Highlights of NCI's Prevention and Control Programs

Cancer prevention is a major component and a current priority of the National Cancer Institute's (NCI) mission to reduce suffering and death from cancer. Research in the areas of diet and nutrition, tobacco cessation, chemoprevention, and early detection and screening are the NCI's major cancer prevention programs. The NCI also sponsors programs to increase participation in clinical trials. The ultimate goal of all of these programs is to achieve reductions in cancer incidence and mortality. Through these efforts, the chances for preventing and surviving cancer are improving. Each of these areas of research is described below.

Diet and Nutrition

In the early 1980s, the NCI established a diet, nutrition, and cancer prevention research program. This program includes nutrition and metabolic studies to identify cancer-preventive dietary substances and supports dietary-modification clinical trials. The expansion of knowledge about the role that nutritional factors play in the development and progression of cancer will lead to increased opportunities to develop dietary and lifestyle modifications to prevent human cancers.

A growing number of compounds in fruits, vegetables, and cereal grains have been found to interfere with the process of cancer development in laboratory research. Scientists continue to

explore the absorption, metabolism, and mechanisms of action of many of these compounds to determine their possible protective roles in cancer development.

Epidemiologists have found that populations that consume large amounts of plant-derived foods have lower incidence rates of some types of cancer. Eating vegetables and fruits is associated with a decreased risk of cancers of the esophagus, oral cavity, stomach, colon, rectum, lung, prostate, and larynx (and possibly other cancers).

Knowledge gained from epidemiologic studies and laboratory research is being applied in dietary-modification clinical trials. In 1991, following a successful pilot study of low-fat dietary intervention in postmenopausal women at increased risk of breast cancer, NCI began a feasibility study to find the best way to help African American, Hispanic, and low-income women change to a low-fat eating pattern. Findings from this and other feasibility trials were used in the design and implementation of the National Institute of Health's Women's Health Initiative, the largest community-based prevention trial ever conducted in the United States. This Initiative is focusing on the effects of dietary modification, calcium/vitamin D supplementation, and hormone replacement therapy on the incidence of breast and colon cancer, as well as heart disease and osteoporosis.

Since its inception in October 1991, the 5 A Day for Better Health Program, a collaborative effort between the food industry and NCI, has been encouraging Americans to eat five or more servings of vegetables and fruits each day as part of a low-fat, high-fiber diet. The NCI is working with the Produce for Better Health Foundation to promote the program's message in the marketplace.

Tobacco Cessation

Tobacco use is the single most preventable cause of death in the United States. Cigarette smoking alone is directly responsible for at least one-third of all cancer deaths annually in the United States. Therefore, programs designed to reduce tobacco use among both children and adults are an important aspect of NCI's overall cancer prevention and control efforts.

To intensify its efforts and to establish tobacco-related research priorities for the next 5 to 7 years, the NCI established the Tobacco Research Implementation Group (TRIG). This group included leading scientists and experts from the NCI, the National Institute on Drug Abuse (NIDA), and the Office of the Director of the National Institutes of Health, as well as members of the extramural research community and representatives of major NCI review and advisory committees.

Through a consensus-building process, the TRIG identified a core set of tobacco-related cancer research opportunities in its Tobacco Research Implementation Plan. Within this core set, the group identified unique high-priority research opportunities that require immediate implementation. These opportunities range from basic biological and basic biobehavioral research to clinical intervention, policy, epidemiology, surveillance research, and support for research activities. The research priorities also emphasized the special opportunities and challenges of tobacco initiation, regular tobacco use, addiction, and cessation among young people and populations at high risk.

Two major research initiatives have already been launched as a result of the TRIG's recommendations. For the first project, which creates a collaborative Transdisciplinary Tobacco Research Centers program, researchers sponsored by NCI and NIDA are studying the prevention of tobacco use, initiation of tobacco use, addiction to tobacco, and/or treatment of tobacco

addiction and tobacco-related cancers. The centers are focusing on areas in which gaps in knowledge have been identified, such as adolescent smoking and the use of smokeless tobacco products. The second research initiative is studying the effectiveness of mass media and policy interventions that are used to motivate tobacco use prevention and cessation at state and community levels. This project is designed to give state officials better information on the most effective interventions to reduce tobacco use.

The NCI is also involved in several major activities to promote the primary prevention and cessation of spit tobacco use. With the National Institute of Dental and Craniofacial Research, the NCI cochairs a national initiative on spit tobacco involving cancer centers; researchers; and government, professional, voluntary, and athletic organizations. Various resource materials have been developed and distributed, including a teaching guide; a videotape; motivational and informational publications, such as posters and brochures; and trading cards for use by Little League, the National Collegiate Athletic Association (NCAA), and Major League Baseball (MLB). The NCI's work with MLB resulted in a ban against spit tobacco in all the minor leagues. The NCAA has banned the use of spit tobacco during regular and postseason play.

Chemoprevention

Chemoprevention is the use of natural or synthetic substances to reduce the risk of cancer. NCI's chemoprevention research effort has grown considerably since it was established in the early 1980s. The program is designed to study whether some micronutrients and synthetic compounds can reduce cancer incidence. Currently, over 450 compounds are being studied as potential chemopreventive agents, mainly in laboratory research. More than 40 compounds are

being investigated in approximately 80 clinical trials (research studies in which people participate).

Four classes of preventive agents have shown particular promise in clinical trials and are considered priority substances for study. These classes include selective estrogen receptor modulators (SERMS) and other hormonal agents, nonsteroidal anti-inflammatory drugs (NSAIDS), calcium compounds, and retinoids (chemical cousins of vitamin A).

The drug tamoxifen, a SERM that has been used to treat women with breast cancer for more than 20 years, was studied as a chemopreventive agent in the Breast Cancer Prevention Trial. The study enrolled 13,388 women age 35 and older. This trial was designed to see whether taking tamoxifen (Nolvadex®) could prevent breast cancer in women who were at increased risk of developing the disease. Data published in the September 16, 1998, *Journal of the National Cancer Institute* showed 49 percent fewer diagnoses of breast cancer among women who took tamoxifen. These results were the first clear indication that a chemopreventive agent could reduce the risk of breast cancer in high-risk women. However, tamoxifen also caused serious problems such as endometrial cancer and blood clots. Now, another SERM, raloxifene (Evista®), which is used for the prevention of osteoporosis, is being compared to tamoxifen in postmenopausal women in a large study known as STAR (Study of Tamoxifen and Raloxifene). The STAR trial, which began recruiting participants in June 1999, expects to enroll about 22,000 participants. This trial is designed to find out whether raloxifene is as effective in reducing the chance of developing breast cancer as tamoxifen has proven to be, and to compare the side effects of the two agents.

The Prostate Cancer Prevention Trial is designed to see whether taking the drug finasteride (used to treat patients with symptomatic noncancerous enlargement of the prostate,

also called benign prostatic hyperplasia) can prevent prostate cancer in men ages 55 and older. The drug reduces levels of dihydrotestosterone (DHT), a male hormone that is important in normal and abnormal prostate growth. DHT plays a key role in benign prostate enlargement and is also believed to be involved in the development of prostate cancer. Some 18,882 men joined the trial. Recruitment is complete, and results are expected in 2003.

NSAIDS, such as aspirin, piroxicam, and ibuprofen, are being studied alone and in conjunction with other agents in the prevention of colon cancer in people with a history of colon polyps or cancer.

Calcium compound studies focus on colon cancer prevention mainly in individuals previously diagnosed with colon polyps or cancer. Studies involve a variety of calcium compounds.

Scientists are studying both natural and synthetic retinoids alone and in combination with other compounds in the prevention of cervical cancer, lung cancer, cancers of the head and neck, and skin cancer.

In addition, certain other promising chemopreventive compounds are under investigation. These include oltipraz, selenium, vitamin E, and N-acetylcysteine.

Early Detection and Screening

Early detection research focuses on developing tests for diagnosing cancer that can lead to decreased cancer death rates. In addition to studies to identify effective early detection and screening strategies, NCI supports research to increase the use of proven screening measures within the medical and public health communities.

A large-scale screening trial called the Prostate, Lung, Colorectal, and Ovarian Cancer Screening Trial is being conducted to determine if certain tests will reduce the number of deaths from these cancers. Approximately 37,000 men will be screened for prostate cancer, and some 37,000 women will be screened for ovarian cancer. Both groups will be screened for colorectal cancer and lung cancer. A comparison (control) group of 74,000 men and women will receive usual care. The trial began in 1993 and is expected to continue up to 16 years.

Researchers are also working on improved methods of cancer detection, such as new imaging techniques to discover breast cancers. In addition, genetic studies of families with a high incidence of certain cancers have led to the identification of a number of cancer-related genes, which may lead to early detection of cancer in people with these genes.

Clinical Trials for Cancer Prevention

The Community Clinical Oncology Program (CCOP) is an NCI initiative to enable community physicians to enter patients into NCI-approved clinical trials. The CCOPs are affiliated with clinical cooperative groups and cancer centers. The research addresses specific questions that may lead to improved treatment of people with cancer or prevention of cancer in healthy individuals.

The CCOP helps bring up-to-date cancer prevention and treatment practice and research to more people in their own communities. Each CCOP is responsible for conducting cancer control research, which provides a basis for involving a wider segment of the community (including minority groups and medically underserved populations) and for investigating how advances in cancer therapy and control can change community medical practices.

More than 4,400 individuals are enrolled each year in cancer prevention and control clinical trials through the CCOP. Minority-based CCOPs have been established to increase the participation of minority populations in cancer prevention and control clinical trials.

The Future of Cancer Prevention and Control Research

The NCI encourages and supports collaborative partnerships with and among other Federal agencies, industry, private research institutions, state and local governments, and voluntary organizations that also support or conduct cancer research. The NCI continues to expand this network to advance the Nation's collective efforts to reduce the burden of cancer and save lives. Scientists at the NCI are confident that the broad range of ongoing and planned activities will lead to better ways to prevent and control cancer.

For additional information about cancer prevention clinical trials, contact the Cancer Information Service (see below).

# # #

Sources of National Cancer Institute Information

Cancer Information Service

Toll-free: 1–800–4–CANCER (1–800–422–6237)
TTY (for deaf and hard of hearing callers): 1–800–332–8615

NCI Online

Internet

Use http://cancer.gov to reach NCI's Web site.

CancerMail Service

To obtain a contents list, send e-mail to cancermail@cips.nci.nih.gov with the word "help" in the body of the message.

CancerFax® fax on demand service

Dial 1–800–624–2511 or 301–402–5874 and follow the voice-prompt instructions.

This fact sheet was reviewed on 5/25/01