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FCRF Program Proving Good Basic Research Can Be Supported By NCI With A Contract

Basic research supported by a contract rather than a grant? Some members of the scientific community argue that it can't be done, and even if it could, it shouldn't be. That view eventually prevailed at NCI, resulting in shift-

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In Brief

Holleb To Retire In June As ACS Vice President; Consensus Conference On Neurofibromatosis Set

ARTHUR HOLLEB, senior vice president/medical affairs of the American Cancer Society, plans to retire June 30. He has been with the Society since 1968. The reason, Holleb said, "is simple enough--the belief that the time has come for a new and younger chief medical officer." He will be 66 April 1. Robert Gadberry, ACS executive vice president, said Holleb "has been a visionary, totally dedicated, loyal and tireless in maintaining the highest standards for the Society". . . . **NIH CONSENSUS** conference on neurofibromatosis is scheduled for July 13-15, sponsored by NCI and the National Institute of Neurological & Communicative Disorders & Stroke. Questions to be addressed include: What are the various clinical types of neurofibromatosis, and what are their frequencies and their diagnostic criteria? What are the recommendations for care of patients?. . . . **COLIN CAMPBELL**, Cornell Univ., who is director of a joint China-U.S.-British study of dietary relationships to cancer mortality rates in China, recently presented facsimile transmission equipment to the Chinese Academy of Preventive Medicine. Believed to be the first permanent facsimile hookup between scientific health institutions in China and the U.S., it was provided by a grant from the American Assn. for Cancer Research. Cornell and Oxford Univ. are participating in the study, which is supported in part by NCI and AICR. . . . **"CONFRONTING CANCER** Through Art," the first national juried group exhibition by fine artists and craftspersons who have experienced cancer, is scheduled for May 9-June 2 in Brand Library, Glendale, CA. The exhibition is being sponsored by the Jonsson Comprehensive Cancer Center at UCLA. Professional and semiprofessional artists who have dealt with cancer are invited to entire. A prospectus may be obtained from Devra Breslow, Director for Special Programs, JCCC, UCLA, 924 Westwood Blvdl, Suite 630, Los Angeles 90024, phone 213/825-4066.

FCRF Basic Research Program Unique--It's Contract Supported

(Continued from page 1)
ing millions of dollars being spent each year on virology and immunology contracts during the 1960s and early 1970s to RO1 and PO1 grants.

(Even the critics now acknowledge that much of that contract supported research was superb and helped lay the groundwork for the biological information explosion of the 1970s and 80s).

One outpost of contract supported basic research remains--the Basic Research Program at Frederick Cancer Research Facility. It is small compared with the big virology and immunology programs of the 1970s, with a budget this year of almost $10 million.

The program, for which NCI presently contracts with Bionetics Research Inc., was established at the insistence of the National Cancer Advisory Board after President Nixon gave the Army biological warfare facility at Fort Detrick, MD, to NCI. Some NCI executives and advisors felt the labs and animal facilities would be useful for resource production and support activities but were cool toward establishing a basic research effort there. NCAB members argued that the work there would be more intellectually satisfying and productive with a basic research element present.

The Basic Research Program was established in 1972, within the overall contract for operation of the entire facility, with Litton Bionetics Inc. It survived repeated reviews, congressional investigations, suggestions from various NIH executives to phase it out, and a change in the corporate ownership, with Bionetics Research now a subsidiary of a Netherlands firm.

It also survived two recompetitions, including the last one in 1982 when the FCRF contract was split into five separate contracts, with the Basic Research Program as one. Another recompetition is under way, and although no one at NCI will admit it, it appears that no one has challenged Bionetics Research.

George Vande Woude, who succeeded Michael Hanna, the original director of the Basic Research Program (and who is now president of Bionetics Research), said in the recently published program annual report that "I believe we have chosen the right people and the right research projects to make the Basic Research Program one of the most productive and creative environments in the field of biomedical research. We are making significant contributions to the emerging disciplines of molecular genetics and molecular biology and to the understanding of normal and aberrant genetic systems and the mechanisms of carcinogenesis."

Vande Woude said that in his opinion, "the most significant change in the program in the past three years has been the emphasis placed on the training and recruitment of postdoctoral fellows. The Postdoctoral Fellowship Program has grown from four fellows in 1984 to 39 fellows in 1986. If I were asked to name the single most important ingredient of our scientific program, my response would be the bright, energetic, and hard working young people we have recruited as postdoctoral fellows. Their enthusiasm and energy have created opportunities for interaction among researchers of the Basic Research Program and those of the National Cancer Institute and Program Resources Inc. (the FCRF operations and support contractor), and have contributed immeasurably to the high morale that we now enjoy."

Six Laboratories

Vande Woude mentioned two other programs which he said grew significantly during the past year. "The Summer Fellowship Program enrolled 27 undergraduate and graduate students. This group was geographically diverse, representing 17 colleges and universities. The Visiting Scientist Program had 25 participants, either on sabbatical leave from their universities or working in our laboratories for shorter periods of time. We greatly encourage these arrangements since they foster ongoing collaborations, strengthen our ties with other research institutions, and, most importantly, bring new ideas into the program."

The program is organized into six laboratories with 17 sections and groups. They are, with the laboratory directors and section or group chiefs:

--Mammalian Genetics, Neal Copeland, director; Copeland heads the Molecular Genetics of Oncogenesis Section and Nancy Jenkins heads the Molecular Genetics of Development Section.

--Laboratory of Eukaryotic Gene Expression, Jeffrey Strathern, director; Strathern heads the Genome Recombination, Rearrangement and Regulation Section and David Garfinkel heads the Movable Genetic Elements Group.

--Laboratory of Genetics and Recombinant DNA, Stuart Austin, director; Austin is head of the Cell Cycle Regulation Section.

--Laboratory of Molelcular Virology and Carcinogenesis, Stephen Oroszlan, director; Oroszlan heads the Immunochemistry Section, Nancy Rice heads the Molecular Biology of Retroviruses Section, Alan Rein heads the Retroviral Genetics Section and Maurice Cohen heads the Genetics of Human Retroviruses Group.

--Laboratory of Chemical and Physical Carcinogenesis, William Lijinsky, director; Christopher Michejda heads the Chemistry of Carcinogens Section, Anthony Dipple heads the Molecular Aspects of Chemical Carcinogenesis Section and Lijinsky heads the Mechanisms of Nitrosamine Carcinogenesis Section.

--Molecular Mechanisms of Carcinogenesis Laboratory, Vande Woude, director; Stephen Hughes heads the Gene Expression in Eukaryotes Section, Mariano Barbacid heads the Developmental Oncology Section, George Paviakis heads the Cell Transformation Group, James Ihle heads the Molecular Mechanisms of T Cell Leukemogenesis Section and Vande Woude heads the Molecular Oncology Section.

New Laboratory

In the annual report, Vande Woude mentioned plans to establish a Crystallography Laboratory dedicated to the study of protein crystallography. He said that a search committee consisting of David Davies, NIH; Wayne Hendrickson, Columbia Univ. and Brian Matthews, Univ. of Oregon, was screening candidates.

Last month at the meeting of the FCRF Advisory Committee, Vande Woude said the committee's work had been completed and he had been successful in recruiting Alexander Wlodawer, presently with the National Bureau of Standards, to head the new lab. Wlodawer will assume that position by October, 1987, and will be recruiting additional staff, Vande Woude said.

"This will fulfill a longstanding goal," Vande Woude said. "It has become quite clear that there is a tremendous need for renewed vigour in crystallography."

Correction: The Jan. 2 article in **The Cancer Letter** describing the organizations competing for the FCRF operations and support contract referred to the joint venture formed by Bechtel Corp. and Battelle Memorial Institute. The article incorrectly stated that Battelle employs 3,000 persons at its Gaithersburg, MD, office, is the largest employer in Frederick, MD, and was involved in a number of major construction projects around the U.S. In each of those instances, the reference should have been to Bechtel.

Organ Systems Program "Filling The Gaps" With Targeted Research

NCI's Organ Systems Program is another of the National Cancer Advisory Board's initiatives which has survived severe criticism and attempts to eliminate it and is now prospering.

The program was started in 1972 by Palmer Saunders, who headed what was then the Div. of Research Resources & Centers, the division which managed all of NCI's grants, with strong support and encouragement from the NCAB. Four working groups were established to stimulate and target research in bowel, bladder, prostate and pancreas cancer. Each group had a headquarters grant, was given a budget, solicited grant proposals, reviewed them and made funding recommendations.

Although they worked with the National Organ Site Programs Branch in Saunders' division, the groups were about as autonomous and independent as any NIH supported extramural program could be. The fact that there was at least one program which was managed largely by the extramural community was seen by some as one of the major attributes of the concept, especially the practice of permitting the working groups to serve as the initial reviewers.

Another organ site group, the Breast Cancer Task Force, was established by the Div. of Cancer Biology & Diagnosis, and later moved to the Div. of Cancer Treatment. This group at first supported its extramural efforts with contracts, then switched to grants when that mechanism was made available to NCI's program divisions.

Vincent DeVita became director of NCI in 1980, approximately when the severe budget restrictions imposed hardships on most of the Institute's programs. His suggestion that some of the organ site working groups might have succeeded in stimulating research in their respective areas and therefore could be disbanded met with strong opposition from NCAB members. An ad hoc committee review of the program found some weaknesses and recommended, among other things, that the review be brought back into NIH (for the RO1 grants) and NCI (for the program project and

clinical trials grants).

DeVita insisted that the NCAB at least consider additional options, including elimination of all the headquarters grants and all management functions left to the Organ Site Branch, by then located in the Div. of Cancer Prevention & Control. The NCAB went along with return of grant review to NIH and NCI but devised a new program in which one headquarters grant would be awarded through which all the working groups would be organized and managed. DeVita eventually agreed, the headquarters grant (actually a cooperative agreement) was awarded to Roswell Park Memorial Institute, with Gerald Murphy, then RPMI director, as principal investigator and director of the renamed Organ Systems Coordinating Center. When Murphy left RPMI, his OSCC deputy, James Karr, became PI and OSCC director.

Organ systems grants have held their own in NIH and NCI competitive review, and the working groups have developed concepts for research projects which, for the most part, have been accepted by the NCI boards of scientific counselors. Resulting RFAs and program announcements have been and are continuing to be released, although in the first year after the reorganization, some working group members were disappointed that more grants had not been funded.

The OSCC award had originally been approved for five years, but, NCI, with the NCAB's approval, had made only a three year award with the understanding that the program would be reconsidered at the end of that period. DeVita and the NCI Executive Committee decided last year that it was working well enough to proceed with the additional two years (**The Cancer Letter**, Oct. 3).

Meanwhile, two more working groups have been added, for cancers of the central nervous and upper aerodigestive systems.

"In contrast to last year when we heard some concerns and even doubt as to whether the newly structured Organ Systems Program would succeed, I am most pleased to report that the experiment has begun to work and that we are all encouraged by the real progress that has been achieved," Karr said in his presentation to the NCAB last month.

"A number of factors have contributed to the progressive evolution we have experienced. Not the least of which has been the close interaction of the programs with members of all four divisions of NCI. At our joint workshop and on other occasions, Dr. DeVita expressed NCI's commitment to giving the programs a fair assessment and the opportunity to evolve. This was just recently reinforced with the announcement that the cooperative agreement for the Organ Systems Coordinating Center will be extended through July of 1989. This has clearly settled the question of stability and will give these programs the time needed to evolve and mature. At some later point the determination can be made as to whether they represent a constructive and productive contribution to solid tumor research."

The working groups, which are made up of recognized scientific and clinical investigators, identify and prioritize research needs and exploitable opportunities that are relevant to the advancement of knowledge on the biology, detection and diagnosis, and treatment of cancers of the seven organ systems. The annual report submitted by Karr noted that planning sessions, information gathering workshops, interactive working sessions, conferences and publications have been utilized to determine program priorities, stimulate the interest of researchers, and develop recommendations and concepts for review by NCI and the divisional boards of scientific counselors.

"In addition to development of concepts for BSC review," the report continues, "the working groups have engaged in other activities such as workshops, development of position papers, recommendations for NCI consideration and publications that are ultimately aimed at stimulating research efforts on prioritized areas. . . The OSCC has also fostered interactions between the working groups and coordination of such activities has resulted in joint endeavors, the most notable of which was the major conference on stromal-epithelial interactions that resulted in the merger of research needs among programs and initiation of a concept under current development by members of the Bladder, Breaast, Large Bowel and Prostate Working Groups. The new working groups for cancers of the central nervous system and upper aerodigestive system have recently held their first meetings and have identified priority areas to be developed; the progress of these programs is expected to benefit from the overall experience gained thus far by the OSP.

"In order to sustain current momentum and to ensure future progress of these programs,

it will be important to maintain a critical mass of investigators who can continually bring to the forefront priority research needs, new leads and recommendations on state of the art technology and approaches for attaining optimal utilization of available expertise and resources. Moreover, the interest of investigators to perform the basic/clinical research identified must be stimulated, and the results of such activities must be transferred to the biomedical community and applied research settings through communication and educational activities. To achieve these endpoints, the Organ Systems Coordinating Center will continue in its support, planning and coordination of the working groups' programs and activities. Additional extramural scientific expertise will be involved as necessary, in the planning and development of multidisciplinary research concepts. The OSCC will provide the clerical, computer, communications and administrative services necessary for the working groups to define specific clinical and basic research needs. Prioritized concepts will be developed by the OSCC for BSC review; implementation of approved concepts will be facilitated through their advertisement in the Organ Systems Newsletter (They will also appear in **The Cancer Letter**, as in the past, with other NCI and appropriate other NIH RFA, RFP and program announcements). In order to stimulate investigative activity, attract the interest of researchers and foster interaction among the seven programs, the OSCC will support workshops planned by working group members with the participation of new investigators and the broad multidisciplinary expertise of the biomedical community."

An OSCC Advisory Board was established to annually review each program and provide qualitative and quantitative assessments on each program's progress and future plans. William Shingleton, director of the Duke Comprehensive Cancer Center, is the chairman. Other members are James Cox, chairman of the Dept. of Radiation Oncology at Columbia Univ.; Walter Lawrence, professor of surgery and director of the Massey Cancer Center at the Medical College of Virginia; Peter Magee, director of Fels Research Institute at Temple Univ. School of Medicine; Bradford Patterson, chief of the Div. of Cancer Control at Dana-Farber Cancer Institute; Willet Whitmore, attending surgeon of the Urologic Service at Memorial Sloan-Kettering Cancer Center; and Sidney Winawer, chief of the Gastroenterology Service at MSKCC.

Gloria Heppner, Michigan Cancer Foundation, chairs the Bladder Cancer Working Group. Her term expires in 1988. Elinor Spring-Mills, State Univ. of New York (Upstate Medical Center), chairs the Breast Cancer Working Group. Her term expires this year.

Joseph Ransohoff, New York Univ. Medical Center, chairs the Central Nervous System Cancer Working Group. Glenn Steele, New England Deaconess Hospital, chairs the Large Bowel Cancer Working Group, and his term expires in 1988.

James Jamieson, Yale Univ. School of Medicine, chairs the Pancreas Cancer Working Group. His term expires in 1988. Donald Coffey, Johns Hopkins Univ., chairs the Prostate Cancer Working Group. His term expires in 1988. Eugene Myers, Univ. of Pittsburgh, chairs the Upper Aerodigestive System Cancer Working Group.

"There is a striking difference in needs and areas of emphasis identified by the different working groups," the annual report says, "as reflected in part by the BSCs to which concepts have been assigned. Most of the concepts, however, address research needs that would not be achieved through traditional investigator initiated grants. That is, the research solicited by these initiatives generally requires interdisciplinary and/or multi-institutional approaches, and frequently falls into categories that are neither purely basic nor purely clinical research, but instead bridge gap areas, in what has been termed 'transition science' by unifying expertise and resources from both the basic research laboratory and clinical settings."

NCI Study Fails To Support Finding Of Excess Cancer In Utah Fallout Area

An NCI study reported in the January issue of the "American Journal of Epidemiology" fails to verify results from a study published in 1984 which found an alarming, 61 percent excess of cancer incidence among Mormon families living in areas of Southwestern Utah and adjacent Nevada and Arizona communities that received large amounts of fallout from Nevada nuclear tests from 1951-1962.

The earlier study, by Carl Johnson of the South Dakota Dept. of Health, was reported in

the Jan. 13, 1984 issue of "Journal of the American Medical Assn." Johnson's study was based on interviews of members of Mormon families in the affected areas.

The NCI study, conducted by S.G. Machado of the Radiation Epidemiology Branch in the Div. of Cancer Etiology, and Charles Land and F.W. McKay in DCE's Clinical Epidemiology Branch, looked at mortality statistics for essentially the same time period. They found that, compared to cancer incidence for the rest of the state, the three counties surveyed actually had a 13 percent lower cancer mortality rate.

"Cancer mortality was compared between a three county region in southwestern Utah and the remainder of Utah in an investigation of reported excess cancer risks associated with residence in southwestern Utah during the period of above ground nuclear tests at the Nevada Test Site," the Machado et al abstract states. "Because most of the fallout in southwestern Utah was deposited during 1953-1957, comparisons were limited to persons born before 1958, and to deaths from leukemia and bone cancer during 1955-1980 and from other cancers during 1964-1980. There was no excess risk of cancer mortality in southwestern Utah, for single or grouped sites, with the single exception of leukemia which showed statistically significant odds ratios of 1.45 based on 62 deaths at all ages, and 2.84 baased on nine deaths at ages 0-14. The finding for childhood lelukemia was based on different time periods and geographic comparisons from those of two earlier studies in which no such excess was found. Mortality from all cancer sites combined was significantly lower in southwestern Utah than in the remainder of the state, even after adjustment for the higher proportion of (lower risk) Mormons in southwestern Utah. The present results, including the positive association for leukemia, are inconsistent with the high excess risks reported by Johnson, based on an interview survey of cancer incidence among long term Mormon residents of southwestern Utah."

Johnson was invited by editors of "American Journal of Epidemiology" to respond, which he did:

"That the Machado et al death certificate study did not find an excess of cancer deaths other than leukemia suggests serious flaws in their study design, similar to deficiencies in their earlier area based study of leukemia reported on death certificates," Johnson wrote in a letter to the editor.

Johnson said the NCI study contrasts with his study of Marshall Islanders exposed to fallout from nuclear tests; with the Japanese exposed to radiation at Hiroshima and Nagasaki; and with persons exposed to therapeutic radiation. "Yet none of these groups is comparable to the cohort incidence study population, which was exposed to penetrating radiation and inhalation and ingestion of large amounts of fallout radionuclides (visible as ash or dust) in the nuclear plumes and clouds from 26 nuclear bombs (and 11 of the underground nuclear bombs that escaped into the atmosphere).

"A valid comparison cannot be made between an area study of cancer reported on death certificates and a study of cancer incidence in a specific cohort of Mormon families," Johnson continued. "Only about one half of persons contracting cancer die of cancer . . many cancer cases are simply not counted in such studies of death certificates. There is confounding by survival periods of years to decades with a pronounced trend for longer survival during the course of studies of long duration. A trend in cancer incidence is not uniformly followed in 'at most a few years' by cancer deaths, as claimed by Machado et al, especially in a nonsmoking population with little lung cancer. . . the relation between cancer incidence and death certificate data is not as simple as represented by Machada et al, and the results of incidence studies may be significantly different from the results of mortality studies."

Also, Johnson continued, "area based cohort studies cannot account for inmigration of many people not exposed to fallout nor for outmigration of those exposed who may die of cancer elsewhere. . . The cohort incidence study was a true cohort study, identifying individual persons in all Mormon families listed in both 1951 and 1962 phone directories in towns known to be exposed to fallout, living in these towns throughout 12 years of atmospheric testing. . . The cohort of Mormon families exposed to fallout was directly compared with all Utah Mormons, since cancer incidence for Mormons is 23 percent less than for the U.S. population."

The Machado study did find a 45 percent excess (about 20 deaths) on leukemia, but this was far smaller than the five fold excess reported by Johnson. Machado and her

colleagues conclude that the two studies cannot be reconciled, even after allowances are made for the effects of migration in and out of southwestern Utah, generally lower cancer rates among Mormons as compared to non Mormons, and differences between fatal and nonfatal cancers. They also point to a number of methodological flaws in the Johnson study that might have led to over reporting of cancer risk.

"Are there particular features of the incidence study that might explain the discrepancies?" Machado asked. "Based on the 1950 census data for the communities surveyed by Johnson, the population turnover rates from the 1960 census, the reported 60 percent followup rate, and the number of family members in the sample, it would appear that an attempt was made at complete coverage of the Mormon households continuously resident in these communities from 1951-1962. The surveyed communities in Utah contained only 48 percent of the combined populations of Iron, Kane and Washington counties . . . A preponderance of cancers in the surveyed communities would rersult in overestimation of risk, by a factor of up to two for the extreme case in which no cancers occurred in the nonsurveyed communities. This would be more likely for a rare cancer, like leukemia, than for a more common one. It is of some interest, therefore, that previous reports had identified leukemia clusters in St. George, Fredonia, Parowan and Paragonah. Cedar City, which contains over half the population of Iron County and which may have received more fallout exposure than either Parowan or Paragonah, was one of the communities not surveyed by Johnson.

"Based on a reading of the incidence study and of contemporary newspaper accounts, it appears that there was ample scope for possible overreporting of incident cancer cases. There was clearly some popular support for the possibility that a fallout related excess cancer risk had occurred. Contrary to usual epidemiologic practice, reported cancer cases in the incidence study were not verified by checking with the Utah Cancer Registry, or with physicians, hospitals or the state registrar of vital statistics. . . . Given widespread awareness in the surveyed population of the possibility that a causal connection might exist between fallout exposure and cancer risk, it is plausible that a respondent reporting one or more cancers among family members might be more likely to feel that one or more 'immediate effects' from a list supplied by the interviewer had in fact occurred, as compared with respondents not reporting cancer."

Johnson responded, "Concerning the criticism of the use of an area household survey rather than cancer registry data, the registry was not established until 14 years after exposures to nuclear fallout began. Further, such cancer registry data could not be used to establish a true cohort or to consider religion, smoking, and occupation, factors considered important in the cohort incidence study. Moreover, the histories given by persons outdoors in the path of fallout plumes and clouds, of burning of eyes or skin, changes in color or loss of hair, etc., are important observations suitable for establishing a subgroup at higher risk. Large exposures to carcinogens can lead to large risks of cancer. Establishing this group permitted comparisons."

Johnson concluded, "I recommend my study design for future studies of effects of nuclear bomb fallout and of offsite contamination by nuclear facilities such as the Three Mile Island and Chernobyl reactors. A true cohort of persons living in the area of high exposure should be followed forward in time, noting blood lymphocyte counts, chromosomal aberration rates, radioisotope concentrations in breast milk and deciduous teeth, fetal and infant mortality, cancer incidence rates, etc. . . The research design should establish subpopulations with greater exposures, so that the study population itself can serve as a control."

Johnson's study gave strong support to the body of evidence backing the threat to residents of the fallout areas, which led to considerable federal and state funding of research and other cancer related programs there. But it was controversial, and the new NCI study, as demonstrated by Johnson's response, does not diminish the controversy.

ACS Reports Increasing Incidence Of Breast Cancer, An "All Time High"

One in 10 American women will develop breast cancer at some point in her life, marking an all time high for incidence of this form of the disease, according to estimates announced this week by the American Cancer Society. This is the first predicted increase in breast cancer incidence since 1980, when the Society's estimate rose from

one in 13 to one in 11 women.

In its annual publication, "Cancer Facts and Answers," ACS estimates that, in 1987, approximately 130,000 women will develop breast cancer. Although lung cancer still holds first place as the leading cancer killer of both men and women, breast cancer is the most prevalent cancer among women.

According to Virgil Loeb, ACS national president, the reason for this rise in incidence is unknown. "We are trying to determine why breast cancer is striking more women than ever," Loeb said. "For now, we urge women to follow the three steps to detect breast cancer at its earliest stages, when the opportunity for successful treatment is greatest."

The American Cancer Society's guidelines for early detection of breast cancer include monthly self examination for women 20 and over, as well as regular clinical breast examinations performed by a physician. In addition, the Society recommends mammography, a low dose x-ray of the breast, every year for asymptomatic women 50 and over, and a baseline mammogram for those 35 to 39. Women 40 to 49 should have a mammogram every one to two years, ACS says.

"Every woman should consider herself at risk for breast cancer," Loeb said, "and must take the time and effort to detect this disease at its earliest stage."

According to Loeb, the use of mammography is essential in detecting early cancers. "Thanks to mammography, we are now able to locate breast cancers that are too small to be felt by either the woman herself or even the most experienced physician. Finding the cancer in a noninvasive state, before it has a chance to spread, means that the patient, in almost 100 percent of cases and with proper treatment, will remain free of the disease." Patients with a localized form of breast cancer have a survival rate of over 90 percent. If the cancer has spread, however, the survival rate drops to 60 percent.

Despite the increase in incidence of breast cancer, Loeb said that new advances in treatment have helped stabilize the mortality rate for that disease. "In the 1940s, women with localized breast cancer had a survival rate of 78 percent." "Cancer Facts and Figures" also estimates that, overall, 965,000 new cases of cancer will be diagnosed in 1987, and that 483,000 will die of the disease.

Lung cancer, the leading cause of cancer death, this year will strike 150,000--99,000 men and 51,000 women--and will kill 136,000.

Cancer of the colon and rectum, the second leading cancer killer of Americans, holds third place for women and second place for men. It is expected that 145,000 will be diagnosed with this form of cancer in 1987, and another 60,000 will succumb to it.

Among men, the third leading cause of cancer death is cancer of the prostate. Ninety six thousand new cases will be diagnosed this year, and 27,000 deaths are expected to occur.

In children between the ages of 3 and 14, cancer continues to be the chief cause of death, with 2,200 deaths estimated for 1987, about half from leukemia. However, "Cancer Facts and Figures" reports, mortality among this group has declined markedly over the past four decades. In 1950, the mortality rate for this age group was 8.3 per 100,000 population; in 1983 (the latest year in which figures are available), the rate fell to 4.1.

"We've had tremendous success in treating childhood cancers and many of the adult cancers," Loeb said. "Today, about 385,000 Americans, or four out of 10 patients who get cancer this year, will be alive five years after diagnosis. There is more hope than ever for those diagnosed with cancer."

The ACS estimate that only four out of 10 cancer patients are now surviving five years is more conservative than that of NCI's Surveillance, Epidemiology and End Results Program. SEER data for the past two to three years have shown that overall five year survival for all cancers, all races and both sexes is 49 percent. The difference may be accounted for by the fact that NCI bases its figures on "relative" survival while ACS just uses "survival."

"Relative" survival attempts to eliminate from the cancer deaths total those cancer patients who die of other causes before they reach the five year after diagnosis status.

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