,200	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.	$37,000-$41,000	Apply to the Medical Staff Fellowship Program Office, National Institutes of Health, Clinical Center, Building 10, Room 1C129, 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.	$37,000-$41,000	Apply to the Medical Staff Fellowship Program Office, National Institutes of Health, Clinical Center, Building 10, Room 1C129, Bethesda, MD 20892
IV. Visiting Program (limited tenure)[2]			
A. Visiting Fellow (maximum 3 years)	1-3 years postdoctoral experience or training.	Entrance stipend $25,000-$28,000	Contact Division 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.	$24,709-$46,571	Contact Division 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.	$35,825-$78,190	Contact Division 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 $28,000-$39,426 Other Doctorates $24,000-$41,795 Senior Staff Fellows Physicians $32,000-$54,727 Other Doctorates $28,000-$46,861	Contact Director or Laboratory Chief in area of interest or the NCI Personnel Office.

[1]Does not necessarily indicate that positions are currently available at the National Cancer Institute.
[2]Under 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 Division 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.D.S., Ph.D., or other doctoral degree in a related discipline (epidemiology, biostatistics, and the biomedical, nutritional, public health or behavioral sciences); 2) U.S. citizen or resident alien eligible for citizenship within four years.	First year for an M.D. or D.O. $26,000-$37,000 for Ph.D. $18,000-$31,000.	Program Director, CPFP, Executive Plaza South, Room T41, 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. $25,000-$31,000 Physicians $37,000-$41,000	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 $2,300 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 October 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.	M.D. $26,000-$35,000 Ph.D. $18,000-$31,000 Master's level $17,000-$19,000	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.	$25,000-$28,000	Contact Division Director or Laboratory Chief in area of interest.

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	Lung	Leukemia	Leukemia	Leukemia	Breast	Lung	Breast	Lung	Lung	Lung	Colon & Rectum
87,164	42,702	402	293	683	688	8,877	8,489	55,188	26,203	22,906	14,782
Colon & Rectum	Breast	Brain & CNS	Brain & CNS	Brain & CNS	Leukemia	Colon & Rectum	Lung	Colon & Rectum	Breast	Prostate	Breast
28,337	40,896	214	176	443	465	2,340	5,108	14,709	20,071	16,498	11,648
Prostate	Colon & Rectum	Endocrine	Endocrine	Non-Hodgkin's Lymphoma	Cervix	Brain & CNS	Colon & Rectum	Prostate	Colon & Rectum	Colon & Rectum	Lung
27,863	28,914	115	92	393	348	1,321	2,008	11,050	11,966	11,063	11,279
Pancreas	Pancreas	Non-Hodgkin's Lymphoma	Soft Tissue	Hodgkin's Disease	Brain & CNS	Non-Hodgkin's Lymphoma	Ovary	Pancreas	Ovary	Pancreas	Pancreas
11,550	12,187	68	45	281	317	1,200	1,648	6,492	6,336	3,823	5,665
Leukemia	Ovary	Soft Tissue	Bone	Non-Melanotic Skin Cancer	Hodgkin's/ Non-Hodgkin's Lymphoma	Pancreas	Cervix	Stomach	Pancreas	Bladder	Ovary
9,487	11,838	66	32	278	184	1,194	1,372	4,358	5,734	3,388	3,716

Source: Mortality tape (1987) from National Center for Health Statistics.

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

Rank	Cause	Number of Deaths	Crude Death Rate per 100,000 Population	Percent of Total Deaths
	ALL CAUSES	2,123,323	872.4	100.0%
1	Diseases of the Heart	760,353	312.4	35.8
2	CANCER	476,927	195.9	22.5
3	Cerebrovascular	149,835	61.6	7.1
4	Accidents	95,020	39.0	4.5
5	Bronchitis, Emphysema & Asthma	78,380	32.2	3.7
6	Pneumonia & Influenza	69,225	28.4	3.3
7	Diabetes Mellitus	38,532	15.8	1.8
8	Suicide	30,796	12.7	1.5
9	Cirrhosis of the Liver	26,201	10.9	1.2
10	Atherosclerosis	22,474	9.2	1.1
11	Nephritis & Nephrosis	22,052	9.1	1.0
12	Homicide	21,103	8.7	1.0
13	Septicemia	19,916	8.2	0.9
14	Diseases of Infancy	18,222	7.5	0.9
15	Human Immunodeficiency Virus Infection	13,468	5.5	0.6
	Other & Ill-defined	280,819	115.4	13.2

Source: National Center for Health Statistics, 1987.

Estimated New Cancer Cases and Deaths by Sex for All Sites 1990*

	Estimated New Cases			Estimated Deaths		
	Total	**Male**	**Female**	**Total**	**Male**	**Female**
All Sites	1,040,000*	520,000*	520,000*	510,000	270,000	240,000
Buccal Cavity & Pharynx **(ORAL)**	30,500	20,400	10,100	8,350	5,575	2,775
Lip	3,600	3,100	500	100	75	25
Tongue	6,100	3,900	2,200	1,950	1,300	650
Mouth	11,500	6,900	4,600	2,500	1,500	1,000
Pharynx	9,300	6,500	2,800	3,800	2,700	1,100
Digestive Organs	236,800	121,300	115,500	122,900	64,600	58,300
Esophagus	10,600	7,400	3,200	9,500	7,000	2,500
Stomach	23,200	13,900	9,300	13,700	8,300	5,400
Small Intestine	2,800	1,500	1,300	900	500	400
Large Intestine } **(COLON-RECTUM)**	110,000	52,000	58,000	53,300	26,000	27,300
Rectum }	45,000	24,000	21,000	7,600	4,000	3,600
Liver & Biliary Passages	14,600	7,700	6,900	11,900	6,200	5,700
Pancreas	28,100	13,600	14,500	25,000	12,100	12,900
Other & Unspecified Digestive	2,500	1,200	1,300	1,000	500	500
Respiratory System	173,700	115,000	58,700	147,100	95,900	51,200
Larynx	12,300	10,000	2,300	3,750	3,000	750
LUNG	157,000	102,000	55,000	142,000	92,000	50,000
Other & Unspecified Respiratory	4,400	3,000	1,400	1,350	900	450
Bone	2,100	1,200	900	1,100	600	500
Connective Tissue	5,700	3,000	2,700	3,100	1,500	1,600
SKIN	27,600†	14,800†	12,800†	8,800§	5,700	3,100
BREAST	150,900‡	900‡	150,000‡	44,300	300	44,000
Genital Organs	185,000‡	113,100	71,900‡	54,100	30,600	23,500
Cervix Uteri } **(UTERUS)**	13,500‡	—	13,500‡	6,000	—	6,000
Corpus, Endometrium }	33,000	—	33,000	4,000	—	4,000
Ovary	20,500	—	20,500	12,400	—	12,400
Other & Unspecified Genital, Female	4,900	—	4,900	1,100	—	1,100
Prostate	106,000	106,000	—	30,000	30,000	—
Testis	5,900	5,900	—	350	350	—
Other & Unspecified Genital, Male	1,200	1,200	—	250	250	—
Urinary Organs	73,000	51,000	22,000	20,000	12,600	7,400
Bladder	49,000	36,000	13,000	9,700	6,500	3,200
Kidney & Other Urinary	24,000	15,000	9,000	10,300	6,100	4,200
Eye	1,700	900	800	300	150	150
Brain & Central Nervous System	15,600	8,500	7,100	11,100	6,000	5,100
Endocrine Glands	13,600	4,000	9,600	1,750	775	975
Thyroid	12,100	3,200	8,900	1,025	375	650
Other Endocrine	1,500	800	700	725	400	325
Leukemias	27,800	15,700	12,100	18,100	9,800	8,300
Lymphocytic Leukemia	11,600	6,700	4,900	5,200	3,000	2,200
Granulocytic Leukemia	11,500	6,300	5,200	7,600	4,000	3,600
Other & Unspecified Leukemia	4,700	2,700	2,000	5,300	2,800	2,500
Other Blood & Lymph Tissues	54,800	28,900	25,900	28,700	14,900	13,800
Hodgkin's Disease	7,400	4,200	3,200	1,600	1,000	600
Non-Hodgkin's Lymphomas	35,600	18,600	17,000	18,200	9,500	8,700
Multiple Myeloma	11,800	6,100	5,700	8,900	4,400	4,500
All Other & Unspecified Sites	41,200	21,300	19,900	40,300	21,000	19,300

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 nonmelanoma skin cancers are not included in totals. Carcinoma in situ of the uterine cervix accounts for more than 50,000 new cases annually, carcinoma in situ of the female breast accounts for about 15,000 new cases annually, and melanoma carcinoma in situ accounts for about 5,000 new cases annually. Overall, about 100,000 new cases of carcinoma in situ of all sites of cancer are diagnosed each year. Nonmelanoma skin cancer accounts for about 600,000 new cases annually.*

† Melanoma only. *‡Invasive cancer only.* *§ Melanoma 6,300; other skin 2,500*

INCIDENCE ESTIMATES ARE BASED ON RATES FROM NCI SEER PROGRAM 1984-1986.

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.

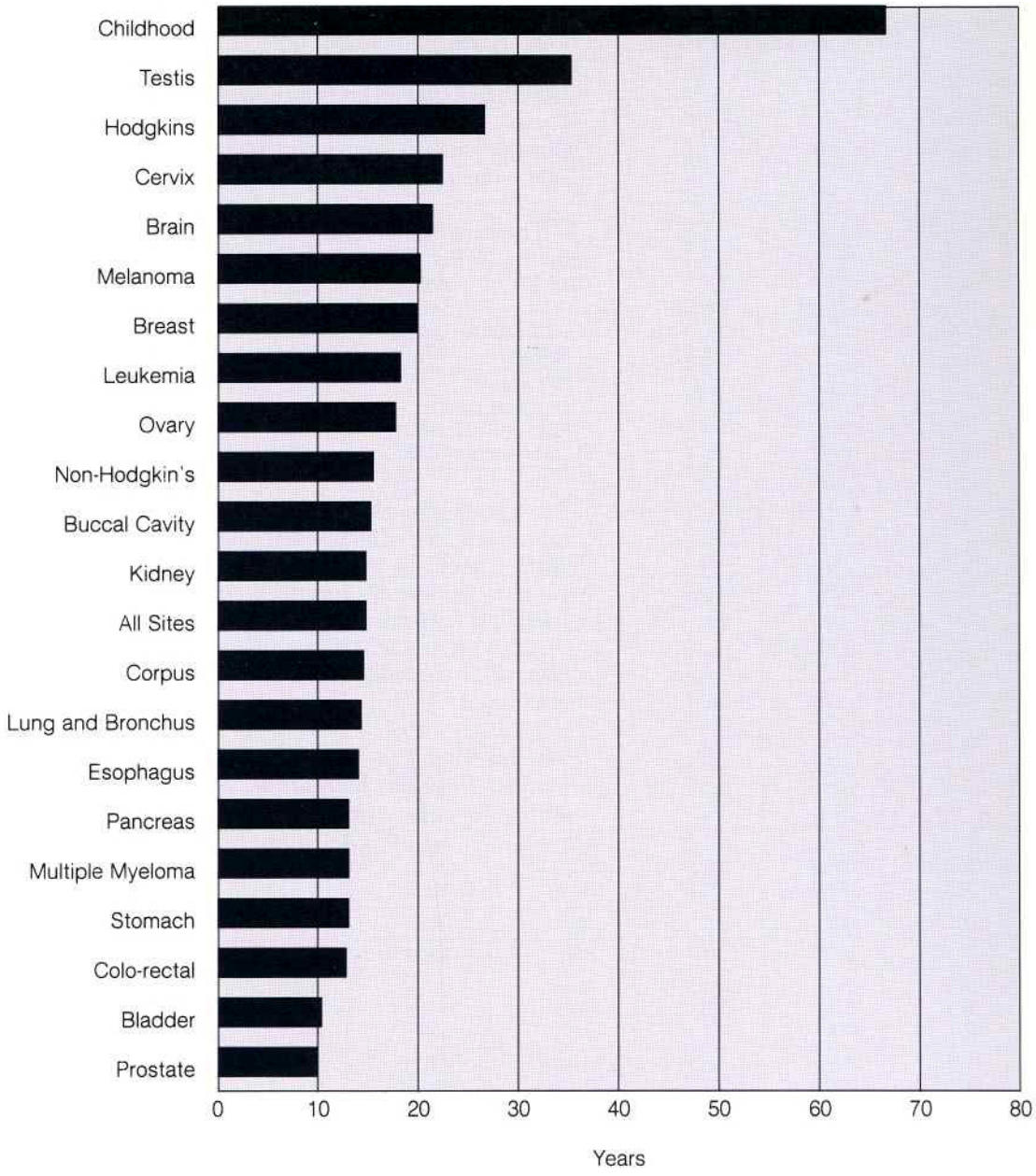
The most recent figures for the annual cost of cancer have been supplied by the National Center for Health Statistics. These figures are as follows for 1987:

All Costs in Millions	Total Cost	Direct Cost	Morbidity Cost	Mortality Cost
All Cancers	$ 83,532	$ 26,333	$ 9,876	$ 47,323
All Health Care	$846,054	$442,600	$136,723	$266,731
Percent Relationship of Cancer to Total	10%	6%	7%	18%

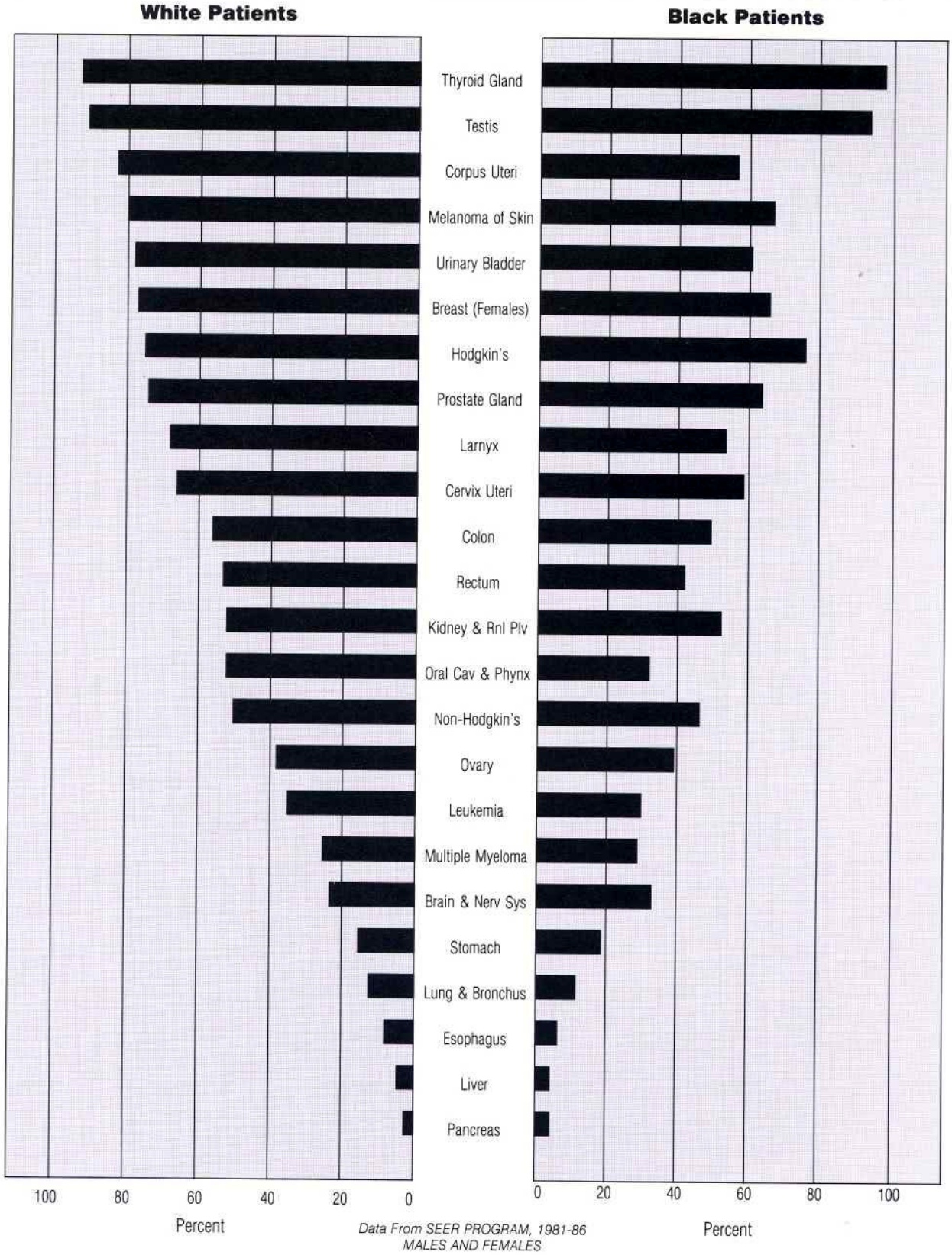
The figures show that cancer accounts for 10 percent of the total cost of disease in the United States and that its share of the total cost of premature death is about 18 percent of all causes of death. Mortality costs are computed as the loss of expected lifetime earnings of the decedent, which is relatively low for persons over age 65. Some 66 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, 1987—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, 1987

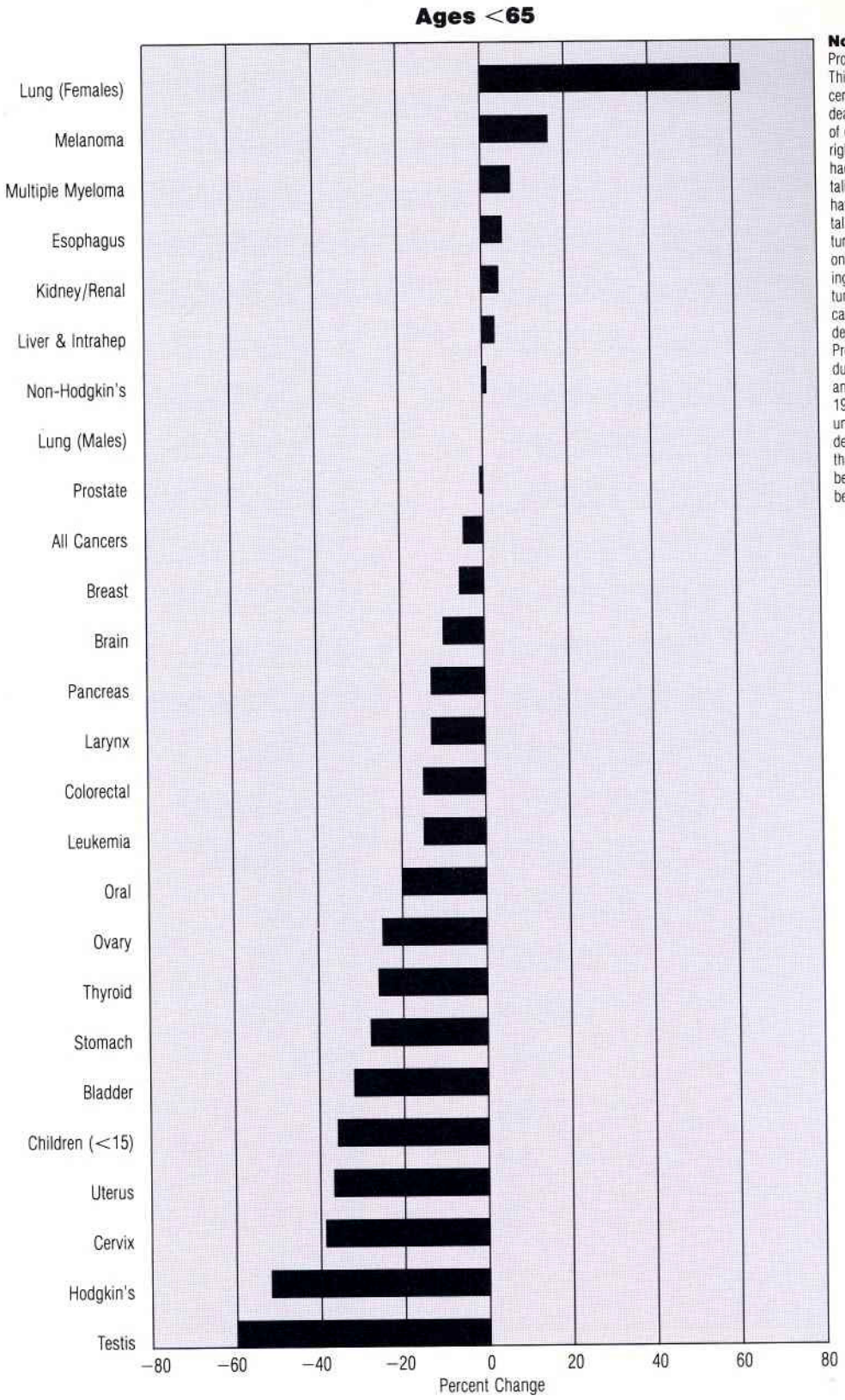


5-Year Relative Survival Rates, by Site White versus Black Patients 1981 to 1986



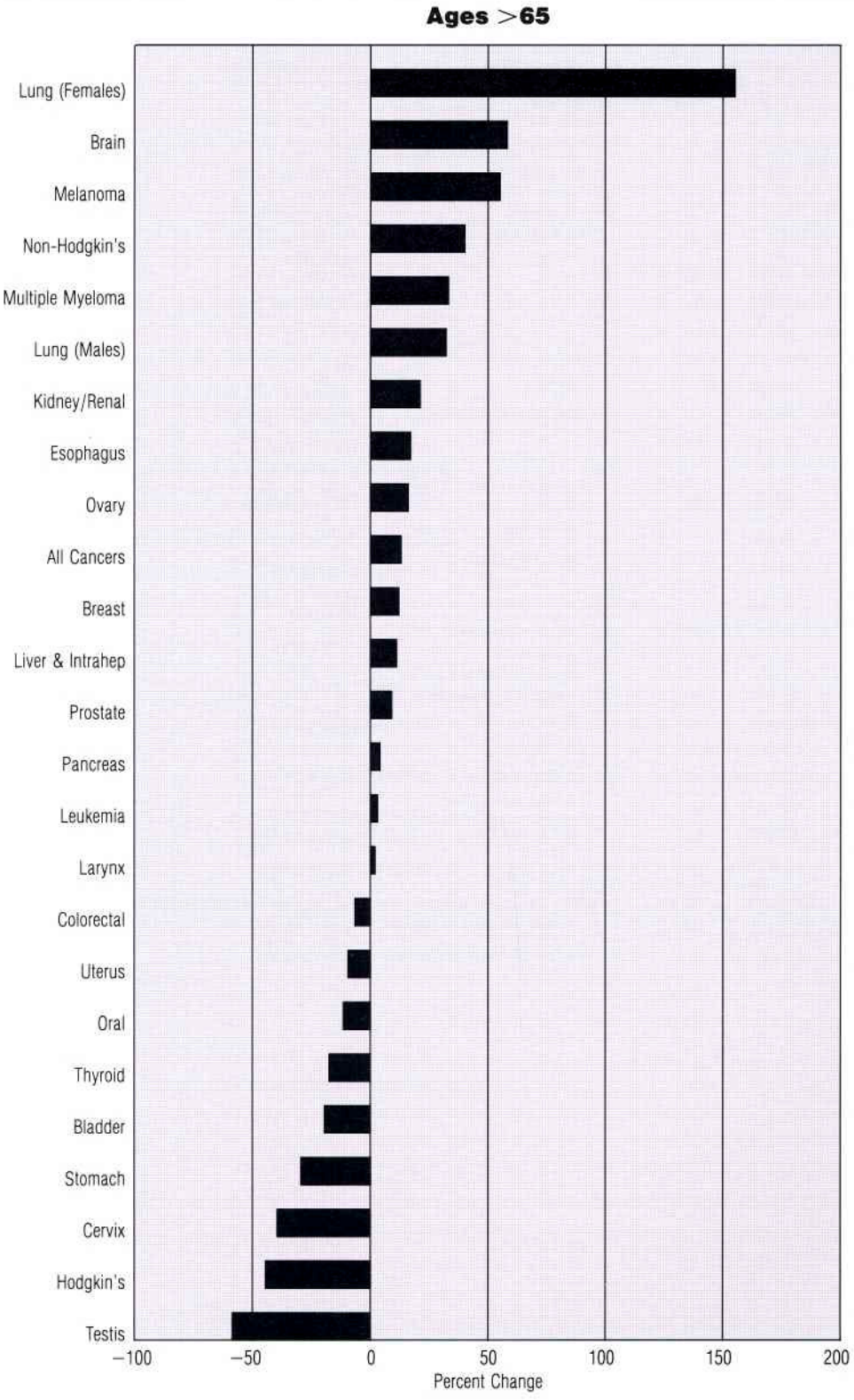
Data From SEER PROGRAM, 1981-86
MALES AND FEMALES

Cancer Mortality Rates
Changes from 1973 to 1987



Note:
Progress and problems: This graph illustrates percent changes in the annual death rate for a wide range of cancers. Cancers to the right of the zero axis have had increased cancer mortality rates, those to the left have had decreased mortality rates. If the graph is turned counter-clockwise on its side, the bars pointing down show the major tumors in which a significant reduction in annual death rate has occurred. Progress is apparent: a reduction has occurred in the annual death rates since 1973 in both common and uncommon cancers. This definitely shows progress in the age group under 65, albeit more progress needs to be made.

Cancer Mortality Rates
Changes from 1973 to 1987



Note:
Progress and problems: Comparing this chart to that for individuals under 65, it is clear that not as much progress is being made in reducing cancer death rates in older groups. The cancer deaths to the right of the zero axis have risen, those to the left have decreased. This graph should be compared to the accompanying graph addressing changes in mortality rates for people under age 65. Issues such as low-income, patterns of medical care, and other related factors are thought to be important considerations in the older population.

Cancer Mortality Rates
United States, 1983-1987

	Mortality Rate per 100,000		Ratio
Cancer Site	**Blacks**	**Whites**	**Blacks/Whites**
All Sites	217.7	167.5	1.3
Males	299.9	212.5	1.4
Females	161.0	137.6	1.2
Esophagus	8.8	2.8	3.1
Cervix Uteri	7.4	2.7	2.7
Prostate	46.8	21.9	2.1
Multiple Myeloma	5.5	2.6	2.1
Stomach	9.1	4.6	2.0
Larynx	2.6	1.3	2.0
Oral Cavity	5.4	2.9	1.9
Corpus & Uterus NOS	6.0	3.5	1.7
Liver & Intrahep.	3.9	2.3	1.7
Pancreas	11.7	8.2	1.4
Thyroid	0.4	0.3	1.3
Lung & Bronchus	56.5	45.8	1.2
Males	98.6	72.2	1.4
Females	25.9	26.6	1.0
Colon/Rectum	23.1	20.3	1.1
Colon	20.1	17.5	1.1
Rectum	3.0	2.8	1.1
Breast (Females)	29.2	27.2	1.1
<50 years	9.1	6.0	1.5
50+ years	91.2	92.7	1.0
Urinary Bladder	3.4	3.4	1.0
Leukemia	5.8	6.5	0.9
Kidney & Renal Pelvis	3.0	3.3	0.9
Hodgkin's Disease	0.6	0.7	0.9
Ovary	6.3	7.9	0.8
Testis	0.2	0.3	0.7
Brain & CNS	2.4	4.2	0.6
Non-Hodgkin's	3.7	5.9	0.6
Melanoma of Skin	0.4	2.3	0.2
All Except Lung	161.2	121.7	1.3
Males	201.3	140.3	1.4
Females	135.1	111.0	1.2

NOTE: The annual number of cancer deaths per 100,000 persons derived from estimates of the National Center for Health Statistics, adjusted to the 1970 US population age distribution.

Cancer Incidence Rates
United States, 1983-1987

Cancer Site	Incidence Rate per 100,000		Ratio
	Blacks	Whites	Blacks/Whites
All Sites	404.6	368.0	1.1
Males	532.2	427.2	1.2
Females	322.5	334.5	1.0
Esophagus	11.2	3.2	3.5
Multiple Myeloma	8.6	3.8	2.3
Cervix Uteri	15.8	7.8	2.0
Stomach	13.1	7.2	1.8
Nasopharynx	0.7	0.4	1.8
Liver & Intrahep.	3.8	2.1	1.8
Pancreas	14.6	9.2	1.6
Prostate	132.0	88.0	1.5
Larynx	7.0	4.6	1.5
Lung & Bronchus	77.9	55.9	1.4
Males	129.6	82.5	1.6
Females	39.2	36.3	1.1
Oral Cavity	14.7	11.1	1.3
Kidney & Renal Pelvis	8.1	8.1	1.0
Colon/Rectum	51.7	51.0	1.0
Colon	39.6	36.2	1.1
Rectum	12.1	14.8	0.8
Breast (Females)	89.7	105.0	0.9
<50 years	33.5	32.1	1.0
50+ years	262.8	329.7	0.8
Leukemia	8.9	10.1	0.9
Ovary	10.0	14.3	0.7
Corpus & Uterus NOS	14.5	23.3	0.6
Urinary Bladder	10.0	17.8	0.6
Non-Hodgkin's	8.4	13.1	0.6
Brain & CNS	3.7	6.4	0.6
Hodgkin's Disease	1.8	3.1	0.6
Thyroid	2.5	4.2	0.6
Testis	0.8	4.7	0.2
Melanoma of Skin	0.7	10.6	0.1
All Except Lung	326.7	312.1	1.0
Males	402.6	344.7	1.2
Females	283.3	298.2	1.0

NOTE: The annual number of new cancer cases per 100,000 persons derived from NCI's SEER Program, adjusted to the 1970 US population age distribution.

The Prevalence of Cancer: Estimated Number of Persons Diagnosed with Cancer United States, 1990

	1990 Estimated Prevalence		
	Total	**Male**	**Female**
All Sites	6,848,000	2,636,000	4,212,000
Oral & Pharynx	203,000	127,000	76,000
Stomach	69,000	39,000	30,000
Colon/Rectal	1,197,000	553,000	644,000
Colon	845,000	375,000	470,000
Rectum	352,000	178,000	174,000
Pancreas	22,000	10,000	12,000
Larynx	133,000	106,000	27,000
Lung & Bronchus	346,000	200,000	146,000
Melanoma of Skin	346,000	164,000	182,000
Breast	1,646,000	—	1,646,000
Cervix Uteri	193,000	—	193,000
Corpus & Uterus	491,000	—	491,000
Ovary	164,000	—	164,000
Prostate Gland	522,000	522,000	—
Testis	98,000	98,000	—
Urinary Bladder	516,000	368,000	148,000
Kidney & Renal Pelvis	149,000	91,000	58,000
Brain & Nervous System	70,000	36,000	34,000
Thyroid	169,000	41,000	128,000
Hodgkin's Disease	126,000	68,000	58,000
Non-Hodgkin's Lymphomas	228,000	113,000	115,000
Leukemia	98,000	51,000	47,000

NOTE: Based on estimates of number of persons diagnosed with cancer prepared by the Connecticut Cancer Registry and population estimates from the National Cancer Institute; projections based on linear extrapolation.

1990 Budget Data

(Dollars in Thousands)

A. Actual Obligations Resulting From Appropriated Funds:

FY 1990 Appropriation	$1,634,332
Transfer from NIH	10,130*
	1,644,462
Less:	
Lapse	(132)
ACTUAL NCI OBLIGATIONS	**1,644,330**

B. Reimbursable Obligations:

Major Components—

• Acquired Immune Deficiency Syndrome (AIDS): Office of the Director, NIH	1,565
• Reimbursement of Supercomputer Costs from the Office of the Director, NIH	33,490
• Other Reimbursements	1,680
Reimbursements	36,735

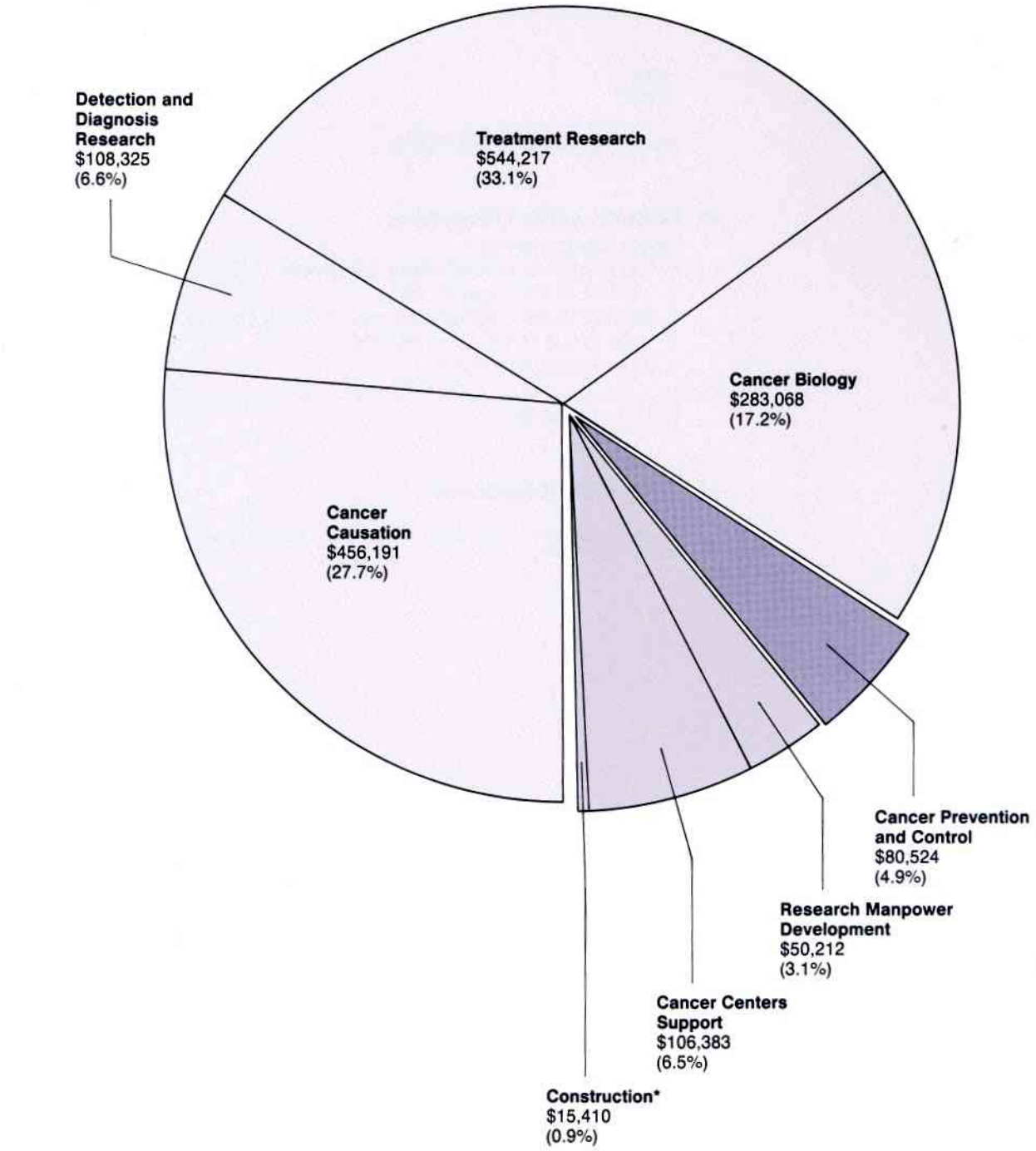
C. Total NCI Obligations: $1,681,065

**Amount transferred by NIH from other NIH Institutes to partially fund several grants responding to an NIH Construction RFA.*

Program Structure
Fiscal Year 1990

(Dollars in Thousands)

TOTAL DOLLARS
$1,644,330



RESEARCH $1,391,801 (84.6%)

RESOURCE DEVELOPMENT $172,005 (10.5%)

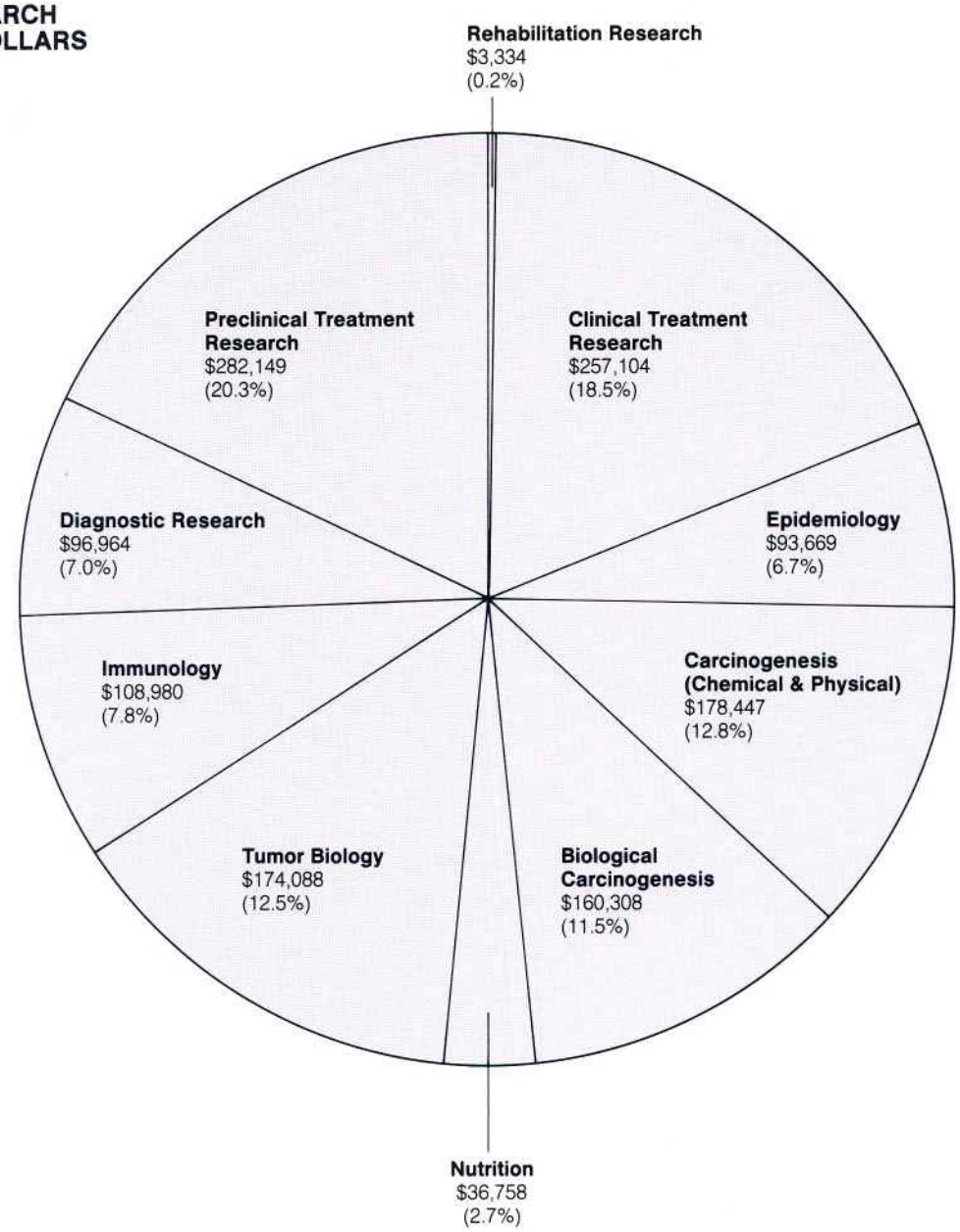
CANCER PREVENTION AND CONTROL $80,524 (4.9%)

**Includes $10,130 which was transferred to NCI from other NIH Institutes to partially fund several grants responding to an NIH Construction RFA.*

NCI Research Programs
Fiscal Year 1990

(Dollars in Thousands)

TOTAL RESEARCH PROGRAM DOLLARS
$1,391,801



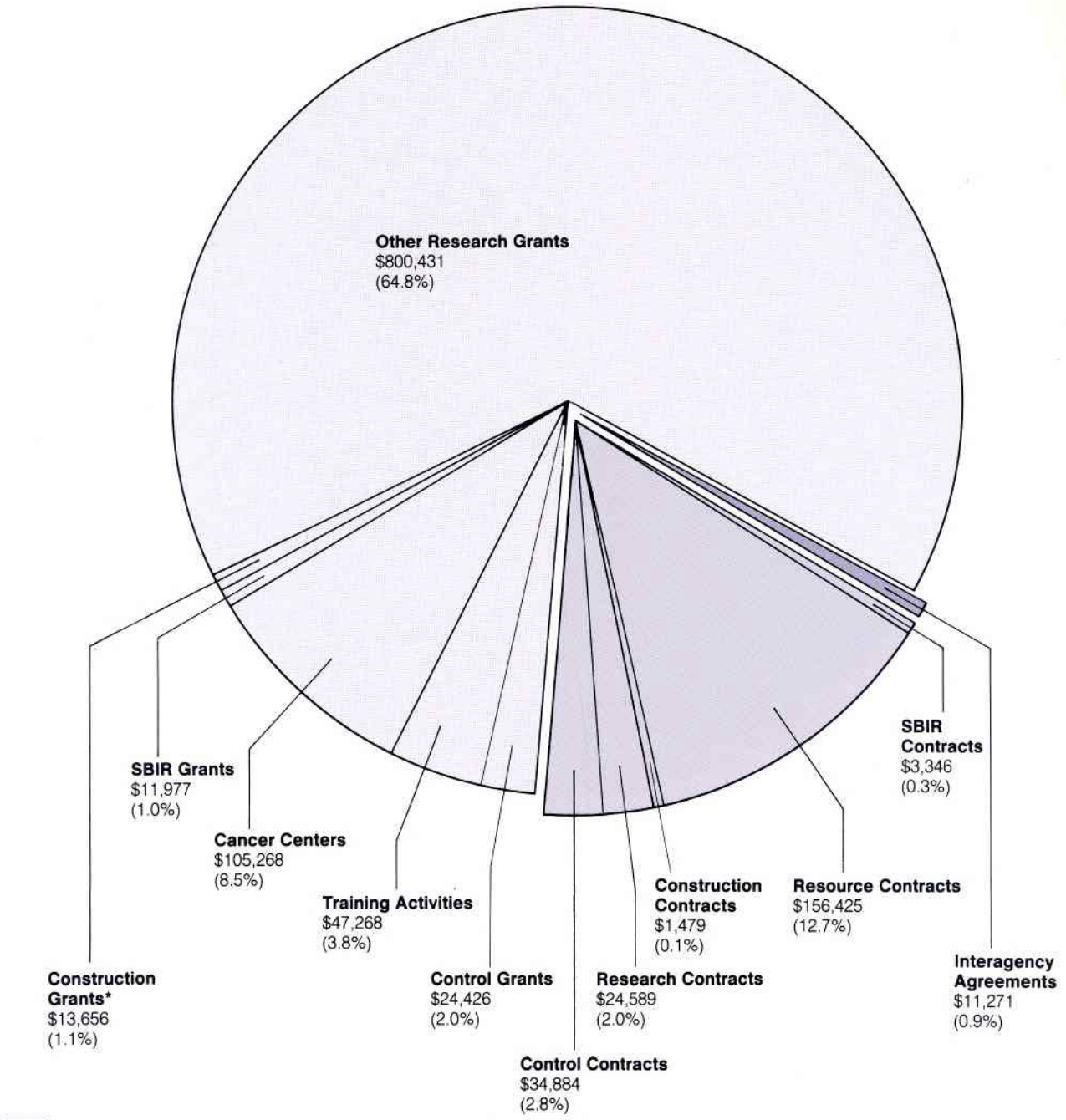
		Percent of Total
Research Programs	$1,391,801	84.6%
Resource Development		
Cancer Centers Support	106,383	6.5
Research Manpower Development	50,212	3.1
Construction*	15,410	0.9
Cancer Prevention and Control	80,524	4.9
Total NCI	$1,644,330	100.0%

**Includes $10,130 which was transferred to NCI from other NIH Institutes to partially fund several grants responding to an NIH Construction RFA.*

Extramural Funds
Fiscal Year 1990

(Dollars in Thousands)

TOTAL EXTRAMURAL
$1,235,020



GRANTS $1,003,026 (81.2%)

CONTRACTS $220,723 (17.9%)

INTERAGENCY AGREEMENTS $11,271 (0.9%)

TOTAL INTRAMURAL/RMS	$409,310
TOTAL NCI	$1,644,330

**Includes $10,130 which was transferred to NCI from other NIH Institutes to partially fund several grants responding to an NIH Construction RFA.*

Total Dollars by Mechanism Fiscal Year 1990

(Dollars in Thousands)

Amount	Mechanism	Percent of Total
Research Project Grants		
$371,225	Traditional	22.6%
185,130	Program Projects	11.3
25,547	FIRST Awards	1.6
39,264	MERIT Awards	2.4
11,977	SBIR Grants	0.7
57,857	Outstanding Investigator Grants	3.5
17,335	RFAs	1.1
31,145	Coop Agreements	1.9
739,480	Total	45.0
Cancer Centers Grants		
105,268	Center Core Grants	6.4
Other Research Grants		
3,162	Instrumentation Grants	0.2
1,356	Exploratory/ Developmental Grants	0.1
382	Conference Grants	—
60,208	Clinical Coop Group	3.7
1,340	Small Grants	0.1
2,676	Comp. Min. Bio. Supp. Prog.	0.2
3,804	Scientific Evaluation	0.2
2,955	Cancer Education Program	0.2
	Research Career Programs:	
2,414	RCDA	0.2
66	RCA	—
2,042	Phys. Invest. Awds.	0.1
955	Preventive Oncology	0.1
3,043	Clin. Invest. Awds.	0.2
8,520	Subtotal Careers	0.5
84,403	Total	5.1
Total		
929,151	Research Grants	56.5%

Amount	Mechanism	Percent of Total
Training Program		
31,390	NRSA Institutional	1.9%
4,403	NRSA Individual	0.2
35,793	Total	2.2
Research and Development Contracts		
181,014	Research and Resource Contracts	11.0
7,574	Interagency Agreements	0.5
3,346	SBIR Contracts	0.2
191,934	Total	11.7
Cancer Prevention and Control		
	Grants:	
472	Rehabilitation	—
23,954	Cancer Control	1.5
24,426	Subtotal Grants	1.5
38,581	Contracts	2.4
12,426	Inhouse	0.8
75,433	Total	4.6
Inhouse		
316,464	Intramural Research	19.3
80,420	Research Management and Support	4.9
396,884	Total	24.1
Construction		
13,656	Grants*	0.8
1,479	Contracts	0.1
15,135	Total	0.9
Total		
$1,644,330	NCI	100.0%

**Includes $10,130 which was transferred to NCI from other NIH Institutes to partially fund several grants responding to an NIH Construction RFA.*

Division Obligations by Mechanism Fiscal Year 1990

(Dollars in Thousands)

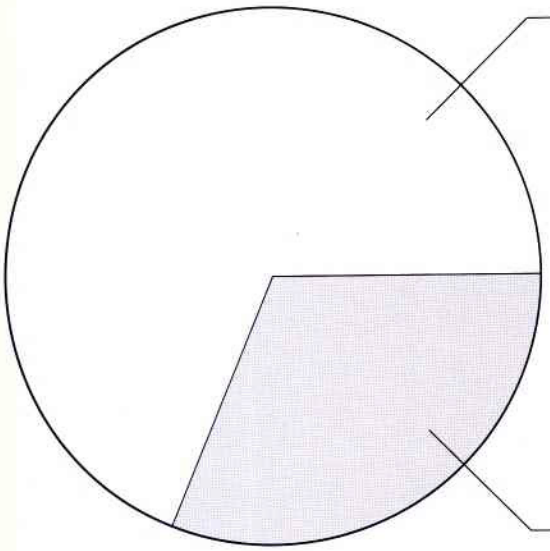
	DCBDC	DCT	DCE	AIDS Task Force	DCPC	DEA	FCRDC	OD	Program Support	TOTAL NCI
Research Grants:										
Research Project Grants	$217,102	$233,911	$218,433		$56,911	$1,146				$727,503
SBIR Grants	2,565	8,068	1,178		166					11,977
Subtotal, Research Project Grants	219,667	241,979	219,611		57,077	1,146				739,480
Cancer Centers Grants	104,478					790				105,268
Other Research Grants:										
Clinical Cooperative Groups		60,208								60,208
Cancer Education Program	2,955									2,955
Career Program	8,520									8,520
Instrumentation Grants	3,162									3,162
Exploratory/Developmental		1,356								1,356
Conference Grants	127	116	65		43	31				382
Small Grants		919	371		50					1,340
Minority Biomedical Support						2,676				2,676
Scientific Evaluation						3,804				3,804
Subtotal, Other Research Grants	14,764	62,599	436		93	6,511				84,403
Subtotal, Research Grants	338,909	304,578	220,047		57,170	8,447				929,151
NRSA Fellowships	35,425					368				35,793
Research and Development Contracts:										
R&D Contracts	5,195	68,857	36,019	$962	13,079	977	$54,616	$8,883		188,588
SBIR Contracts		1,044	1,341		961					3,346
Subtotal, Contracts	5,195	69,901	37,360	962	14,040	977	54,616	8,883		191,934
Cancer Prevention and Control:										
Grants										
Rehabilitation Grants					472					472
Cancer Control					23,948	6				23,954
Subtotal, Grants					24,420	6				24,426
Control Contracts					38,581					38,581
Inhouse					12,426					12,426
Total, Prevention & Control					75,427	6				75,433
Inhouse[1]	55,074	86,724	64,978	1,510	3,028	6,138	1,347	39,532		258,331
NIH Management Fund									$115,449	115,449
Construction*	13,656								1,479	15,135
All Other[2]									23,104	23,104
Division Totals	$448,259	$461,203	$322,385	$2,472	$149,665	$15,936	$55,963	$48,415	$140,032	$1,644,330

[1]Includes Research Management and Support and Intramural Research.
[2]Includes central assessments for General Expense, Program Evaluation and NCI General Account (covers costs associated with trans-NCI activities like telephones.)
*Includes $10,130 which was transferred to NCI from other NIH Institutes to partially fund several grants responding to an NIH Construction RFA.

Reimbursement to NIH Management Fund Fiscal Year 1990

(Dollars in Thousands)

TOTAL NIH SERVICES
$353,507



DISTRIBUTION OF NCI SERVICES $115,449

Standard Level User Charges (SLUC)
$3,202 (2.8%)
Building rental including utilities
Guard services for rental buildings

Other Research Services $22,954 (19.8%)
Procurement Services
Safety Services
Engineering Services
Biomedical Engineering Services
Veterinary Resources Services
Library Services

Division of Research Grants $5,067 (4.4%)
Initial Scientific Review of Applications
Assignment of Research Grant Applications Among Institutes

Clinical Center $76,042 (65.9%)
Admissions and Follow-up
Anesthesiology
Diagnostic X-Ray
Nuclear Medicine
Clinical Pathology
Blood Bank
Rehabilitation Medicine
Pharmacy
Medical Records
Nursing Services
Patient Nutrition Service
Housekeeping Services
Laundry
Social Work

Division of Computer Research and Technology $8,184 (7.1%)
Research & development program in which concepts & methods of computer science are applied to biomedical problems
(In addition, services are rendered to the NIH community on a fee-for-service basis.)

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

Program, Project and Activity Fiscal Year 1990

(Dollars in Thousands)

Program, Project and Activity (PPA)	
AIDS (less Pediatric AIDS)	$142,413
Information Dissemination	92,380
Research Training—NRSA	35,793
STOP Cancer Campaign	12,278
Pediatric AIDS Initiative	9,091
Proton Beam Therapy	1,479
Rural Area Research	491

The term "program, project, and activity" refers to budget items and specific dollar levels that an Agency is required to meet. These items are identified in the House and Senate Committee reports, and the conference report.

CRADAs

As a result of the Federal Technology Transfer Act of 1986, government laboratories are now authorized to enter into Cooperative Research and Development Agreements (CRADAs) with private sector entities. Licensing agreements are usually incorporated into the CRADA document, which addresses patent rights attributable to research supported under the CRADA.

Royalty Income

NCI can now retain royalty income generated by the patents related to NCI-funded research. A major portion of this royalty income is used to reward employees of the laboratory, to further scientific exchange and for education and training in accordance with the terms of the Act. A portion of the receipts is used to support the National Technical Information Service (NTIS), Department of Commerce, who handles the processing and collection phases. Support is also provided to NIH to cover their associated expenses.

History of Funding
(dollars in thousands)

	Years Available	Obligated Funds Received*	Inventor Payments	Other Uses
Royalty Income:	1988/1989	$ 982	$427	$555
	1989/1990	813	575	238
	1990/1991	1,442	871	571

*Does not include assessments by NIH and NTIS.

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 the study of AIDS. Key discoveries by NCI investigators include:

- Development, testing and successful clinical trials of the drug azidothymidine (AZT), confirming its effectiveness as an anti-retroviral agent against AIDS.
- Identification of many new compounds which are active against the AIDS virus in tissue culture experiments. These compounds include both synthetic drugs and natural products. Several of these are in the initial phases of development. Two additional drugs, dideoxcytidine (ddC) and dideoxyadenosine (ddA), are currently in early clinical trials and show promise as anti-retroviral agents.
- Demonstration in clinical trials that dideoxyinosine (ddI) has activity against HIV infection. ddI has been approved by the FDA for Treatment IND use in AIDS patients who are intolerant to or failing treatment with AZT.
- Demonstration that AZT is very effective in children with AIDS and/or AIDS-related complex (ARC). All children tested who had neurological symptoms due to the AIDS virus showed dramatic improvement. In addition, ddI has been shown to be beneficial for children with AIDS. Importantly, the effects of ddI on reducing the p24 antigen or improving altered neurocognitive function have been shown to correlate significantly with the plasma concentration of ddI over time. This has important ramifications for optimizing the dose and schedule of ddI.
- There is evidence that HIV from patients on long-term AZT therapy which has become resistant to AZT preserves its sensitivity to ddI and ddC. Preliminary results of combination therapy with AZT, acyclovir, ddI and ddC in patients with AIDS or severe ARC suggest that patients feel better, have increases in their T4 cells, and have decreases in HIV p24 antigen on the regimen.
- The recent isolation and purification of the reverse transcriptase enzyme from HIV. This viral enzyme 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. The discovery, therefore, has important implications for anti-retroviral drug development.
- NCI investigators have shown that an enzyme known as topoisomerase I (topo I) is present in HIV and that a chemical known as camptothecin inhibits this enzyme, at least *in vitro*. Topo I is an important enzyme because it is thought to play a role in the virus' life cycle. Camptothecin is a cytotoxic natural product obtained from plants and which has potent antitumor activity against a wide range of experimental tumors and human colon cancer.
- 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.
- People at high risk for AIDS are commonly infected with a recently discovered DNA virus known as human herpesvirus-6 (HHV-6), suggesting that this agent may play a role in the progression of HIV-1 infection. NCI researchers have demonstrated that when the target cell for HIV-1, the CD4+ T-lymphocyte, is coinfected by both HHV-6 and HIV, both viruses are expressed, but the HIV virus expression is dramatically elevated. Moreover, coinfection markedly increases HIV-medicated cytopathic effects. Recent results indicate that this effect takes place because HHV-6 gene products have the ability to "turn on" some of the regulatory genes which enhance the proliferation of HIV.

- 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 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.
- In monocytes infected with HIV-1 and HIV-2, viral expression can be regulated in several ways. Differences in viral expression were seen among infected cultures: 1) latency (provirus with no viral expression); 2) restricted expression (intracytoplasmic viral antigens, RNA and virions but little or no detectable virus released); and 3) continuous production. Both restricted and latent HIV expression exist in monocytes and probably occur by different mechanisms. Monocytes with restricted expression provide a reservoir for viral transmission to uninfected T cells that itself is not detected by immune surveillance mechanisms.
- Demonstration that prevention of a common, spontaneous retrovirus-induced immunosuppressive disease in rhesus monkeys (Simian Acquired Immunodeficiency Syndrome or SAIDS) is now possible through vaccination.
- The finding that the anticancer drug Trimetrexate 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.
- More precise identification, by means of a multi-center study of male hemophiliacs, of 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 the infection rate of female spouses. This represents a major risk factor in the sexual transmission of HIV.
- Determination of the first crystal structure of retroviral protease and its successful use to predict the structure of the HIV protease and substrate using supercomputer methodology.
- Identification of portions of the AIDS virus envelope that are recognized by cytotoxic and helper T-cells and which elicit immune responses in healthy and symptomatic HIV-infected individuals.
- Studies of the immune responses of HIV-positive mothers and their children recently established a correlation between maternal antibodies to the HIV envelope protein gp120 and reduced risk of HIV transmission to her offspring. Determination of the precise antigenic determinant (epitope) on the gp120 molecule which confers this protective effect is of extremely high priority to the development of methods to prevent perinatal transmission to the babies of HIV-infected women.
- The CD4 AIDS virus receptor on the surface of human T-cells has been found to be physically associated with a proto-oncogene known as ^{p56} lck; the protein product of which is a tyrosine-specific kinase. The efficacy of daily intramuscular injections of recombinant CD4 in preventing progression of simian AIDS in rhesus monkeys has been demonstrated. This protein may be useful as a therapeutic agent for the treatment of human AIDS.
- Kaposi's sarcoma (KS) has gained importance because of the high incidence (20 to 30 percent) in patients with HIV infection and AIDS. Recently NCI researchers demonstrated that KS cells can be maintained in tissue culture if they are grown in conditioned media from HTLV-1 or HTLV-2 transformed or activated CD+4 T-cells. AIDS-KS cells release into the medium a number of cytokines which induce the AIDS-KS derived cells to proliferate. The factors have been shown to be biologically active growth-promoting proteins (cytokines) released by the T cells and not products of the virus itself.

- Development of noninfectious mutants of HIV which hold promise both as potential vaccine strains and as nonhazardous surrogates for infectious HIV in research laboratories.
- NCI epidemiologists have detected an apparent decrease in the expected incidence of AIDS in the U.S. This decrease was rather an abrupt one and began in 1987. The most plausible explanation for this finding is the impact of therapy on preventing seriously immune compromised persons from progressing to AIDS, although a marked reduction in HIV incidence between 1983 and 1985 may also be contributing to this phenomenon. It is noteworthy that these effects were most prominent in persons with best access to care, but were not seen in groups such as drug abusers who have limited access to therapy.
- Recent investigations on the development of tumors in patients with AIDS or AIDS-related complex (ARC) on long-term HIV therapy showed that eight out of 55 patients on long-term AZT containing regimens developed non-Hodgkin's lymphomas. When the development of the lymphomas was plotted by the methods of Kaplan and Meier, the chance of developing a non-Hodgkin's lymphoma was 46 percent in patients with AIDS or severe ARC who were maintained on AZT-based therapy for three years.

Acquired Immunodeficiency Syndrome (AIDS) Funding by Functional Category Fiscal Year 1990

(Dollars in Thousands)

I. Basic Science Research	
A. Biomedical Research	
1. HIV and HIV genome	$ 28,579
2. Immunology	7,916
3. Blood/Blood products	163
5. Animal models & related studies	5,203
Subtotal, Biomedical Research	41,861
D. Therapeutic Agents	
1. Development	40,455
2. Clinical Trials	32,738
Subtotal, Therapeutic Agents	73,193
E. Vaccines	
1. Development	18,990
2. Clinical Trials	0
Subtotal, Vaccines	18,990
TOTAL, BASIC SCIENCE RESEARCH	134,044
II. Risk Assessment and Prevention	
A. Surveillance	
1. Diseases associated with HIV	2,771
2. HIV surveys (incidence, prevalence)	0
3. Knowledge, attitudes, behaviors	0
Subtotal, Surveillance	2,771
B. Population-Based Research	
1. Transmission	
a. Sexual	1,372
b. Intravenous drug abusers	0
c. Hemophiliac populations	809
d. Blood recipient/donor studies	0
e. Perinatal infection	1,674
f. Occupationally related	0
g. Other/Miscellaneous	3,606
Subtotal, Transmission	7,461
2. Natural history and cofactors	6,028
Subtotal, Population-Based Research	13,489
TOTAL, RISK ASSESSMENT AND PREVENTION	16,260
Total, NCI	**$150,304**

Note: The functional codes of AIDS activities were developed by PHS at the request of Dr. Mason, Deputy Secretary of HHS. These functional categories are intended to identify AIDS research in terms of "deliverables."

Acquired Immunodeficiency Syndrome (AIDS) Funding by Activity Fiscal Year 1990

(Dollars in Thousands)

By Mechanism:	Amount
Research Project Grants	$ 14,384
Cancer Center Grants	3,708
Conference Grants	22
R&D Contracts	59,004
Intramural Research	68,289
Research Management and Support	4,897
Total, NCI	$150,304

By Research Program:	Amount
Causation Research	$ 68,864
Detection and Diagnosis Research	272
Treatment Research	70,081
Cancer Biology	7,379
Total Research	146,596
Resource Development	
Cancer Center Grants	3,708
Total, NCI	$150,304

By Division:	Amount
Division of Cancer Biology, Diagnosis and Centers	$ 11,087
Division of Cancer Treatment	51,371
Division of Cancer Etiology	45,948
Frederick Cancer Research and Development Center	19,807
AIDS Vaccine Task Force	2,472
Division of Extramural Activities	1,097
Office of the Director	3,410
NIH Management Fund*	15,112
Total, NCI	$150,304

*Supports common services shared by NIH Institutes; in this case is used principally for support costs associated with NCI's activities at the NIH Clinical Center.

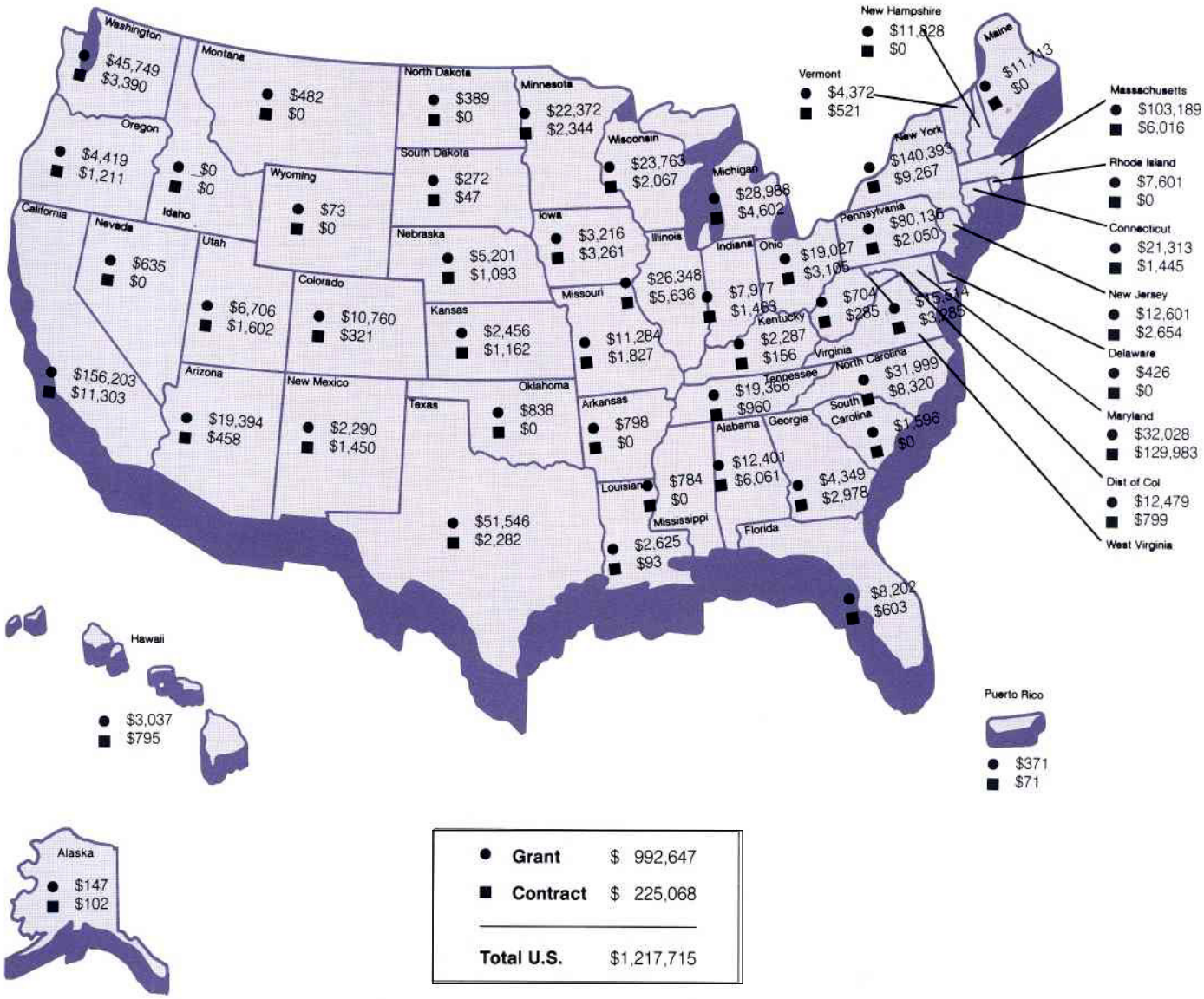
Acquired Immunodeficiency Syndrome (AIDS) Funding History Fiscal Years 1982-1990

(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%
1989	122,247	627,076	19%
1990	150,304	740,509	20%

Grant and Contract Awards by State Fiscal Year 1990

(Dollars in Thousands)



Note: Grant figures exclude foreign grants of $6,553 and Scientific Evaluation of $3,804; contract figures exclude foreign contracts of $5,991; all figures include grant and contract funding for Cancer Prevention and Control activities.

Institutions Receiving More than $5,000,000 in NCI Support Fiscal Year 1990

(Dollars in Thousands)

State	Institution	Grants	Contracts	Construction	Total NCI
Alabama	University of Alabama System	$8,534	$986	$0	$9,520
	Southern Research Institute	2,839	5,075	0	7,914
Arizona	University of Arizona	16,930	0	0	16,930
California	University of California	67,145	1,482	0	68,627
	Stanford University	20,453	281	0	20,734
	University of Southern California	17,227	536	1,188	18,951
	Scripps Clinic and Research Foundation	8,393	0	0	8,393
	Kaiser Foundation Hospitals	4,282	2,228	0	6,510
	Salk Institute for Biological Studies	5,967	0	0	5,967
	La Jolla Cancer Research Foundation	5,589	0	0	5,589
Colorado	University of Colorado System	5,732	0	0	5,732
Connecticut	Yale University	19,664	65	0	19,729
DC	U.S. Department of Army	64	5,835	0	5,899
	Georgetown University	5,189	162	0	5,351
Illinois	University of Chicago	11,387	216	0	11,603
	University of Illinois	6,097	2,496	0	8,593
Indiana	Purdue University	3,214	335	1,538	5,087
Iowa	University of Iowa	2,538	3,261	0	5,799
Maine	Jackson Laboratory	1,945	0	9,500	11,445
Maryland	Program Resources, Inc.	0	54,187	0	54,187
	Johns Hopkins University	25,541	698	0	26,239
	Bionetics Research, Inc.	0	17,286	0	17,286
	Westat, Inc.	0	11,574	0	11,574
Massachusetts	Dana-Farber Cancer Institute	24,272	252	0	24,524
	Harvard University	16,631	0	0	16,631
	Massachusetts General Hospital	10,899	0	0	10,899
	Massachusetts Institute of Technology	10,177	0	0	10,177
	Brigham and Women's Hospital	8,337	0	0	8,337
	University of Massachusetts	4,542	813	0	5,355
Michigan	University of Michigan	13,785	0	1,045	14,830
	Wayne State University	6,920	0	0	6,920
	Michigan Cancer Foundation	2,896	2,578	0	5,474
Minnesota	University of Minnesota	11,765	0	0	11,765
	Mayo Foundation	9,012	430	0	9,442
Missouri	Washington University	6,248	0	0	6,248
Nebraska	University of Nebraska System	4,836	1,093	0	5,929
New Hampshire	Dartmouth College	11,419	0	0	11,419
New York	Memorial Sloan-Kettering Cancer Center	31,097	2,132	0	33,229
	Columbia University	15,731	0	0	15,731
	New York State Department of Health	13,853	1,147	0	15,000
	New York University	11,692	201	0	11,893
	American Health Foundation	9,258	1,575	0	10,833
	Yeshiva University	10,345	0	0	10,345
	University of Rochester	10,270	0	0	10,270
	Cold Spring Harbor Laboratory	8,584	0	0	8,584
	State University of New York	7,561	275	0	7,836
North Carolina	Duke University	15,578	177	0	15,755
	University of North Carolina System	12,622	1,057	0	13,679
	Research Triangle Institute	174	4,965	0	5,139
Ohio	Ohio State University	5,337	287	0	5,624
	Case Western Reserve University	5,514	0	0	5,514
Pennsylvania	Fox Chase Cancer Center	19,056	427	0	19,483
	University of Pittsburgh	14,006	723	0	14,729
	University of Pennsylvania	13,344	529	0	13,873
	Wistar Institute of Anatomy and Biology	10,926	0	0	10,926
	Temple University	6,024	0	0	6,024
	Pennsylvania State University	6,002	0	0	6,002
Tennessee	St. Jude Children's Research Hospital	8,030	0	0	8,030
	Vanderbilt University	7,601	0	0	7,601
Texas	University of Texas System	39,554	1,073	0	40,627
	Baylor College of Medicine	5,184	0	0	5,184
Utah	Utah State Higher Education System	6,306	1,379	0	7,685
Virginia	American College of Radiology	5,727	855	0	6,582
Washington	Fred Hutchinson Cancer Research Center	30,708	2,590	0	33,298
	University of Washington	10,623	800	0	11,423
Wisconsin	University of Wisconsin System	20,363	1,395	385	22,143
	Total	$741,539	$133,456	$13,656	$888,651
	Percent of Total Awarded Above	83.4%	15.0%	1.5%	100.0%
	Total NCI Fiscal Year 1990 Obligations				$1,644,330
	Percent of Total NCI Obligations	45.1%	8.1%	0.8%	54.0%

Cancer Centers Funding History

(Dollars in Thousands)

Fiscal Year	Center Support	Percent Increase
1984	$ 79,273	—
1985	84,957	7.2%
1986	88,426	4.0
1987	95,819	8.3
1988	100,427	4.8
1989	101,127	0.7
1990	105,268	4.1

Cancer centers supported by the NCI multidisciplinary research programs at academic and other organizations are one of the key elements of the research infrastructure for cancer research. As a group, they are engaged in all aspects of cancer research, including basic, clinical and cancer control research, also serving as a stable resource for training new cancer investigators.

The cancer centers concept was initiated nearly 20 years ago in order to promote interactions between basic scientists, clinical scientists, and physicians that would stimulate more rapid translation of laboratory findings into medical practice. As major advances in research provided an increased understanding of the causes and etiology of different forms of cancer, cancer centers became engaged in a broader range of research activities as well as in community outreach activities in the areas of education and prevention.

The types of NCI-designated centers include laboratory centers engaged in basic research, clinical centers emphasizing both basic research and clinical research, and comprehensive centers engaged in all aspects of cancer research, including cancer prevention and control. A fourth type of center, the consortium cancer center, stimulates and facilitates multi-institutional collaboration and interacts with regional public health agencies and other organizations that have the ability to conduct programs of cancer prevention and control. Of the 56 cancer center support grants (CCSG) awarded in FY 1990, 15 were to basic laboratory centers, two were to consortium centers, and the remaining 39 were to clinical centers. Among the 39 clinical centers, 23 have comprehensive status, and one of the consortium centers also has comprehensive status, for a total of 24.

The Cancer Centers Program provides a small but critical portion of the total research support to NCI-designated cancer centers through the CCSG. This grant specifically promotes research by stimulating interactions and collaborations between basic and clinical scientists who already have received peer-reviewed research support to take advantage of research opportunities, promotes cost-effectiveness of research resources, provides access to the newest technologies, and together with other support mechanisms such as the NCI Cancer Information Service contracts, enhances the interactions of the center with its local and regional communities. The CCSGs achieve their objectives by stabilizing the leadership of the center, which will be responsible for facilitating, catalyzing, and promoting an interactive, collaborative research environment and by requiring the commitment of the institution to the cancer center concept.

Fiscal year 1990 marked the beginning of an intensive revitalization of the Cancer Centers Program to serve its Institute-wide mission. In response to a major recommendation of the 1989 Institute of Medicine Report on cancer centers, the National Cancer Institute (NCI) initiated the development of a comprehensive, strategic five-year plan for the Cancer Centers Program. Prepared under the auspices of the Cancer Centers Subcommittee of the National Cancer Advisory Board, the document was drafted by a working committee which included representatives from the NCI cancer centers community as well as NCI staff. This strategic plan, which received final approval in the Spring of 1990, will serve as a guideline for the next five years of continued development and enhancement of the Cancer Centers Program.

In October of 1989, a new program was created within the Division of Cancer Biology and Diagnosis called the Centers, Training, and Resources Program (CTRP) headed by an Associate Director within the Division. The Cancer Centers Branch was moved into this program along with the Cancer Training Branch, Organ Systems Branch and Cancer Construction Branch, and the Division title was changed to the Division of Cancer Biology, Diagnosis and Centers (DCBDC). The Division Board of Scientific Counselors was also changed to increase the number of representatives from the cancer centers community.

One of the major initiatives under the reorganization was a workshop convened in conjunction with the Association of American Cancer Institutes (AACI) sponsored by the Mayo Foundation Comprehensive Cancer Center in Rochester, Minnesota, June 20-21, 1990. The purpose of this workshop was to: introduce the NCI-designated cancer centers to the Division of Cancer Biology, Diagnosis and Centers and to the new staff of the Cancer Centers Program; to discuss and modify a draft of the "Strategic Plan for Cancer Centers Program;" to address and discuss some of the issues related to the designation of comprehensiveness; to address some of the key issues and problems facing the Cancer Centers Program; and to review and discuss a number of issues related to possible changes in the CCSG Guidelines. A number of suggestions developed at the workshop will be implemented during the next fiscal year.

Since 1978, the NCI has recognized a special class of NCI-designated cancer centers which provided a comprehensive set of cancer research and community services: the NCI designated comprehensive cancer centers. On January 1, 1990, the Institute issued new guidelines that redefined the concept of an NCI-designated comprehensive cancer center and described the application processes that centers may use to attain and renew this designation. In order to receive this designation, a clinical cancer center with an active CCSG award must provide evidence that they meet eight key criteria for comprehensiveness (see below). Since the revised guidelines were issued, eight cancer centers which had previously been designated as comprehensive under the old guidelines and five centers which had never been so designated, received approval of their applications for comprehensive status. These approvals increased the number of comprehensive cancer centers from 19 to 24. More centers are expected to apply for redesignation under the new guidelines. No NCI funding is associated with an application for, or approval of, comprehensive status for a cancer center. Comprehensive status is reevaluated on a periodic basis.

Criteria for Comprehensiveness

Together with scientific excellence and leadership, the essential characteristics of a comprehensive cancer center include:

1) **Basic Laboratory Research:** A critical mass of integrated personnel, facilities and peer-reviewed support for interdisciplinary basic research is essential in a comprehensive cancer center.

2) **Basic/Clinical Research Linkage:** A comprehensive cancer center should facilitate the transfer of exciting laboratory discoveries to innovative clinical applications, including clinical treatment and prevention.

3) **Clinical Research:** A significant clinical research program utilizing patient resources of the institution and its region is essential to a comprehensive center.

4) **High-Priority Clinical Trial Research:** Comprehensive centers should participate significantly in clinical trials that have been accorded high-priority status by the NCI, *unless* the center is participating in trials testing competing hypotheses for the same disease site.

5) **Cancer Prevention and Control Research:** Comprehensive cancer centers are expected to have peer-reviewed research in cancer prevention and control and to have planned or ongoing involvement in cancer control on a regional and national basis.

6) **Education, Training and Provision of Updates on Current Technology:** It is essential that a comprehensive center be a focal point for clinical and research training, including state-of-the-art research and technology, for health care professionals locally and within the region.

7) **Information Services:** A comprehensive cancer center should have an established patient education program and the ability to provide patients and their families with up-to-date information on local as well as national resources that may be needed. In addition, the center should participate in its region's Cancer Information Service.

8) **Community Service and Outreach:** A comprehensive cancer center should define the community it serves, take steps to identify cancer issues and problems in this community, and carry out appropriate outreach programs addressing these concerns including cancer prevention and control activities.

Cancer Centers by State

State	Grantee Institution
Alabama	University of Alabama System
Arizona	University of Arizona
California	Beckman Research Institute/City of Hope
	California Institute of Technology
	Charles R. Drew University
	La Jolla Cancer Research Foundation
	Salk Institute for Biological Studies
	University of California at Los Angeles
	University of California at San Diego
	University of Southern California
Colorado	University of Colorado System
Connecticut	Yale University
District of Columbia	Georgetown University Medical Center
Florida	University of Miami Medical School
Illinois	Illinois Cancer Council
	University of Chicago
Indiana	Purdue University
Maine	Jackson Laboratory
Maryland	Johns Hopkins University
Massachusetts	Dana-Farber Cancer Institute
	Massachusetts Institute of Technology
	Worcester Foundation for Experimental Biology
Michigan	University of Michigan
	Wayne State University
Minnesota	Mayo Foundation
Nebraska	University of Nebraska System
New Hampshire	Dartmouth College
New York	Albert Einstein College of Medicine (Yeshiva University)
	American Health Foundation
	Cold Spring Harbor Laboratory
	Columbia University
	Memorial Sloan-Kettering Cancer Center
	New York University (2)
	State University of New York (Roswell Park)
	University of Rochester
North Carolina	Duke University
	University of North Carolina System
	Wake Forest University
Ohio	Ohio State University
	Case Western Reserve University
Pennsylvania	Fox Chase Cancer Center
	Temple University
	University of Pennsylvania
	University of Pittsburgh
	Wistar Institute of Anatomy and Biology
Rhode Island	Brown University (Roger Williams General Hospital)
Tennessee	St. Jude Children's Research Hospital
Texas	University of Texas System
Utah	University of Utah
Vermont	University of Vermont
Virginia	Medical College of Virginia (Virginia Commonwealth University)
	University of Virginia
Washington	Fred Hutchinson Cancer Research Center
Wisconsin	University of Wisconsin System (2)

(2) = Comprised of two centers.

NCI Foreign Research Grants and Contracts Fiscal Year 1990

(Dollars in Thousands)

Country	Number Grants	Grant $	Number Contracts	Contract $	Total Dollars Awarded	Percent of Total Dollars Awarded
Australia	6	$669	1	$510	$1,179	9.4%
Belgium	1	274	0	0	274	2.2
Canada	28	2,302	2	1,248	3,550	28.3
China	0	0	2	1,001	1,001	8.0
Denmark	1	413	2	128	541	4.3
Finland	0	0	1	1,149	1,149	9.2
France	6	1,013	0	0	1,013	8.1
Israel	7	650	1	51	701	5.6
Italy	1	318	0	0	318	2.5
Jamaica	0	0	1	589	589	4.7
Japan	1	37	0	0	37	0.3
New Zealand	0	0	1	452	452	3.6
Sweden	5	495	2	316	811	6.4
Switzerland	2	159	0	0	159	1.2
Trinidad	0	0	1	539	539	4.3
United Kingdom	3	223	0	0	223	1.8
Yugoslavia	0	0	1	8	8	0.1
Total Foreign	**61**	**6,553**	**15**	**5,991**	**12,544**	**100.0%**

Total Research Project Grants Fiscal Years 1984–1990

(Dollars in Thousands)

Fiscal Year	Type Awarded	Requested Number	Requested Amount	Recommended Number	Recommended Amount	Awarded Number	Awarded Amount	Percent Funded[1]
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**	
1989	Competing[2]							
	New	2,290	$474,978	2,090	$385,584	402	$73,081	19.2%
	Renewal	823	246,172	802	202,283	324	85,645	40.4
	Board Supplement	14	2,883	9	1,485	2	49	22.2
	Subtotal	3,127	$724,033	2,901	$589,352	728	$158,775	25.1%
	Noncompeting					2,374	564,234	
	Total					**3,102**	**$723,009**	
1990	Competing[2]							
	New	2,193	$527,256	2,078	$429,203	421	$82,656	20.3%
	Renewal	849	278,541	834	233,096	302	87,497[3]	36.2
	Board Supplement	15	2,837	13	1,867[4]	305	991	38.5
	Subtotal	3,057	$808,634	2,925	$664,166	728	$171,144	24.9%
	Noncompeting					2,288	568,336	
	Total					**3,016**	**$739,480**	

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 RFAs and R43/R44 Small Business Innovative Research awards.

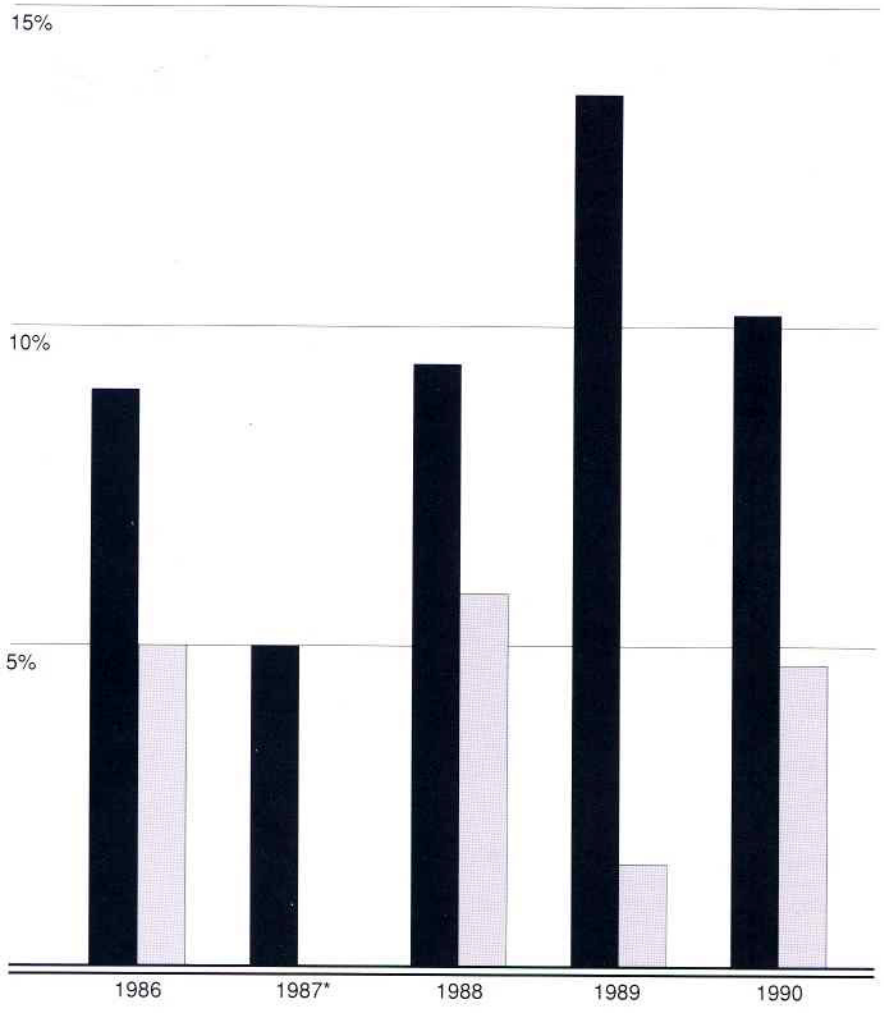
[1] *Percent Funded; Number Awarded ÷ Number Recommended*

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

[3] *Includes two Type 4 MERITs for $570.*

[4] *Includes seven Type 4 MERITs for $1,699.*

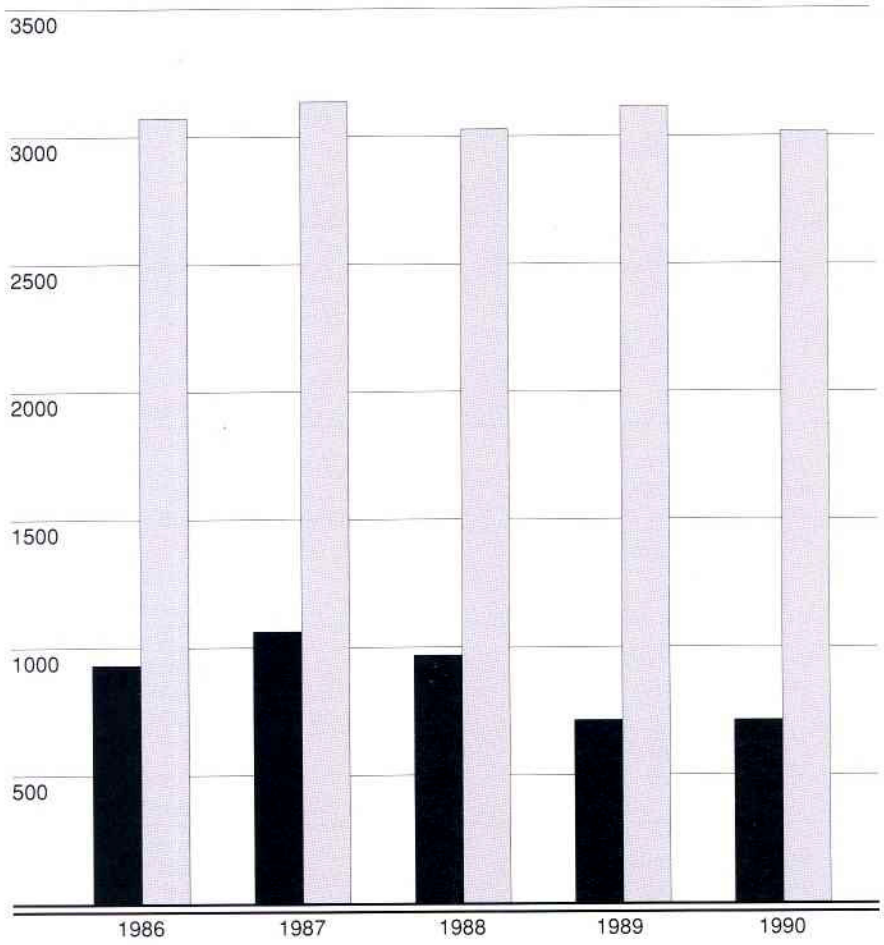
Research Project Grants
Historical Downward Negotiations
Fiscal Years 1986–1990



NOTE: Future year (non-competing) approved amounts have been reduced by the percentage reductions applied during the competing grant cycle. The percent reductions shown are taken against this adjusted base.

**FY 1987 non-competing awards were paid at the recommended level.*

Research Project Grants
Number of Awards
Fiscal Years 1986–1990



Research Project Grants Awarded History by Activity Fiscal Years 1987-1990

(Dollars in Thousands)

TYPE	1987 Number	1987 Amount	1988 Number	1988 Amount	1989 Number	1989 Amount	1990 Number	1990 Amount
R01	2,434	$381,956	2,322	$367,475	2,239	$377,164	2,068	$371,225
P01	155	161,009	159	170,119	165	188,015	162	185,130
R35	57	35,123	69	45,227	75	52,973	78	57,857
R37	62	15,011	105	24,114	132	32,353	153	39,264
U01	57	16,508	57	18,490	70	20,939	87	31,145
R29	85	8,042	171	15,713	232	21,244	280	25,547
R01-RFA	90	13,304	94	14,727	108	18,884	101	17,335
R43/R44	91	8,323	56	8,325	79	11,332	87	11,977
R23	72	3,877	24	1,213	2	105	0	0
TOTAL	**3,103**	**$643,153**	**3,057**	**$665,403**	**3,102**	**$723,009**	**3,016**	**$739,480**

R01 **Research Project (Traditional)**
To support a discrete, specified, circumscribed project to be performed by the names, investigator(s) in an area representing his specified interest and competencies.

P01 **Research Program Projects**
For the support of a broadly based, multidisciplinary, often long-term research program which has a specific major objective or a basic theme. A program project is directed toward a range of problems having a central research focus in contrast to the usually narrower thrust of the traditional research project.

R35 **Outstanding Investigator Grants**
To provide long-term support to an experienced investigator with an outstanding record of research productivity. This support is intended to encourage investigators to embark on long-term projects of unusual potential in a categorical program area.

R37 **Method to Extend Research in Time (MERIT) Award**
To provide long-term grant support to investigators whose research competence and productivity are distinctly superior and who are highly likely to continue to perform in an outstanding manner. Investigators may not apply for a MERIT award. Program staff and/or members of the cognizant National Advisory Council/Board will identify candidates for the MERIT award during the course of review of competing research grant applications prepared and submitted in accordance with regular PHS requirements.

U01 **Research Project (Cooperative Agreement)**
To support a discrete, specified, circumscribed project to be performed by the named investigator(s) in an area representing his specific interest and competencies.

R29 **First Independent Research Support and Transition (FIRST) Award**
To provide a sufficient intitial period of research support for newly independent biomedical investigators to develop their research capabilities and demonstrate the merit of their research ideas.

RFA **Request for Applications**
A formal statement which invites grant or cooperative agreement applications in a well-defined scientific area to accomplish specific program purposes and indicates the amount of funds set aside for the competition and/or the estimated number of awards to be made.

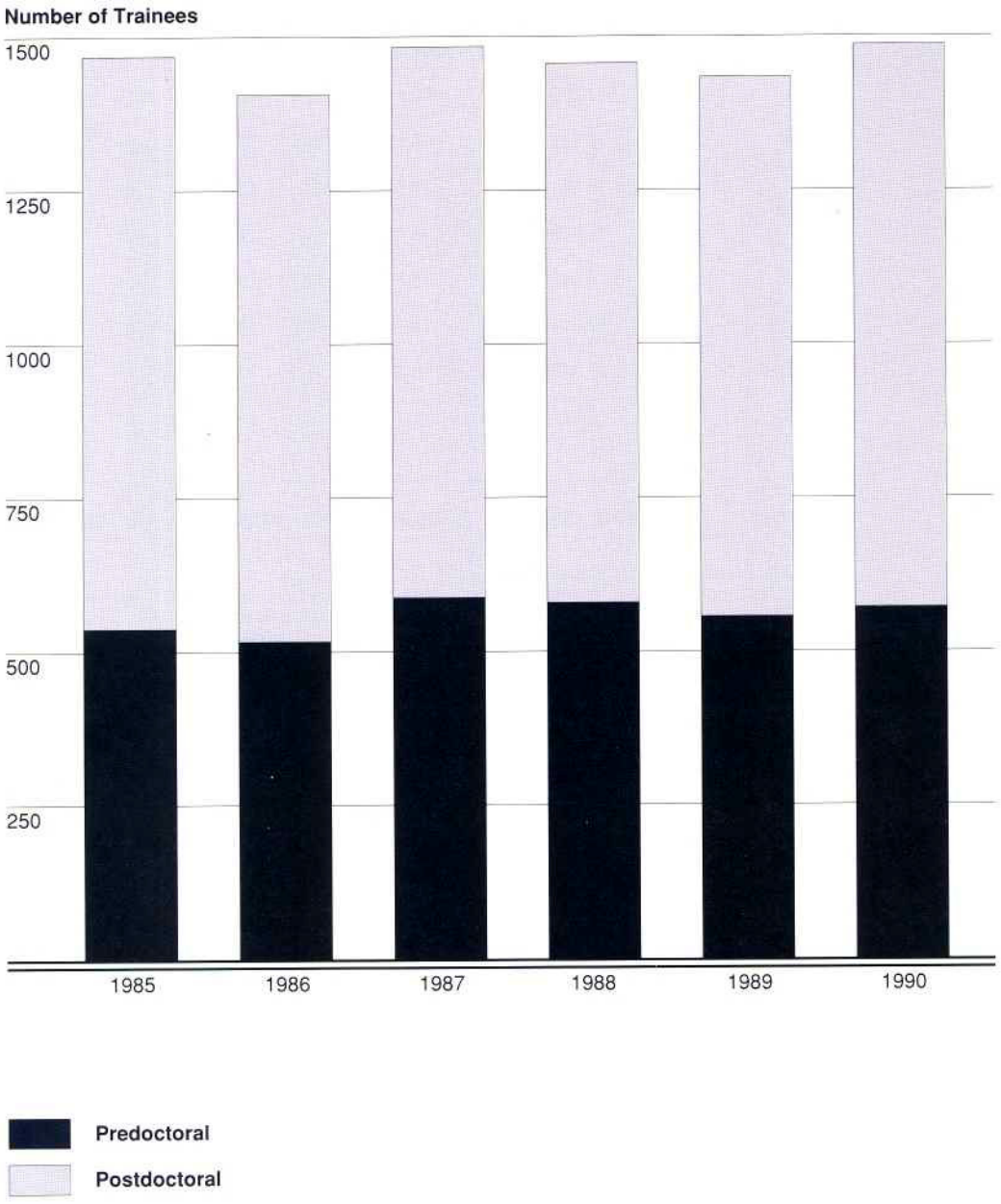
R43 **Small Business Innovative Research (SBIR) Grants—Phase I**
To support projects, limited in time and amount, to establish the technical merit and feasibility of R&D ideas which may ultimately lead to a commercial product(s) or service(s).

R44 **Small Business Innovative Research (SBIR) Grants—Phase II**
To support in-depth development of R&D ideas whose feasibility has been established in Phase I and which are likely to result in commercial products or services.

R23 **New Investigator Research Awards**
To support basic and clinical studies so that newly trained investigators remain active during the development stage of their career.

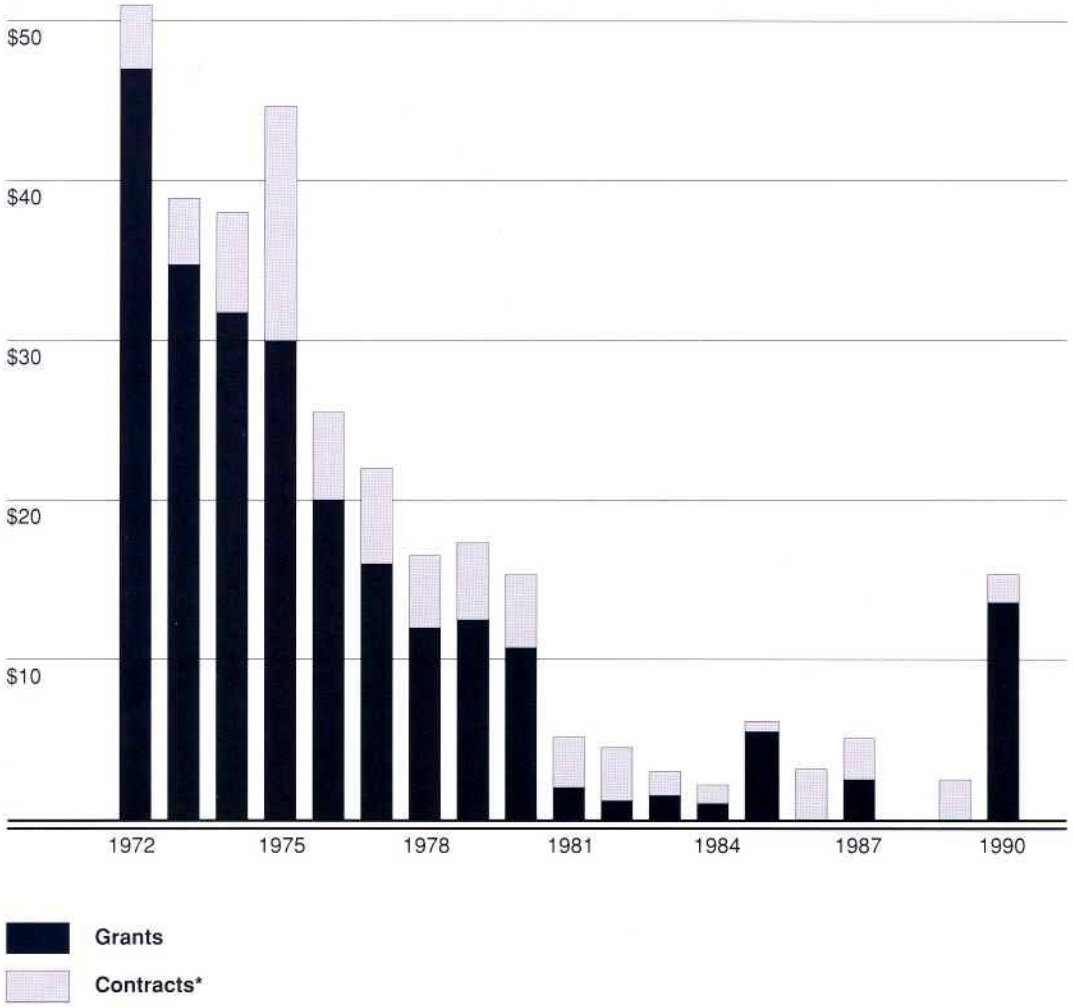
National Research Service Awards Fiscal Years 1985–1990

(Number of Trainees)



Construction/ Renovation Funding Fiscal Years 1972–1990

(Dollars in Millions)



NOTE: Fiscal year 1990 includes $10 million which was transferred to NCI from other NIH Institutes to partially funds several grants responding to an NIH Construction RFA.

**Includes repair and maintenance at the Frederick Cancer Research and Development Center.*

Selected Minority Focused Activities Fiscal Year 1990

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:

Minority Activities

Minority Accrual to Clinical Trials:
A number of factors are potential barriers to minorities participating in clinical trials. Economic and geographic constraints, foreign language barriers, cultural reluctance to seek early medical attention and/or experimental therapy for cancer, and possible physiologic differences, may explain why racial and ethnic minority patients tend to survive for a shorter time after cancer diagnosis than the national average. As part of a multi-faceted NCI plan to improve the access of minority participation at all levels of cancer research, the Cancer Therapy Evaluation Program of the DCT coordinates two interrelated clinical programs. The individuals intended to benefit from these programs are Americans of Black (African-American) ancestry, Hispanics of Mexican, Puerto Rican, Cuban or Central American descent, and Native Americans, including Alaskan and Hawaiian Natives.

Minority Initiative Program:
A new Minority Initiative program will replace the Minority Satellite Supplement (MSS) program, formerly administered by the DEA. The MSS program has provided support to individual investigators to extend clinical research to minority populations. The new Minority Initiative program widens the potential base of clinical activities made available to minority groups and will completely replace the MSS over the next three years. Six Cooperative Groups (NSABP, GOG, SWOG, RTOG, CALGB, and ECOG) have developed plans to recruit and train new institutions with predominantly minority patients, to encourage early diagnosis and clinical trials participation among potential patients, and to overcome language and logistic barriers for specific minority groups.

Minority-Based Community Clinical Oncology Program (MBCCOP):

Supports participation of minority populations and their physicians in cancer treatment and cancer prevention and control clinical trials, providing access to advances in diagnosis, treatment, and cancer control to minority patients and opportunities for studies in selected high-risk minority populations which may lead to a better understanding of cancer etiology and control. Twelve awards were made in 1990.

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. It also seeks to enhance the effectiveness of programs in cancer treatment and control in reaching the minority community and other historically underserved segments of the general population.

- ***Minority Investigator Supplement Awards:***
  The Minority Investigator Supplement award is designed to encourage participation in cancer-related research by members of underrepresented ethnic American minorities and will enable the NCI/CMBP to provide additional funds to NCI grantees who initiate an application to support minority researchers in their cancer research projects. This initiative is now included in the NIH program announcement entitled "Initiatives for Underrepresented Minorities in Biomedical Research," and has been expanded to include undergraduate and graduate students in its scope.
- ***Co-funding:***
  Minority Access to Research Careers provides fellowships to minority students to pursue training related to cancer research. Through co-funding with the ***Minority Biomedical Research Support*** program NCI provides support for specific cancer-related projects at participating minority institutions.
- ***Support for Meeting Attendance:***
  Encourages participation by minority researchers in annual meetings by providing travel support through the American Association of Cancer Research.
- ***Special Training:***
  The Summer Training Supplement is an extension of the Minority Access to Research Careers (MARC) program and provides increased training opportunities for MARC scholars by way of short-term intramural laboratory training at the NCI.
- ***Cancer Information Dissemination:***
  Initiates, with the Office of Cancer Communications, model strategies for the dissemination of cancer information to the Black populations by utilizing minority institutions, especially historically Black colleges.
- ***Cancer Centers Minority Enhancement Award:***
  Provides support for the expansion of the involvement of minority populations in cancer control research.

Cancer Communications

- Development of ethnically relevant nutrition education materials for people of low literacy.
- Production of television public service campaign featuring professional basketball personalities to encourage smoking cessation among African Americans.
- Conduct of public awareness campaigns to encourage early detection of breast, cervical, and prostate cancers among African American and Hispanic populations.
- Support of community-based cancer awareness projects using various channels to reach African Americans: churches, community organizations, mass media, food banks, and public health clinics.

Appropriations of the NCI 1938-1991

15.9%
$3,718,759,220

1938 through 1968	*$1,690,550,220*
1969	185,149,500
1970	190,486,000
1971	230,383,000
1972	378,794,000
1973	492,205,000
1974	551,191,500

84.1%
$19,619,995,000

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]
1990	1,664,000,000[13]
1991	1,766,324,000[14]

Total
(1938–1991) $23,338,754,220

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.

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

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

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

[4] 1980 appropriation authorized under a Continuing Resolution.

[5] Reflects 1981 rescission of $11,975,000.

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

[7] Appropriated under Continuing Resolution and Supplemental Appropriation Bill.

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

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

[10] Authorized under Omnibus Continuing Resolution.

[11] Authorized under Omnibus Continuing Resolution.

[12] Appropriation 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).

[13] Appropriation prior to reduction contained in P.L. 101-166 (–$6,839,000) and P.L. 101-239 (–$22,829,000).

[14] Appropriation prior to reductions in P.L. 101-517 (–$8,972,000 for salary and expense reduction; –$42,568,000 for across-the-board reduction).

By-Pass Budget Requests Fiscal Years 1973-1992

Fiscal Year	Request
1973	$ 550,790,000
1974	640,031,000
1975	750,000,000
1976	898,500,000
1977	948,000,000
1978	955,000,000
1979	1,036,000,000
1980	1,055,000,000
1981	1,170,000,000
1982	1,192,000,000
1983	1,197,000,000
1984	1,074,000,000
1985	1,189,000,000
1986	1,460,000,000
1987	1,570,000,000
1988	1,700,000,000
1989	2,080,000,000
1990	2,195,000,000
1991	2,410,000,000
1992	2,612,000,000

1973 [illegible]

NOTE: Following the original passage of the National Cancer Act in December 1971, a provision was included for the Director of the National Cancer Institute to submit a budget request directly to the President; hence it has come to be called the By-Pass Budget. The budget submitted for fiscal year 1973 was the initial submission.

Clinical Trials Activities Fiscal Years 1985-1990

(Dollars in Millions)

	1985	1986	1987	1988	1989	1990
Clinical Trials:						
Treatment/Detection/ Diagnosis	$ 129.1	$ 124.0	$ 154.3	$ 151.2	$ 152.3	$ 182.6
[Clinical Cooperative Groups]	[50.8]	[49.3]	[57.1]	[59.3]	[60.2]	[60.2]
Prevention & Control	27.0	29.5	29.1	35.7	36.2	37.1
Subtotal	156.1	153.5	183.4	186.9	188.5	219.6
Center Core Support	10.6	22.1	24.0	25.1	25.3	26.3
Subtotal, Trials Support	166.7	175.6	207.4	211.9	213.8	246.0
[Support for AIDS trials]	[—]	[—]	[—]	[14.8]	[23.4]	[32.7]
Total NCI Budget	$1,177.9	$1,228.8	$1,402.8	$1,469.3	$1,572.9	$1,634.2
Groups as % of NCI	4.3%	4.0%	4.1%	4.0%	3.8%	3.7%
Trials as % of NCI	14.2%	14.3%	14.8%	14.4%	13.6%	15.1%

NOTES:
1. Beginning in 1986, Core Support for centers includes indirect costs.
2. Separate clinical trials data for AIDS not reported prior to 1988.
3. 1986 includes $17 million transfer for AIDS from NIH.
4. 1989 includes $2.5 million transfer from NIH.
5. 1990 excludes $10.1 million construction transfer.

Comparison of Dollars, Positions and Space Fiscal Years 1972–1990

	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
1972	378,636	Base Year	—	1,665	Base Year	—	329,587	Base Year	—
1973	431,245	13.9	13.9	1,736	4.3	4.3	357,972	8.6	8.6
1974	581,149	53.5	34.8	1,805	8.4	4.0	381,436	15.7	6.6
1975	699,320	84.7	20.3	1,849	11.1	2.4	382,485	16.0	0.3
1976	760,751	100.9	8.8	1,955	17.4	5.7	387,324	17.5	1.3
1977	814,957	115.2	7.1	1,986	19.3	1.6	428,285	29.9	10.6
1978	872,369	130.4	7.0	1,969	18.3	−0.9	491,725	49.2	14.8
1979	936,969	147.5	7.4	1,973	18.5	0.2	493,156	49.6	0.3
1980	998,047	163.6	6.5	1,837	10.3	−6.9	467,730	41.9	−5.2
1981	989,338	161.3	−0.9	1,815	9.0	−1.2	472,633	43.4	1.0
1982	986,564	160.6	−0.3	1,703	2.3	−6.2	477,782	45.0	1.1
1983	986,811	160.6	0.03	1,731	4.0	1.6	484,093	46.9	1.3
1984	1,081,460	185.6	9.6	1,698	2.0	−1.9	466,890	41.7	−3.6
1985	1,177,853	211.1	8.9	1,596	−4.1	−6.0	466,890	41.7	0.0
1986	1,210,284	219.6	2.8	1,573	−5.5	−1.4	465,790	41.3	−0.2
1987	1,402,790	270.5	15.9	1,642	−1.4	4.4	465,790	41.3	0.0
1988	1,468,435	287.8	4.7	1,708	2.6	4.0	458,556	39.1	−1.6
1989	1,570,342	314.7	6.9	1,701	2.2	−0.4	483,778	46.8	5.5
1990	1,644,330*	334.3	4.7	1,837	10.3	8.0	489,604	48.6	1.2

* Includes $10,130 which was transferred to NCI from other NIH Institutes to partially fund several grants responding to an NIH Construction RFA.

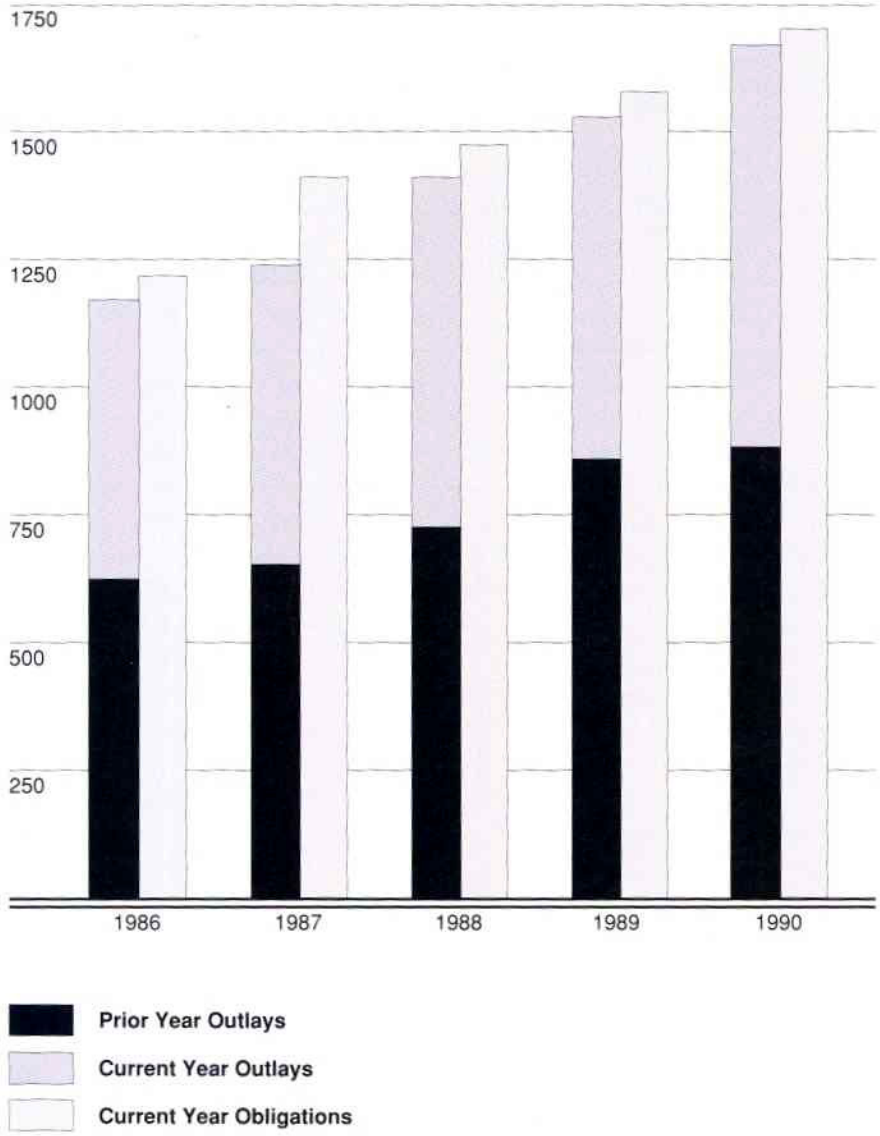
Personnel Resources

Fiscal Year	Number of FTEs*			Number of Employees
	Cancer	AIDS	Total	
1984	2,344	72	2,416	2,371
1985	2,145	85	2,230	2,195
1986	2,003	98	2,101	2,096
1987	1,981	129	2,110	2,272
1988	2,137	146	2,283	2,302
1989	1,985	188	2,173	2,201
1990	1,960	232	2,192	2,322

*Full-Time Equivalents

National Cancer Institute Obligations and Outlays Fiscal Years 1986–1990

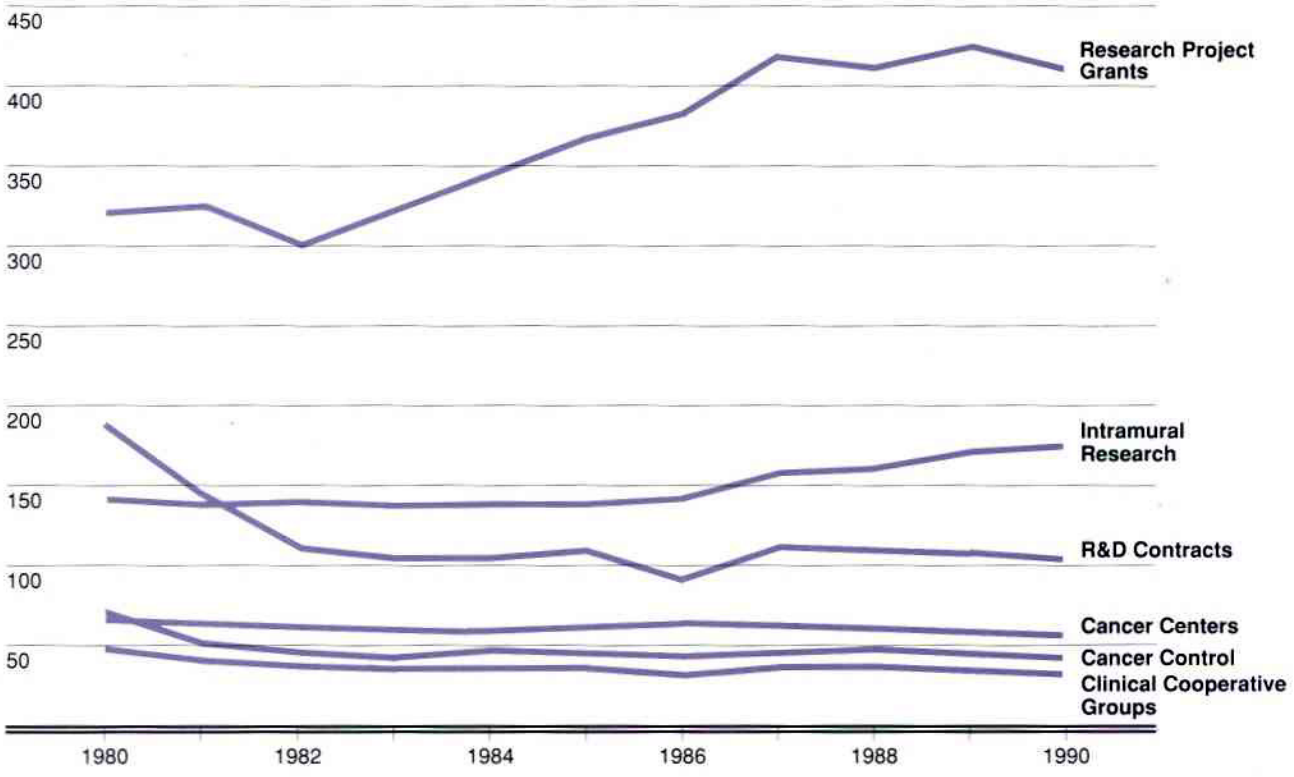
(Dollars in Millions)



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.*

Constant Dollar Trends Obligations By Mechanism Fiscal Years 1980-1990

(Dollars in Millions)



1980 Constant Dollars in Millions

NATIONAL CANCER INSTITUTE