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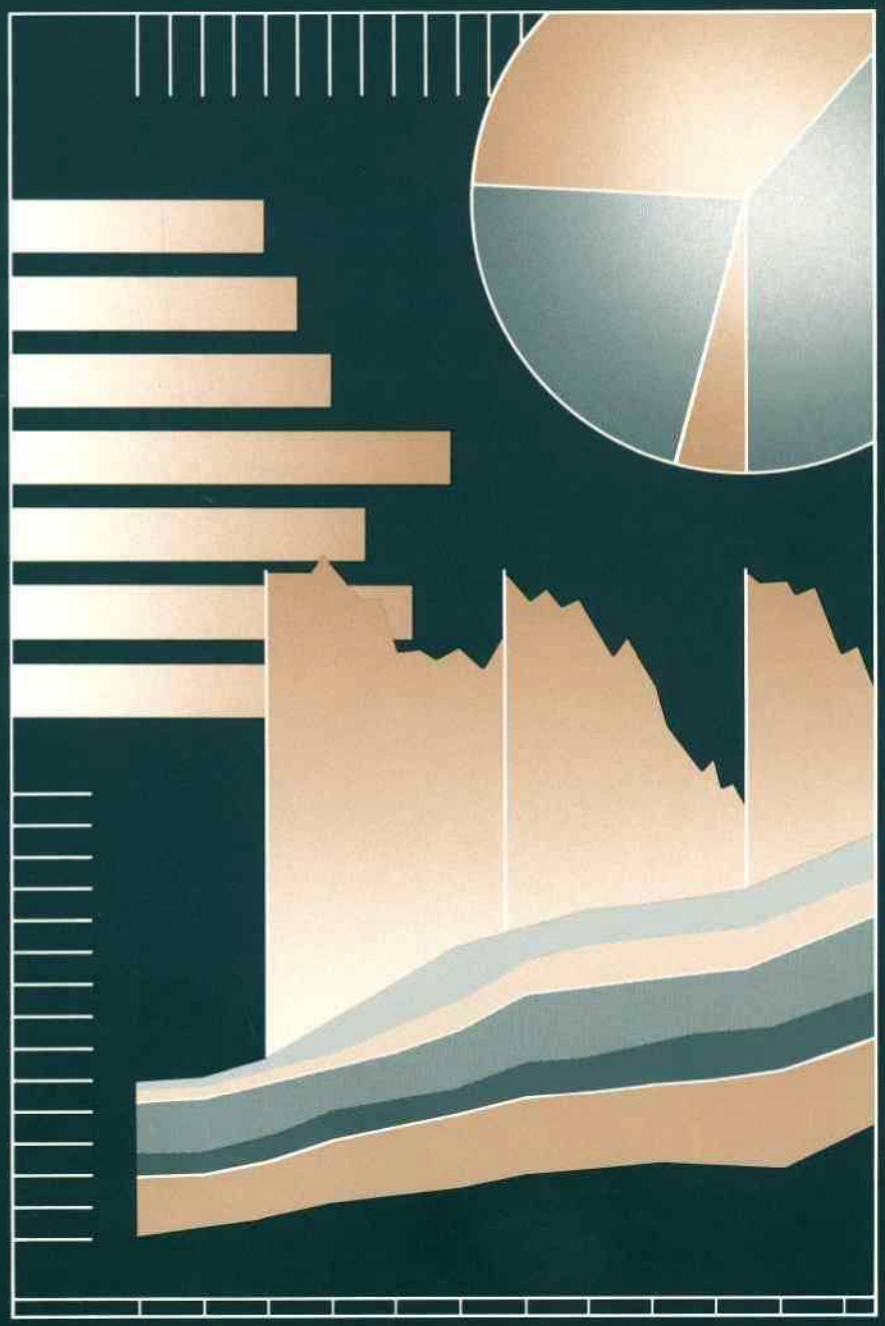

1993

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U.S. DEPARTMENT
OF HEALTH AND
HUMAN SERVICES

Public Health
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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 Management Branch, National Cancer Institute, 9000 Rockville Pike, Bethesda, Maryland, 20892.

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Significant Initiatives in 1993

Division of Cancer Biology, Diagnosis, and Centers

Active Immunotherapy to Human Tumor Associated Antigens
Carcinoembryonic antigen (CEA), a tumor associated antigen expressed on many tumor types (including most colon cancers and over 50% of breast tumors), can be used as a target for the active immunotherapy of human cancer. While CEA alone is unable to elicit a strong anti-tumor response, laboratory studies have shown that when the gene for CEA is introduced into a vaccinia virus, the resulting construct can induce anti-CEA responses that can eliminate the tumor. This approach is being evaluated in a Phase I clnical study to determine whether a recombinant CEA-vaccinia virus construct can induce a specific imune respose to CEA-expressing human tumors. Similar constructs are being developed using the prostate specific antigen for the potential immunotherapy of human prostate cancer.

Prevention of Tumor Invasion and Metastasis
Exciting progress has been made in elucidating the genetic changes associated with tumor cell invasion and metastasis. Understanding the mechanism of action of these genetic changes has led to new strategies for therapy, diagnosis and prevention, some of which are currently being evaluated in clinical trials. CAI, a novel signal transduction inhibitor that blocks tumor cell cytokine-stimulated growth and motility, has been developed as a new cancer therapy approach which shows particular potential for ovarian and breast cancer. A clinical phase I trial for treatment of refractory cancers began in March 1992. Low toxicity and several promising tumor responses have been seen in the first 14 patients. CAI is also being developed as a potential chemopreventive agent. Significant progress has been made in our understanding of the NM23 family of genes in the regulation of tumor metastasis. Laboratory studies have revealed that expression of the human NM23 gene is reduced in highly metastatic human breast, hepatocellular and melanoma tumors, suggesting that NM23 may provide a new approach for predicting the agressiveness of an individula patint's tumor. Agents that modulate NM23 expression or function or that mimic its action may have therapeutic potential. TIMP-2, a protein that inhibits an enzyme responsible for the destruction of the basement membrane, has been shown in experimental studies to block tumor cell invasion and metastasis formation. The complete domain structure of TIMP-2 has been determined, and the chromosomal location of TIMP-2 on 17q has been determined and confirmed. Current data support the hypothesis that TIMP-2 may function as a tumor suppressor protein by inhibiting metalloproteinase activity required for invasion. *In vivo* TIMP-2 also arrests metastasis through inhibition of angiogenesis. Specific clinical

applications of TIMP-2 could include the treatment of bone metastasis and Kaposi's sarcoma.

Development of a Human Papillomavirus Vaccine for Cervical Cancer
Studies over the past several years have established an etiological association for specific types of human papillomaviruses (HPV) and cervical cancer. Two HPV genes, L1 and L2, encode the proteins that form the viral coat of the virus, and thus they represent good candidates for an HPV vaccine. Preliminary studies using the closely related bovine papillomavirus have shown that, when expressed in insect cells, the L1 protein alone or the L1 and L2 proteins together self-assembled in the cells to form particles that can induce very high titers of neutralizing antibody. It is also possible to make particles from L1 or L1 plus L2 from HPV 16, the virus type that is associated most commonly with cervical cancers. In addition, a new laboratory assay based on HPV16 L1/L2 particles has been developed that can identify women infected with HPV. This assay, or a similar one based on a mixture of high risk HPV particles, may aid in determining the natural history of high risk HPV infection and might be useful as an adjunct to cervical cytologic screening to identify women at risk for developing cervical cancer.

Gamma Interferon
Gamma interferon was the first great hope for cytokine therapy of cancer. While this proved unrealistic, interferon is making a strong comeback as a critical regulator of immune responsiveness. It is believed to be one of the major control points in the lymphocyte-macrophage-NK cell communication pathway. The exact role of gamma interferon or any other cytokine in the immune system has not been determined because it is difficult to control the level of expression of a cytokine and because functional outcomes typically depend on cross-talk among many cytokines. Gene knockout technology has been very useful in sorting out cytokine function, and two groups have now provided complementary information about gamma interferon by preparing knockout mice lacking, respectively, expression of the interferon gene or the interferon receptor gene. The results are very similar. Mice lacking the receptor gene have increased susceptibility to infectious diseases. Their susceptibility to cancer has yet to be evaluated. A detailed study of macrophage function in these knockout mice has now shown that complete macrophage activation is impossible without gamma interferon. While gamma interferon has long been known to be a potent macrophage activating factor, other pathways of activation could be demonstrated in vitro. The recent results show that alternative pathways of macrophage activation are not physiologically relevant. This reemphasizes the importance of gamma interferon not only as a manipulator of macrophage function directly, but as a regulator of the balance between the helper T-cell subsets Th1 and Th2.

Tumor Angiogenesis
Continuing growth of a tumor absolutely depends on the simultaneous development of a vascular system to supply needed nutrients to the expanding cell population. The stimulus for the growth of this new vascular system apparently comes from the cancer itself as it reaches a distinct stage of cancer progression and switches on an angiogenic phenotype. Utilizing a unique tumor cell model where the timing of the

conversion from non-angiogenic to angiogenic is highly predictable, a number of proteins have been identified which are associated with this phenotypic switch. Some of these proteins are well known growth factors with angiogenic activity, some are newly identified growth stimulating peptides. However, new proteins that are inhibitors of angiogenesis have also been discovered. As with many biological systems, angiogenesis seems to be regulated by inductive factors working in synergy and opposing the influence of inhibitors.

Innovative Techniques for the Identification of Genetic Alterations in Tumors

Comparative genomic hybridization (CGH) and arbitrarily primed polymerase chain reaction (AP-PCR) allow the entire genome of tumor cells to be scanned for disease related genetic alteration. No prior knowledge of the location of the alterations is needed. CGH is a novel application of fluorescence *in situ* hybridization (FISH), and AP-PCR amplifies genomic DNA sequences using sets of random PCR primers. These new techniques are being applied to the rapid identification of genetic alterations involved in cancer initiation and progression. AP-PCR was critical to the discovery of a unique alteration that is associated with some hereditary cases of colon cancer and characterized by widespread genomic instability.
The development of recombinant toxins as anti-cancer agents represents an exciting new therapeutic approach to cancer and other diseases.

Division of Cancer Treatment

Taxol Development
Taxol is the first of a new class of anticancer drugs which has focused attention on tubulin and microtubules as critical targets for chemotherapy. Taxol binds to and stabilizes microtubules and is thought to cause cell death by adversely affecting microtubule function during interphase and mitosis. Initial phase I/II studies have shown significant activity in refractory ovarian cancer (with response rates ranging from 21-40%) and in metastatic breast cancer (with response rates of 56-62%). Recent studies have focused on defining optimal taxol schedules and the role of taxol in combination regimens. The first Phase III trial, conducted by the Gynecologic Oncology Group, meeting compared taxol plus cisplatin to standard therapy with cyclophosphamide and cisplatin in women with suboptimally debulked ovarian cancer. Replacement of cyclophosphamide with taxol was associated with a significant improvement in clinical response rate and an increased rate of negative second look laparotomy. Preliminary analysis demonstrated extension of progression-free survival on the taxol arm. Data are not yet sufficiently mature to assess survival. Results of this trial and of three additional phase III trails now underway will define the role of taxol in primary and refractory ovarian cancer.

Significantly, on the strength of these and other NCI-supported clinical trials, taxol was approved by the FDA in 1993 for use in patients with refractory ovarian cancer. This event marked the culmination of successful efforts to address drug supply problems. FDA approval means that taxol, the most active agent discovered int the past 20 years, is now available to all U.S. cancer patients.

Development of New Breast Imaging Technologies

Digital mammography has been identified as the most promising novel technology for early detection of breast cancer. Digital images offer several potential advantages in image quality compared to conventional film-based systems. These include: 1)improved image contrast and resolution at a reduced radiation dose; 2) more efficient image storage and retreival; 3) the potential for electronic image transfer facilitating comparison to previous films and review by expert mammographic readers; and 4) the potential for computer-assisted image interpretation. In March 1992, an interagency agreement between the NCI and the National Aeronautics and Space Administration (NASA) resulted in the establishment of a Working Group for Digital Mammography. At a Workshop held in May, 1993, forty-three proposals received in response to a program announcement entitled "National Digital Mammography Development Group" were reviewed. Thirteen of these were viewed as being "breakthrough" technologies potentially addressing some of the fundamental technologic problems in digital mammography. These included a proposal to develop digital detectors and display systems for the generation of high-resolution, high-field-of-view, high contrast images of the breast, and high performance, low cost networks which can make telemammorgraphy a practical tool. In addition, a number of state-of-the-art machine intelligence-based computer algorithms, which were originally developed for space and military applications, have been identified as novel and promising for image processing and computer-aided diagnosis in digital mammography. It is anticipated that multi-disciplinary teams composed of clinical radiologists, physicists and technical equipment designers from industry and the private sector will be co-funded through a joint NCI/NASA Program Announcement.

Clinical Development of Suramin in the Treatment of Patients With Metastatic Prostate Cancer

Total androgen ablation with the use of leuprolide and flutamide has become routine treatment for patients with metastatic prostate cancer. However, several NCI sponsored trials have established the efficacy of suramin, a prototype heparin-binding polyanionic compound which appears to act at many pivotal points which serve to regulate cell growth, in the treatment of patients with hormone refractory prostate cancer. Of thirty patients with metastic prostate cancer treated with the addition of suramin to leuprolide and flutamide, 70% normalized their elevated prostate specific antigen (PSA) levels. In 50%, PSA levels became undetectable (below 0.5ng/ml). Approximately half of those with measurable soft tissue disease had a response. These results can be compared to three previously reported studies of men with metastatic prostate cancer treated with routine hormonal therapy, 22-50% normalized their PSAs and 0-30% had undetectable PSA levels. In the suramin trial, normalization of PSA was found to be a good predictor of response. None of the 21 patients whose PSA fell to normal has died. Four of the nine patients whose PSA did not fall to normal have died. In this trial, suramin was safely administered in the outpatient setting with few toxicities observed. The results of these studies support the conduct of a larger randomized clinical trial to define the role of suramin with total and androgen ablation.

Initiation of Carcinoembryonic Antigen (CEA) Clinical Trials

Carcinoembryonic antigen (CEA) is one of the most widely studied tumor associated antigens and is expressed by more than 90% of gastrointestinal

carcinomas, 50% of breast cancers, and 70% of adenocarcinomas of the lung. While CEA is generally weakly immunogenic in humans and no evidence exists for humoral or cell-mediated immunity to CEA in normal or cancer patients, co-presentation of CEA with a strong immunogen is an approach to inducing an anti-CEA response for tumor therapy. Recent advances in recombinant vaccinia virus technology has permitted the development of clinical grade recombinant CEA-vaccinia constructs and other recombinant CEA vector constructs. A Phase I clinical trial was initiated at the NCI-Navy Medical Oncology Branch in May, 1993. Accrual to this trial which is open to patients with adenocarcinoma of the gastrointestinal tract, breast, or lung has been brisk. To date, fifteen patients have been enrolled, completing the second dose level of this trial. While no efficacy data is available at this point, no significant hematologic or organ function toxicities have been seen.

Division of Cancer Etiology

Dietary Mutagens and Carcinogens

A number of compounds known as heterocyclic aromatic amines (HAAs) are formed during the normal process of cooking meat, fish and fowl at high temperatures, especially by frying, broiling, or barbecuing. They are formed by the reaction of creatinine with an amino acid(s) at high temperatures. Thus far, 19 HAAs have been identified and generally they are very potent mutagens in a bacterial assay system known as the Ames test. In addition, 10 of the 19 HAAs have been tested and shown to be carcinogenic when administered to rodents and one of the HAAs referred to as PhIP induces only two types of tumors at a high percentage in rats, i.e. breast and colon. The mutagenic and carcinogenic effects of the HAAs is due to their metabolism to reactive forms which can react with DNA to form complexes known as adducts. In addition to rodents, DNA-adducts have also been found in nonhuman primates being administered selected HAAs and one of the HAAs known as IQ is also a potent carcinogen in nonhuman primates inducing liver tumors in a high percentage of the animals in about one-seventh of their lifetime. Studies underway may allow an estimation of the risk of the HAAs to human cancer etiology and methods to mitigate this risk.

Molecular Studies with the p53 Tumor Suppressor Gene

The most common cancer-related genetic change known at the molecular level is mutation in the p53 tumor suppressor gene, which is implicated in lung, breast, colon, liver and many other cancers. These p53 mutations can lead to losing normal tumor suppressor functions of p53 and to gaining functions as an oncogene. Different carcinogens cause characteristic mutations in the p53 gene. Exposure to one common carcinogen, ultraviolet light, is correlated with transition mutations at dipyrimidine sites in skin cancer; dietary aflatoxin B_1, exposure is correlated with G:C to T:A transversions that lead to a serine substitution at residue 249 of p53 in hepatocellular carcinoma; and exposure to cigarette smoke is correlated with G:C to T:A transversions in lung and head and neck carcinomas. These observations provide strong evidence for a molecular mechanism for chemical carcinogenesis and raises the exciting prospect that mutational analysis may uncover the molecular "fingerprints" left by other environmental carcinogens. Accumulating evidence indicates that the p53 mutational spectrum differs among various cancers, and analysis of these

mutations is providing clues to the etiology of diverse tumors and to the function of specific regions of p53.

Studies on the Li-Fraumeni Syndrome

Only about 100 families around the world are known to have the rare genetic disorder known as the Li-Fraumeni syndrome (LFS), but they serve to highlight the point that cancer is in some cases an inherited disease. Members of these families are highly susceptible to several tumors, especially breast cancer, often developing the malignancies before they are 30 years old. NCI scientists and their collaborators at Massachusetts General Hospital in Boston reported that the gene defect underlying the LFS is a mutation in the p53 gene, and that the gene defect is present in the germ cells, which means it can be passed from one generation to another. This was an important breakthrough because it will make it possible to identify precisely which members of LFS families carry the gene defect and are thus at high risk of getting cancer. These individuals could then be the subject of individual monitoring in order to detect cancer early on, when they are most curable. To date, at least 7 component cancers of the syndrome have been identified on the basis of their excess occurrence in Li-Fraumeni families; breast cancer, soft-tissue sarcoma, osteosarcoma, acute leukemia, brain tumors, adrenocortical carcinoma, and gonadal germ-cell tumors. Recent studies have detected germ line p53 mutations in a few patients with multiple cancer at an early age but no family history, suggesting new mutations. On the other hand, germ line p53 mutations have not been detectable in some families with classical Li-Fraumeni syndrome, raising the possibility of genetic heterogeneity and providing an impetus for further molecular study of LFS with apparently normal p53. The clinical, psychosocial, legal and ethical issues posed by p53 testing have led to published recommendations that can be applied to other cancer susceptibility genes that are discovered.

Human Papillomaviruses and Cancer Risk

The papillomaviruses are small DNA-containing viruses which are associated with benign warts and papillomas in a variety of higher vertebrates, including man. There are now 70 human papillomaviruses (HPVs) which have been identified. Approximately 20 of these have been associated with lesions of the human genital tract; several of these have been associated with genital warts which rarely progress to carcinoma. Others have been associated with cervical dysplasia and other pre-neoplastic lesions which may progress to malignancy. HPVs have also been linked to human cervical carcinoma and other anogenital carcinomas including cancer of the penis, vulvar carcinoma, and perianal carcinoma. Recently many major advances have been made in understanding the molecular biology of the HPVs. The viral genes which are expressed in cervical cancer tissues have been identified and shown to be at least in part responsible for the malignant characteristics of the cells. Two viral genes, designated E6 and E7, are now recognized to be transforming genes of the HPVs. The E7 protein has been shown to form stable complexes with a cellular protein, the product of the retinoblastoma (RB) gene. The RB gene is missing or inactivated in a variety of human cancer, leading researchers to believe that the RB protein normally acts to regulate cell growth. By binding to the RB protein, E7 may alter the activity of RB, thereby allowing cells to grow in an uncontrolled fashion. Evidence now exists that the E6 gene product also complexes with the p53 cellular protein, that, as described above, is also involved in regulating cell

growth. The identification of the viral genes which contribute directly to the deregulated growth of the cancer cell and the identification of the cellular protein with which they interact should provide insight for the screening and development of antiviral agents.

Studies of Cancer in Women

NCI epidemiologists are pursuing a wide variety of analytical studies designed to elucidate the relationship of exposures and host factors to cancer outcomes specific to women. The approaches utilized in these studies have been both retrospective and prospective in nature, with many of the studies utilizing laboratory probes to better define exposures. Cancers unique to women are the focus of these studies, and include malignancies of the breast, ovary, cervix, endometrium, and vagina/vulva. Of particular interest with respect to breast cancer etiology are the effects of exogenous hormone use (oral contraceptives and menopausal hormones) and of different dietary patterns, including recent as well as adolescent diet. These factors are currently being analyzed in a recently completed large case-control study. This study also will be able to address reasons for differing incidence rates in black versus white women and will examine possible biologic mechanisms for identified risk factors through a variety of serologic measurements. Other NCI studies are evaluating radiotherapy for breast cancer as a primary risk factor for second primary breast cancer occurring in the contralateral breast. If such a risk exists, the dependence of the risk on dose and age at exposure will be evaluated. Individual dosimetry determinations are being made; the record abstraction is underway. NCI epidemiologists are also assessing the role of pesticides and other agricultural exposures, as well as cooking practices, in determining a woman's risk for breast cancer.

Division of Cancer Prevention and Control

The American Stop Smoking Intervention Study (ASSIST)

ASSIST is a collaborative effort between the NCI and the American Cancer Society (ACS), along with state and local health departments and other voluntary organizations to develop comprehensive tobacco control programs in 17 states. Its purpose is to demonstrate that the wide-spread, coordinated application of the best available strategies to prevent and control tobacco use will significantly accelerate the current downward trend in smoking and tobacco use. The five year intervention phase began in 1993 and continues through 1998 (Phase II) during which smoking control strategies, adapted from science-based models developed through NCI research and other sources, will be implemented. Through ASSIST, media, policy, and cessation support will be delivered to target groups using the health care system, schools, the worksite, and other community channels.

National 5-A-DAY Program

The National 5-A-Day Program, designed to encourage Americans to eat five or more servings of fruits and vegetables every day, represents a significant public/private enterprise between NCI and the Produce for Better Health Foundation. NCI's role as the educator and providing credible information plays an integral part in communicating the 5-A-DAY message. Research grants awarded to state health agencies, universities, and cancer centers are evaluating the effect of 5-A-DAY activities in schools, workplaces and other community settings.

Cancer in Minorities and the Underserved

Reducing cancer in minority and underserved populations is facilitated by the mobilization of professional and lay leaders in the community to address the specific cancer needs of that community as well as through coalition building among health-related, academic and community organizations. The NCI supports three such initiatives in an effort to address the cancer prevention and control needs of certain populations. The National Black Leadership Initiative on Cancer (NBLIC), as of January 1993, has establised 47 coalitions and is forming 19 others within six regional areas of the United States: Northeastern, Mid-Atlantic, Mid-Western, Southwestern, Western, and Southeastern. A major goal of the NBLIC is to address the barriers that limit or prevent Black Americans from gaining access to quality cancer control services. The National Hispanic Leadership Initiative on Cancer (NHLIC) brings together Hispanic investigators from five major Hispanic groups whose outreach activities strategically cover areas with a large population of Latino residents and representation from five major Hispanic groups. The NHLIC has established nine coalition sites where baseline data collection and needs assessments are underway with the aim of advancing the Healthy People 2000 goals on cancer in Hispanics. The third of these initiatives, the Appalachia Leadership Initiative (ALIC) on Cancer is targeted to all persons, particularly those who are medically underserved, who reside in the region of the United States known as Appalachia. Among the ALIC's priorities are the promotion of smoking cessation, diet modification, and early detection screening and treatment. The four awards made in 1992 cover 330 counties in the Appalachian region from New York to Georgia.

Cancer has become the leading cause of death for Alaskan Native women and the second leading cause of death among both Native American and Native Hawaiian women. The Native American Women's Cancer Initiative was developed by the NCI in response to emerging cancer needs and issues of Native American women. The goals of ongoing research include: the identification of barriers to culturally appropriate quality cancer control services including screening, appropriate follow-up, diagnostic, treatment and rehabilitation programs for cancers common and/or disproportionately elevated among indigenous women; and the reduction of cancer risk behaviors in Native American women.

Women's Health Trial: Feasibility Study in Minority Populations

NCI also has been exploring a dietary intervention, specifically fat restriction, to reduce the risk of developing breast, colorectal, and possibly cardiovascular diseases in postmenopausal women in the Women's Feasibility Study in Minority Populations. The study, which began recruitment in August 1992, targets minority and underserved women and addresses the probability of achieving and sustaining dietary modification. The study will also endeavor to determine whether adoption of a low fat dietary pattern will reduce breast and colorectal cancer incidence and reduce overall mortality from cancer and heart disease in postmenopausal women. Elements of the study design and the generated results will contribute to and be coordinated with the projected 10-year, trans-NIH, multidisciplinary Women's Health Initiative, especially those portions that focus on community-based interventions and diet/micronutrient studies.

National DES Educational Program for Health Professionals and the Public
An NCI-initiative is in progress to provide information and recommendations to women exposed to diethylstilbestrol (DES), their families, and health care professionals. DES, a synthetic nonsteroidal estrogen, was frequently prescribed to pregnant women in several areas of the United States from 1945 to 1955 and less frequently from 1955 to the early 1970s, with the intention of preventing miscarriages and other pregnancy complications.

Physicians and other health care professionals will be informed of the risks faced by patients exposed to DES and to their children. Standards for treatment also will be developed and widely disseminated. Methods will be developed and tested to reach those individuals at risk for medical conditions associated with exposure to DES with appropriate educational messages.

Screening for Prostate, Lung, Colorectal, and Ovarian Cancers
Through this 16-year randomized trial, 37,000 men will be screened for four years for prostate, lung, and colorectal cancers and 37,000 women will be screened for the same period of time for lung, colorectal, and ovarian cancers. The trial, which began patient accrual in 1993, is employing the following screening modalities: prostate specific antigen (PSA) and digital rectal exam for prostate cancer; chest x-ray for lung cancer; 60-cm flexible sigmoidoscopy for colorectal cancer; and ovarian palpatation, CA125 blood test and transvaginal sonography for ovarian cancer. Equal numbers of men and women are being followed with routine medical care as controls. There will be a 10-year follow-up of both study subjects and controls to determine the effects of screening for those four sites on disease specific mortality. Diagnostic biopsy specimens will be examined to characterize genetic alterations in these screen-detected cancers. The anticipated benefits of this large scale screening trial include the identification of biomarkers that will pinpoint cancers in their earliest stages as well as serve as intermediate endpoints that will allow prevention trials to be conducted in a more efficient and cost effective manner.

Prostate Cancer Prevention Trial
A Prostate Cancer Prevention Trial (PCPT) using finasteride (Proscar) began accrual in October of 1993. This study is an intergroup study in the Community Clinical Oncology Program (CCOP) clinical trials network. As prostate cancer is influenced by androgens, the study tests the ability of finasteride, a 5-alpha-reductase inhibitor of androgen synthesis, to reduce the incidence of prostate cancer. Because finasteride blocks the production of the hormone dihydrotestosterone, the trial will also focus on whether the long-term prophylactic use of the drug prevents the occurrence of benign prostate hyperplasia. The trial will involve 15,000-20,000 men at risk for prostate cancer. Subjects are randomized to receive finasteride or placebo for up to ten years. The endpoint of the study will be diagnosis of clinically significant prostate cancer.

Breast Cancer Prevention Trial
The Breast Cancer Prevention Trial (BCPT) with tamoxifen is underway in the Community Clinical Oncology Program (CCOP) clinical trials network. Implemented through the National Surgical Adjuvant Breast and Bowel Project (NSABP), this trial is testing the ability of tamoxifen, an anti-estrogen medication used in postsurgical treatment of early stage breast cancer, to

prevent the development of breast cancer in women at increased risk for developing the disease. Based on results from treatment clinical trials in which tamoxifen reduced the incidence of breast cancer in the opposite breast in women already diagnosed with breast cancer, scientists estimate that tamoxifen has the potential to reduce the incidence rate of breast cancer in high-risk women by at least 30 percent. Approximately 16,000 women at increased risk for breast cancer due to age, family history, and personal history (i.e., age at first birth, age at menarche, and previous breast biopsies) are being randomized to receive tamoxifen (20 mg/day) or placebo for an initial period of five years. The study, which will last ten years, is being implemented in over 250 nucleus and sub-centers across the United States and in Canada. Samples are being collected from the trial participants to analyze any inherent genetic factors that may contribute to the risk of developing breast cancer in this population. In addition, an in-depth evaluation of any breast tissue abnormalities that are detected at biopsy in BCPT participants will be analyzed for both inherited and acquired genetic mutations.

Community Clinical Oncology Program (CCOP)
The Community Clinical Oncology Program (CCOP) is a network of cancer specialists, primary care physicians, and other health professionals who conduct both clinical treatment research and cancer prevention and control research studies. The primary objectives of the CCOP encompass the development of clinical trials for effective implementation of cancer prevention and control research in multi-institutional settings in early detection and screening, chemoprevention, smoking, patient management, and rehabilitation. The current program involves 49 CCOPs including over 300 hospitals and 2,800 physicians. Several large-scale chemoprevention trials are are being implemented through this network to study the effectiveness of various agents to prevent cancer such as The Breast Cancer Prevention Trial with tamoxifen and the recently initiated Prostate Cancer Prevention Trial with finasteride (Proscar).

Minority-Based Community Clinical Oncology Program (MBCCOP)
The Minority-Based Community Clinical Oncology Program (MBCCOP) was initiated to provide minority cancer patients with access to state-of-the-art cancer treatment and control technology. MBCCOP consists of eight programs with greater than fifty percent of new cancer patients from minority populations and involves 31 hospitals and 300 physicians. Since funding began in 1990, patient accrual from these eight MBCCOPs has grown to account for approximately 10 percent of all ethnic minorities enrolled in NCI-approved clinical trials. In addition to providing a service to their patient populations, the MBCCOPs allow for study of minority recruitment and accrual to cancer clinical trials.

Division of Extramural Activities

Cancer Centers and Cancer Control in Minority Populations
The National Cancer Institute seeks to expand minority involvement in cancer control research, through the Comprehensive Minority Biomedical Program (CMBP) and the Cancer Center Minority Enhancement Awards (MEAs). MEAs are awarded competitively as supplements to NCI Cancer Centers for the purpose of facilitating the participation of minority groups in cancer control research. By broadening the operational base of cancer centers, MEAs allow expansion of center-based cancer control efforts in

prevention, early detection, screening, pre-treatment evaluation, treatment, continuing care and rehabilitation, as well as stimulating the increased involvement of those primary care providers who serve minority populations.

The Minority Health Professional Training Initiative (MHPTI)
The MHPTI, which began in 1991, supports training and career development opportunities for minority health professionals by providing opportunities in oncology research and other subspecialities related to cancer. Such opportunities will increase the number of minority clinicians, clinical researchers, and other health professionals who are prepared to deal with the problem of excess mortality among minority populations due to cancer. As the result of the three Requests for Applications (RFAs) published, four awards to minority clinicians were made in FY 1992. The program has continued through program announcements and two additional awards to faculty members from minority health professional schools were approved for funding in FY 1993.

Research Supplements for Underrepresented Minorities
The NIH-wide supplemental program entitled "Initiatives for Underrepresented Minorities in Biomedical Research", which began as an extension of the NCI Minority Investigator Supplement Program, includes supplements for Minority High School Students, Minority Undergraduate Students, Minority Graduate Research Assistants and Minority Individuals in Postdoctoral Training. While this mechanism provides support indirectly to minority scientists and students by way of funded grantees, the ultimate intent of these awards is to influence a greater number of minority individuals to develop their research capabilities and pursue independent careers as cancer research investigators.

Co-funding
For the purpose of encouraging undergraduate and graduate students to pursue training related to cancer research, CMBP co-funds, with the Minority Access to Research Careers (MARC) Program of National Institute of General Medical Sciences, pre-doctoral fellowships to minority students and Honors Undergraduate Training Grants to minority institutions. Similarly, through co-funding with the Minority Biomedical Research Support program, NCI provides support for specific cancer-related projects at participating minority institutions.

Other NCI Training Opportunities
The Summer Training Supplement is an extension of the MARC program and provides increased training opportunities for MARC scholars by way of short-term intramural laboratory training at the NCI.

Support for Meeting Attendance
CMBP continues to encourage participation of minority students and researchers in annual professional scientific meetings by providing travel support to such organizations as the American Association for Cancer Research and the Electron Microscope Society of America.

Cancer Information Dissemination
The CMBP, jointly with the Office of Cancer Communications (OCC), continues its efforts to heighten awareness about cancer risk and prevention in Black Americans. A contract solicitation was undertaken, and the

published Request for Proposal (RFP) was targeted to the network of Black colleges and universities in a variety of settings with close ties to the Black community. The aim of this undertaking is to develop and disseminate information through educational programs regarding steps that can be taken to control or reduce cancer in Black Americans.

Two awards have been made and the contractors are now carrying out the major phase of their projects. Research designs and questionnaires have been developed and cleaared by the Office of Management and Budget.

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 and the International Cancer Information Center, where they work with staff members on health education projects or science writing.

Cancer Information Service

The Office of Cancer Communications supports a nationwide network of offices known as the Cancer Information Service (CIS). The CIS serves as the NCI's primary mechanism to disseminate accurate up-to-date information to the American public at the community level. As OCC field offices, the CIS provides information on cancer and local resources through its toll free phone service. Over 500,000 calls are received each year. In addition, the CIS serves as a catalyst for the adoption and adaptation of NCI education programs. Under a new program structure implemented in 1993, the regional CIS offices now serve the entire continental United States, Alaska, Hawaii, and Puerto Rico. The CIS offices are funded through a contract mechanism with NCI designated cancer centers and community hospitals.

International Cancer Information Center

To increase the dissemination of cancer research and treatment information to physicians, researchers and other health professionals involved in health care, the International Cancer Information Center (ICIC) publishes the Journal of the National Cancer Institute and produces the PDQ and CANCERLIT databases. The ICIC continues to enhance the CancerFax® and CancerNet® information services. Cancer Fact Sheets from the Office of Cancer Communications are now available from both services, and highly focused, CANCERLIT-derived search results will be available in early 1994. The ICIC, in cooperation with the University of Chile and the Chilean Embassy, installed the Spanish language version of CancerFax in Santiago, Chile for regional dissemination of ICIC information. The CancerNet service was made widely available on the Internet using the DCRT Gopher server and is being used extensively by U.S. and foreign countries.

PDQ has been enhanced with screening/prevention and drug information. Summaries of evidence for screening have been written for cancer sites. Drug information has been compiled for 11 investigational drugs, and additional statements are under development. All of this information is available in CancerFax and CancerNet, as well as in PDQ.

The ICIC has begun working with regional distributors of information throughout the world that provide free access to local or specialized

audiences that do not have access to the Internet or large scale information providers. These local distributors obtain PDQ and CANCERLIT information via the Internet, then redistribute it to their audience via bulletin boards, local Gopher servers, etc.

The ICIC is also utilizing the Small Business Innovative Research (SBIR) program to explore the feasibility of using new technologies to disseminate NCI's computerized databases, PDQ and CANCERLIT. Recent contract awards are aimed at developing: 1) a portable medical record containing patient data and patient specific information from PDQ and CANCERLIT; 2) voice activated access to a clinician oriented knowledge server that will provide assistance forming queries to access external databases (the standard for this knowledge server will be placed in the public domain); and 3) hand-held, wireless PC access to the PDQ and CANCERLIT databases. The ICIC has also published requests for proposals for the development of: 1) use of 3-D visualization software as an interface to the PDQ and CANCERLIT databases; 2) a multi-media version of PDQ; and 3) a domain model and reference architecture for an integrated, multi-media clinical information system for oncology (to be placed in the public domain).

Office Of International Affairs (OIA)

OIA coordinates collaborative research between American and Foreign scientists. It cosponsors international workshops and scientist exchanges. Twenty-three workshops and 281 scientist exchanges were sponsored during FY 1993. Many more required no OIA funding. Seven European Organizations for Research and Treatment of Cancer (EORTC) and seven Japanese Foundations for Cancer Research (JFCR) exchangees came to American laboratories. In addition, 686 foreign scientists were at NCI under the NIH Visiting Program.

The Oncology Research Faculty Development Program for scientists from the developing world supported sixteen trainees during FY 1993.

A new program of Career Development Awards for Young Cancer Researchers in the Newly Independent States of the Former USSR was begun in 1993.

OIA funds contracts for cancer information dissemination in Latin America through the Pan American Health Organization (PAHO), for technology transfer through the International Union Against Cancer (UICC) and for the support of the U.S. National Committee of the UICC through the National Academy of Sciences (NAS).

With the Fogarty International Center (FIC), OIA participates in the administration of projects on bone marrow transplantation in Zagreb, Croatia, on the carcinogenicity of Indian Tobacco products and on the molecular epidemiology of childhood leukemia in Bangalore, Bombay, and New Delhi. It administers U.S. Agency for International Development (USAID)-funded projects at the Ain-Shams Medical Genetics Center and at the National Cancer Institute in Cairo, Egypt.

OIA funds the screening of Red Sea natural products for anti-cancer drug activity and cancer epidemiology studies of migrants into Israel. Other OIA supported projects include a US-German effort to develop an HPV

mucosotropic vaccine and US-CIS (Commonwealth of Independent States) efforts in charged particle therapy and anti-sense nucleotide synthesis.

In cooperation with the International Cancer Information Center (ICIC), OIA's three CD-ROM based information dissemination demonstration projects in cancer centers in Eastern Europe in 1990 expanded to fifty in the developing world in FY 1993.

PDQ has been translated into Spanish, is available in this language through CancerFax, and is accessible through electronic mail using the Internet (CancerNet) or BITNIS systems.

Distribution of an "Outstanding Cancer Seminars" series on videotape was continued during FY 1993.

OIA maintains a liaison between the NCI and international agencies involved in cancer research and prevention, such as the EORTC, IARC, UICC, OECI, PAHO, WHO, and with national organizations which have international components, such as the American Cancer Society (ACS) and NAS in the U.S.; the United Kingdom Coordinating Committee for Cancer Research (UKCCCR), the Cancer Research Campaign (CRC), and Imperial Cancer Research Fund in the United Kingdom, the Association pour la Recherche sur le Cancer (ARC); Centre National de la Recherche Scientifique (CNRS), and Institut National de la Sante et de la Recherche Medicale (INSERM) in France; the JFCR, or the Japan Society for the Promotion of Science (JSPS); and many more.
The NCI's four research divisions supported 75 foreign grants and contracts (54 and 21, respectively). In addition, 26 domestic grants and 18 contracts had a foreign component.

OIA funded, in cooperation with FIC, the first year of seven Fogarty International Research Collaboration Awards (FIRCA) to NCI-supported scientists for work to be performed in Central and East European institutions.

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's information dissemination efforts include behavior modification interventions, e.g. smoking and breast screening, as well as education activities specifically directed towards professional and public audiences. The PDQ system is a database containing treatment recommendations and summary information on all active clinical trials supported by NCI. A directory of physicians and organizations that provide cancer care is also included in the PDQ system.

The Cancer Information Service (CIS), known to the public as 1-800-4-CANCER, is staffed by information specialists 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 new cancer treatment (i.e. gene vaccine therapy, taxol), results in a flood of calls to this toll free number.

The CIS consists of a nationwide network of 19 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.

In addition to individual mailings of pamphlets/brochures by the local network offices, 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 Calls	Total Literature Distributed	PDQ Searches
FY 1993	550,000	127,641	18,000,000	30,000

Scientific Information Dissemination

The ICIC continues to promote the use of PDQ to the widest audiences possible. The ICIC maintains three services that make cancer information from NCI available quickly and easily through fax (CancerFax®), electronic mail (CancerNet®), or via the Internet. These services make all PDQ treatment, supportive care, and cancer screening and drug summaries from PDQ available to users throughout the world. To facilitate communication with Spanish speaking health professionals and patients, much of the information in CancerFax and CancerNet is available in Spanish as well as English. The ICIC, in cooperation with the University of Chile and the Chilean Embassy, installed the Spanish language version of CancerFax in Santiago, Chile for regional dissemination of NCI's cancer information. The ICIC continues to increase the number of distributors and methods of access to PDQ and CANCERLIT. The Journal of the National Cancer Institute, the NCI's peer-reviewed scientific periodical publication, provides information regarding clinical and basic research advances to cancer professionals worldwide. ICIC staff present NCI's scientific information services, including database demonstrations and seminars, at national and international medical meetings to enhance the awareness of these services.

Organization

Directory of Personnel

Director, National Cancer Institute			
	Dr. Samuel Broder	Building 31 11-A-48	301-496-5615
Deputy Director			
	Dr. Daniel C. Ihde	Building 31 11-A-48	301-496-1927
Special Assistant			
	Dr. Judith E. Karp	Building 31 11-A-27	301-496-3505
Special Assistant for Minority Affairs			
	(Vacant)	Building 31 11-A-27	301-496-3506
Program Manager, Equal Employment Opportunity Office			
	Ms. Maxine I. Richardson	Building 31 10-A-33	301-496-6266
Director, Office of Legislation and Congressional Activities			
	Ms. Dorothy Tisevich	Building 31 11-A-23	301-496-5217
Assistant Director for Program Operations and Planning			
	Ms. Iris Schneider	Building 31 11-A-48	301-496-5534
Chief, Planning, Evaluation, and Analysis Branch			
	Ms. Cherie Nichols	Building 31 11-A-21	301-496-5515
Acting Associate Director for Cancer Prevention Research Program			
	Dr. Peter Greenwald	Building 31 10-A-52	301-496-6616
Associate Director for Cancer Communications			
	Mr. J. Paul Van Nevel	Building 31 10-A-31	301-496-6631
Chief, Information Resources Branch			
	Ms. Nancy Brun	Building 31 10-A-30	301-496-4394
Chief, Reports and Inquiries Branch			
	Ms. Eleanor Nealon	Building 31 10-A-31	301-496-6631
Chief, Information Projects Branch			
	Dr. Sharyn Sutton	Building 31 10-A-11	301-402-3304
Associate Director for International Affairs			
	Dr. Federico Welsch	Building 31 4-B-55	301-496-4761
Associate Director for International Cancer Information Center			
	Ms. Susan M. Hubbard	Building 82 102	301-496-9096
Chief, Computer Communications Branch			
	Mr. Nicholas B. Martin	Building 82 219	301-496-8880
Chief, Scientific Publications Branch			
Managing Editor, Journal of the National Cancer Institute			
	Ms. Julianne Chappell	Building 82 235	301-496-1997

Chief, International Cancer Research Data Bank Branch
Dr. Gisele Sarosy — Building 82 113 — 301-496-7406

Associate Director for Administrative Management
Mr. Philip D. Amoruso — Building 31 11-A-48 — 301-496-5737
Deputy Associate Director for Administrative Management
Mr. Donald Christoferson — Building 31 11-A-48 — 301-496-5737
Chief, Administrative Services Branch
Ms. Susan Kiser — Building 31 11-A-33 — 301-496-5801
Chief, Financial Management Branch
Mr. John P. Hartinger — Building 31 11-A-16 — 301-496-5803
Budget Officer
Ms. Mary Cushing — Building 31 11-A-16 — 301-496-5803
Chief, Personnel Management Branch
Ms. Marianne Wagner — Building 31 3-A-19 — 301-496-3337
Chief, Research Contracts Branch
Mr. John P. Campbell, Jr. — Executive Plaza South 604 — 301-496-8628
Chief, Management Analysis Branch
Ms. Marilyn Jackson — Executive Plaza South 550 — 301-496-6985
Chief, Grants Administration Branch
Mr. Leo F. Buscher, Jr. — Executive Plaza South 234 — 301-496-7753
Chief, Extramural Financial Data Branch
Mr. Stephen M. Hazen — Executive Plaza South 643 — 301-496-7660
Chief, Management Information Systems Branch
Ms. Betty Ann Sullivan — Executive Plaza South 511 — 301-496-1038

Director, Office of Laboratory Animal Science
Dr. John Donovan — Building 31 4-B-59 — 301-496-1866

Director, Office of Technology Development
Dr. Thomas D. Mays — Building 31 4-A-51 — 301-496-0477

Associate Director for Frederick Cancer Research and Development Center
Frederick Cancer Research and Development Center, Frederick Maryland
(Vacant) — Building 427 9 — 8-301-846-5096
General Manager/Project Officer
Dr. Cedric W. Long — Building 427 8 — 8-301-846-1108
Deputy General Manager
Mr. Richard Carter — Building 427 3 — 8-301-846-1106

Director, Division of Cancer Etiology
Dr. Richard H. Adamson — Building 31 11-A-03 — 301-496-6618
Administrative Officer
Mr. Mark F. Kochevar — Building 31 11-A-11 — 301-496-6556

Director, Division of Cancer Biology, Diagnosis, and Centers			
	Dr. Alan S. Rabson	Building 31 3-A-11	301-496-4345
Administrative Officer			
	Mr. Lawrence D. Willhite	Building 31 3-A-11	301-496-3381
Director, Division of Cancer Treatment			
	Dr. Bruce A. Chabner	Building 31 3-A-44	301-496-4291
Administrative Officer			
	Mr. Lawrence J. Ray	Building 31 3-A-44	301-496-2775
Director, Division of Extramural Activities			
	Mrs. Barbara S. Bynum	Executive Plaza North 600	301-496-5147
Administrative Officer			
	Ms. Deborah Jarman	Executive Plaza North 604	301-496-5915
Director, Division of Cancer Prevention and Control			
	Dr. Peter Greenwald	Building 31 10-A-52	301-496-6616
Administrative Officer			
	Mr. Nicholas Olimpio	Building 31 10-A-50	301-496-9606

Director's Biography
Dr. Samuel Broder

Dr. Samuel Broder was named Director of the National Cancer Institute in 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. He is a career officer in the United States Public Health Service and holds the rank of Assistant Surgeon General (08).

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

Dr. Broder's research has centered on the biology of the immune system with emphasis on abnormal immunoregulation in cancer, and on the relationship between cancer and immunodeficiency states including AIDS. 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. He is the recipient of numerous scientific awards and is a member of the Institute of Medicine. His major focus as Director has been the need to ensure balance among the three foundation stones of the Institute: basic research, clinical trials (in prevention and therapy), and cancer centers. He has also focused on the relationship between poverty and cancer.

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.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

National Cancer Advisory Board

Appointees	Expiration of Appointment	Appointees	Expiration of Appointment	Appointees	Expiration of Appointment
Paul Calabresi, M.D., Chairperson *Rhode Island Hospital* *Providence, RI*	1996	Robert W. Day, M.D., MPH, Ph.D *Fred Hutchinson Cancer Research Center* *Seattle, Washington*	1998	Ellen V. Sigal, Ph.D *SIGAL Environmental Inc.* *Washington, D.C.*	1998
Frederick F. Becker, M.D. *University of Texas* *Houston, TX*	1996	Mrs. Barbara P. Gimbel *The Society of Memorial Sloan-Kettering Cancer Center* *New York, New York*	1998	Howard M. Temin, Ph.D *University of Wisconsin* *Madison, WI*	1994
Erwin P. Bettinghaus, Ph.D *Michigan State University* *East Lansing, MI*	1994	Mrs. Brenda L. Johnson *BrenMer Industries, Inc.* *New York, NY*	1994	Samuel Wells, Jr., M.D. *Washington University* *St. Louis, MO*	1994
David G. Bragg, M.D. *University of Utah* *Salt Lake City, UT*	1994	Walter Lawrence, Jr., M.D. *Virginia Commonwealth University* *Richmond, VA*	1994	Charles B. Wilson, M.D. *Brain Tumor Research Center* *U.C.S.F.* *San Francisco, Ca.*	1998
Mrs. Zora K. Brown *Cancer Awareness Program* *Washington, D.C.*	1998	Marlene A. Malek, R.N. *Vincent Lombardi Cancer Center* *McLean, VA*	1996	Executive Secretary *Mrs. Barbara S. Bynum* *National Cancer Institute, NIH* *Bethesda, MD*	
Kenneth Chan, Ph.D *Ohio State University* *Columbus, Ohio*	1996	Deborah K. Mayer, M.S.N., O.C.N., F.A.A.N. *Ontario Cancer Institute/Princess Margaret Hospital* *Toronto, Ontario, Canada*	1996		
Pelayo Correa, M.D. *Louisiana State University* *Medical Center* New Orleans, Louisiana	1998	Sydney Salmon, M.D. *Arizona Cancer Center* *Tucson, AZ*			

Ex Officio Members

The Honorable Donna E. Shalala, Ph.D *Secretary for Health and Human Services* *Washington, D.C.*	James W. Holsinger, Jr., M.D. *Department of Veterans' Affairs* *Washington, D.C.*	Mrs. Jacqueline Jones-Smith *Consumer Product Safety Commission* *Bethesda, MD*
Harold Varmus, M.D. *Director, National Institutes of Health* *Bethesda, MD*	David A. Kessler, M.D. *Food and Drug Administration* *Rockville, MD*	Kenneth Olden,M.D. *National Institute of Environmental Health Sciences* *Research Triangle Park, NC*
The Honorable Robert B. Reich *Secretary of Labor* *Washington, D.C.*	J. Donald Millar,M.D. *National Institute for Occupational Safety and Health* *Atlanta, GA*	Clifford J. Gabriel, Ph.D *Office of Science and Technology Policy* *Washington, D.C.*
The Honorable Edward Martin, M.D. *Acting Assistant Secretary of Defense--Health Affairs* *Washington, D.C.*	Ari Patrinos, Ph.D. *Department of Energy* *Washington, D.C.*	Ms. Carol M. Browner *Environmental Protection Agency* *Washington, D.C.*

Alternates to Ex Officio Members

Richard A. Lemen, Ph.D. *National Institute for Occupational Safety and Health* Atlanta, GA.	Hugh McKinnon, M.D. *Environmental Protection Agency* *Washington, D.C.*	Ralph E. Yodaiken, M.D. *Department of Labor* *Washington, D.C.*
John R. Johnson, M.D. *Food and Drug Administration* *Rockville, MD*	Raymond L. Sphar, M.D. *Department of Veterans' Affairs* *Washington, D.C.*	Captain Bimal C. Ghosh, M.D. *Department of the Navy* *Washington, D.C.*
	Andrew Ulsamer, Ph.D. *Consumer Product Safety Commission* *Bethesda, MD*	John C. Wooley, Ph.D. *Department of Energy* *Washington, D.C.*

Division Boards of Scientific Counselors

Division of Cancer Biology, Diagnosis, and Centers	Albert H. Owens, Jr., M.D. Chairperson	1994	David M. Livingston, M.D. Albert H. LuBuglio, M.D.	1996 1994
	Barbara F. Atkinson, M.D.	1995	Sue Ellen Martin, M.D., Ph.D.	1997
	Judith L. Campbell, Ph.D.	1994	O. Ross McIntyre, M.D.	1994
	Esther H. Chang, Ph.D.	1996	Azorides R. Morales, M.D.	1995
	Albert E. Dahlberg, M.D., Ph.D.	1996	Curtis L. Parker, Ph.D.	1997
	Lois B. Epstein, M.D.	1995	Robert L. Reddick, M.D.	1995
	Max E. Gottesman, M.D.	1996	Alan Solomon, M.D.	1996
	Michael E. Lamm, M.D.	1997	Jouni Uitto, M.D.,Ph.D.	1996
Division of Cancer Treatment	Clara D. Bloomfield, M.D. Chairperson	1995	Donald W. Kufe, M.D. Elliot C. Lasser, M.D. Victor Ling, Ph.D.	1994 1994 1994
	Charles A. Coltman, Jr., M.D.	1997	Beverly S. Mitchell, M.D.	1996
	Phillip Crews, Ph.D.	1994	Rodrique Mortel, M.D.	1995
	Carlo M. Croce, M.D.	1995	Allen I. Oliff, M.D.	1996
	Zvi Y. Fuks, M.D.	1997	Lester J. Peters, M.D.	1995
	Philip D. Greenberg, M.D.	1996	Patricia L Schmoke, M.D.	1996
	Sidney M. Hecht, Ph.D.	1997	Paul M. Sondel, M.D., Ph.D.	1997
	Robert W. Holden, M.D.	1994	Glenn D. Steele, Jr., M.D., Ph.D.	1995
	Loretta M. Itri, M.D.	1994	Ellen S. Vitetta, Ph.D.	1996
Division of Cancer Etiology	G. Barry Pierce, M.D. Chairperson	1994	Stephen S. Hecht, Ph.D. Maurice R. Hilleman, Ph.D. Barbara S. Hulka, M.D.	1993 1993 1994
	Marcel A. Baluda, Ph.D.	1993	Ru Chih C. Huang, Ph.D.	1994
	Webster Cavanee, Ph.D.	1994	Abraham M. Nomura, M.D.	1994
	Donald S. Davies, Ph.D.	1995	Nancy L. Oleinick, Ph.D.	1995
	James S. Felton, Ph.D.	1993	Alan P. Poland, M.D.	1995
	Lawrence J. Fischer, Ph.D.	1993	David Schottenfeld, M.D.	1994
	Peter J. Fischinger, M.D., Ph.D.	1994	Mimi C. Yu, Ph.D.	1994
Division of Cancer Prevention and Control	M. Alfred Haynes, M.D., M.P.H. Chairperson	1995	E. Robert Greenberg, M.D. Charles H. Hennekens, M.D., Dr. P.H.	1995 1994
	David S. Alberts, M.D.	1994	Rumaldo Z. Juarez, Ph.D.	1993
	John G. Boyce, M.D.	1996	Carol K. Redmond, M.S., Sc.D.	1996
	Helene G. Brown	1995	Maryann Roper, M.D.	1994
	Eric R. Fearon, M.D., Ph.D.	1996	G. Marie Swanson, Ph.D., M.P.H.	1996
	Elaine B. Feldman, M.D.	1994	Ian M. Thompson, Jr., M.D.	1996
	Cutberto Garza, M.D., Ph.D.	1994	Melvyn S. Tockman, M.D., Ph.D.	1996
Frederick Cancer Research and Development Center	Donald R. Helinski, Ph.D. Chairperson	1994		
	John M. Coffin, Ph.D.	1996	Rasika M. Harshey, Ph.D.	1996
	Frank Costantini, Ph.D.	1997	John E. Johnson, Ph.D.	1997
	Raymond L. Erikson, Ph.D.	1997	James L. Sherley, M.D., Ph.D.	1996

President's Cancer Panel

Harold Freeman, M.D. 1994
Chairman
Director of Surgery
Harlem Hospital Center
New York, NY

Frances M. Visco, Esq. 1996
President
National Breast Cancer Coalition
Philadelphia, Pa.

Henry C. Pitot., M.D., Ph.D. 1995
Professor of Oncology and Pathology
McArdle Laboratory
University of Madison
Madison, Wisconsin

Executive Secretary
Maureen O. Wilson, Ph.D.
Assistant Director
National Cancer Institute
Building 31, Room 4A34
Bethesda, MD 20892

Executive Committee Members

Dr. Samuel Broder
Director

Dr. Daniel C. Ihde
Deputy Director

Mr. Philip D. Amoruso
Associate Director for Administrative Management

Dr. Richard H. Adamson
Director, Division of Cancer Etiology

Mrs. Barbara Bynum
Director, Division of Extramural Activities

Dr. Bruce A. Chabner
Director, Division of Cancer Treatment

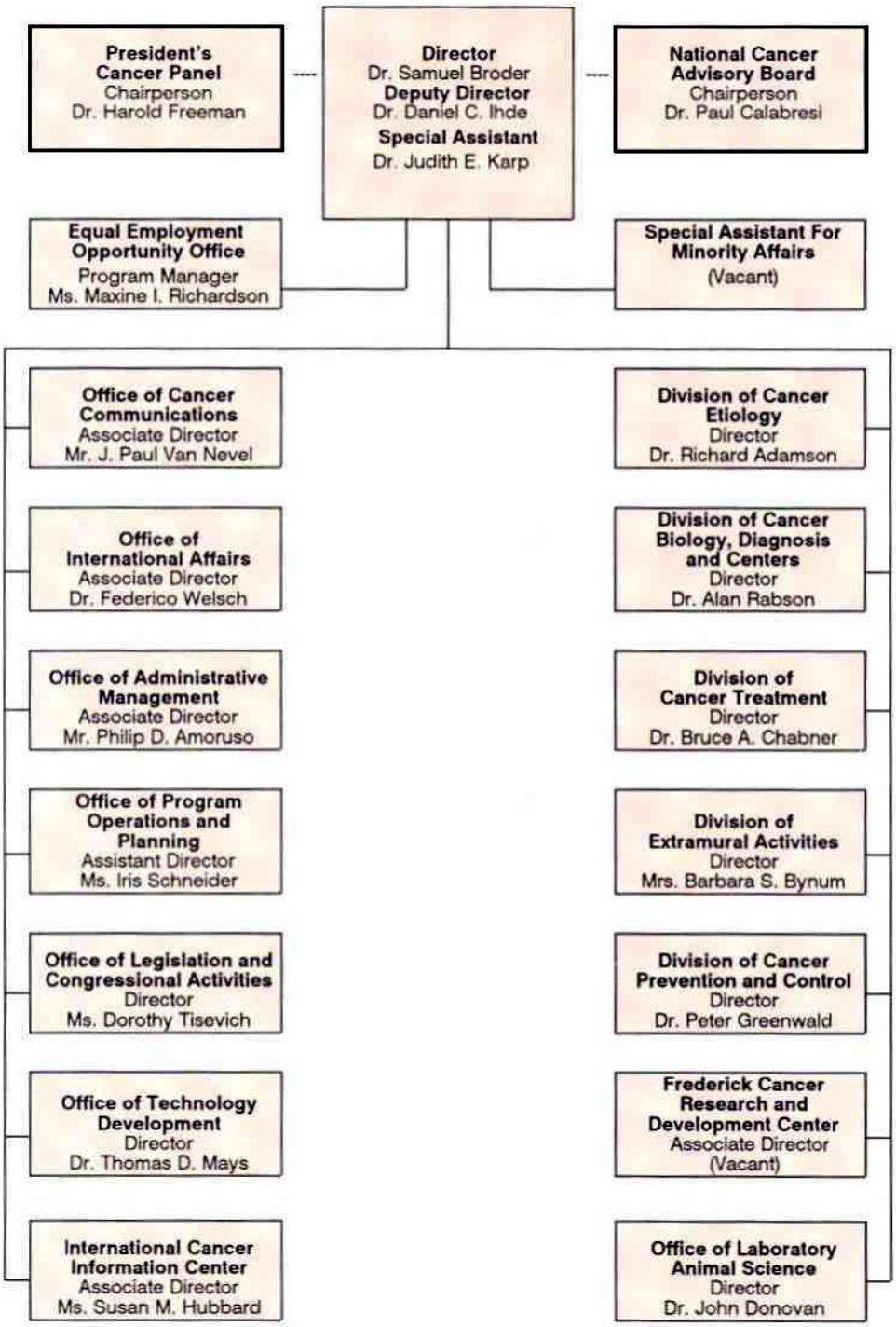
Dr. Peter Greenwald
Director, Division of Cancer Prevention and Control

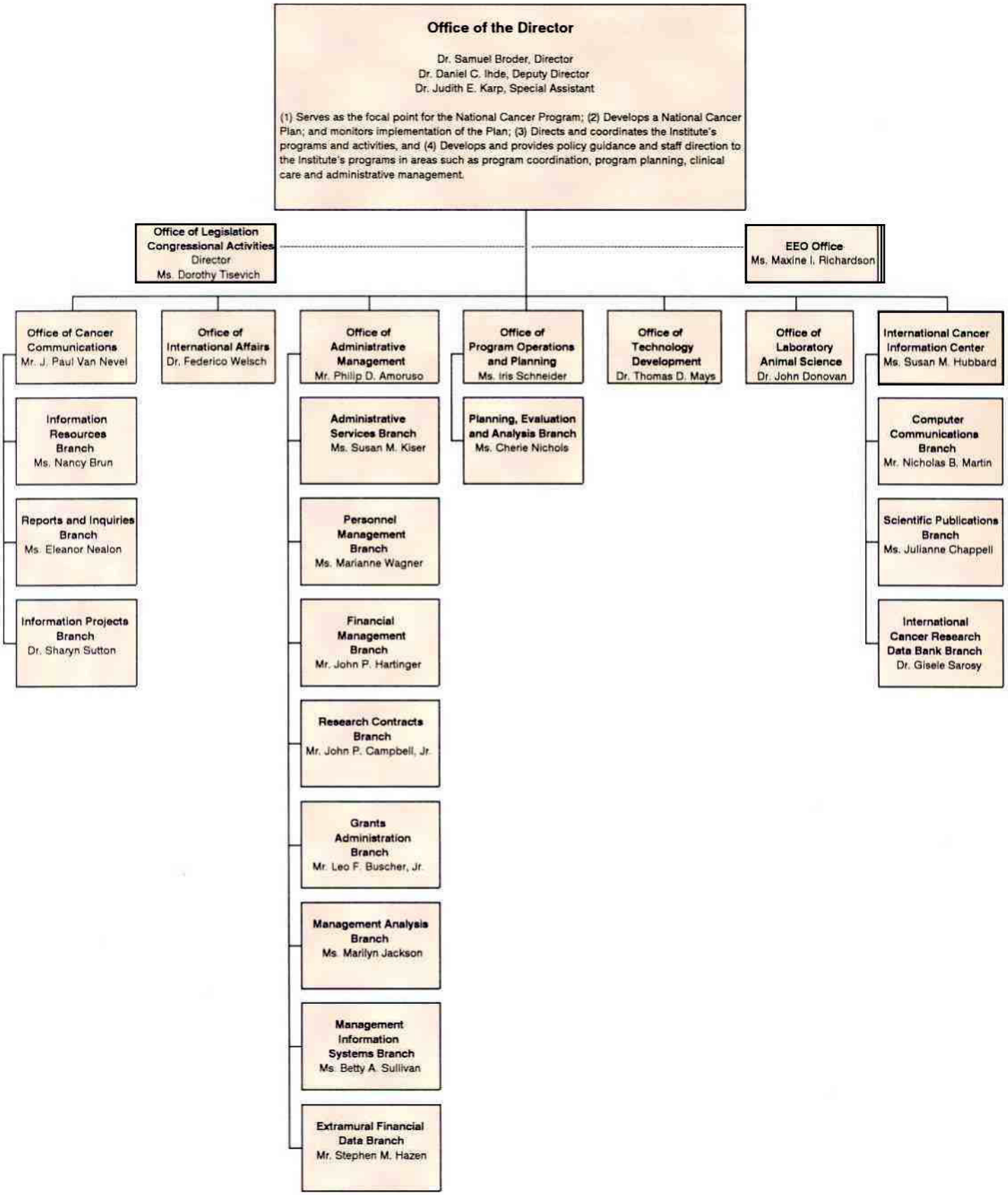
Vacant
Associate Director, Frederick Cancer Research and Development Center

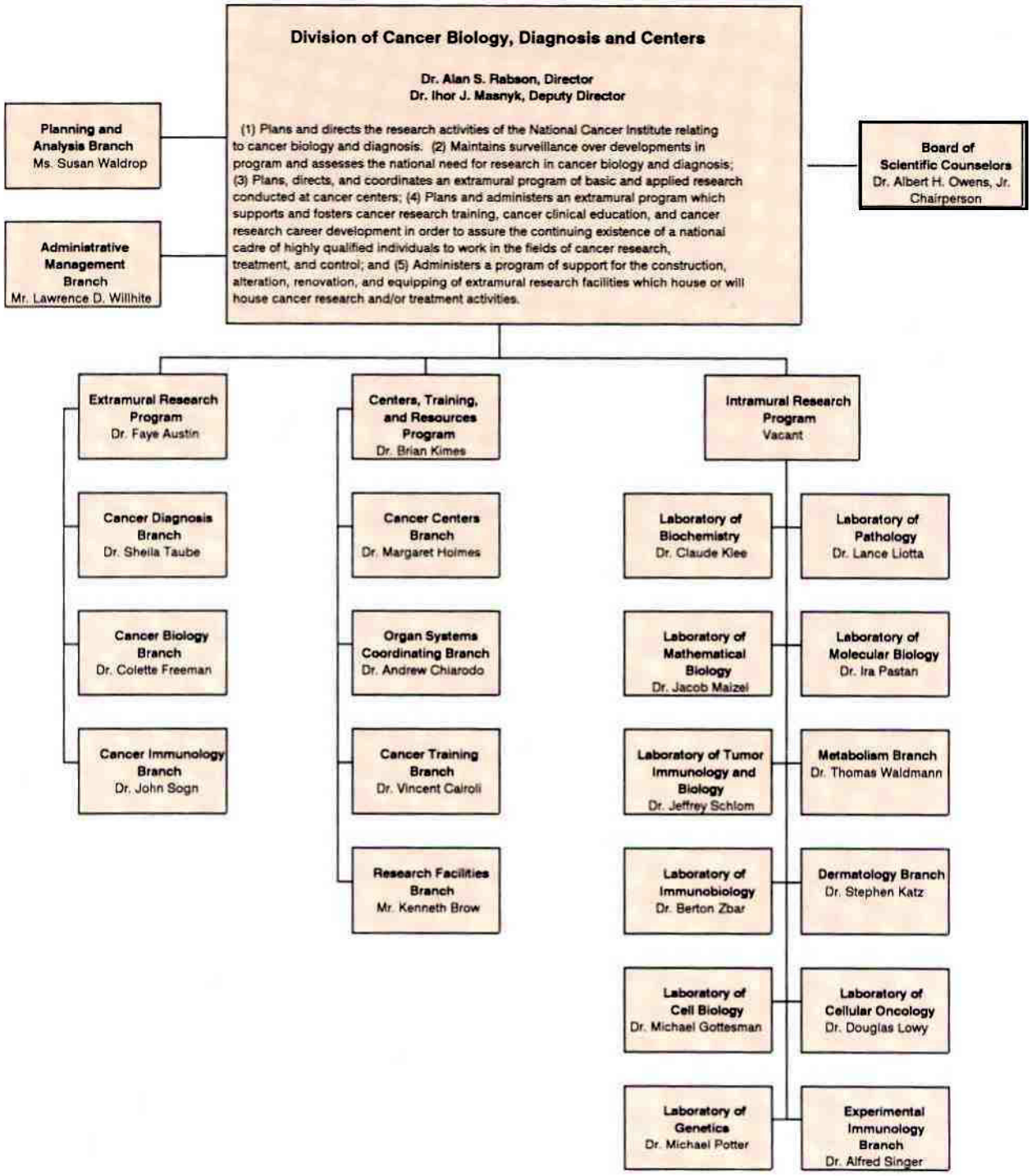
Dr. Alan Rabson
Director, Division of Cancer Biology, Diagnosis and Centers

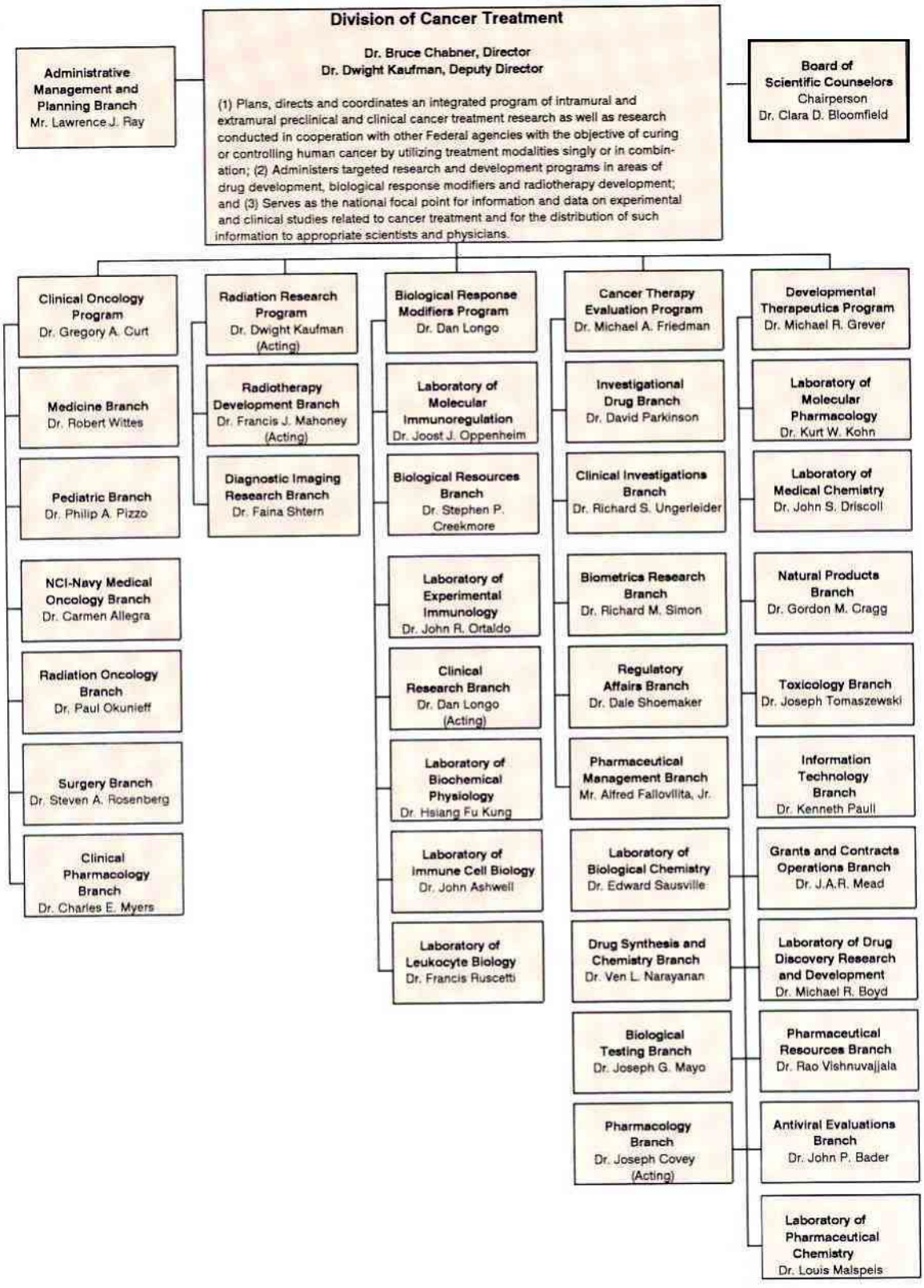
Ms. Iris Schneider
Executive Secretary

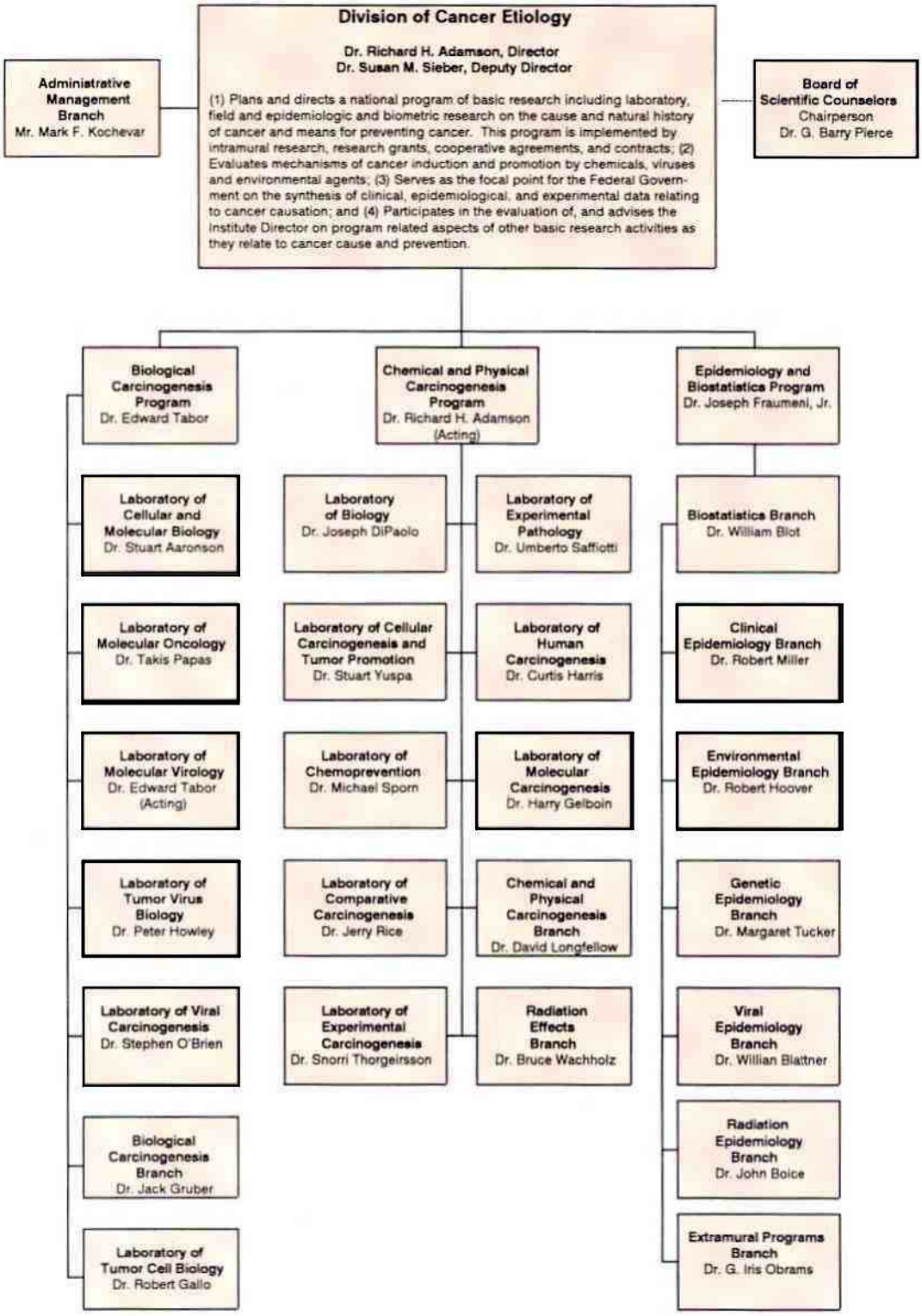
National Cancer Institute Organization

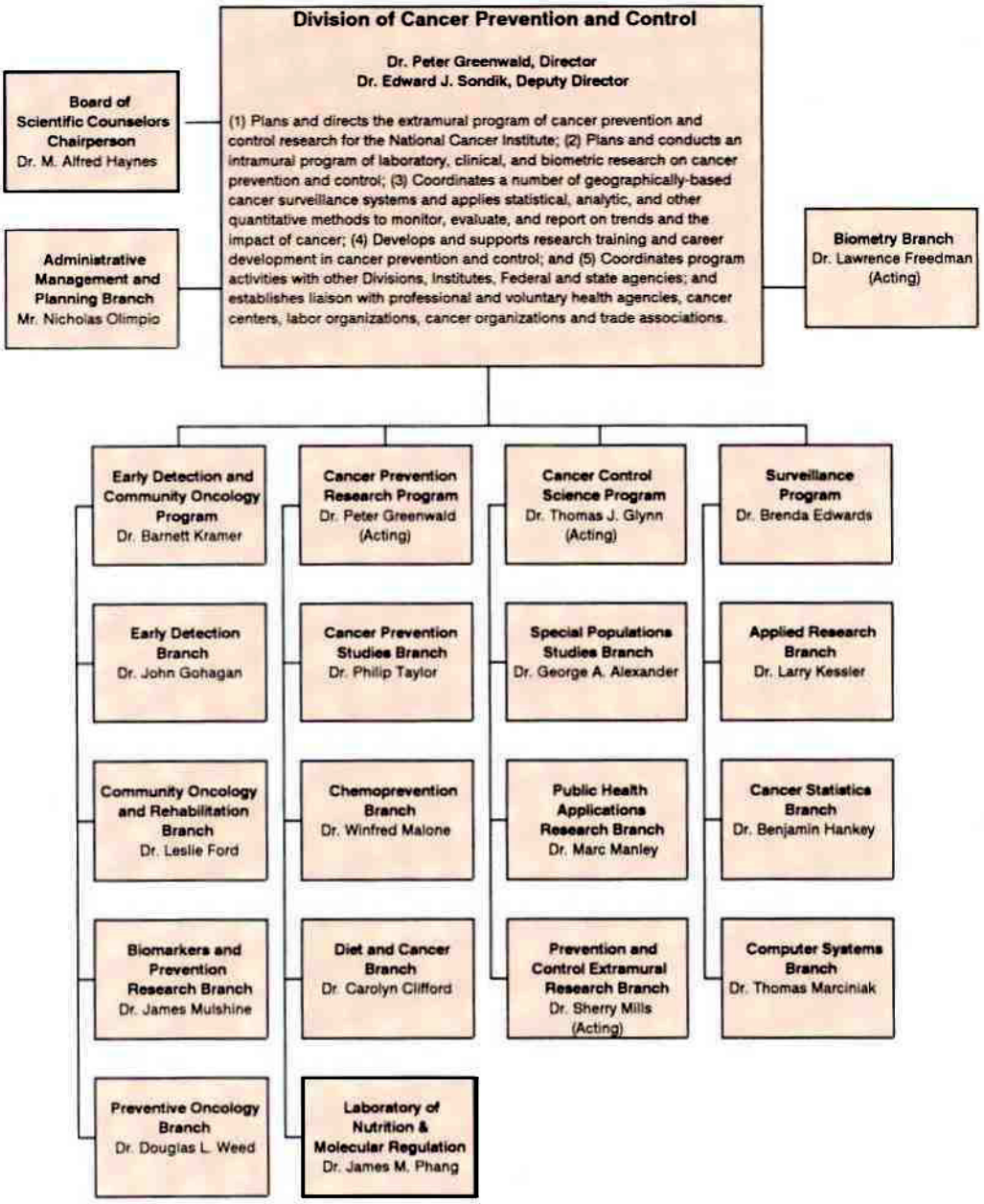



Office of the Director
Dr. Samuel Broder, Director
Dr. Daniel C. Ihde, Deputy Director
Dr. Judith E. Karp, Special Assistant
(1) Serves as the focal point for the National Cancer Program; (2) Develops a National Cancer Plan; and monitors implementation of the Plan; (3) Directs and coordinates the Institute's 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.
Office of Legislation Congressional Activities
Director
Ms. Dorothy Tisevich
EEO Office
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 M. 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
Ms. Marilyn Jackson
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. Cherie Nichols
Office of Technology Development
Dr. Thomas D. Mays
Office of Laboratory Animal Science
Dr. John Donovan
International Cancer Information Center
Ms. Susan M. Hubbard
Computer Communications Branch
Mr. Nicholas B. Martin
Scientific Publications Branch
Ms. Julianne Chappell
International Cancer Research Data Bank 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; (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 Waldrop
Administrative Management Branch
Mr. Lawrence D. Willhite
Board of Scientific Counselors
Dr. Albert H. Owens, Jr.
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
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
Laboratory of Cell Biology
Dr. Michael Gottesman
Laboratory of Genetics
Dr. Michael Potter
Laboratory of Pathology
Dr. Lance Liotta
Laboratory of Molecular Biology
Dr. Ira Pastan
Metabolism Branch
Dr. Thomas Waldmann
Dermatology Branch
Dr. Stephen Katz
Laboratory of Cellular Oncology
Dr. Douglas Lowy
Experimental Immunology Branch
Dr. Alfred Singer


Division of Cancer Treatment
Dr. Bruce Chabner, Director
Dr. Dwight Kaufman, 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 human cancer 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
Chairperson
Dr. Clara D. Bloomfield
Clinical Oncology Program
Dr. Gregory A. Curt
Medicine Branch
Dr. Robert Wittes
Pediatric Branch
Dr. Philip A. Pizzo
NCI-Navy Medical Oncology Branch
Dr. Carmen Allegra
Radiation Oncology Branch
Dr. Paul Okunieff
Surgery Branch
Dr. Steven A. Rosenberg
Clinical Pharmacology Branch
Dr. Charles E. Myers
Radiation Research Program
Dr. Dwight Kaufman (Acting)
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
Laboratory of Immune Cell Biology
Dr. John Ashwell
Laboratory of Leukocyte Biology
Dr. Francis Ruscetti
Cancer Therapy Evaluation Program
Dr. Michael A. Friedman
Investigational Drug Branch
Dr. David Parkinson
Clinical Investigations Branch
Dr. Richard S. Ungerleider
Biometrics Research Branch
Dr. Richard M. Simon
Regulatory Affairs Branch
Dr. Dale Shoemaker
Pharmaceutical Management Branch
Mr. Alfred Fallovilita, Jr.
Laboratory of Biological Chemistry
Dr. Edward Sausville
Drug Synthesis and Chemistry Branch
Dr. Ven L. Narayanan
Biological Testing Branch
Dr. Joseph G. Mayo
Pharmacology Branch
Dr. Joseph Covey (Acting)
Developmental Therapeutics Program
Dr. Michael R. Grever
Laboratory of Molecular Pharmacology
Dr. Kurt W. Kohn
Laboratory of Medical Chemistry
Dr. John S. Driscoll
Natural Products Branch
Dr. Gordon M. Cragg
Toxicology Branch
Dr. Joseph Tomaszewski
Information Technology Branch
Dr. Kenneth Paull
Grants and Contracts Operations Branch
Dr. J.A.R. Mead
Laboratory of Drug Discovery Research and Development
Dr. Michael R. Boyd
Pharmaceutical Resources Branch
Dr. Rao Vishnuvajjala
Antiviral Evaluations Branch
Dr. John P. Bader
Laboratory of Pharmaceutical Chemistry
Dr. Louis Malspeis

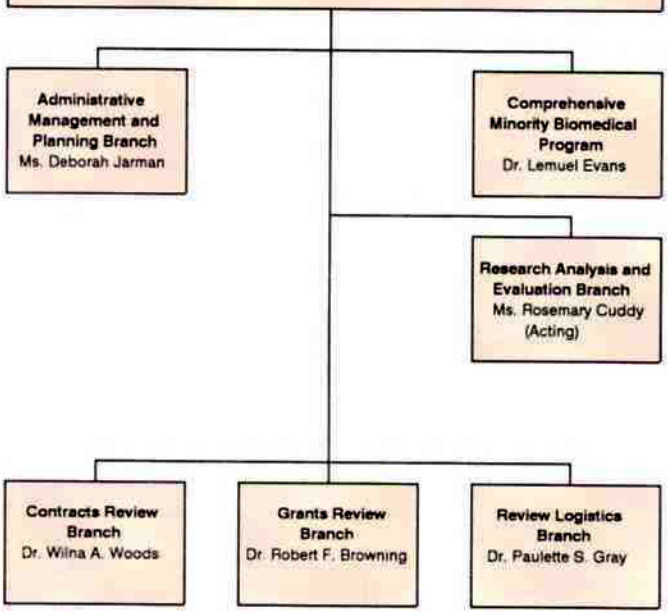

Division of Cancer Etiology
Dr. Richard H. Adamson, Director
Dr. Susan M. Sieber, Deputy Director
(1) Plans and directs a national program of basic research including laboratory, field and epidemiologic and biometric research on the cause and natural history of cancer and means for preventing cancer. 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 F. Kochevar
Board of Scientific Counselors
Chairperson
Dr. G. Barry Pierce
Biological Carcinogenesis Program
Dr. Edward Tabor
Chemical and Physical Carcinogenesis Program
Dr. Richard H. Adamson (Acting)
Epidemiology and Biostatistics Program
Dr. Joseph Fraumeni, Jr.
Laboratory of Cellular and Molecular Biology
Dr. Stuart Aaronson
Laboratory of Biology
Dr. Joseph DiPaolo
Laboratory of Experimental Pathology
Dr. Umberto Saffiotti
Biostatistics Branch
Dr. William Blot
Laboratory of Molecular Oncology
Dr. Takis Papas
Laboratory of Cellular Carcinogenesis and Tumor Promotion
Dr. Stuart Yuspa
Laboratory of Human Carcinogenesis
Dr. Curtis Harris
Clinical Epidemiology Branch
Dr. Robert Miller
Laboratory of Molecular Virology
Dr. Edward Tabor (Acting)
Laboratory of Chemoprevention
Dr. Michael Sporn
Laboratory of Molecular Carcinogenesis
Dr. Harry Gelboin
Environmental Epidemiology Branch
Dr. Robert Hoover
Laboratory of Tumor Virus Biology
Dr. Peter Howley
Laboratory of Comparative Carcinogenesis
Dr. Jerry Rice
Chemical and Physical Carcinogenesis Branch
Dr. David Longfellow
Genetic Epidemiology Branch
Dr. Margaret Tucker
Laboratory of Viral Carcinogenesis
Dr. Stephen O'Brien
Laboratory of Experimental Carcinogenesis
Dr. Snorri Thorgeirsson
Radiation Effects Branch
Dr. Bruce Wachholz
Viral Epidemiology Branch
Dr. Willian Blattner
Biological Carcinogenesis Branch
Dr. Jack Gruber
Radiation Epidemiology Branch
Dr. John Boice
Laboratory of Tumor Cell Biology
Dr. Robert Gallo
Extramural Programs Branch
Dr. G. Iris Obrams


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, Federal and state agencies; and establishes liaison with professional and voluntary health agencies, cancer centers, labor organizations, cancer organizations and trade associations.
Board of Scientific Counselors Chairperson
Dr. M. Alfred Haynes
Administrative Management and Planning Branch
Mr. Nicholas Olimpio
Biometry Branch
Dr. Lawrence Freedman (Acting)
Early Detection and Community Oncology Program
Dr. Barnett Kramer
Early Detection Branch
Dr. John Gohagan
Community Oncology and Rehabilitation Branch
Dr. Leslie Ford
Biomarkers and Prevention Research Branch
Dr. James Mulshine
Preventive Oncology Branch
Dr. Douglas L. Weed
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
Laboratory of Nutrition & Molecular Regulation
Dr. James M. Phang
Cancer Control Science Program
Dr. Thomas J. Glynn (Acting)
Special Populations Studies Branch
Dr. George A. Alexander
Public Health Applications Research Branch
Dr. Marc Manley
Prevention and Control Extramural Research Branch
Dr. Sherry Mills (Acting)
Surveillance Program
Dr. Brenda Edwards
Applied Research Branch
Dr. Larry Kessler
Cancer Statistics Branch
Dr. Benjamin Hankey
Computer Systems Branch
Dr. Thomas Marciniak

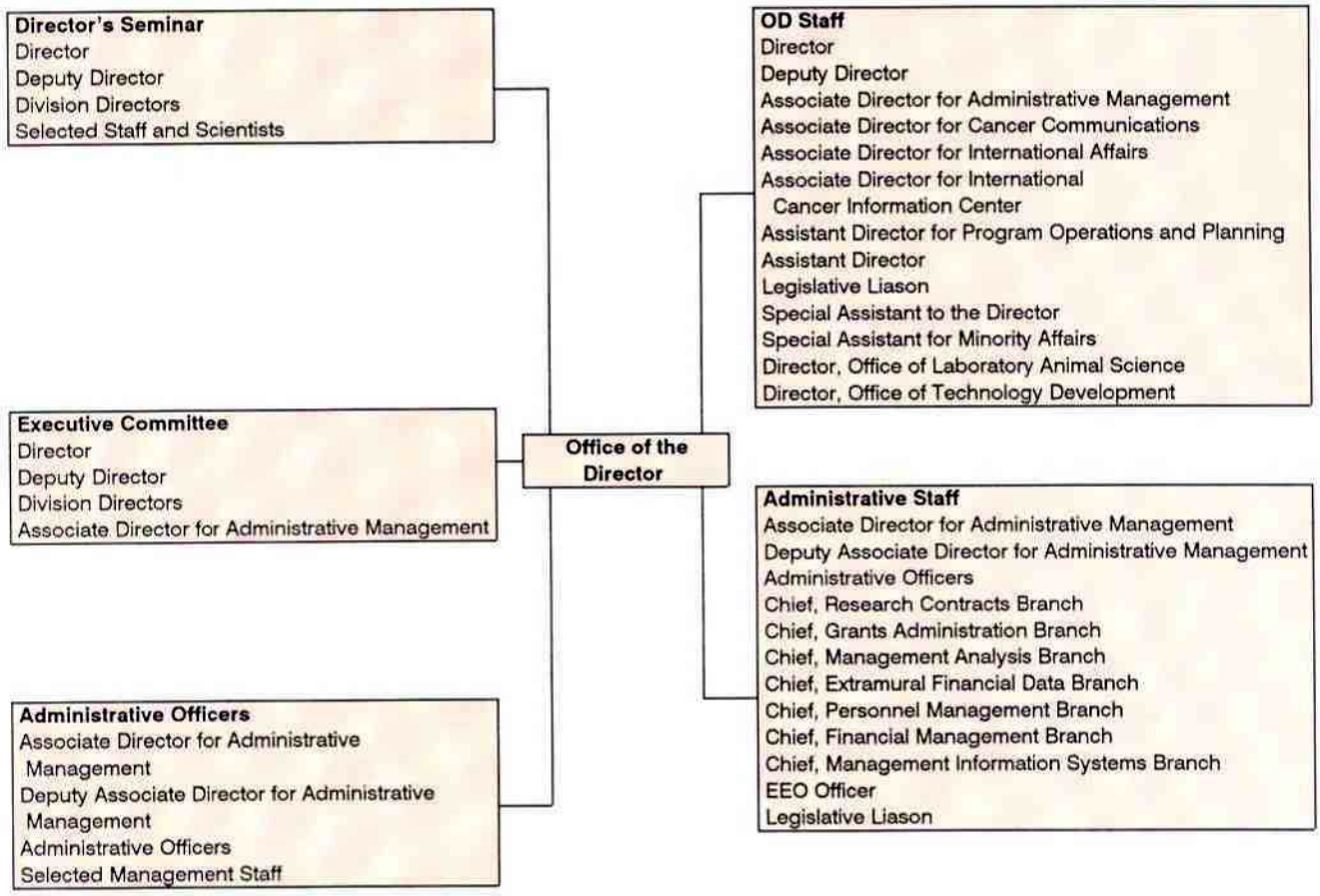
Division of Extramural Activities

Mrs. Barbara S. Bynum, Director
Dr. Marvin Kalt, Deputy Director
Dr. Vincent Oliverio, Associate Director
Dr. Elliot Stonehill, Special Assistant to the Director

(1) Administers and directs the Institute's grant and contract review 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) Monitors and coordinates the operation of the divisional Boards of Scientific Counselors to assure uniformity and timeliness of the concept review of projects to be developed under contract or in response to RFAs; (7) Coordinates program planning and evaluation in the extramural area; (8) Provides scientific reports and analysis to the Institute's grant and central programs; and (9) administers programs to broaden participation by minorities in cancer-related research and training activities and to enhance the effectiveness of programs in cancer treatment and control in reaching the minority community and and other historically underserved segments of the general population.



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. - $47,920 (GS-13/1) Physicians - $59,099 (GS-13/8)	Office of Personnel Management; Contact Division Director of 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.	Salary range is equivalent to GS-13/1 and with maximum limited to level IV of the Executive Schedule $115,700[2].	Final approval rests with the Division Director or Deputy Director, NCI depending on recommended action.

[1]*Does not necessarily indicate that positions are currently available at the National Cancer Institute.*
2Medical Officer (Research), GS-602 Special Rate Scale

Position	Eligibility	Annual Salary	Mechanism of Entry
III. Clinical Associate Program			
A. Clinical Associates	Initial appointment for 2 years with the possibility of 1-year extension. 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. Must be a U.S. Citizen or a permanent U.S. resident. **NOTE:** Foreign M.D.'s in a U.S. residency training program are also eligible through a Fogarty International Center appointment.	$38,500 1st yr $40,500 2nd yr $42,500 3rd yr	Apply to NIH Office of Education Building 10 Room 1C-129
B. Pharmacology Research Associates (PRAT). Physicians committed to research careers in pharmacologic sciences, or clinical pharmacology.	Appointment for 2 years. Candidates must be U.S. citizens or permanent residents of the U.S. who have been awarded a doctoral degree or who have been certified by a university as meeting all the requirements leading to a doctorate. The degree must be in a biomedical or related science and must have been received within the 5 years preceding the date of application.	First year salaries range from $33,500 for pH.Ds to $37,000 for M.D.s based on years of postdoctoral experience.	Apply to PRAT Program Westwood Building Room 919

Position	Eligibility	Annual Salary	Mechanism of Entry
IV. Visiting Program (limited tenure)[2]			
A. Visiting Fellow (maximum 5 years)	5 years or less postdoctoral experience or training.	First year salaries range from $25,000 to $42,000 based on years of postdoctoral experience	Contact Division Director or Laboratory Chief in area of interest.
B. Visiting Associate (1 year initial appointment with renewals to end of project)	3+ years of postdoctoral experience or training with appropriate knowledge needed by NCI.	$28,000 - (GS9/1) $53,000 - (GS12/10)	Contact Division Director or Laboratory Chief in area of interest.
C. Visiting Scientist (duration of project)	6+ years of postdoctoral experience with appropriate specific experience and knowledge needed.	$41,000 - (GS12/1) $87,000 - (GS15/10)	Contact Division Director or Laboratory Chief in area of interest.

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

Position	Eligibility	Annual Salary	Mechanism of Entry
V. Staff Fellowships			
A. Staff Fellowship	Physician or other doctoral degree equivalent who has less than 3 years of relevant postdoctoral research experience. U.S. citizen or resident alien. Typical appointments are made for two years. Additional one-year extensions may also be made with a maximum of 7 years.	Physicians $28,000 - $48,196 (Maximum GS11/8) Other Doctors $28,000 - $47,013 (Maximum GS12/6)	Contact Division Director or Laboratory Chief in area of interest or the NCI Personnel Office.
B. Senior Staff Fellowship	Physician or other doctoral degree equivalent who has 3 to 7 years of relevant postdoctoral research experience. U.S. citizen or resident alien. Typical appointments are made for two years. Additional one-year extensions may also be made with a maximum of 7 years.	Physicians $39,000 - $73,472 (Maximum GS13/10) Other Doctors $34,744 - $62,293 (Maximum GS13/10)	Contact Division Director or Laboratory Chief in area of interest or the NCI Personnel Office.

Position	Eligibility	Annual Salary	Mechanism of Entry
VI. Civil Service Summer Employment Programs			
A. Summer Clerical Program	Must be 16 years of age or older. Must be U.S. Citizen.	GS-1 through GS-4. Grade is based on education and/or experience.	Apply to NIH on or before March 15.
B. Summer Aides	Provides summer employment opportunity for students who meet economic needs criteria. Must be 16 years of age or older. Disabled students are not required to meet economic criteria. Noncitizens may compete provided they have permanent visa status and are from a country allied with the United States.	Federal minimum wage.	Register with the local office of the State Employment service and apply to NCI.
VII. Special Programs			
A. Guest Researcher-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 or 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.

Position	Eligibility	Annual Salary	Mechanism of Entry
B. Commissioned Officer Student Training and Extern Program (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. $2,250 per month.	Apply to Director, Division of Commissioned Personnel Attention: COSTEP Coordinator Room 4-35, Parklawn Building, 5600 Fishers Lane, Rockville, MD. 20857.
C. Fogarty International Scholars in Residence Program.	International reputation, productivity, demonstrated ability in biomedical field.	$90,000 for 1 year.	Nominations are submitted to Fogarty Center by Institute Director, any senior tenured member of the NIH scientific staff, or former scholar.
D. Stay-in-School Program	Provides employment opportunity for students who meet economic needs criteria, attend accredited schools on a full-time basis, and are in good academic standing. Must be 16 years of age or older. Disabled students are not required to meet economic criteria. Noncitizens may compete provided they are from a country allied with the United States.	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. Must have demonstrated satisfactory academic performance with accumulative G.P.A. equivalent to a "C+" or above. Must plan to attend or have been accepted for admission to an accredited college or university. Must qualify under financial needs criteria based upon family income. Must be a U.S. citizen or a resident of American Samoa or Swains island. May be a non-citizen if lawfully admitted to the U.S. as a permanent resident and will be able to meet citizenship requirements prior to conversion and is a national of an allied country.	GS-2 through GS-5.	Nominations are submitted directly to NIH by high school principals or counselors.
F. 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 (work permit required if under 18).	N/A	Contact Division Director or Laboratory Chief in area of interest.

Position	Eligibility	Annual Salary	Mechanism of Entry
G. Cooperative Education Program	Must be 16 years of age or older, enrolled in an accredited educational program, high school, undergraduate, graduate, or professional degree program and be in good academic standing (GPA at least 2.0). School must participate in the coop program. Must be enrolled in a field of study related to the assigned work with at least half-time academic course load. U.S. citizen or national (resident of American Samoa or Swains Island) or noncitizen lawfully admitted to the U.S. as a permanent resident who will be able to meet citizenship requirements prior to conversion, and is a national of a country allied with the U.S.	GS-1 through GS-11	Contact Co-op Coordinator for NCI
VIII. Other Training Programs			
A. Cancer Prevention Fellowship Program	Must be an M.D., D.D.S., D.O., O.R., Ph.D., or other doctoral degree in a related discipline (epidemiology, biostatistics, and the biomedical, nutritional, public health, or behavioral sciences). Must be a U.S. citizen or resident alien eligible for citizenship within four years.	First year for an M.D., D.D.S., or D.O. $31,000 - $42,000 for Ph.D. $23,000 - $36,000.	Apply to Program Director, CPFP, Executive Plaza South, Room T41, Bethesda, Maryland, 20892.

Position	Eligibility	Annual Salary	Mechanism of Entry
B. Biotechnology Training Program	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 postdoctoral 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 - $38,000 Physicians $37,000 - $41,000	Contact Division Director or Laboratory Chief in area of interest.

Position	Eligibility	Annual Salary	Mechanism of Entry
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 work and clinical capability, a letter describing their interest in the program, and a Personal Qualification Statement, SF-171.	Stipends for the program will be $2,600 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 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 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.

Position	Eligibility	Annual Salary	Mechanism of Entry
E. 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 the duties assigned and candidate's education and/or experience.	Contact Division Director or Laboratory Chief in area of interest.
F. 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.	First year for M.D. $31,000 - $42,000 for Ph.D. $23,000 $36,000 for Master's level $16,000 - $20,000	Contact the Administrative Office of the Division of Cancer Etiology.

Position	Eligibility	Annual Salary	Mechanism of Entry
G. Intramural Research Training Award (IRTA)	**(1) Postdoctoral:** Appointments of 1 or 2 years with a maximum of 5 years to candidates with physician or other doctoral degree in the biomedical, behavioral or related sciences and 7 or fewer years of relevant postdoctoral research experience.	First year salaries range from $25,000 - $38,000 based on years of experience.	Contact Division Director or Laboratory Chief in area of interest.
	(2) Predoctoral: Fellowships are granted to students enrolled in PhD, MD, DDS, DMD, DVM, or equivalent degree programs. Students will have completed their graduate course work and will engage full-time in a laboratory research program for the purpose of developing and writing a thesis in an intramural laboratory.	Based on years of post-baccalaureate education ranging from $16,000 - $21,000.	Contact Division Director or Laboratory Chief in area of interest.
H. Technology Transfer Fellowship Program	Physicians, PhDs, JDs(lawyers), individuals with a master's degree in health communications, biomedical science, behavioral science, computer science, informatics, library science, health education, marketing, journalism, English, a graduate degree in law, or a graduate degree in another discipline with legal/paralegal expertise, with little or no experience or training in technology transfer or communications research but with an interest in these areas.	Based on years of (1) postdoctoral experience starting at $25,000 - $38,000 or (2) post-Master's degree starting at $22,000 - $34,000.	Contact following program in area of interest: International Cancer Information Center, the Office of Cancer Communications, the Division of Cancer Prevention and Control, the Office of Technology Development, or the Planning, Evaluation, and Analysis Branch.

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
91,012	50,134	344	232	721	643	8,873	9,192	56,175	29,698	25,754	15,423
Prostate	Breast	Brain & CNS	Brain & CNS	Non-Hodgkin's Lymphoma	Leukemia	Colon & Rectum	Lung	Colon & Rectum	Breast	Prostate	Lung
32,376	43,389	248	212	483	484	2,376	5,408	14,117	20,096	19,622	14,906
Colon & Rectum	Colon & Rectum	Endocrine	Endocrine	Brain & CNS	Cervix	Non-Hodgkin's Lymphoma	Colon & Rectum	Prostate	Colon & Rectum	Colon & Rectum	Breast
28,481	28,673	113	89	441	324	1,528	1,957	12,423	11,127	11,804	13,458
Pancreas	Pancreas	Non-Hodgkin's Lymphoma	Soft Tissue	Hodgkin's Disease	Brain & CNS	Brain & CNS	Ovary	Pancreas	Ovary	Pancreas	Pancreas
12,198	12,883	66	50	279	301	1,454	1,711	6,771	6,443	4,128	6,376
Leukemia	Ovary	Soft Tissue	Kidney & Renal Pelvis	Melanoma	Non-Hodgkin's Lymphoma	Pancreas	Cervix	Non-Hodgkin's Lymphoma	Pancreas	Leukemia	Ovary
10,290	12,566	43	27	220	195	1,252	1,612	4,467	5,674	3,700	4,264

Source: Mortality tape (1990) from National Center for Health Statistics.

Relationship of Cancer to the 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	2,147,901	863.6	100.0%
1	Diseases of the Heart	719,954	289.5	33.5
2	CANCER	505,295	203.2	23.5
3	Cerebrovascular	144,075	57.9	6.7
4	Accidents	91,870	36.9	4.3
5	Bronchitis, Emphysema & Asthma	86,671	34.8	4.0
6	Pneumonia & Influenza	79,506	32.0	3.7
7	Diabetes Mellitus	47,660	19.2	2.2
8	Suicide	30,895	12.4	1.4
9	Cirrhosis of the Liver	25,800	10.4	1.2
10	Human Immunodeficiency Virus Infection	25,175	10.1	1.2
11	Homicide	24,834	10.0	1.2
12	Nephritis & Nephrosis	20,764	8.4	1.0
13	Septicemia	19,165	7.7	0.9
14	Atherosclerosis	18,044	7.3	0.8
15	Diseases of Infancy	17,667	7.1	0.8
	Other & Ill-defined	290,526	116.8	13.5

Estimated New Cancer Cases and Deaths by Sex for All Sites 1993*

	Estimated New Cases			Estimated Deaths		
	Total	Male	Female	Total	Male	Female
All Sites	1,170,000	600,000	570,000	526,000	277,000	249,000
Buccal Cavity & Pharynx **(ORAL)**	29,800	20,300	9,500	7,700	4,975	2,725
Lip	3,500	3,000	500	100	75	25
Tongue	5,900	3,800	2,100	1,750	1,100	650
Mouth	11,200	6,800	4,400	2,050	1,200	850
Pharynx	9,200	6,700	2,500	3,800	2,600	1,200
Digestive Organs	236,900	125,200	111,700	120,325	64,350	55,975
Esophagus	11,300	8,100	3,200	10,200	7,600	2,600
Stomach	24,000	14,800	9,200	13,600	8,200	5,400
Small Intestine	3,600	2,000	1,600	925	500	425
COLON-RECTUM:						
Large Intestine	109,000	53,000	56,000	50,000	25,000	25,000
Rectum	43,000	24,000	19,000	7,000	3,800	3,200
Liver & Biliary Passages	15,800	8,500	7,300	12,600	6,800	5,800
Pancreas	27,700	13,500	14,200	25,000	12,000	13,000
Other & Unspecified Digestive	2,500	1,300	1,200	1,000	450	550
Respiratory System	187,100	113,000	74,100	154,200	96,900	57,300
Larynx	12,600	10,000	2,600	3,800	3,000	800
LUNG & BRONCHUS	170,000	100,000	70,000	149,000	93,000	56,000
Other & Unspecified Respiratory	4,500	3,000	1,500	1,400	900	500
Bone & Joint	2,000	1,100	900	1,050	600	450
Soft Tissue	6,000	3,300	2,700	3,100	1,500	1,600
MELANOMA of SKIN	32,000	17,000	15,000	6,800	4,200	2,600
BREAST	183,000	1,000	182,000	46,300	300	46,000
Genital Organs	244,400	172,900	71,500	59,950	35,550	24,400
UTERUS:						
Cervix Uteri	13,500		13,500	4,400		4,400
Corpus, Endometrium	31,000		31,000	5,700		5,700
Ovary	22,000		22,000	13,300		13,300
Other & Unspecified Genital, Female	5,000		5,000	1,000		1,000
Prostate	165,000	165,000		35,000	35,000	
Testis	6,600	6,600		350	350	
Other & Unspecified Genital, Male	1,300	1,300		200	200	
Urinary Organs	79,500	55,800	23,700	20,800	13,000	7,800
Bladder	52,300	39,000	13,300	9,900	6,500	3,400
Kidney & Other Urinary	27,200	16,800	10,400	10,900	6,500	4,400
Eye and Orbit	1,750	950	800	250	125	125
Brain & Central Nervous System	17,500	9,600	7,900	12,100	6,600	5,500
Endocrine Glands	14,050	4,150	9,900	1,725	800	925
Thyroid	12,700	3,400	9,300	1,050	450	600
Other Endocrine	1,350	750	600	675	350	325
Leukemias	29,300	16,700	12,600	18,600	10,100	8,500
Lymphocytic Leukemias	12,600	7,500	5,100	5,400	3,100	2,300
Myeloid Leukemia	11,700	6,400	5,300	7,300	3,900	3,400
Other Leukemias	5,000	2,800	2,200	5,900	3,100	2,800
Other Blood & Lymph Tissues	63,700	35,000	28,700	31,400	16,300	15,100
Hodgkin's Disease	7,900	4,500	3,400	1,500	900	600
Non-Hodgkin's Lymphomas	43,000	24,000	19,000	20,500	10,600	9,900
Multiple Myeloma	12,800	6,500	6,300	9,400	4,800	4,600
All Other and Unspecified Sites	43,000	24,000	19,000	41,700	21,700	20,000

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

** Carcinoma in situ and basal and squamous cell skin are not included in totals.*

SOURCE: American Cancer Society Cancer Facts and Figures (1993). Incidence estimates are based on rates from NCI SEER Program 1987-89.

The Cost of Cancer

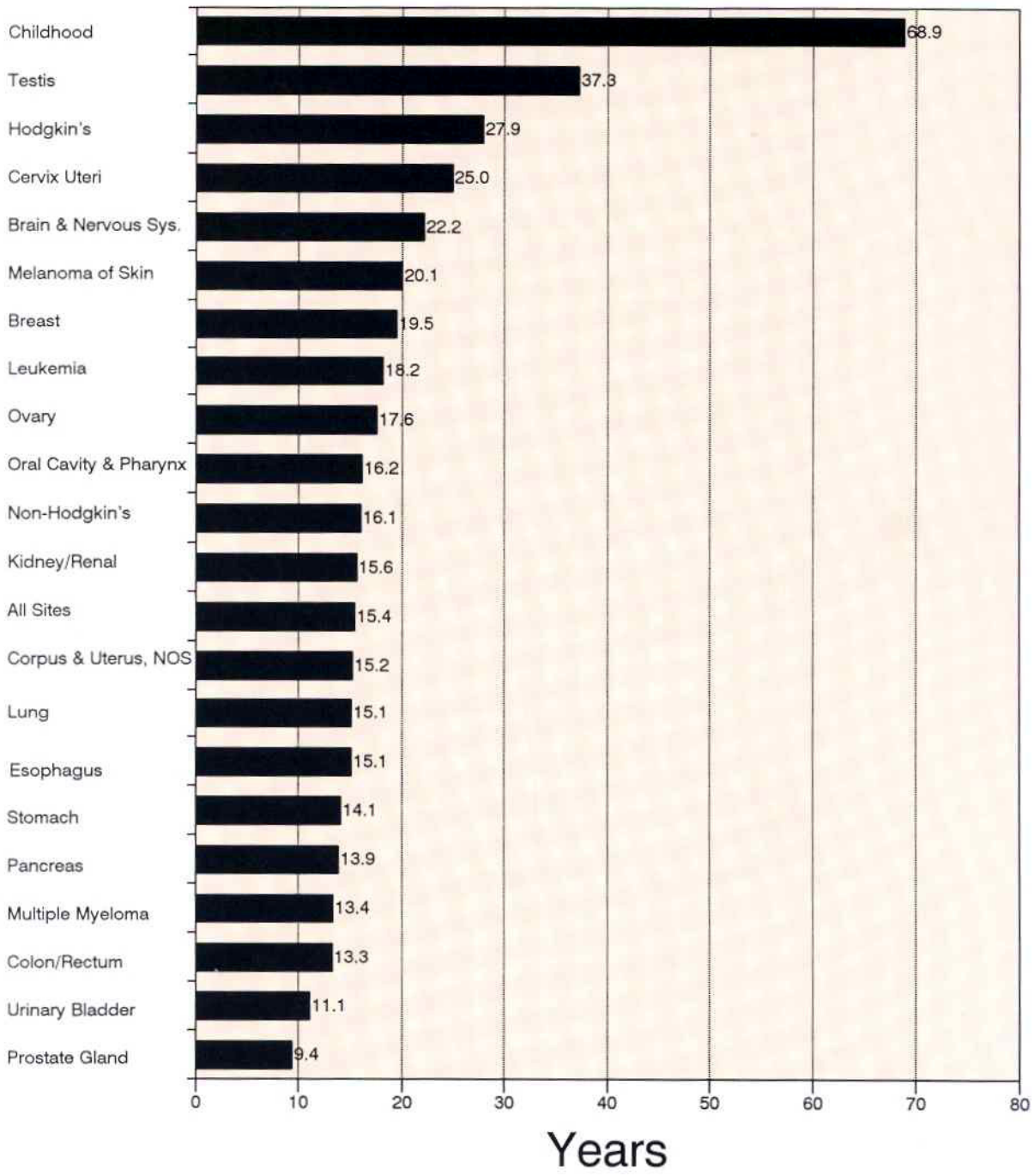
The direct cost of cancer is derived from the figures for care of patients. It does not include the cost of the productivity lost while individuals are away from their work due to treatment of disability or the value of lost productivity due to premature death. Figures for the direct cost of cancer and for all health care for 1990 are as follow:

(in Millions)

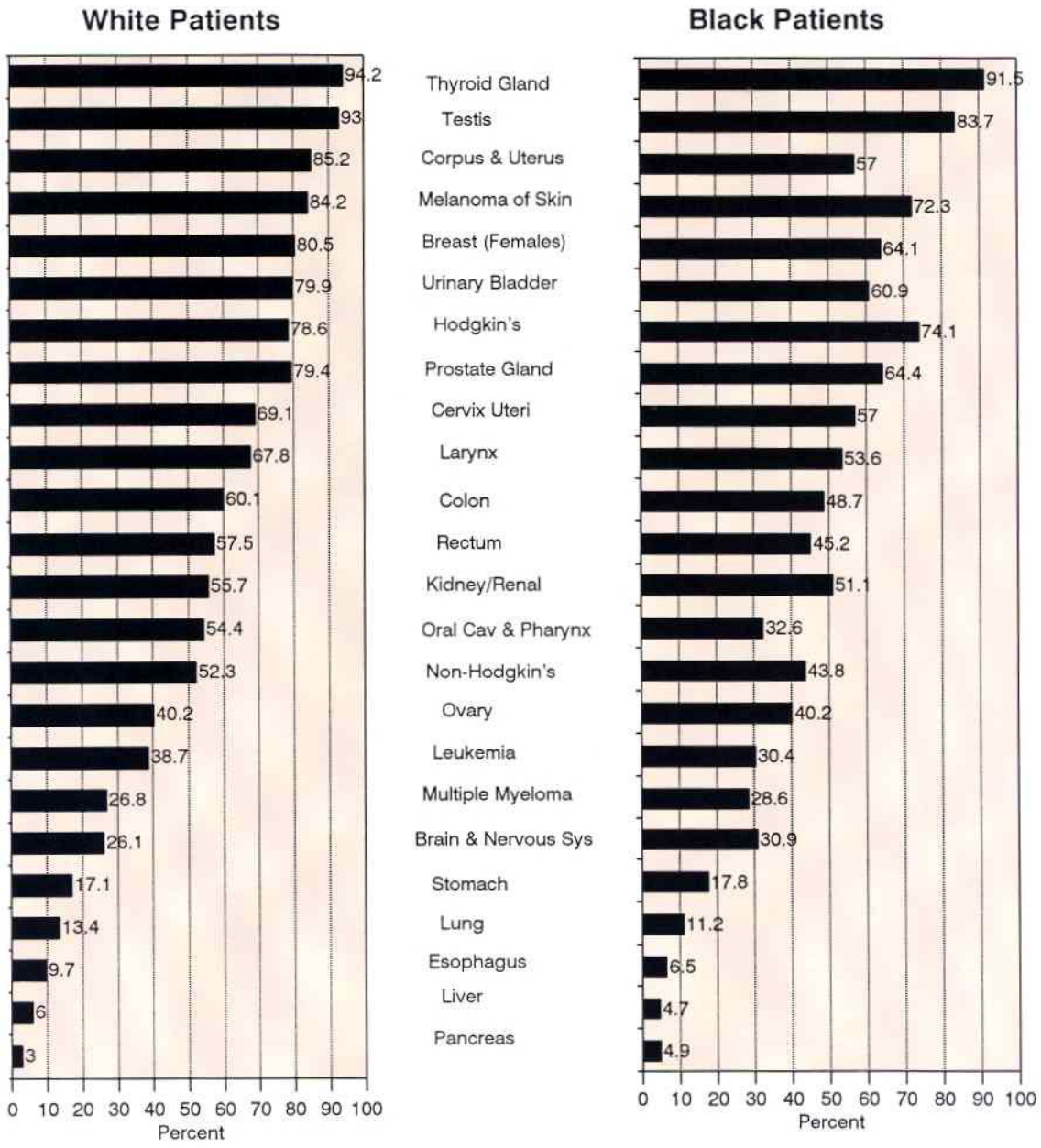
All Costs	Direct Cost
All Cancers	$ 35,256
All Health Care	$585,300
Percent Relationship of Cancer to Total	6%

Sources:
Brown, M.L. The National Economic Burden of Cancer: An Update. *Journal of the National Cancer Institute,* 1990, 82:1881-1814.
Office of the Actuary, Health Care Financing Administration.

Average Years of Life Lost Per Person Dying of Cancer All Races, Both Sexes, 1990

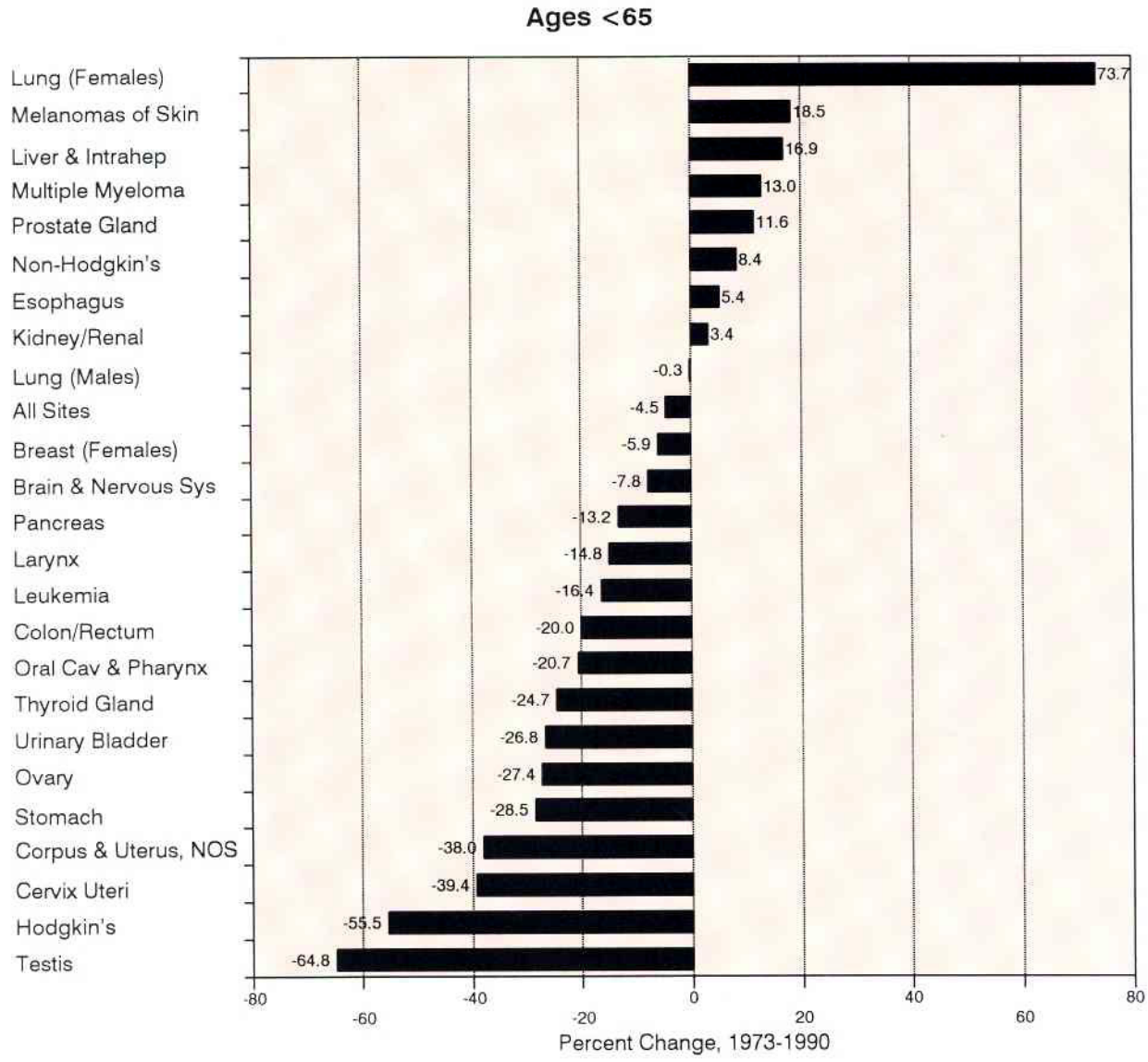


5-Year Relative Survival Rates, by Site White versus Black Patients 1983 to 1989



Data From SEER PROGRAM,
1983-1989 Males
and Females

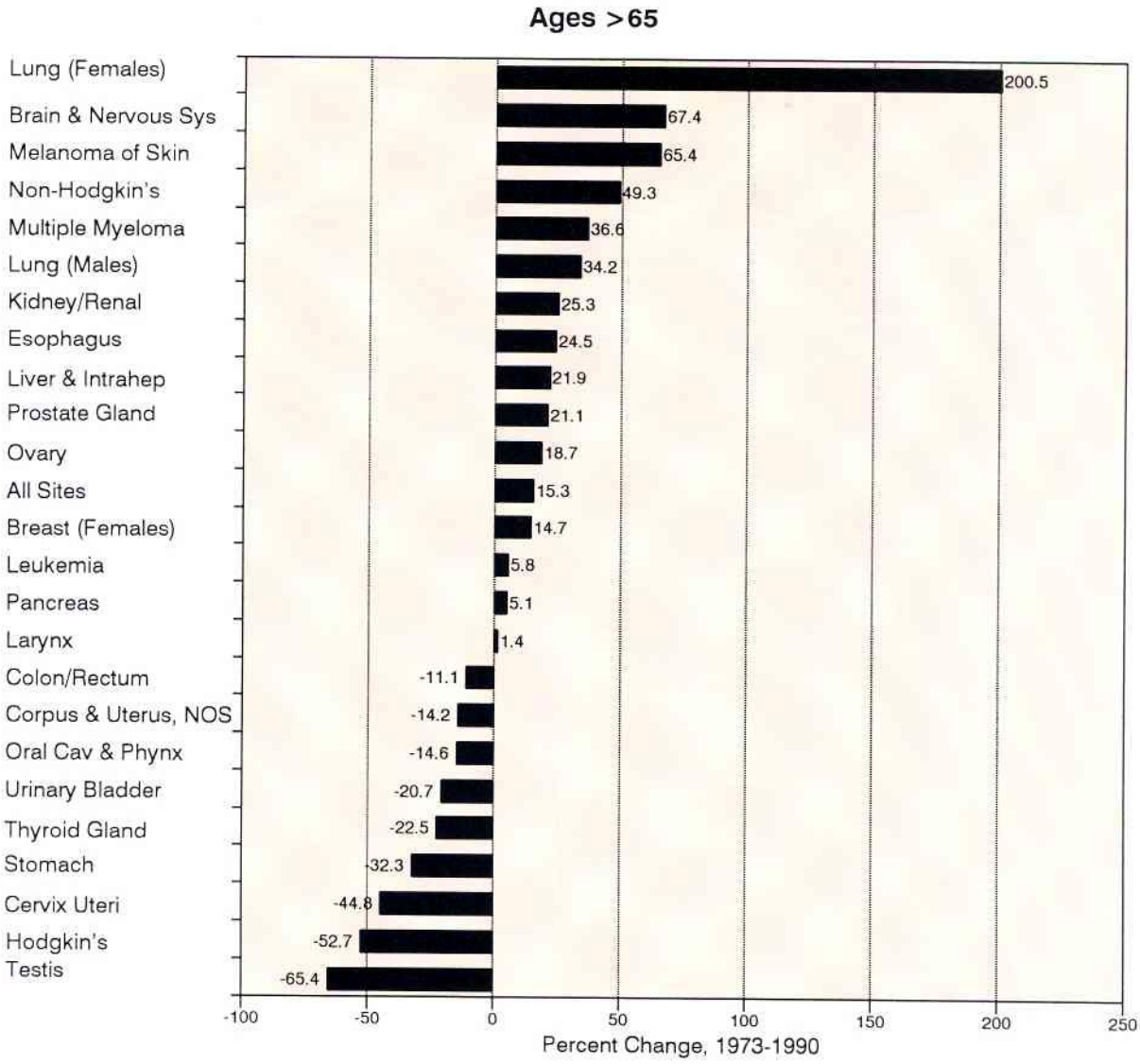
Cancer Mortality Rates
Changes from 1973 to 1990
(Ages Under 65)



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 1990
(Ages Over 65)



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, 1986-1990

Cancer Site	Mortality Rate per 100,000		Ratio
	Blacks	Whites	Blacks/Whites
All Sites	225.0	168.7	1.3
Males	315.0	213.2	1.5
Females	165.7	139.2	1.2
Esophagus	8.7	2.9	3.0
Cervix Uteri	6.9	2.6	2.7
Prostate	50.7	23.1	2.2
Multiple Myeloma	5.7	2.7	2.1
Larynx	2.7	1.2	2.3
Stomach	8.9	4.3	2.1
Oral Cavity and Pharynx	5.3	2.8	1.9
Corpus & Uterus NOS	6.0	3.3	1.8
Liver & Intrahep.	4.1	2.5	1.6
Pancreas	11.9	8.1	1.5
Lung and Bronchus	60.5	48.0	1.3
Males	105.1	72.9	1.4
Females	29.4	29.8	1.0
Colon and Rectum	23.5	19.2	1.2
Breast (Females)	30.8	27.3	1.1
<50 years	9.3	5.9	1.6
≥ 50 years	97.1	93.3	1.0
Thyroid	0.4	0.3	1.3
Urinary Bladder	3.3	3.3	1.0
Kidney & Renal Pelvis	3.2	3.4	0.9
Leukemia	6.0	6.4	0.9
Hodgkin's Disease	0.5	0.6	0.8
Ovary	6.4	8.0	0.8
Non-Hodgkin's Lymphomas	4.2	6.3	0.7
Brain & CNS	2.6	4.4	0.6
Testis	0.2	0.3	0.7
Melanoma of Skin	0.4	2.4	0.2
All Sites Except Lung	164.5	120.7	1.4
Males	209.9	140.3	1.5
Females	136.3	109.4	1.2

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

Cancer Incidence Rates
Unites States, 1986-1990

	Incidence Rates per 100,000		Ratio
Cancer Site	**Blacks**	**Whites**	**Blacks/Whites**
All Sites	413.7	384.7	1.1
Males	540.0	450.4	1.2
Females	328.8	345.8	1.0
Esophagus	10.8	3.3	3.3
Multiple Myeloma	8.7	3.9	2.2
Cervix	14.3	7.9	1.8
Stomach	12.6	6.9	1.8
Liver & Intrahep.	4.6	2.3	2.0
Pancreas	13.8	8.8	1.6
Larynx	7.3	4.5	1.6
Prostate	145.8	107.3	1.4
Lung and Bronchus	77.1	57.5	1.3
Males	124.1	81.2	1.5
Females	43.1	40.2	1.1
Oral Cavity and Pharynx	14.4	10.6	1.4
Kidney and Renal Pelvis	9.2	8.7	1.1
Colon and Rectum	52.2	48.8	1.1
Colon	40.2	34.7	1.2
Rectum	12.0	14.1	0.9
Leukemia	8.7	10.2	0.9
Breast (Females)	93.1	112.1	0.8
<50 years	32.0	33.0	1.0
≥50 years	281.6	356.0	0.8
Ovary	10.2	15.0	0.7
Non-Hodgkin's Lymphomas	9.5	14.6	0.7
Brain and Other Nervous	4.0	6.7	0.6
Corpus & Uterus NOS	14.6	22.2	0.7
Hodgkin's Disease	2.1	3.1	0.7
Thyroid	2.4	4.4	0.5
Bladder	9.7	18.2	0.5
Testis	0.7	5.1	0.1
Melanoma of Skin	0.8	12.1	0.1
All Sites Except Lung	336.6	327.2	1.0
Males	415.9	369.2	1.1
Females	285.7	305.6	0.9

NOTE: The annual number of new cancer cases per 100,000 persons is 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, 1993

	1993 Estimated Prevalence		
	Total	**Males**	**Females**
ALL SITES	7,534,000	2,921,000	4,613,000
Oral & Pharynx	212,000	132,000	80,000
Stomach	72,700	41,800	30,900
Colon/Rectal	1,315,000	612,000	703,000
Colon	941,000	422,000	519,000
Rectum	374,000	190,000	184,000
Pancreas	24,200	11,100	13,100
Larynx	143,000	113,000	30,000
Lung & Bronchus	388,000	219,000	169,000
Melanoma of Skin	402,000	191,000	211,000
Breast	1,814,000	-	1,814,000
Cervix Uteri	194,000	-	194,000
Corpus & Uterus	529,000	-	529,000
Ovary	178,000	-	178,000
Prostate Gland	583,000	583,000	-
Testis	111,000	111,000	-
Urinary Bladder	585,000	416,000	169,000
Kidney & Renal Pelvis	163,000	99,500	63,500
Brain and Nervous System	77,000	39,000	38,000
Thyroid	188,000	46,000	142,000
Hodgkin's Disease	141,000	77,000	64,000
Non-Hodgkin's Lymphomas	261,000	129,000	132,000
Leukemia	104,000	53,000	51,000

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

Fiscal Year 1993 Budget

(Dollars in Thousands)

A. Actual Obligations Resulting From Appropriated Funds:

FY 1993 Appropriation	$2,007,483
Section 216 Salary & Expense Reduction	-9,933
Section 511 .8% Reduction	-16,060
Section 513 Consultant Services Reduction	-139
Transfer to other NIH Institutes for Cancer Research	-2,931
	1,978,420
Less:	
Lapse	80
Actual NCI Obligations	**1,978,340**

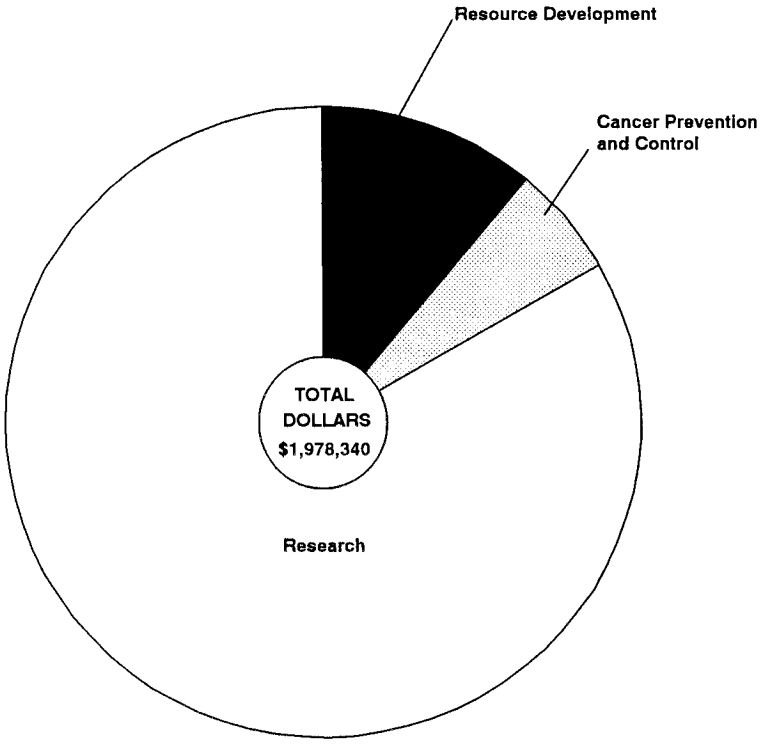
B. Reimbursable Obligations:

AIDS Reimbursement from Office of the Director, NIH	1,948
Construction Reimbursement from NIH	2,887
Other Reimbursements	9,242
Reimbursements	**14,077**

C. Total NCI Obligations **$1,992,417**

Program Structure
Fiscal Year 1993

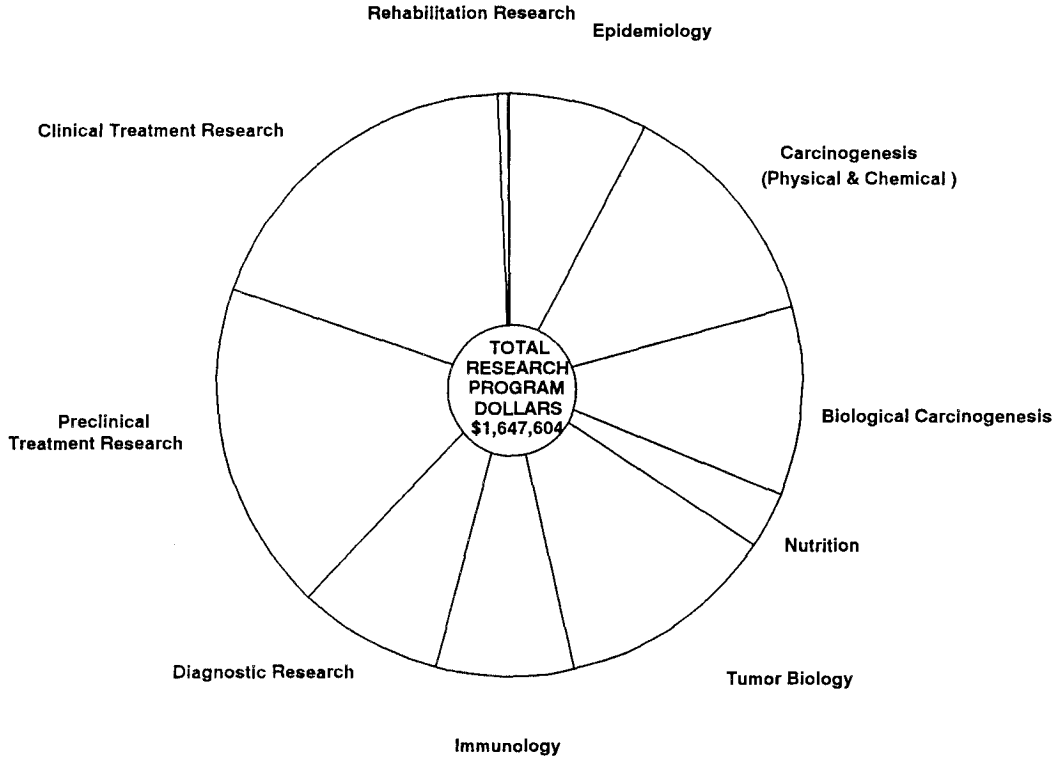
(Dollars in Thousands)



Budget Activity	Dollars	Percent
Research		
Cancer Causation	$550,981	27.9%
Detection and Diagnosis Research	144,187	7.3%
Treatment Research	626,025	31.6%
Cancer Biology	326,411	16.5%
Subtotal Research	$1,647,604	83.3%
Resource Development		
Cancer Centers Support	147,412	7.5%
Research Manpower Development	62,899	3.2%
Construction	7,846	0.4%
Subtotal Resource Development	$218,157	11.0%
Cancer Prevention and Control	$112,579	5.7%
Total NCI	$1,978,340	100.0%

NCI Research Programs
Fiscal Year 1993

(Dollars in Thousands)

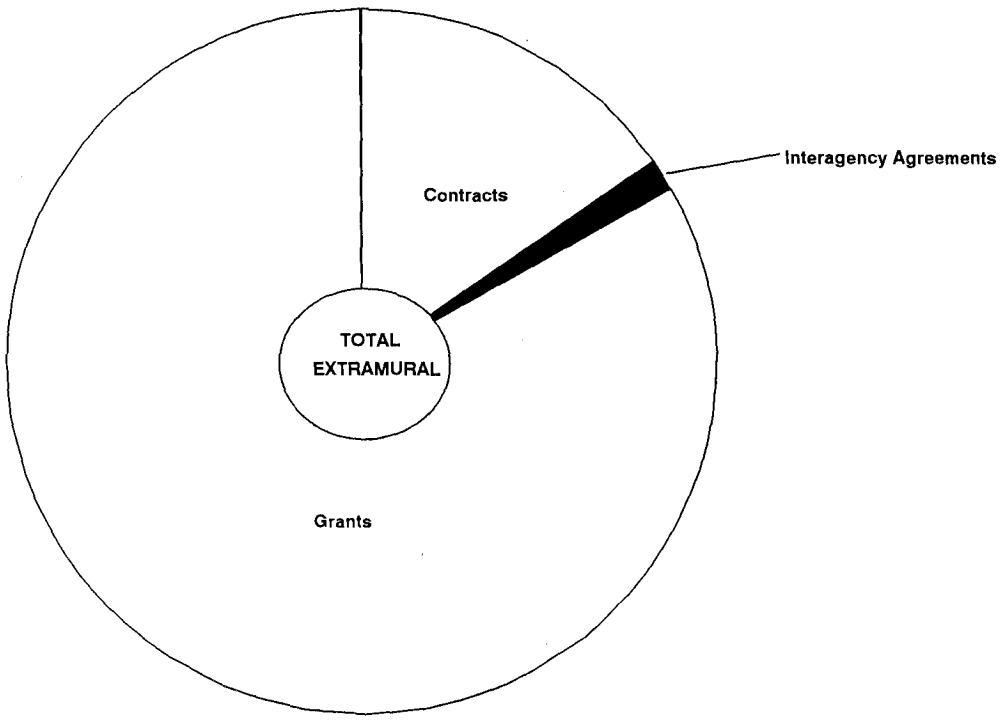


All Budget Activities	Dollars	Percent of Total
Research Programs	$1,647,604	83.3%
Resource Development		
Cancer Centers Support	147,412	7.5%
Research Manpower Development	62,899	3.2%
Construction	7,846	0.4%
Cancer Prevention and Control	112,579	5.7%
Total NCI	$1,978,340	100.0%

Research Budget Activity	Dollars	Percent of Total
Epidemiology	$125,732	7.6%
Carcinogenesis (Physical & Chemical)	215,672	13.1%
Biological Carcinogenesis	174,446	10.6%
Nutrition	50,024	3.0%
Tumor Biology	201,214	12.2%
Immunology	125,197	7.6%
Diagnostic Research	131,356	8.0%
Preclinical Treatment Research	301,410	18.3%
Clinical Treatment Research	312,855	19.0%
Rehabilitation Research	9,698	0.6%
Total	$1,647,604	100.0%

Extramural Funds
Fiscal Year 1993

(Dollars in Thousands)



	Dollars	Percent
Contracts:		
SBIR Contracts	$1,599	0.1%
Research Support Contracts	178,153	11.9%
Construction Contracts	346	0.0%
Cancer Control Contracts	49,875	3.3%
Subtotal Contracts	$229,973	15.3%
Interagency Agreements	21,793	1.5%
Grants:		
Research Project Grants	895,909	59.7%
Cancer Control Grants	33,338	2.2%
Training Activities	37,285	2.5%
Cancer Centers/SPORES	145,395	9.7%
SBIR Grants	20,401	1.4%
Construction Grants	7,182	0.5%
Other Research Grants	108,471	7.2%
Subtotal Grants	1,247,981	83.2%
Total Extramural Funds	1,499,747	100.0%
Total Intramural/RMS/Control	478,593	
Total NCI	$1,978,340	

Total NCI Dollars by Mechanism
Fiscal Year 1993

(Dollars in Thousands)

		Number	Amount	Percent of Total
Research Grants:				
Research Project Grants:				
Traditional	Awards:	1,955	$430,203	21.7%
Program Projects		176	202,852	10.3%
FIRST Awards		291	29,053	1.5%
MERIT Awards		166	51,633	2.6%
SBIR Grants		215	20,401	1.0%
Outstanding Investigator Grants		75	61,337	3.1%
RFAs		282	63,267	3.2%
Cooperative Agreements		171	56,199	2.8%
Shannon Awards		6	1,365	0.1%
Subtotal, Research Project Grants		3,337	916,310	46.3%
Cancer Centers Grants		57	123,930	6.3%
SPOREs		22	21,465	1.1%
Subtotal, Centers		79	145,395	7.3%
Other Research Grants:				
Career Program				
RCDA-KO4		23	1,488	0.1%
Clinical Oncology-K12		17	2,664	0.1%
Physician Investigator-K11		47	3,835	0.2%
Preventive Oncology-KO7		22	1,939	0.1%
Clinical Investigator-KO8		51	4,034	0.2%
Minority Faculty Development-K14		1	85	0.0%
Subtotal, Career Program		161	14,045	0.7%
Cancer Education Program		78	7,815	0.4%
Clinical Cooperative Groups		158	74,994	3.8%
Minority Biomedical Support			2,959	0.1%
Scientific Evaluation		3	4,317	0.2%
Instrumentation Grants		47	857	0.0%
Continuing Education Grants		0	145	0.0%
Small Grants		50	2,510	0.1%
Conference Grants		59	829	0.0%
Subtotal, Other Research Grants		556	108,471	5.5%
Subtotal, Research Grants		3,972	1,170,176	59.1%
NRSA Fellowships	Trainees:	1,446	37,285	1.9%
Research and Development Contracts:				
R&D Contracts	Awards:	410	197,259	10.0%
SBIR Contracts		8	1,599	0.1%
Subtotal, Contracts		418	198,858	10.1%
Intramural Research:				
Intramural Research	FTEs:	1,895	240,861	12.2%
Management Fund			122,664	6.2%
Subtotal, Intramural Research		1,895	363,525	18.4%
Research Management & Support:				
Research Management & Support	FTEs:	525	84,342	4.3%
Management Fund			11,333	0.6%
Subtotal, RMS		525	95,675	4.8%
Cancer Prevention and Control:				
Cancer Control Grants	Awards:	68	33,338	1.7%
Cancer Control Contracts		128	52,562	2.7%
Inhouse	FTEs:	181	18,653	0.9%
Management Fund			740	0.0%
Subtotal, Prevention and Control		181	105,293	5.3%
Construction		3	7,528	0.4%
Total NCI		2,601	$1,978,340	100.0%

Division Obligations by Mechanism Fiscal Year 1993

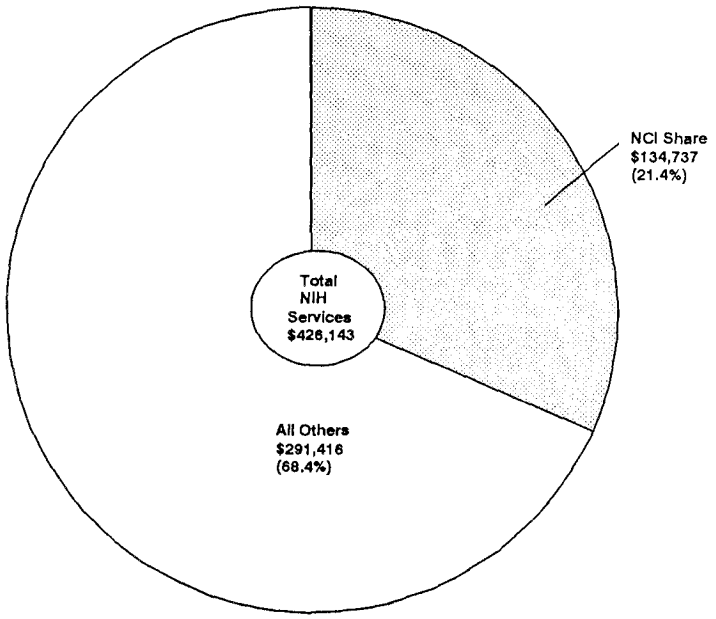
(Dollars in Thousands)

	DCBDC	DCT	DCE	DCPC	DEA	FCRDC	OD	Research Grants	Program Support(1)	TOTAL NCI
Research Grants:										
Research Project Grants	$0	$0	$0	$0	$0	$0	$0	$895,909	$0	$895,909
SBIR Grants	0	0	0	0	0	0	0	20,401	0	20,401
Subtotal, Research Project Grants	0	0	0	0	0	0	0	916,310	0	916,310
Cancer Centers Grants	123,036	0	0	0	894	0	0	0	0	123,930
SPOREs	21,465	0	0	0	0	0	0	0	0	21,465
Subtotal, Centers	144,501	0	0	0	894	0	0	0	0	145,395
Other Research Grants:										
Career Program	13,670	0	0	0	375	0	0	0	0	14,045
Cancer Education Program	7,815	0	0	0	0	0	0	0	0	7,815
Clinical Cooperative Groups	0	74,994	0	0	0	0	0	0	0	74,994
Minority Biomedical Support	0	0	0	0	2,959	0	0	0	0	2,959
Scientific Evaluation	0	0	0	0	4,317	0	0	0	0	4,317
Instrumentation Grants	0	0	0	0	0	0	0	857	0	857
Continuing Ed. Train. Grants	0	0	0	0	0	0	0	145	0	145
Small Grants	0	0	0	0	0	0	0	2,510	0	2,510
Conference Grants	0	0	0	0	0	0	0	829	0	829
Subtotal, Other Research Grants	21,485	74,994	0	0	7,651	0	0	4,341	0	108,471
Subtotal, Research Grants	165,986	74,994	0	0	8,545	0	0	920,651	0	1,170,176
NRSA Fellowships	37,139	0	0	0	146	0	0	0	0	37,285
Research and Development Contracts:										
R&D Contracts	5,551	56,714	35,676	15,884	810	54,230	17,835	0	10,559	197,259
SBIR Contracts	0	749	250	0	0	0	600	0	0	1,599
Subtotal, Contracts	5,551	57,463	35,926	15,884	810	54,230	18,435	0	0	198,858
Intramural Research:										
Intramural Research	61,079	100,979	69,599	2,949	213	0	4,200	0	1,842	240,861
Management Fund	0	0	0	0	0	0	122,664	0	0	122,664
Subtotal, Intramural Research	61,079	100,979	69,599	2,949	213	0	126,864	0	1,842	363,525
Research Management & Support:										
Research Management & Suppt.	1,680	0	0	0	7,760	2,642	48,035	0	24,225	84,342
Management Fund	0	0	0	0	0	0	11,333	0	0	11,333
Subtotal, RMS	1,680	0	0	0	7,760	2,642	59,368	0	24,225	95,675
Cancer Prevention and Control:										
Cancer Control Grants	0	0	0	33,338	0	0	0	0	0	33,338
Cancer Control Contracts	0	0	0	52,562	0	0	0	0	0	52,562
Inhouse	0	0	0	18,653	0	0	0	0	0	18,653
Management Fund	0	0	0	740	0	0	0	0	0	740
Total Prevention & Control	0	0	0	105,293	0	0	0	0	0	105,293
Construction	7,528	0	0	0	0	0	0	0	0	7,528
Division Totals	$278,963	$233,436	$105,525	$124,126	$17,474	$56,872	$204,667	$920,651	$26,067	$1,978,340

(1) Includes Central Assessments for DHHS-NIH General Expense, and Program Evaluation

NIH Management Fund Reimbursement Fiscal Year 1993

(Dollars in Thousands)



DISTRIBUTION OF NCI PAYMENT		
	Dollars	Percent
Clinical Center	$88,250	65.5%
Division of Research Grants	4,846	3.6%
Division of Computer Research and Technology	7,487	5.6%
Standard Level User Charge	5,256	3.9%
Other Research Services	28,898	21.4%
Total, NCI Payment	$134,737	100.0%

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

Clinical Center: Admissions and followup, anesthesiology, diagnostic x-ray, nuclear medicine, clinical pathology, blood bank, rehabilitation medicine, pharmacy, medical records, nursing services, patient nutrition service, housekeeping services, laundry, and social work

Division of Research Grants: initial scientific review of applications, assignment of research grant applications to institutes

Division of Computer Research and Technology: Research and development program in which concepts and methods of computer science are applied to biomedical problems

Standard Level User Charge: building rental including utilities and guard services

Other Research Services: procurement, safety, engineering, biomedical engineering, veterinary resources, and library

Special Sources of Funds

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.

CRADA Receipts Deposited to the U.S. Treasury

(dollars in thousands)

	Carryover from Prior Year	Receipts	Obligations
1990	$ 116	$ 61	$125
1991	52	115	66
1992	101	1,627	466
1993	1,262	2,509	1,582
1994	2,189		

Royalty Income

NCI can now retain a portion of the 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, which handles a portion of the processing and collection phases. Support is also provided to NIH to cover expenses associated with technology transfer efforts.

Royalty Income Funding History

(dollars in thousands)

Years Available	Collections*	Inventor Payments	Other**
1989/1990	$ 813	$ 575	$ 238
1990/1991	1,452	871	581
1991/1992	2,084	431	1,653
1992/1993	2,105	451	1,654
1993/1994	5,633	1,010	4,623

* Does not include assessments by NIH and NTIS.

** To be used for the furtherance of technology transfer

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. The large scale preparation of HIV-1 in permanent cell lines led to the development of a serological test for AIDS which enabled the detection of AIDS in our nation's blood supply. Detection of the virus in latent form has been established through the *in situ* hybridization method which allowed scientists to detect the virus in brain and blood cells, T lymphocytes and macrophages. Recent key discoveries, by NCI investigators include:

- Development, testing and successful clinical trials of the drugs azidothymidine (AZT), dideoxyinosine (ddI) and dideoxycytidine (ddC), confirming their effectiveness as anti-retroviral agents against AIDS.

- Progress in treating children with AIDS has occurred through the rapid introduction of antiretroviral agents into clinical trials. The studies performed by the Pediatric Branch contributed to the licensure of AZT for children in May of 1990 and dideoxyinosine (ddI) in October 1991. The latter, based solely on Pediatric Branch Studies, occurred simultaneously with licensure for adults, a historical event. The Pediatric Branch is currently completing studies of combination regimens to optimize activity (e.g., AZT plus ddI) as well as to offset toxicity (e.g., AZT plus G-CSF and erythropoietin).

- Viral particles are detectable in plasma throughout the early stages of primary infection. The number of viral particles in plasma decrease by up to 200-fold following the initial viremia of primary infection. NCI scientists have documented that changes in the titer of viral particles seem to monitor disease progression, with increasing viral particles detected as the infection moves from the asymptomatic phase in AIDS-related complex (ARC) or full blown AIDS. The increase in viral particles bears an inverse relationship to CD4 count. Scientists at NCI and elsewhere have adapted Polymerase Chain Reaction (PCR) technology to detect and quantitate the amount of HIV-1 RNA present in plasma. Thus, the RNA-PCR assay may provide a sensitive marker of response to therapy.

- There is evidence that HIV from patients on long-term AZT therapy which has become resistant to AZT remains sensitive to ddI and ddC. NCI investigators have studied the phenotypic and genotypic changes of HIV-1 strains isolated from 9 patients before and after prolonged therapy with either an alternating regimen of AZT and ddC or ddI alone. From these studies, it appears that HIV-1 develops reduced susceptibility of AZT more readily than to ddC and ddI. Moreover, an alternating regimen of AZT and ddC does not block the emergence of AZT-resistant HIV-1 variants. NCI scientists will initiate a study examining a new combination of AZT and a new purine analog, PMEA, by early 1994. PMEA possesses activity against both RNA and DNA viruses, inhibiting both HIV reverse transcriptase and DNA polymerase-alpha from CMV and other herpesviruses, and may exert its inhibitory effects on latent as well as replicating HIV, with perhaps a special activity against the HIV reservoir in monocytes/macrophages.

- Identification through the high-capacity AIDS drug screen 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.

- 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. HIV protease is an

enzyme whose action is required in the processing of HIV proteins and production of infectious virions. NCI scientists have identified several inhibitors of the HIV protease including KNI-272 which has exhibited potent anti-HIV activity and favorable pharmacokinetics in test animals. Following the completion of ongoing pharmacology and toxicology, NCI scientists plan to implement clinical trials of KNI-272.

- Growth hormone (GH) and insulin-like growth factor (IGF)-1 are critical for normal T cell development within the thymus. GH-deficient dwarf mice have marked thymic hypoplasia and deficiency in T progenitor cells. Treatment of these mice with GH leads to T cell reconstitution within the thymus. In the severe combined immunodeficiency (SCID) mouse model reconstituted with human peripheral blood cells, GH and IGF-1 lead to increased numbers of lymph node and thymic CD4 cells and may promote immunoreconstitution by enhancing overall thymic function. Clinical trials combining GH and/or IGF-1 with AZT and ddI are underway in adults and children with severe HIV infection. Measurement of GH and/or IGF-1 induced changes in CD4+ cell number and function and immunologic parameters is an integral part of this study.

- 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.

- HIV-infected cells may release biologically active Tat, the protein product of the *tat* gene, which can be taken up by cells in close proximity and induce cell proliferation, viral transactivation and perhaps other toxic effects. 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.

- Individuals infected with HIV may be asymptomatic for years before progressing to overt AIDS. Since monocytes possess surface CD4 molecules, they can bind and act as a reservoir for HIV in infected individuals. Latently infected monocytoid THP-1 cells and freshly isolated adherent monocytes from asymptomatic seropositive individuals did not show detectable viral expression until they are co-cultured with activated T cells from HIV-negative normal donors. Cell-cell contact is required and seems to induce factor(s) in monocytes capable of overcoming latency. Thus, monocytes in AIDS patients can harbor latent HIV inducible by T cells during an immune response. HIV produced by such monocytes infects T cells leading to viral-induced pathology. In addition to monocytes, NIAID scientists determined that follicular dendritic cells (FDC) also serve as reservoirs for latent HIV infection, sequestering HIV for eventual transmission to CD4+ cells.

- The magnitude of CNS disease is often more prominent and the latency period which precedes HIV-related encephalopathy shorter in children than in adults, suggesting that fetal or developing brain cells (in particular, glial cells) may release cytokines capable of activating expression of latent HIV. To address the pathogenesis of neurologic disorders in HIV-1 infected children, NCI scientists have developed an *in vitro* model using a normal fetal olfactory neuroblast cell line, to investigate the potential contributions of direct viral infection and virally-induced cytokines in glial (and perhaps other accessory) cells to neurodevelopmental impairment.

- NCI epidemiologists have played a major role in uncovering the emergence of a new peak of tuberculosis (TB)-associated death in young individuals (ages 20-49) that appears linked to AIDS.

- Recent studies of vaginally-delivered multiple birth cohorts in HIV-infected women demonstrate that HIV transmission is greatest for the first-born infant, suggesting that some component of HIV transmission occurs at the time of the delivery in the cervix or vagina.

- Immunoepidemiologic studies have found that humoral immunity (i.e. antibody) directed against the HIV envelope glycoprotein gp120 in the mother protects against the risk for maternal-fetal transmission. Now, the protective contributions of cellular immunity have also been uncovered, using the T helper lymphocyte test. This HIV-specific T-cell immunity appears to occur very early in HIV infection and has been found in approximately 50 to 60 percent of seronegative individuals in high-risk populations (homosexual men, IVDUs, HIV-exposed health care workers), many of whom have not yet seroconverted after two years' follow-up, suggesting that T-cells are capable of mediating immune protection. In addition, NCI scientists have now found that neutralizinag antibody to the envelope protein, gp41, confers protection agaisnt maternal-fetal transmission.

- Sequential studies have now defined critical peptides that elicit distinct T-cell and B-cell (especially neutralizing antibody) responses and identified those peptides recognized by multiple histocompatibility antigens. NCI scientists have now developed two new prototype synthetic vaccines consisting of broadly-recognized histocompatibility determinants of T helper cells (so-called "cluster peptides") and a combined site constructed to elicit both cytotoxic T lymphocytes (CTL) and neutralizing antibody.

- NCI scientist have constructed novel vaccines comprised of various recombinant and live vectors (attenuated vaccinia, avipox, and Salmonella typhimurium) carrying HIV-1, HIV-2 and SIV antigenic proteins or protein units. These constructs are now being tested in rhesus macaques for their efficacy as initial immunogens, followed by "boosters" using purified native or viral antigens, in eliciting protective immune responses. In particular, the potential of an orally-administered recombinant Salmonella-based vaccine incorporating HIV-2 gag and env genes to confer protection from HIV-2 infection is under investigation in both mice and primates. Early results indicate that the recombinant Salmonella-viral antigen constructs are able to induce MHC class I-restricted CD8+ CTL that are directed against both Gag and Env proteins in both animal models. Other recombinant constructs coupling vaccinia virus vectors to various HIV antigens have also been shown to induce virus-specific cellular and humoral responses in primates, thus suggesting that vaccinia vectors may also be promising delivery systems for an HIV vaccine.

- Eukaryotic recombinant expression vector systems, in particular the baculovirus-insect cell and metallothione promoter vector systems, HIV, simian immunodeficiency virus (SIV), and proviral molecular clones of bovine immunodeficiency virus (BIV), are being used to engineer novel noninfectious pseudovirons. These virus-like particles are designed to contain Gag proteins, Gag-Pol-Env, or Gag and a combination of T- and/or B-cell reactive virus Env epitopes (e.g., primary neutralizing and/or fusion domains) or immunomodulators (e.g., IL-2).

- The bovine immunodeficiency-like virus (BIV) is a unique member of the lentivirus subfamily of retroviruses. Chronic infection in specific pathogen-free rabbits *(Oryctolagus cuniculus)* has been established with a natural isolate or progeny of an infectious molecular clone of BIV. The infection results in a rapid and sustained BIV-specific humoral response suggesting that infection is targeted to cells of the immune system.

- NCI investigators have put the poly Tat activation region (TAR) which binds to the viral regulatory protein, Tat, into the HIV promoter, thereby inhibiting viral replication. Since binding of Tat to TAR is necessary for RNA expression and viral replication, the polymeric TAR (poly TAR) provides a molecular decoy which inhibits viral replication. Cultures containing the protected cells show a gradual decline in virus production that reaches 90% in two months. Six months after infection the protected cell cultures express little detectable virus and are resistant to reinfection. Poly TAR appears to be an effective antiviral gene that may have eventual clinical application as a gene therapy modality.

- A glycoprotein growth factor known as Oncostatin M, derived from activated T-cells, is a potent growth stimulator for AIDS-KS cells. This growth factor is distinct from other important cytokines in AIDS-KS, namely IL-6 and the HIV Tat protein, but binds to the active subunit of the IL-6 receptor. Oncostatin M appears to cause AIDS-KS cell proliferation both directly and in part by enhancing the expression of IL-6

by vascular endothelial cells, and further induces morphologic changes in AIDS-KS cells, namely to the spindle configuration of smooth muscle cells.

- The striking production of autostimulatory and angiogenic growth factors by KS cells suggest that these factors should be an important target for therapy. In the past year, Phase I clinical trials were begun on a new inhibitor of angiogenesis, Fumagillin, and its synthetic analog, TNP-470.

- NCI scientists have found a non-cytotoxic bacterial product, a sulfated polysaccharide-peptidoglycan compound (SP-PG) which inhibits the growth and vascular responses, in particular the induction of angiogenesis and hyperpermeability, of AIDS-KS spindle cells *in vitro* and in a nude mouse model.

- Profound cellular immunodeficiency plays a central role in lymphomagenesis, as evidenced by the striking relationship between the depletion of CD4 lymphocytes and the development of NHL, particularly when the CD4 count falls below $50/mm^3$. NCI investigators are expanding the clinical data and laboratory correlates generated from the continuing follow-up of the original AZT-treated AIDS cohort (8 of the 55 of whom developed NHL a median of two years after AZT institution) and similar observations in 61 ddI-treated AIDS patients. In the AZT-treated cohort, there is roughly a 30 percent chance of developing NHL within three years. The most important risk factor determinant for both the AZT- and ddI-treated cohort/s is a CD4 count below the critical level of $50/mm^3$.

- The remarkable occurrence of high-grade B-cell, non-Hodgkin's lymphomas (NHL) has recently emerged as a major sequela of HIV infection, especially in patients who survive other consequences of AIDS in a protracted state of profound immunosuppression. NHLs develop in approximately 10 percent of AIDS patients treated with dideoxynucleosides. NCI investigators have developed a "lymphoma subpanel" comprised of two AIDS lymphoma cell lines including an EBV+ Burkitt's lymphoma, and eight non-AIDS lymphoma cell lines for screening potential therapeutic compounds.

Acquired Immunodeficiency Syndrome (AIDS) Funding by Functional Category Fiscal Year 1993

(Dollars in Thousands)

I. Basic Science Research	
Biomedical Research	
HIV and HIV genome	$31,194
Immunology	11,162
Blood/Blood products	233
Diagnostic Methods/Reagent Development	1,711
Animal models & related studies	9,255
Subtotal, Biomedical Research	53,555
Therapeutic Agents	
Development	41,526
Clinical Trials	47,469
Subtotal, Therapeutic Agents	88,995
Vaccines	
Development	12,069
Clinical Trials	0
Subtotal Vaccines	12,069
TOTAL, BASIC SCIENCE RESEARCH	154,619
II. Risk Assessment and Prevention	
Surveillance	
Diseases associated with HIV	2,626
HIV surveys (incidence, prevalence)	0
Knowledge, attitudes, behaviors	0
Subtotal, Surveillance	2,626
Population-Based Research	
Transmission	
Sexual	629
Intravenous drug abusers	0
Hemophiliac populations	1,391
Blood recipient/donor studies	0
Perinatal infection	1,982
Occupationally related	0
Other/Miscellaneous	3,256
Subtotal, Transmission	7,257
Natural History and Cofactors	8,527
Subtotal, Population-Based Research	15,785
TOTAL RISK ASSESSMENT AND PREVENTION	18,410
Total, NCI	**$173,029**

Note: The functional codes of AIDS were developed by PHS at the request of Dr. James 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 1993

(Dollars in Thousands)

By Mechanism:	
Research Project Grants	$26,623
Cancer Center Grants	3,765
Cooperative Clinical Groups	1,743
Conference Grants	13
Small Grants	688
R&D Contracts	51,388
Intramural Research	82,761
Research Management and Support	6,048
Total, NCI	$173,029

By Research Thrust:	
Cancer Causation	$58,659
Detection and Diagnosis Research	9,848
Treatment Research	75,457
Cancer Biology	25,300
Total Research	169,264
Cancer Center Grants	3,765
Total, NCI	$173,029

By Division:	
Division of Cancer Biology, Diagnosis and Centers	$17,695
Division of Cancer Treatment	63,027
Division of Cancer Etiology	48,573
Frederick Cancer Research and Development Center	20,618
Division of Extramural Activities	1,144
Office of the Director	4,396
NIH Management Fund*	17,576
Total, NCI	$173,029

*Supports common services shared within the NIH; in AIDS the Management Fund is used principally for support costs associated with NCI's activities at the NIH Clinical Center.

Acquired Immunodeficiency Syndrome (AIDS) Funding History Fiscal Years 1983-1993

(Dollars in Thousands)

Fiscal Year	NCI Amount	NIH Amount	% NCI To NIH
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%
1991	160,869	799,821	20%
1992 (not including ADAMHA)	165,668	837,895	20%
1992 (including ADAMHA)	165,668	1,047,294	16%
1993	173,029	1,073,957	16%

Grant and Contract Awards by State Fiscal Year 1993

State	Grants		Contracts		Total NCI
	Number	Amount	Number	Amount	
Alabama	34	$13,302,962	16	$8,163,959	$21,466,921
Alaska	3	604,893	1	65,631	670,524
Arizona	50	19,736,015	1	159,560	19,895,575
Arkansas	11	1,977,611	0	0	1,977,611
California	530	170,798,429	35	13,355,637	184,154,066
Colorado	45	18,505,814	6	2,159,856	20,665,670
Connecticut	61	18,755,125	3	2,512,611	21,267,736
Delaware	2	203,091	0	0	203,091
District of Columbia	63	20,915,495	12	1,826,904	22,742,399
Florida	55	12,997,713	6	2,936,497	15,934,210
Georgia	23	4,504,269	10	3,371,096	7,875,365
Hawaii	18	6,606,684	4	1,598,925	8,205,609
Idaho	1	50,000	0	0	50,000
Illinois	131	34,381,642	14	3,886,166	38,267,808
Indiana	28	6,750,896	4	1,650,749	8,401,645
Iowa	26	3,673,872	3	2,163,943	5,837,815
Kansas	22	3,940,809	5	2,387,215	6,328,024
Kentucky	24	3,262,761	4	1,702,119	4,964,880
Louisiana	16	3,430,195	1	51,028	3,481,223
Maine	7	2,863,787	1	659,745	3,523,532
Maryland	135	48,492,606	106	88,507,156	136,999,762
Massachusetts	346	130,777,238	14	4,428,571	135,205,809
Michigan	156	36,680,157	8	5,777,670	42,457,827
Minnesota	89	28,200,784	8	3,073,259	31,274,043
Mississippi	5	445,868	1	49,937	495,805
Missouri	57	13,427,016	9	4,491,015	17,918,031
Montana	1	147,718	0	0	147,718
Nebraska	24	4,646,078	0	0	4,646,078
Nevada	3	398,279	0	0	398,279
New Hampshire	34	13,145,113	1	84,368	13,229,481
New Jersey	49	12,258,208	6	3,649,849	15,908,057
New Mexico	16	3,287,601	5	1,682,977	4,970,578
New York	453	148,620,800	24	9,431,224	158,052,024
North Carolina	127	43,561,378	23	11,374,212	54,935,590
North Dakota	4	748,684	0	0	748,684
Ohio	108	24,470,177	6	4,263,499	28,733,676
Oklahoma	13	1,458,015	0	0	1,458,015
Oregon	23	5,723,007	3	394,782	6,117,789
Pennsylvania	281	99,049,437	7	2,538,571	101,588,008
Rhode Island	32	9,364,874	1	639,503	10,004,377
South Carolina	15	2,136,070	1	742,179	2,878,249
South Dakota	3	294,286	0	0	294,286
Tennessee	78	21,552,606	4	876,855	22,429,461
Texas	266	76,241,277	11	4,022,945	80,264,222
Utah	31	8,310,019	5	1,564,451	9,874,470
Vermont	15	5,259,915	1	261,931	5,521,846
Virginia	48	15,925,007	16	41,835,029	57,760,036
Washington	125	54,099,286	9	4,526,871	58,626,157
West Virginia	11	1,563,829	3	1,151,572	2,715,401
Wisconsin	81	23,877,306	8	5,034,121	28,911,427
Wyoming	0	0	0	0	0
Total	3,779	1,181,424,702	406	249,054,188	1,430,478,890
Puerto Rico	0	223,052	0	0	223,052
Total	3,779	$1,181,647,754	406	$249,054,188	$1,430,701,942

Institutions Receiving More than $5,000,000 in NCI Support Fiscal Year 1993

(Dollars in Thousands)

State	Institution	Grants	Contracts	Construction	Total NCI
Alabama	University of Alabama System	$10,283	$2,818	$0	$13,101
	Southern Research Institute	3,289	5,346	0	8,635
Arizona	University of Arizona	17,584	160	0	17,744
California	City of Hope	6,287	0	0	6,287
	University of California	76,147	3,922	0	80,069
	SRI International	2,508	2,514	0	5,022
	Stanford University	20,852	0	0	20,852
	University of Southern California	15,602	1,211	0	16,813
	Scripps Research Institute	9,109	0	0	9,109
	La Jolla Cancer Research Foundation	7,225	0	0	7,225
	Salk Institute for Biological Studies	8,405	0	0	8,405
	National Childhood Cancer Foundation	5,606	0	0	5,606
Colorado	University of Colorado System	7,988	391	0	8,379
Connecticut	Yale University	18,983	1,229	0	20,212
District of Columbia	Georgetown University	11,797	364	0	12,161
	U.S. Department of the Army	91	6,561	0	6,652
Florida	University of Miami Coral Gables	7,087	2,388	0	9,475
Georgia	Emory University	4,125	2,020	0	6,145
Hawaii	University of Hawaii System	6,029	951	0	6,980
Illinois	Northwestern University	5,918	36	0	5,954
	University of Chicago	13,999	440	0	14,439
	University of Illinois System	8,692	2,798	0	11,490
Maryland	Johns Hopkins University	39,705	1,638	0	41,343
	Organon Teknika Corporation	0	17,003	0	17,003
	University of Maryland System	3,542	1,580	0	5,122
	Westat, Inc.	0	11,843	0	11,843
Massachusetts	Dana-Farber Cancer Institute	31,659	232	0	31,891
	Harvard University	20,525	234	0	20,759
	Massachusetts General Hospital	15,570	0	7,000	22,570
	Brigham and Women's Hospital	16,371	0	0	16,371
	Massachusetts Institute of Technology	10,008	0	0	10,008
	Tufts University Medford	5,129	0	0	5,129
Michigan	University of Michigan at Ann Arbor	19,785	0	0	19,785
	Wayne State University	8,991	0	0	8,991
	Michigan Cancer Foundation	2,482	2,648	0	5,130
Minnesota	University of Minnesota	16,267	1,465	0	17,732
	Mayo Foundation	10,081	689	0	10,770
Missouri	Washington University	9,338	772	0	10,110
New Hampshire	Dartmouth College	13,255	84	0	13,339
New York	Memorial Sloan-Kettering	34,739	2,422	0	37,161
	Columbia University	15,221	0	0	15,221
	New York University	13,755	0	0	13,755
	Yeshiva University	12,929	0	0	12,929
	Cold Spring Harbor Laboratory	10,380	0	0	10,380
	American Health Foundation	10,274	650	0	10,924
	State University of New York	7,758	830	0	8,588
	New York State Dept. of Health	14,264	2,229	0	16,493
	Cornell University	5,045	0	0	5,045
	University of Rochester	10,997	0	0	10,997
North Carolina	University of North Carolina System	19,187	904	182	20,273
	Duke University	20,664	808	0	21,472
	Research Triangle Institute	0	6,189	0	6,189
Ohio	Case Western Reserve University	10,719	239	0	10,958
	Ohio State University	8,293	301	0	8,594
Pennsylvania	University of Pittsburgh	29,193	1,226	0	30,419
	University of Pennsylvania	15,565	197	0	15,762
	Fox Chase Cancer Center	21,379	1,103	0	22,482
	Wistar Institute of Anatomy and Biology	8,413	0	0	8,413
	Pennsylvania State University	6,644	0	0	6,644
	Thomas Jefferson University	10,451	0	0	10,451
Tennessee	St. Jude Children's Research Hospital	12,496	0	0	12,496
	Vanderbilt University	7,148	0	0	7,148
Texas	University of Texas System	55,131	3,403	0	58,534
	Cancer Therapy and Research Center	11,083	0	0	11,083
	Baylor College of Medicine	7,781	132	0	7,913
Utah	Utah State Higher Education System	8,401	1,565	0	9,966
Vermont	Univ. of Vermont & State Agriculture Colleg	5,214	262	0	5,476
Virginia	American College of Radiology	6,387	179	0	6,566
	Dyncorp	0	36,486	0	36,486
Washington	Fred Hutchinson Cancer Research Center	39,156	3,270	0	42,426
	University of Washington	13,052	195	0	13,247
Wisconsin	University of Wisconsin System	21,544	2,555	0	24,099
	Total	963,577	136,482	7,182	1,107,241

Cancer Centers Funding History

Fiscal Year	1988	1989	1990	1991	1992	1993
Center Support	$100,427,000	$101,127,000	$105,268,000	$110,481,000	$127,351,000	$123,930,000
Annual Growth	4.8%	0.7%	4.1%	5.0%	15.3%	3.4%

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. Cancer Centers also serve as a stable resource for training new cancer investigators. Of the 57 cancer center support grants (CCSG) awarded in FY 1993, 14 were to basic laboratory centers, 2 were to consortium centers, 14 were to clinical centers, and 27 have been awarded comprehensive status. In addition, 2 new Cancer Center Planning Grants were funded in FY 1993, which together with the 12 continuing planning grants from FY 1992 bring the total number of planning grants to 14. The Cancer Center Planning Grant was initiated in FY 1992 to increase geographic distribution of cancer center in underrepresented areas.

The Cancer Centers Program promotes research by stimulating interactions between basic and clinical scientists, who already have received peer-reviewed research support, to take advantage of research opportunities to promote cost-effectiveness of research resources and to provide access to the newest technologies. Together with other support mechanisms such as the NCI Cancer Information Service contracts, the program enhances the interactions of the center with its local and regional communities.

Significant progress has been achieved during the past year with efforts in these major areas: (1) two new P20 Cancer Center Planning Grants to Michigan State University and the University of Arkansas and one new Cancer Center Support Grant to Northwestern University were funded in FY 1993; (2) substantially revised guidelines for Comprehensive status were put into effect and six applications were reviewed under these new guidelines; (3) the implementaion and refinement of the CCSG guidelines which had undergone a major revision in FY 1992 were continued; (4) a number of pilot projects were supported in high-priority areas of research including breast, prostate, ovarian, and cervical cancers, gene therapy, vaccine development, and cancer prevention and control research; (5) an increased emphasis was placed on improvement of clinical research programs and on developing translational research at all cancer centers; (6) completion of two workshops, one for Cancer Center Directors, and one for P20 Planning Grant Directors; (7) approval for funding of 16 large-scale Breast Cancer Education Summits and 10 mini-summits in collaboration with the Office of Cancer Communications, NCI; and (8) approval of a concept for an RFA for P20 planning grants for the development of breast cancer programs in NCI-designated cancer centers.

The P20 Planning Grant for Breast Cancer Research Programs in NCI-designated Cancer Centers is to be activated in FY 1994 and will be co-sponsored by the National Cancer Institute, the National Institute on Aging, and the National Institute for Environmental Health Sciences. Through this RFA, Cancer Centers will be invited to develop broad, multidisciplinary research programs including basic, clinical and prevention and control approaches to breast cancer research. The RFA will emphasize inclusion of research not only on breast cancer in young women and populations of women with higher rates of breast cancer, but also environmental influences on breast cancer.

The revised guidelines for Comprehensive status, implemented in FY 1993, strengthen the application procedures, the review process, and criteria for evaluating the programmatic elements. In addition, the criteria for comprehensive status are designed to improve the outreach, information, education and community service efforts of the Cancer Center which ultimately has the potential to impact on the region it serves.

Since 1978, the NCI has recognized a special class of NCI-designated Comprehensive Cancer Centers which have provided a comprehensive set of cancer research and community services. 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. To receive this designation, a clinical cancer center must provide evidence that they meet eight key criteria for comprehensiveness.

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.

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

(Dollars in Thousands)

State	Grantee Institution	Type	Awarded
Alabama	University of Alabama at Birmingham	Comprehensive	$3,719,299
Arizona	University of Arizona	Comprehensive	1,423,141
California	Beckman Research Institute/City of Hope	Clinical	1,268,408
	La Jolla Cancer Research Foundation	Basic	1,148,976
	Salk Institute for Biological Sciences	Basic	1,560,452
	University of California at Los Angeles	Comprehensive	3,399,324
	University of California at San Diego	Clinical	1,297,476
	University of Southern California	Comprehensive	3,298,705
Colorado	University of Colorado Health Sciences Center	Clinical	2,113,834
Connecticut	Yale University	Comprehensive	1,248,138
District of Columbia	Georgetown University	Comprehensive	1,949,834
Florida	University of Miami	Comprehensive	2,082,297
Illinois	Illinois Cancer Center	Consortium	57,136
	Northwestern University	Clinical	1,253,492
	University of Chicago	Clinical	1,839,094
Indiana	Purdue University West Lafayette	Basic	465,035
Maine	Jackson Laboratory	Basic	1,626,348
Maryland	Johns Hopkins University	Comprehensive	4,788,832
Massachusetts	Dana-Farber Cancer Institute	Comprehensive	3,653,229
	Massachusetts Institute of Technology	Basic	2,046,907
	Worcester Foundation for Experimental Biology	Basic	425,380
Michigan	University of Michigan at Ann Arbor	Comprehensive	2,070,325
	Wayne State University	Comprehensive	1,001,515
Minnesota	Mayo Foundation	Comprehensive	1,824,856
Nebraska	University of Nebraska Medical Center	Basic	836,166
New Hampshire	Dartmouth College	Comprehensive	1,500,335
New York	Cold Spring Harbor Laboratory	Basic	2,753,892
	Columbia University New York	Clinical	1,757,720
	Kaplan Comprehensive Cancer Center/NYU	Comprehensive	1,673,648
	Nelson Institute of Environmental Medicine/NYU	Basic	895,062
	Roswell Park Memorial Institute	Comprehensive	1,811,698
	Memorial Sloan-Kettering	Comprehensive	6,029,292
	University of Rochester	Clinical	2,388,838
	American Health Foundation	Basic	2,742,916
	Albert Einstein College of Medicine	Clinical	3,627,759
North Carolina	Duke University	Comprehensive	3,723,902
	University of North Carolina Chapel Hill	Comprehensive	2,188,365
	Wake Forest University/Bowman Gray Sch. of Medicine	Comprehensive	1,391,341
Ohio	Case Western Reserve University	Clinical	1,253,411
	Ohio State University	Comprehensive	2,924,251
Pennsylvania	Fox Chase Cancer Center	Comprehensive	6,624,301
	Temple University	Basic	934,483
	University of Pennsylvania	Comprehensive	2,327,505
	University of Pittsburgh	Comprehensive	1,648,343
	Wistar Institute of Anatomy and Biology	Basic	2,845,975
Rhode Island	Roger Williams Hospital	Clinical	897,567
Tennessee	St. Jude Children's Research Hospital	Clinical	3,732,293
	Drew-Meharry-Morehouse Consortium Cancer Center	Consortium	1,078,692
Texas	San Antonio Cancer Institute	Clinical	970,533
	M.D. Anderson Cancer Center/Univ. of Texas	Comprehensive	2,135,185
Utah	University of Utah	Clinical	1,054,632
Vermont	University of Vermont	Comprehensive	1,198,723
Virginia	University of Virginia	Basic	665,612
	Medical College of Virginia/VCU	Clinical	768,897
Washington	Fred Hutchinson Cancer Research Center	Comprehensive	4,942,920
Wisconsin	McArdle Laboratory for Cancer Research	Basic	2,775,869
	University of Wisconsin Madison	Comprehensive	2,620,634
	Total		$120,282,793

Specialized Programs of Research Excellence SPOREs

In 1992, the NCI established the Specialized Programs of Research Excellence (SPOREs) to promote interdisciplinary research and to speed the bidirectional exchange between basic and clinical science in order to move basic research findings from the laboratory to applied settings involving patients and populations. The ultimate goal of the SPORE program is to bring novel ideas that have the potential to reduce cancer incidence and mortality, improve survival, and to improve the quality of life to clinical care settings.

Laboratory and clinical scientists work collaboratively in planning, designing and implementing research programs that impact on cancer prevention, detection, diagnosis, treatment and control. To facilitate this research, each SPORE develops and maintains specialized resources that benefit all scientists working on the specific cancer site, as well as SPORE scientists. An additional SPORE element is a career development program that recruits scientists both within and outside the SPORE institution to enlarge the cadre of laboratory and clinical scientists dedicated to translational research on human cancer. SPOREs meet annually to share data, assess research progress, identify new research opportunities and establish priorities for research most likely to reduce incidence and mortality and to increase survival.

In 1993, NCI funded a total of 22 SPOREs for $19,615,000, of which 9 were for breast cancer, 2 for gastrointestinal (colorectal and pancreatic cancer), 4 for lung cancer and 7 for prostate cancer research and an additional $1,850,000 for brain tumor research and cofunded grants. SPOREs are funded through both the P50 and P20 mechanisms. Nine institutions received full support as P50 SPOREs. Thirteen P20s were awarded to institutions to conduct feasibility studies to determine whether they would qualify to become fully funded SPORE institutions. In the upcoming years, NCI may increase the use of the SPORE mechanism to include funding for other major cancer sites.

SPORE awards in 1993 by cancer site:

Site	Type	Number of Awards	Amount of Funding
Breast	P50	4	$7,811,000
	P20	5	658,000
	Total Breast	9	8,469,000
Gastrointestinal	P50	1	1,484,000
	P20	1	200,000
	Total Gastrointestinal	2	1,684,000
Lung	P50	2	4,023,000
	P20	2	412,000
	Total Lung	4	4,435,000
Prostate	P50	2	4,394,000
	P20	5	633,000
	Total Prostate	7	5,027,000

NCI Foreign Research Grants and Contracts Fiscal Year 1993

(Dollars in Thousands)

Country	Grant		Contract		Total NCI Awards	Percent of Total Dollars Awarded
	Number	Amount	Number	Amount		
Australia	5	$532	0	$0	$532	5.4%
Belgium	1	330	0	0	330	3.4%
Canada	18	1,790	0	0	1,790	18.2%
China	0	0	3	255	255	2.6%
Costa Rica	0	0	1	413	413	4.2%
Denmark	2	828	3	549	1,377	14.0%
Finland	1	122	2	731	853	8.7%
France	4	897	0	0	897	9.1%
Ghana	0	0	1	67	67	0.7%
Israel	5	666	0	0	666	6.8%
Italy	3	776	0	0	776	7.9%
Jamaica	0	0	0	0	0	0.0%
Japan	0	0	1	60	60	0.6%
Netherlands	1	100	0	0	100	1.0%
New Zealand	0	0	2	177	177	1.8%
Norway	0	0	0	0	0	0.0%
Republic of South Africa	1	60	0	0	60	0.6%
Sweden	5	755	2	399	1,154	11.7%
Switzerland	1	56	0	0	56	0.6%
Tanzania	0	0	1	60	60	0.6%
Trinidad	0	0	0	0	0	0.0%
United Kingdom	3	207	0	0	207	2.1%
Total Foreign	**50**	**$7,119**	**16**	**$2,711**	**$9,830**	**100.0%**

NOTE: Excludes Manpower Grants: $52,000

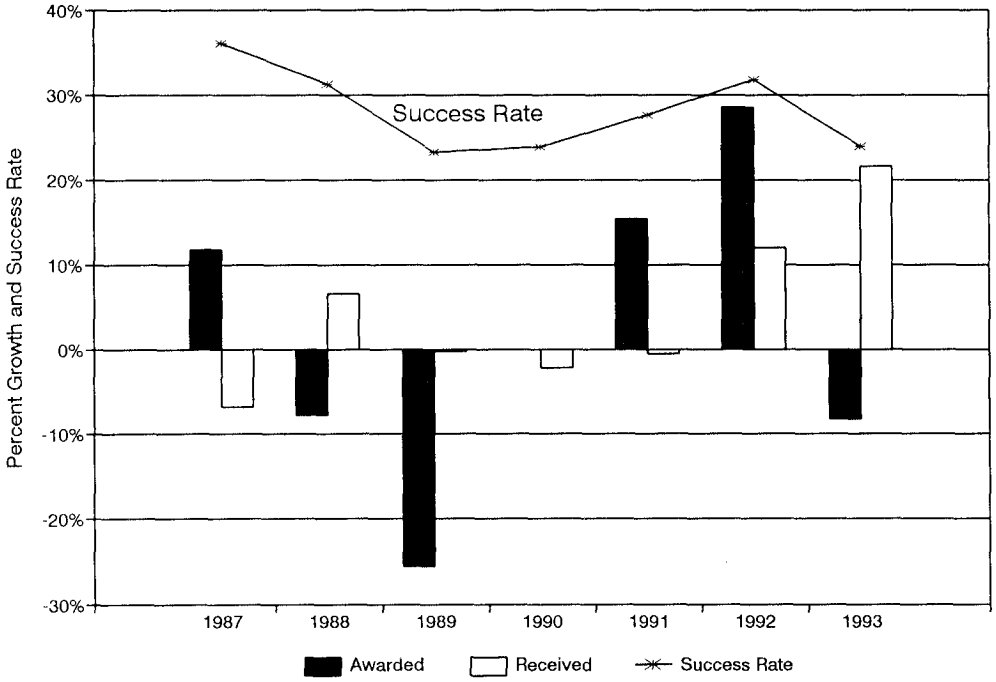
Total Research Project Grants Fiscal Years 1987-1993

(Dollars in Thousands)

Fiscal Year	Type Awarded	Requested No.	Requested Amt.	Recommended No.	Recommended Amt.	Awarded No.	Awarded Amt.	Percent Funded	Succes Rate
1987	Competing								
	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	0.0%	
	Subtotal	2,939	632,394	2,671	487,487	1,061	218,193	39.7%	36.1%
	Noncompeting					2,042	424,960		
	Total					**3,103**	**643,153**		
1988	Competing								
	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%	31.2%
	Noncompeting					2,078	460,025		
	Total					**3,057**	**665,403**		
1989	Competing								
	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%	23.3%
	Noncompeting					2,374	564,234		
	Total					**3,102**	**723,009**		
1990	Competing								
	New	2,193	$527,256	2,078	$429,203	421	$82,656	20.3%	
	Renewal	849	278,541	834	233,096	302	87,497	36.2%	
	Board Supplement	15	2,837	13	1,867	5	991	38.5%	
	Subtotal	3,057	808,634	2,925	664,166	728	171,144	24.9%	23.8%
	Noncompeting					2,288	568,336		
	Total					**3,016**	**739,480**		
1991	Competing								
	New	2,195	$512,665	2,036	$422,161	513	$102,364	25.2%	
	Renewal	837	286,858	836	245,420	323	94,231	38.6%	
	Board Supplement	8	1,161	8	897	4	421	50.0%	
	Subtotal	3,040	800,684	2,880	668,478	840	197,016	29.2%	27.6%
	Noncompeting					2,207	594,532		
	Total					**3,047**	**791,548**		
1992	Competing								
	New	2,508	$612,369	1,825	$408,776	664	$119,091	36.4%	
	Renewal	815	332,428	718	266,075	398	133,413	55.4%	
	Board Supplement	23	3,704	22	2,168	17	1,347	77.3%	
	Subtotal	3,346	948,501	2,565	677,019	1,079	253,851	42.1%	32.2%
	Noncompeting					2,231	620,006		
	Total					**3,310**	**873,857**		
1993	Competing								
	New	3,173	$746,912	2,131	$444,001	644	$114,227	30.2%	
	Renewal	891	328,657	568	196,807	340	107,949	59.9%	
	Board Supplement	75	8,554	57	6,251	7	1,698	12.3%	
	Subtotal	4,139	1,084,123	2,756	647,059	991	223,874	36.0%	23.9%
	Noncompeting					2,346	692,436		
	Total					**3,337**	**916,310**		

Note: RPGs include 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 Request for Applications, and R43/R44 Small Business Innovative Research awards. Percent funded is the number of awarded grants divided by the number of awards recommended. Success rate is the number of awarded grants divided by the number of awards requested. Requested data from 1986 through 1990 includes all submitted applications. Beginning in 1991, the requested data excludes applications not recommended for further review by DRG. 1993 requested and recommended data was preliminary at the time of printing and may be subject to change in the 1994 Fact Book.

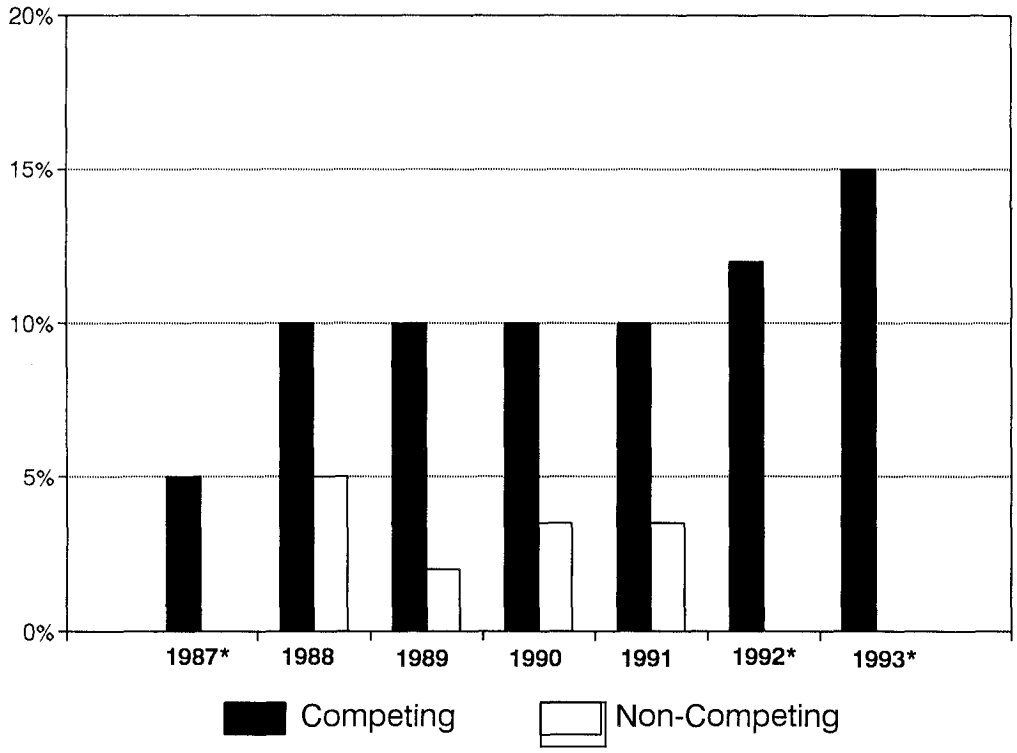
Success Rate:
Effects of Changes in Numbers of Applications and Awards
Fiscal Years 1987-1993



Percent Growth	1987	1988	1989	1990	1991	1992	1993
Awarded	12%	-8%	-26%	0%	15%	29%	-8%
Requested/Received	-7%	7%	-0%	-2%	-1%	12%	22%
RPGs Actual Data:							
Awarded	1,061	979	728	728	840	1,079	991
Requested/Received	2,939	3,133	3,127	3,057	3,040	3,346	4,139
Success Rate	36.1%	31.2%	23.3%	23.8%	27.6%	32.2%	23.9%

The Success Rate is the ratio of awarded to received applications. As illustrated in the graph, the success rate is sensitive to changes in either the numerator or denominator. For example, the success rate fell in 1989 as awarded RPGs decreased 26% from 979 to 728, while received applications essentially remained level. The success rate remained level in 1990 and continued to rise in 1991 and 1992 as the number of awarded applications increased, along with an increase in the number of applications received in 1992.

Research Project Grants
Adjustments from Recommended Levels
Fiscal Years 1987-1993

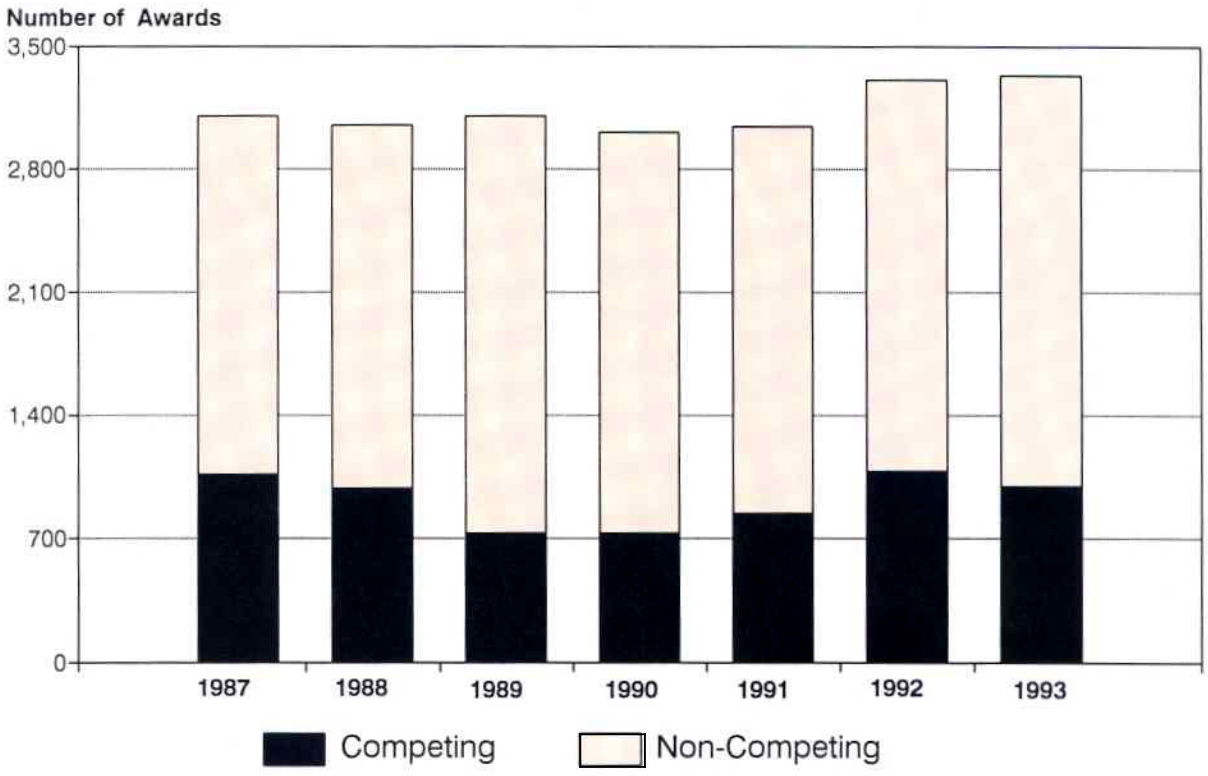


TYPE	1987	1988	1989	1990	1991	1992	1993
Competing	5.0%	10.0%	10.0%	10.0%	10.0%	12.0%	15.0%
Non-Competing	0.0%	5.0%	2.0%	3.5%	3.5%	0.0%	0.0%

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

**FY 1987,1992 and 1993 non-competing awards were paid at the recommended level.*

Research Project Grants
Number of Awards
Fiscal Years 1987-1993



TYPE	1987	1988	1989	1990	1991	1992	1993
Competing	1,061	979	728	728	840	1,079	991
Non-Competing	2,042	2,078	2,374	2,288	2,207	2,231	2,346
Total	3,103	3,057	3,102	3,016	3,047	3,310	3,337

Research Project Grants Awarded History by Activity Fiscal Years 1989-1993

(Dollars in Thousands)

TYPE	1989		1990		1991		1992		1993	
	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount
RO1	2,239	$377,164	2,068	$371,225	1,949	$381,932	2,050	$424,954	1,955	$430,203
PO1	165	188,015	162	185,130	165	190,470	183	205,330	176	202,852
R35	75	52,973	78	57,857	84	62,137	76	59,878	75	61,337
R37	132	32,353	153	39,264	163	43,687	162	47,414	166	51,633
UO1	70	20,939	87	31,145	85	32,431	123	44,171	171	56,199
R29	232	21,244	280	25,547	316	29,494	309	29,726	291	29,053
RFA	108	18,884	101	17,335	154	37,435	208	45,107	282	63,267
R43-R44	79	11,332	87	11,977	131	13,962	199	17,277	215	20,401
R23	2	105	0	0	0	0	0	0	0	0
R55									6	1,365
TOTAL	**3,102**	**$723,009**	**3,016**	**$739,480**	**3,047**	**$791,548**	**3,310**	**$873,857**	**3,337**	**$916,310**

RO1 Research Project (Traditional)
To support a discrete, specified, circumscribed project to be performed by the named investigator(s) in an area representing his/her specified interest and competencies.

PO1 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.

UO1 Research Project (Cooperative Agreement)
To support a discrete, specified, circumscribed project to be performed by the named investigator(s) in an area representing his/her specific interest and competencies.

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

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.

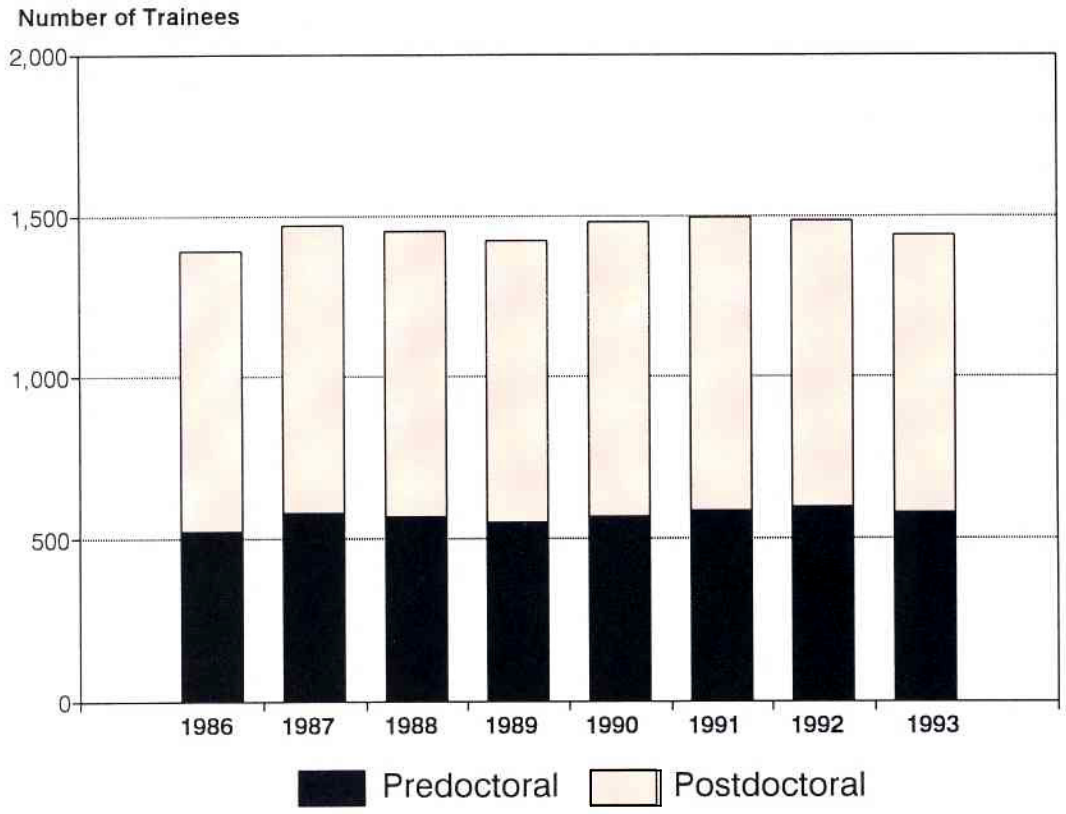
R43 Small Business Innovative Research (SBIR) Grants - Phase I
To support projects, limited in time and amount, to establish the technical merit and feasibility of R&D ideas which may ultimately lead to a commercial product(s) or service(s).

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 careers.

R55 Shannon Awards
To provide discrete limited support to scientists whose research applications fall short of the cutoff for funding yet are at the"margin of excellence" whereby the perceived quality of the grant is statistically indistinguishable from grants that are funded.

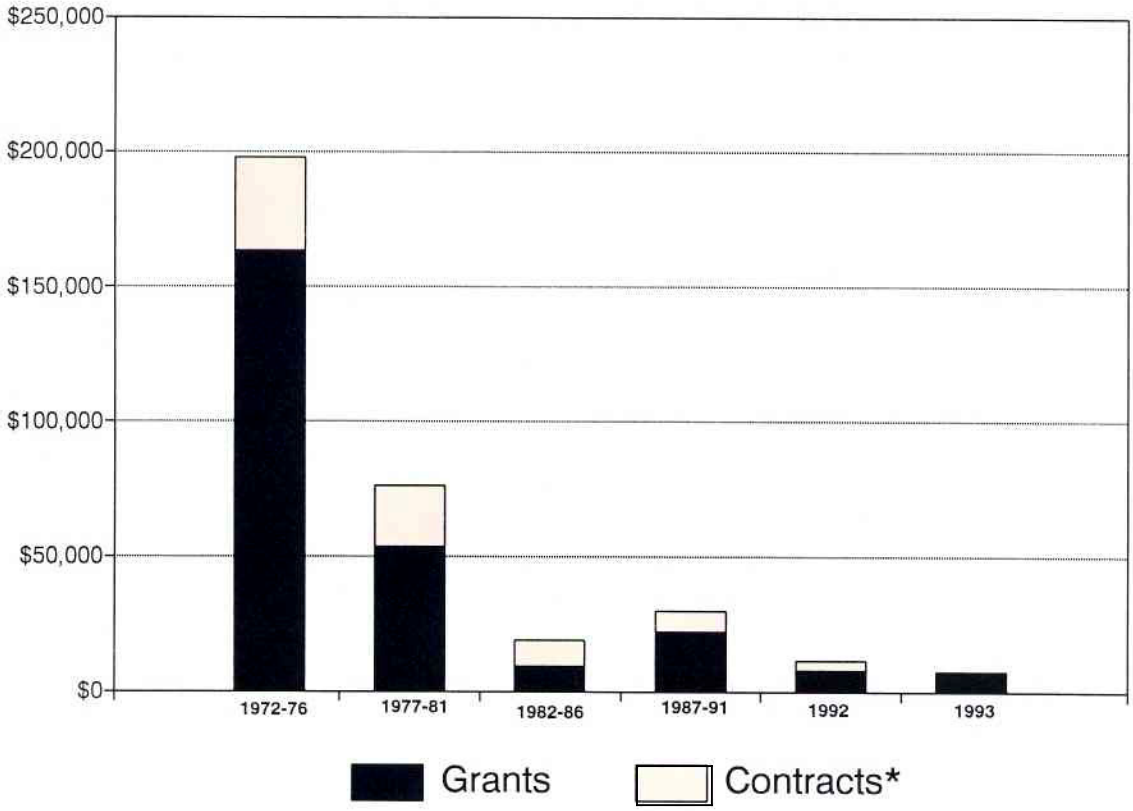
National Research Service Awards Fiscal Years 1986-1993



TYPE	1986	1987	1988	1989	1990	1991	1992	1993
Predoctoral	521	577	568	548	567	584	597	578
Postdoctoral	873	898	888	880	918	913	894	868
Total	1,394	1,475	1,456	1,428	1,485	1,497	1,491	1,446

Construction/ Renovation Funding Fiscal Years 1972-1993

(Dollars in Thousands)



TYPE	1972-1976	1977-1981	1982-1986	1987-1991	1992	1993
Grants	$163,433	$53,293	$9,225	$22,068	$8,000	$7,182
Contracts*	34,644	23,232	10,093	7,935	4,000	346
Total	198,077	76,525	19,318	30,003	12,000	7,528

NOTE: Fiscal year 1990 includes $10 million which was transferred to NCI from other NIH Institutes to partially fund 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 1993

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. NCI 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.

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 access to minority participation at all levels of cancer research, the Cancer Therapy Evaluation Program coordinates interrelated clinical programs. The individuals intended to benefit from these programs are Americans of African-American ancestry, Hispanics of Mexican, Puerto Rican, Cuban, or Central American descent, Asian-Americans, and Native Americans, including Alaskans and Hawaiian natives. Eight Cooperative Groups (NSABP, GOG, CCSG, NCCTG, SWOG, RTOG, CALGB, and ECOG) have developed plans to encourage early diagnosis and clinical trials participation among potential patients and to overcome language and logistic barriers for specific minority groups.

Special Populations Studies:
For special populations who experience high cancer rates and are underserved in terms of cancer prevention and control programs, NCI supports initiatives which focus research on interventions designed to address such barriers as cultural and behavioral nuances unique to special population groups as well as obstacles within the health care delivery systems. A study of the impact of socioeconomic status on cancer risk and survival promises to provide information on more effective delivery of cancer intervention programs. In addition, a cancer mapping program will assist local health officials to better target cancer services to such populations. Special populations research also investigates primary prevention interventions designed to meet the specific

needs of these groups. Support for several cancer control networks has allowed channeling of cancer prevention and control information to stimulate interest from culturally sensitive researchers to address the unique needs of special populations.

Etiologic studies are aimed at identifying factors that place specific minority groups at unusual risk for cancer. For example, a series of population-based case-control studies is evaluating possible reasons for African-Americans having higher rates than Caucasians for multiple myeloma and cancers of the pancreas, esophagus and prostate, and to estimate the extent to which race-specific factors may explain these differences. A major prospective study has been launched to evaluate cancer and other health outcomes among farmers and their families, and will include a study site in North Carolina with a large African-American population. Another project is being designed to develop resources for evaluating cancer risks among migrant and seasonal farm workers, with special efforts to include Hispanic and other underserved groups. Studies are also underway to clarify risk factors responsible for the high rates of lung, stomach, oral and cervical cancers among specific minority populations.

Minority Statistics:
NCI's Surveillance Program continues to expand and refine the data collection and analyses of minority populations. Efforts to increase population coverage of Hispanics continued in 1993 and similar efforts are being undertaken for other racial and ethnic groups, low-income populations and the elderly. Expansion of the Program in FY 1992 increased coverage to approximately 14 percent of the total U.S. population. The two new areas included, Los Angeles County and four counties in the San Jose-Monterey area south of San Francisco. The population of Hispanics in these two areas is nearly four million which brings SEER coverage to 22 percent of the total Hispanic population residing in the U.S. This expansion increased coverage of minority populations, notably Asian and Pacific Islanders and African Americans. In addition, 3,400 patients are being followed for survival in the Black/White Survival Study, which was designed to investigate the significance of social, behavioral, lifestyle, biological, treatment, and health care factors as contributors to the observed differences in survival among Black and white cancer cases. Also underway are efforts to describe the cancer incidence and mortality in Alaskan Natives and American Indians as well as the patterns of care, risk factors, and cultural entities that form barriers to early detection and treatment of cancer in these groups.

Minority-Based Community Clinical Oncology Program (MBCCOP):
Supports the development and implementation of effective cancer control and treatment strategies in minority populations by including these groups in clinical trials research as well as provides minority cancer patients with access to state-of-the-art cancer treatment and technology. MBCCOPs are located in seven states and Puerto Rico and are funded through 1994 involving over 275 physicians. Nearly 1,000 patients have been enrolled onto cancer prevention, control, and treatment clinical trials through this program.

Minority Health Professional Training Initiative (MHPTI):
Initiated in 1991, the MHPTI is supporting training and career development opportunities for minority health professionals by engaging them in cancer research or by providing them with training in subspecialities related to cancer. Such opportunities will increase the number of minority clinicians, clinical researchers, and other health professionals who are prepared to deal with the

problem of excess mortality among minority populations due to cancer. As the result of three Requests for Applications (RFAs) published in 1992, four awards to minority clinicians were made. The program has continued through program announcements and two additional awards which were approved for funding in 1993.

Cancer Communications:
To promote clinical trials to minority and low literate target audiences, special training will be designed for NCI staff, educational resources for patient audiences will be developed, and training programs and resources will be designed for health professionals. Preliminary work has begun on the development of easy-to-read consent forms and this work will be expanded. Future efforts will involve continued work with the clinical trials cooperative groups in efforts to address the recruitment of minority patients.

The Cancer Information Service (CIS) awarded 19 new five year contracts which assure regional CIS services will be provided to the entire US population. The CIS Outreach Coordinators work with NCI-designated programs to tailor NCI messages and initiatives to local populations, with a special focus on minority populations. As part of CIS's outreach function, regional offices develop relationships with programs at the regional and state levels to promote knowledge of cancer control and education activities and to provide technical support and materials within the service area. Many designated programs are specifically concerned with minority health including: CCOPs (including the Minority CCOPS), NBLIC, ALIC and NHLIC, CDC Breast and Cervical Cancer Screening Grantees, and State Health Departments. In addition, it is the role of the CIS Outreach Coordinators to act as advocates for minority and low literate populations when working with Comprehensive and Clinical Cancer Centers, Patient Educators Network, and Data-Based Intervention Research Grantees on regional initiatives. The outreach efforts of the CIS also includes working with minority media and mass media with messages of interest to regional minority populations.

Existing resources for patients and health professionals are continually revised. The special needs of minority populations and low-literate groups are incorporated in the revision of all resources and the development and design of new resources.

The NCI's Comprehensive Minority Biomedical Program (CMBP) continues its efforts to heighten awareness about cancer risk and prevention in African Americans. The aim of this undertaking is to develop and disseminate information through educational programs regarding steps that can be taken to control or reduce cancer in African Americans.

The NCI's CMBP has issued an RFA inviting research grant applications from interested investigators with access to large or predominantly minority populations. The Minority Enhancement Awards would promote minority group participation in cancer research with a special focus on cancer control research. Support provided by this initiative would broaden the operational base of each institution by: expanding cancer control and prevention efforts in early detection, prevention screening, pre-treatment evaluation treatment, continuation care, and rehabilitation; increasing the involvement of minority population primary care providers early in the course of clinical treatment research; promoting the involvement in treatment research at the institutional level with a focus on the

development of treatment protocols for cancers that have a high incidence in minorities; supporting programs involving diet and nutrition cancer control activities.

NCI continued to expand its African American Cancer Education program -- "Do the right thing...Get a new attitude about cancer." "Do the right thing" urges African Americans to adopt a "new attitude" and make some simple lifestyle changes as crucial steps toward maintaining good health.

NCI also continued distribution and promotion of the Hispanic Program Kit "Hagalo hoy...Por su salud y su familia," which focused on early detection of breast and cervical cancers. The kit, developed for community leaders and organizations serving the Hispanic population, serves as a resource for community leaders to develop cancer equation programs, particularly for breast and cervical cancer. The kit contains education materials such as brochures and factsheets that can be used for community events such as fairs, workshops, meetings and conferences. It also contains articles and camera-ready graphics to be used for local media placements. Short and simple breast and cervical cancer bilingual brochures were printed in large quantities for mass distribution.

Project Awareness is a collaborative program designed to provide underserved women with breast cancer education, mammography, clinical breast exams, and followup medical care. It was completed in 10 cities including: Washington, D.C.; Detroit, Michigan; Los Angeles, California; Baltimore, Maryland; Atlanta, Georgia; Raleigh/Durham, North Carolina; St. Louis, Missouri; and Miami, Florida. Evaluation data on the effectiveness of the education campaign is now being completed. A revised program manual has been produced and will be available to interested cities. The community-based model is now being used by the YWCA in cooperation with the CDC to institutionalize the program. The Cancer Information Service (CIS) and National Black Leadership Initiative on Cancer (NBLIC) will "co-chair" local efforts providing media relations and technical support as needed.

NCI continued distribution and promotion of the half-hour television special and public service announcements on mammography "Una Vez al ano...Para toda una vida." The TV special was developed as a tool for educating Hispanic women on the need for breast cancer screening. "Una vez..." aired on the Univision Spanish-language television network for the second time during Breast Cancer Awareness Month in October 1993. Over 8,000 copies have been distributed to organizations serving the Hispanic population in the United States and Puerto Rico. The film is also being used widely by the Centers for Disease Control and Prevention Breast and Cervical Cancer Grantees, State Heath Departments, the Puerto Rico Department of Health, and by many units of the American Cancer Society.

The NCI produced a 9-minute video entitled, "Taking Control of Your Health: The Pap Test and Cervical Cancer." This video is the first culturally-appropriate, intertribal video on cervical cancer for Native American women. Clear, simple language is used to give an overview of the cervical cancer problem among Native American women (many times more prevalent than in the population at large), an explanation of the Pap test, recommendations for screening, and ways that women may be able to protect themselves from the disease. Women of all ages are addressed in the video, from sexually active teens to women past menopause. The film was premiered at a national meeting of Native American

women. The film in conjunction with its original musical score and support materials will be distributed through Native American intermediaries.

Several basic print brochures on cervical cancer were developed and tested for special audiences including low literate, African American and Hispanic women.

A tipsheet on how to quit smoking for African Americans and a bilingual piece for Hispanics were developed and widely disseminated during National Minority Cancer Awareness Month and throughout the year.

NCI collaborated in the revision and update of the "Guia para dejar de fumar," a smoking cessation guide developed by the University of San Francisco Network on Hispanic/Latino Tobacco Control Program. The Guia will be printed by the NCI and be part of the Hispanic Education Program resources.

NCI developed and tested nutrition education materials for low literacy segments of specific ethnic populations. These populations include American Indians, Alaskan Natives, Hawaiian Natives, Chinese, Filipino, Vietnamese, Hispanics, African Americans, and Caucasians. A total of 43 pieces have been developed which include tipsheets, booklets, posters, and scripts for three video and one audio tape. Some of these materials are bilingual and are currently being pretested with appropriate groups across the country. A guide for physicians, "Teaching Your Ethnic Patients," is also being developed. These materials will be available in the Fall of 1994.

The **"Down Home Healthy Cookbook"** was developed by NCI in conjunction with two nationally known African American chefs. They worked with the NCI by taking recipes that are popular among African Americans and making them lower in fat and sodium. This cookbook is being used by numerous African American organizations in their nutrition education programs. The regional CIS offices have been working with local intermediaries for distribution of the booklet.

Appropriations of the NCI 1938-1994

	1938 through 1968.....	$1,690,550,220	
	1969.....	185,149,500	
	1970.....	190,486,000	
12.6%	1971.....	230,383,000	
$3,718,759,220	1972.....	378,794,000	
	1973.....	492,205,000	
	1974.....	551,191,500	
	1975.....	691,666,000	1
	1976.....	761,727,000	
	"TQ".....	152,901,000	2
	1977.....	815,000,000	
	1978.....	872,388,000	3
	1979.....	937,129,000	
	1980.....	1,000,000,000	4
	1981.....	989,355,000	5
	1982.....	986,617,000	6
87.4%	1983.....	987,642,000	7
$25,699,023,000	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
	1992.....	1,989,278,000	15
	1993.....	2,007,483,000	16
	1994.....	2,082,267,000	
	Total (1938-1994).....	**29,417,782,220**	

Transition Quarter ("TQ") --

July 1, 1976 through September 30, 1976. The interim period in 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] *1990 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).*

[15] *Appropriation prior to reductions in P.L. 102-170 (-$21,475,000 for salary and expense reduction; -$1,262,000 for travel reduction; $15,000,000 transferred to other institutes for cancer research).*

[16] *Appropriation prior to reductions in P.L. 102-294 (-$16,060,000 for .8% reduction to all line items, -$9,933,000 for S&E reduction, -$139,000 for consultant services reduction.)*

By-Pass Budget Requests Fiscal Years 1973-1995

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
1993	2,775,000,000
1994	3,200,000,000
1995	3,600,000,000

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 Bypass Budget. The Budget submitted for 1973 was the initial submission.

Comparison of Dollars, Positions and Space Fiscal Years 1972-1993

	Dollars		Positions		Space**	
	Obligations ($000's)	Percent of Increase Over Prior Year	Actual Full-Time Permanen Employee	Percent of Increase Over Prior Year	Allocated Space (Square Feet)	Percent of Increase Over Prior Year
1972	$378,636	-	$1,665	-	329,587	-
1973	431,245	13.9%	$1,736	4.3%	357,972	8.6%
1974	581,149	34.8%	$1,805	4.0%	381,436	6.6%
1975	699,320	20.3%	$1,849	2.4%	382,485	0.3%
1976	760,751	8.8%	1,955	5.7%	387,324	1.3%
1977	814,957	7.1%	1,986	1.6%	428,285	10.6%
1978	872,369	7.0%	1,969	-0.9%	491,725	14.8%
1979	936,969	7.4%	1,973	0.2%	493,156	0.3%
1980	998,047	6.5%	1,837	-6.9%	467,730	-5.2%
1981	989,338	-0.9%	1,815	-1.2%	472,633	1.0%
1982	986,564	-0.3%	1,703	-6.2%	477,782	1.1%
1983	986,811	0.0%	1,731	1.6%	484,093	1.3%
1984	1,081,460	9.6%	1,698	-1.9%	466,890	-3.6%
1985	1,177,853	8.9%	1,596	-6.0%	466,890	0.0%
1986	1,210,284	2.8%	1,573	-1.4%	465,790	-0.2%
1987	1,402,790	15.9%	1,642	4.4%	465,790	0.0%
1988	1,468,435	4.7%	1,708	4.0%	458,556	-1.6%
1989	1,570,342	6.9%	1,701	-0.4%	483,778	5.5%
1990	1,644,330 *	4.7%	1,837	8.0%	489,604	1.2%
1991	1,712,669	4.2%	1,921	4.6%	499,396	2.0%
1992	1,947,571	13.7%	2,037	6.0%	477,067	-4.5%
1993	1,978,340	1.6%	1,977	-2.9%	493,186	3.4%

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

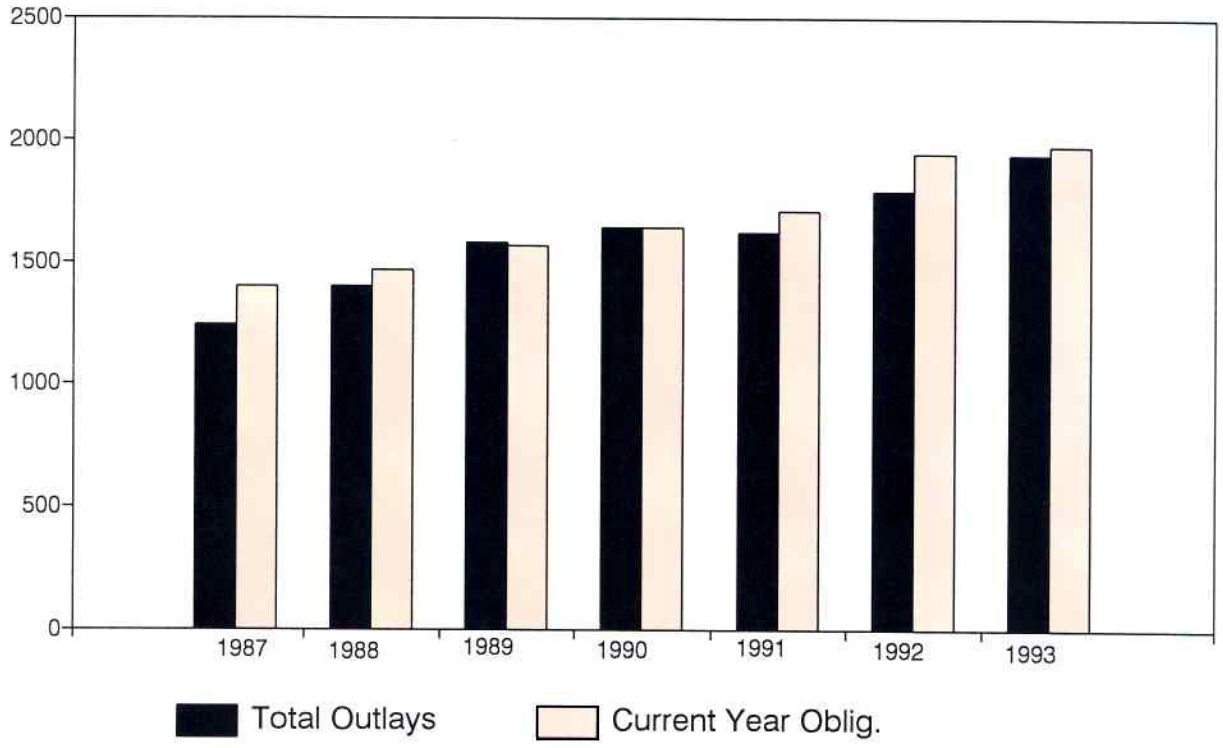
** Does not include space at the Frederick Cancer Research and Development Center.

Personnel Resources Fiscal Years 1984-1993

Fiscal Year	--Number of Full Time Equivalents--			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
1991	2,045	300	2,345	2,437
1992	2,219	306	2,525	2,604
1993	2,184	300	2,484	2,425

National Cancer Institute
Obligations and Outlays
Fiscal Year 1987-1993

(Dollars in Millions)



$ in Millions	1987	1988	1989	1990	1991	1992	1993
Prior Year Outlays	$680	$723	$815	$885	$885	$831	$1,099
Current Year Outlays	565	680	765	759	739	961	843
Total Outlays	1,245	1,403	1,580	1,644	1,624	1,792	1,942
Current Year Obligations	1,403	1,468	1,570	1,644	1,713	1,948	1,978

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

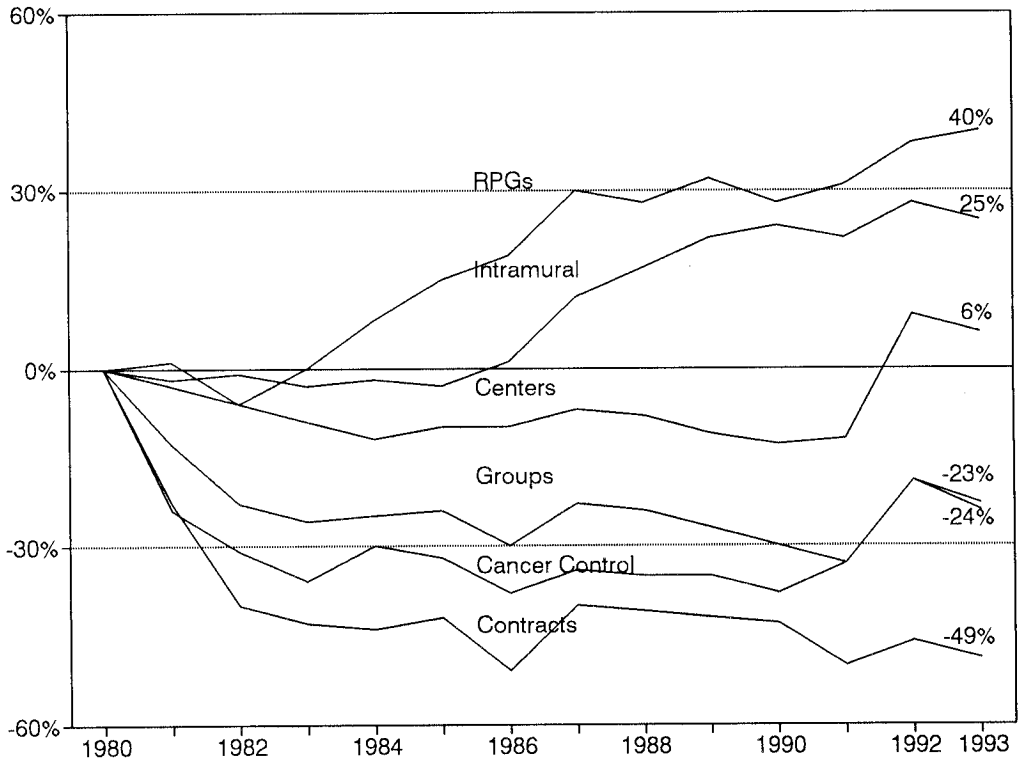
Outlays: Payments (cash or checks) made from appropriations.

Constant Dollar Trends

(Dollars in Millions)

Fiscal Years 1980-1993

Percent Change in Obligations as 1980 Constant Dollars



Constant Dollars	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Research Project Grants	$321	$324	$301	$322	$345	$369	$383	$417	$412	$425	$412	$420	$442	$448
Cancer Prevention & Control	67	51	46	43	47	46	42	44	43	44	42	45	55	52
Centers & SPOREs	67	65	63	61	59	61	60	62	62	59	59	59	73	71
Intramural Research	142	140	141	138	139	138	143	159	166	173	177	173	182	178
Clinical Cooperative Groups	48	42	37	36	36	36	34	37	37	35	33	32	39	37
R&D Contracts	189	145	114	107	106	109	92	113	111	110	107	95	102	97
Subtotal	834	766	702	706	733	759	753	833	831	845	829	824	892	882
All other mechanisms	124	98	90	76	77	81	75	78	77	77	81	84	92	85
Total NCI	$958	$863	$792	$782	$810	$840	$828	$911	$908	$922	$910	$908	$984	$967
NCI Change over 1980	base	-10%	-17%	-18%	-15%	-12%	-14%	-5%	-5%	-4%	-5%	-5%	3%	1%
Current Dollars														
Research Project Grants	$321	$355	$358	$406	$461	$517	$559	$643	$666	$723	$740	$792	$874	916
Cancer Prevention & Control	67	56	55	54	63	64	61	68	70	74	75	85	108	105
Centers & SPOREs	67	71	75	77	79	85	88	96	100	101	105	111	145	145
Intramural Research	142	153	168	174	186	194	209	245	269	294	317	326	360	364
Clinical Cooperative Groups	48	46	44	45	48	51	49	57	59	60	60	61	77	75
R&D Contracts	189	159	136	135	142	153	135	174	180	187	192	179	201	199
Subtotal	834	840	836	891	979	1,064	1,101	1,283	1,344	1,439	1,489	1,554	1,765	1,804
All other mechanisms	124	107	107	96	103	114	109	120	125	131	145	158	183	174
Total NCI	$958	$947	$943	$987	$1,082	$1,178	$1,210	$1,403	$1,469	$1,570	$1,634	$1,712	$1,948	1,978
Deflators	1.0	1.1	1.2	1.3	1.3	1.4	1.5	1.5	1.6	1.7	1.8	1.9	2.0	2.0

Note: Constant dollars are calculated using the Biomedical Research and Development Price Index.

NATIONAL CANCER INSTITUTE

NIH Publication No. 94-512
February 1994