

In January 2006, the National Cancer Institute issued a pivotal planning document to advance cancer research and outcomes: *The NCI Strategic Plan for Leading the Nation*. Expert and wide-ranging teams from NCI staff and the cancer research community contributed to the plan, and also agreed that it would be a living document for the coming years. This *Plan and Budget Proposal for Fiscal Year 2008* marks NCI's first opportunity to describe the proposed implementation of the Strategic Plan's stated goals and objectives.

To lessen the burden of cancer, NCI conducts and leads intensive work to advance cancer research progress in knowledge discovery, patient-centered translation of discovery, and bench-to-bedside delivery. Our partners are critical to this complex set of endeavors.

NCI's Strategic Objectives are central to the focus of these efforts:

To Preempt Cancer at Every Opportunity

- > Understand the causes and mechanisms of cancer
- > Accelerate progress in cancer prevention
- > Improve early detection and diagnosis
- > Develop effective and efficient treatments

To Ensure the Best Outcomes for All

- > Understand the factors that influence cancer outcomes
- > Improve the quality of cancer care
- > Improve the quality of life for cancer patients, survivors, and their families
- > Overcome cancer health disparities

The following pages provide background for each of these strategic objectives. The section titled *Today's Research* lists components of NCI's current portfolio of funded research. The section titled *Tomorrow's Strategies* outlines next steps for achieving the objectives. The *Moving Research Forward* section provides a glimpse of the many emerging research results for each objective.

NCI Strategic Objectives and Progress

Understanding the Causes and Mechanisms of Cancer

We will conduct and support basic, clinical, and population research to better understand how genetic, epigenetic, environmental, behavioral, and sociocultural factors relate to cancer. Our work will focus on the biologic processes that affect our resistance to or likelihood of developing cancer; allow cancer to start (initiation), grow (progression), and spread (metastasis); and cause it to regress or recur.

Today's Research

Research to discover the causes and mechanisms of cancer is essential to enable us to develop and apply treatments or interventions to keep cancers from starting or progressing. NCI's diverse portfolio of research projects and programs addresses this need, spanning research on cancer risk to studies on the process of metastasis. Examples of ongoing NCI research include:

- > Identifying cancer risks associated with interactions between genes and both environmental and lifestyle factors
- > Investigating cellular and molecular mechanisms of cancer initiation, progression, and metastasis
 - Epigenetic pathways, genes, and proteins
 - Factors related to cancer development, including certain viruses, angiogenesis (new blood vessel growth), and the movement of cells within the body
 - Normal cell and molecular biology
 - Cell metabolism and growth
 - Structure and function of genes and proteins
 - Developmental biology and cell-to-cell interactions
- > Understanding how cancer risk factors disrupt normal cells

Tomorrow's Strategies

Cancer is a complex set of diseases that must be understood from many perspectives. NCI will use the following strategies to pinpoint the causes and mechanisms of cancer:

- > Increase our understanding of behavioral, environmental, genetic, and epigenetic causes of cancer and how they interact.
- > Gain a full understanding of how changes in genes can cause cancer to develop.
- > Improve cancer diagnosis through an integrative approach to improving our understanding of:
 - Normal cellular and molecular biology
 - Macroenvironmental influences (i.e., outside the body)
 - Microenvironmental influences (i.e., within the body)
- > Apply new technologies to expand our knowledge of cancer risk factors and biologic mechanisms.
- > Investigate links between cancer and other human diseases.

Moving Research Forward ***...through Identifying and Understanding Cancer Risk Progression***

NCI supports large-scale studies to identify exposures, lifestyles, and genes that affect cancer risk. For example, scientists linked recent, rapidly rising rates of esophageal cancers to two factors: increasing rates of obesity and gastrointestinal acid reflux, which increases the risk of a pre-malignant condition called Barrett's esophagus.

NCI also supports research to understand the many factors involved in a normal cell becoming cancerous and spreading to other parts of the body. Basic laboratory and animal research provides clues about the inner workings of cells that would otherwise be beyond our reach.

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- > Understanding the Role of Bone Marrow Cells in Metastasis.** A recent study in mice shows that normal bone marrow cells may play an important role in metastasis, the spread of cancer. The researchers replaced the bone marrow cells of the mice with bone marrow cells tagged green with a biochemical marker, so they could be tracked. Then the researchers injected the mice with red-tagged cancer cells that were expected to travel to the lungs. However, the bone marrow cells reached the lungs first, appearing to prepare a niche for the cancer cells to use when they arrived in the lungs. When the researchers inhibited the migration of the bone marrow cells, they prevented metastases from forming in the mice. Further research will explore how cancer cells recruit bone marrow cells and use them to establish new tumors. This may help researchers learn how to stop the movement of bone marrow cells as a way to prevent metastasis.
- > Understanding the Normal Biology of Aging.** NCI researchers reported that a gene known for its link to a premature aging syndrome, Hutchinson-Gilford Progeria Syndrome (HGPS), also appears to play a role in the normal aging process. Mutations in a gene called LMNA produce a faulty form of the protein lamin A that has been linked to HGPS. Investigators found that, compared with cells in young individuals, cells from HGPS patients and those of healthy older individuals shared many of the same cellular defects. Laboratory experiments showed that the lamin A protein probably has a role in causing the age-related defects. A better understanding of the mechanisms of normal and premature aging will help scientists understand the molecular mechanisms involved in creating the microenvironment required for a cell to become cancerous.

Accelerating Progress in Cancer Prevention

We will accelerate the discovery, development, and delivery of cancer prevention interventions by focusing on risk assessment, systems biology, behavior modifications, environmental and policy influences, medical and nutritional approaches, and training and education for research and health professionals.

Today's Research

Prevention is our first line of defense against cancer. NCI's portfolio supports research to identify medical and behavioral approaches to cancer prevention that can be applied in public health settings. Examples of ongoing NCI research include:

- > Understanding the role of nutrients and micronutrients in human health and cancer occurrence
- > Developing prevention vaccines to stimulate the immune system to attack cancer cells or cancer-causing agents
- > Identifying effective vaccine delivery strategies
- > Developing drugs to prevent primary and secondary cancers
- > Investigating behavioral factors that affect cancer risk and developing strategies to change these behaviors
- > Exploring complementary and alternative methods for cancer prevention

Tomorrow's Strategies

Research must identify the most promising advances and translate them into new prevention approaches. NCI will broaden and strengthen its prevention portfolio with a rigorous agenda:

- > Support a systematic review of epidemiologic evidence on possible carcinogens and risk factors for cancer.
- > Develop and promote the adoption of medical interventions, including nutritional approaches, chemoprevention drugs, and prevention vaccines that suppress cancer initiation and progression.
- > Develop and test behavioral approaches for reducing cancer risk.
- > Study the impact of environmental and policy interventions on cancer risk.
- > Explore the biology behind successful cancer prevention interventions through a transdisciplinary systems approach.
- > Evaluate the impact of knowledge and intervention dissemination and diffusion programs for cancer prevention using an outcome monitoring system.
- > Train scientists, clinicians, and other health professionals for cancer prevention research.

Moving Research Forward **...with Cancer Chemoprevention Studies**

Chemoprevention is the use of natural or synthetic substances to reduce the risk of developing cancer, or to reduce the chance that cancer will recur. Chemoprevention trials look at possible ways to prevent cancer with interventions that include drugs, vitamins, diet, hormone therapy, or other agents. NCI's chemoprevention research effort, started in the early 1980s, is yielding exciting results. For example, based on findings of the NCI Breast Cancer Prevention Trial, the U.S. Food and Drug Administration approved tamoxifen for reducing the incidence of breast cancer in women at high risk for the disease. This success confirms the usefulness of large-scale chemoprevention clinical trials for identifying ways to stop many of the people at risk for cancer from becoming cancer patients.

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- > **Results of the Study of Tamoxifen and Raloxifene (STAR) Trial.** STAR, the largest breast cancer chemoprevention trial ever conducted, compared two selective estrogen receptor modulators (SERMs). These drugs work by blocking the tumor-promoting effects of estrogen that are seen in about two-thirds of breast cancer patients. STAR findings show that the anti-osteoporosis (anti-bone thinning) drug raloxifene (Evista®) reduces breast cancer risk in postmenopausal women as well as tamoxifen. Moreover, raloxifene appears less likely to cause some of the rare but serious side effects seen with tamoxifen, such as uterine cancer. These findings are promising because this combination of effective treatment and reduced chance of serious side effects may be what is needed to make breast cancer prevention more of a reality for many women.
- > **SELECT (the Selenium and Vitamin E Cancer Prevention Trial).** Previous studies suggest that the mineral selenium and vitamin E (alone or in combination) may reduce the risk of prostate cancer. Only a large clinical trial, such as the NCI SELECT, can confirm those initial findings. SELECT finished enrolling patients in June 2004, with 35,534 participants. The trial is expected to end by 2011.
- > **Finasteride Follow-up Studies.** In June 2003, the Prostate Cancer Prevention Trial (PCPT) was stopped early because of a clear finding that finasteride reduced the incidence of prostate cancer. However, men who did develop prostate cancer while taking finasteride experienced a slightly higher incidence of high-grade tumors. Follow-up studies are investigating whether finasteride actually caused high-grade tumors.

NCI also is supporting chemoprevention research to benefit patients at high risk for other cancers, including colorectal, lung, esophageal, bladder, cervical, and oral cavity cancer.

Improving Early Detection and Diagnosis

We will support the development and dissemination of interventions to detect and diagnose early-stage malignancy.

Today's Research

Detecting and diagnosing tumors early in the disease process, before the tumor invades surrounding tissue, can dramatically improve the patient's odds for successful treatment and eliminate a large portion of cancer deaths. Examples in this area include:

- > Identifying genes, proteins, or other molecules that signal the presence of cancer based on their patterns or levels of expression (the extent to which they are activated)
 - Identifying protein biomarkers for hard to detect cancers, such as ovarian and pancreatic cancers, and finding new biomarkers for prostate cancer
 - Using genomic and proteomic profiling to improve prognosis and guide treatment
 - Developing anatomical and molecular imaging techniques to detect tumors, improve diagnostic accuracy, and find metastases
 - Supporting preclinical evaluation and clinical testing of biomarker and imaging technologies
- > Understanding how and why patients accept and comply with cancer screening methods

Tomorrow's Strategies

NCI will help bridge the gaps across the translational spectrum to speed the movement of effective early detection and diagnostic approaches to the clinic. To achieve this, we will:

- > Promote collaborative, multidisciplinary research to validate biomarkers of early detection and screening.
- > Develop better diagnostic and screening tools for early detection, risk assessment, and disease recurrence.
 - Apply evidence-based research findings to intervention development.
 - Encourage and provide investigator training to facilitate the development and application of new tests.
- > Develop risk factor profiles for identifying patients who are likely to benefit most from cancer screening.
- > Determine why abnormal findings from screening examinations have less than acceptable rates of follow-up and develop strategies to improve this part of the health care system.
- > Make experimental data accessible across the cancer research community.
- > Translate evidence-based research into public health and medical practice.

Moving Research Forward ***...with Molecular Profiling of Cancer***

Our nation's investment in identifying molecular profiles, or signatures, of cancer has been producing impressive results. As early as 2000, NCI researchers were using gene expression profiling to distinguish between different subtypes of lymphoma. Two years later, investigators were reporting preliminary success using proteomic technologies to detect and diagnose some cancers at early stages. Since then, researchers have been discovering and validating molecular profiling techniques that many experts believe are setting the stage for improved cancer detection and diagnosis.

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- > **Defining Ovarian Cancer Subtypes.** A new study helped clarify the relationship between low malignant potential (LMP), low-grade, and high-grade serous ovarian tumors. The study suggests that LMP tumors are not early precursors of aggressive ovarian cancer, as had been suspected, but may be part of an entirely different class of tumors. Moreover, the study showed that low-grade serous tumors are more similar to LMP tumors than to high-grade tumors. These findings suggest the need to reexamine treatment options for women with low-grade disease, who currently receive the same therapy as patients with high-grade disease.
- > **Improved Diagnosis of Burkitt's Lymphoma.** A worldwide team of researchers, including some from NCI, showed that gene expression profiling can accurately distinguish between Burkitt's lymphoma and diffuse large B-cell lymphoma (DLBCL). Burkitt's lymphoma and DLBCL cells appear similar when viewed under a microscope, but correct diagnosis is critical because they require very different treatments. If Burkitt's lymphoma patients are treated with intensive therapy, the survival rate is roughly 80 percent. However, if they are misdiagnosed and treated with the lower intensity chemotherapy recommended for DLBCL patients, the survival rate drops to 20 percent or less.
- > **Sputum Testing for Early Lung Cancer Detection.** A prospective clinical trial has found that testing the sputum (coughed up mucus and other matter) of individuals at high risk for lung cancer, by analyzing certain genes and chemicals, may help identify early signs of the disease. The experimental test screens 14 genes associated with lung cancer for the presence of chemicals called methyl groups that can modify genes and silence them (turn them off). The test identified 65 percent of individuals who later developed symptoms of lung cancer, but it also identified 35 percent of cancer-free control participants. Therefore, at this point a patient who tests positive would also need to receive a diagnostic bronchoscopy or x-ray to see if tumors exist.

Developing Effective and Efficient Treatments

We will support the development and dissemination of interventions to treat malignancy either by destroying all cancer cells or restraining and controlling metastasis, both with little or no harm to healthy tissue.

Today's Research

A large part of NCI's research portfolio focuses on discovering, developing, and evaluating more efficient and effective treatment strategies. Developing cancer treatments that leave surrounding healthy tissue unharmed is at the heart of NCI's research agenda. Examples of NCI research include:

- > Developing and improving localized therapies such as surgery or radiation therapy to directly target the tumor and if necessary, surrounding tissue
- > Investigating systemic (whole body) therapies including cytotoxic (cell-killing) or hormonal agents, vaccines, antibodies (immune system proteins), gene therapy, angiogenesis inhibitors, and differentiating agents
- > Researching molecularly targeted therapies that act primarily on the tumor and associated tissue
- > Developing combination therapies that use two or more drugs and/or treatment types to increase treatment effectiveness
- > Investigating complementary/alternative treatment approaches

Tomorrow's Strategies

NCI's portfolio will include a special focus on facilitating the research and development of individualized therapies tailored to the specific characteristics of a patient's cancer. Treatment strategies may include localized, systemic, molecularly targeted, complementary and alternative, or combination treatment approaches. NCI will:

- > Identify the molecular and cellular factors that cause metastatic behavior.
- > Validate biomarkers for cancer prognosis, metastasis, treatment response, and progression.
- > More quickly identify, develop, and validate potential targets and strategies for cancer treatment by integrating preclinical (laboratory and animal) and clinical research.
- > Integrate clinical trial networks and programs to ensure that the most promising treatment opportunities are identified, the necessary clinical trials are conducted rapidly, and clinicians have effective use of information and resources.
- > Work to manage the toxic effects of cancer therapy.

Moving Research Forward ***...with Improved Treatment Delivery***

FDA approval of a new drug to fight cancer and its availability to patients are only the beginning of the story of cancer treatment research. Even before a new drug is used in the first patient, researchers are planning how to improve ways of giving the drug to patients to make it more effective. For example, part of the remarkable improvement in childhood leukemia survival over the past 20 years has been achieved by modifying the delivery methods and dosing schedules of successful treatment drugs. NCI continues to test both established and new ways to improve the delivery of cancer drugs.

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- > **A New Approach to Immunotherapy.** An NCI research team confirmed the effectiveness of using a new cell-based immunotherapy approach combined with chemotherapy for treating advanced stage metastatic melanoma. The goal is to fight cancer tumors by stimulating and reintroducing a patient's own T cells (rare disease-fighting immune cells). The promise of this therapy is that a patient's own immune system may be used to effectively treat existing tumors.

In a recent clinical trial using this immunotherapy approach, 51 percent of the patients (18 of 35) experienced a significant reduction in the size or the disappearance of their tumors — patients who previously had not responded to treatment. A Phase II trial is under way that will enable researchers to evaluate the effectiveness of this immunotherapy approach among a larger group of participants.

- > **Abdominal Chemotherapy for Ovarian Cancer.** A recent NCI study shows that intraperitoneal (IP) chemotherapy, which delivers drugs directly to the abdominal cavity through a catheter (tube), can significantly increase survival for some women with ovarian cancer. About 400 women in the study were given chemotherapy after successful removal of their tumors. Half received intravenous (IV) cisplatin and paclitaxel, and the others received IV paclitaxel, plus IP cisplatin and paclitaxel. The women who received IP chemotherapy lived on average 16 months longer than women who had IV chemotherapy alone, an unusually large survival benefit for a clinical trial. One year after treatment, both groups of patients reported a similar quality of life. As the results of the study were made public, NCI issued a rare clinical announcement to inform physicians and patients about the potential benefit of IP chemotherapy for ovarian cancer.

Understanding the Factors that Influence Cancer Outcomes

We will support and conduct studies to increase our understanding of and ability to measure the environmental, behavioral, sociocultural, and economic influences that affect the quality of cancer care, survivorship, and health disparities.

Today's Research

Building on more than two decades of population-based surveillance research (tracking and studying cancer trends), NCI is intensifying its efforts to define, foster, and support studies to improve our understanding of the factors that affect the outcomes of cancer and the impact of cancer care. Examples of NCI research include:

- > Improving measurement of cancer outcomes
 - Alternative approaches to measuring health-related quality of life, economic burden, and satisfaction in cancer care
 - Psychometric (psychological measurement) approaches to increase the accuracy and reduce the cost of outcomes assessment conducted at the patient level
- > Supporting large, prospective cohort (defined population) studies to investigate cancer outcomes
 - The impact of high-profile interventions on patient-centered outcomes
 - Dissemination of new therapies in the community
 - The influence of modifiable risk factors
 - Racial/ethnic- and gender-related disparities in care
 - Use the results of outcomes research from community settings to improve methodology

Tomorrow's Strategies

NCI will improve outcomes research methods, increase use of evidence-based cancer interventions, and expand use of research knowledge to guide cancer policies. NCI will:

- > Develop standardized measures of cancer care outcomes across the cancer continuum (prevention, early detection, diagnosis, treatment, survivorship, and end of life).
- > Identify research databases to study influences on cancer care and outcomes.
- > Use improved outcome measurement techniques and database resources to increase the understanding of behavioral and sociocultural factors that influence cancer outcomes.
- > Study the factors that affect access to cancer care.
- > Build sustainable community-based structures to support research on cancer outcomes.
- > Understand how to disseminate research results and promote the adoption of evidence-based cancer interventions by a diverse population of patients, health care providers, and the public.

Moving Research Forward ***...by Transforming Cancer Care Outcomes Research***

In 1999, NCI launched its Quality of Cancer Care Initiative to improve the state of the science for defining, monitoring, and improving the quality of cancer care. Since then, research on several fronts is shaping a new model for moving research results from the laboratory bench to the bedside, particularly the effects of cancer care interventions on patients' lives.

NCI's wide-ranging outcomes research agenda focuses on the many aspects of cancer care to improve the experience of individuals after a cancer diagnosis. This research is intended to generate tools and information to enhance the quality of cancer care decision making and ultimately the quality of cancer care.

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- > **The Patient-Reported Outcomes Measurement Information System (PROMIS).** NCI is taking an important role in PROMIS, a National Institutes of Health Roadmap Initiative. PROMIS aims to develop ways to measure patient-reported symptoms, such as pain and fatigue, and aspects of health-related quality of life across a wide variety of chronic diseases and conditions, including cancer. Two years into development, researchers are designing and building an innovative technology that promises to revolutionize how patients report clinically important symptoms and outcomes. This technology will provide clinical research communities with a consistent and validated approach to measure these clinically relevant, but subjective and difficult-to-measure outcomes.
- > **The Cancer Care Outcomes Research and Surveillance Consortium (CanCORS).** Through CanCORS, NCI is supporting the largest ever observational study of cancer care delivered in diverse, population-based health care settings. This prospective cohort study has enrolled 10,000 patients with newly diagnosed lung or colorectal cancer. Vital information will be collected on how clinical practices affect outcomes, and what influence certain characteristics — of patients, providers, and community health care delivery systems — have on the services that patients eventually receive. CanCORS is providing a unique opportunity to examine community practices regarding palliative (non-curative symptom control) and end-of-life care. This study takes into account the perspective of the patient, caregiver, and providers among a diverse group of patients followed over time. NCI is supporting developmental research to test the feasibility of collecting such measures routinely within clinical practice.

Improving the Quality of Cancer Care

We will support the development and dissemination of quality improvement interventions and measure their success in improving health-related outcomes across the cancer continuum.

Today's Research

For cancer, high quality care means delivering the full range of evidence-based interventions that are safe, patient-centered, effective, timely, efficient, and equitable. Such care must be provided with technical competence and cultural sensitivity and must foster patient choice based on informed decision making. Examples of NCI research include:

- > Refining process and outcome measures
- > Researching patterns of care
- > Improving and disseminating quality of care research resources
- > Understanding behavioral and sociocultural factors that influence the quality of cancer care
- > Developing interventions that target patients and their families
- > Improving symptom management and palliative care
- > Improving the training of specialized care providers
- > Evaluating patient psychological and social distress, the quality of supportive care for advanced cancer patients, and the impact of aging on quality of care

Tomorrow's Strategies

NCI will foster the development and dissemination of research resources for quality of care studies and will help make quality of care interventions available to the people who need them. We will support research to:

- > Foster the use of research evidence about patterns of care and care outcomes, to develop quality improvement interventions.
- > Begin using advanced information systems and interoperable electronic health records to inform future research and guide clinical practice.
- > Turn symptom management and palliative care research findings into interventions to improve care for patients and survivors throughout their cancer experience, and particularly at the end of life.
- > Ensure that the best scientific evidence about quality measures and assessment informs Federal, state, and private sector decision making about cancer care.
- > Ensure that new information about cancer prevention, treatment, and follow-up reaches the people who need it.
- > Strengthen the methods used to evaluate quality improvement efforts.

Moving Research Forward ***...with Improved Access to Quality Cancer Care***

NCI supports research to provide the scientific evidence needed for public and private decision making related to care delivery, insurance coverage, purchasing, regulation, and standard setting. This research gives cancer patients, survivors, and caregivers the information they need to enhance the efficiency and quality of cancer care services. For example, some NCI research findings provide guidance to the cancer community on how to improve cancer patients' and survivors' access to the full range of evidence-based interventions that may benefit them.

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- > **Health Insurance and Quality of Cancer Treatment.** Researchers recently studied the association between treatment received and insurance status (private insurance, Medicaid or Medicare only, or no insurance) for 10 common cancers with established evidence-based treatment guidelines. The study was based on a sample of more than 7,000 patients identified through NCI's Surveillance, Epidemiology, and End Results (SEER) program. Patients who depended on Medicare or Medicaid alone for insurance, especially non-Hispanic Black patients with Medicaid only, were least likely to receive guidelines-based treatment. In a follow-up study, the investigators will examine how insurance status affects survival after cancer diagnosis.
- > **Factors Affecting Completion of Colon Cancer Treatment.** A recent study showed that colon cancer patients who were female, widowed, elderly, or hospitalized during treatment were less likely to complete adjuvant (post-surgical) chemotherapy, even though stopping meant increasing their risk of dying from the disease. The strongest predictor of an incomplete treatment course was a hospital stay after surgery and after beginning chemotherapy, perhaps because of complications from treatment. The investigators suggest that improving social and physical support during treatment may be needed to increase the number of patients who complete treatment.

Improving the Quality of Life for Cancer Patients, Survivors, and Their Families

We will support the development and dissemination of interventions to reduce the adverse effects of cancer diagnosis and treatment and improve health-related outcomes for cancer patients, survivors, and their families/caregivers.

Today's Research

Advances in our ability to detect, treat, and support cancer patients are turning this disease into one that is chronic or readily managed for many and curable for increasing numbers.

NCI quality-of-life research includes:

- > Investigating the effects of cancer and its diagnosis and treatment on survivors and their families/caregivers
 - Long-term and late effects of breast and other cancers
 - Impact of physical, psychosocial, economic, and behavioral factors
- > Supporting both descriptive and intervention survivorship research
- > Researching pediatric cancer survivorship
 - Acute lymphoblastic leukemia
 - Other pediatric cancers

Tomorrow's Strategies

NCI will support survivorship research to improve the health and quality of life of all cancer patients following their diagnosis and initial treatment. These studies will include both the prevention and control aspects of chronic disease epidemiology. NCI will:

- > Increase research to understand biologic, physical, psychological, and social factors and their interactions that affect a cancer patient's response to disease, treatment, and recovery.
- > Expand the development and use of tools to assess the health-related quality of life of cancer survivors and their family members and caregivers.
- > Increase the pace of intervention research designed to reduce cancer-related acute, chronic, or late morbidity (adverse effects caused by treatment) and mortality.
- > Ensure that new information, interventions, and best practices for addressing the health needs of survivors and their families reach the people who need them.

Moving Research Forward

...with Motivation for Healthy Behavior Change after Cancer

The challenges imposed by a cancer diagnosis can be life-altering, particularly in terms of changing the health behaviors of patients and survivors. Indeed, some feel that cancer represents an important “teachable moment” for many cancer survivors that can lead to positive choices and healthier lifestyles. These changes may improve the emotional outlook and overall health of cancer survivors, and even alter the course of their disease.

NCI supports research on the motivation potential of a cancer diagnosis. This research is of special importance because cancer survivors are at increased risk for progressive or recurring disease, second cancers, osteoporosis, obesity, cardiovascular disease, diabetes, and functional decline. Although more research is needed, opportunities exist for medical teams to promote lifestyle changes that may improve the length and quality of survivors’ lives.

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- > **Physical Activity to Extend Survival and Improve Quality of Life.** Physical inactivity following cancer is a known risk with an adverse effect on weight and health. A number of researchers have shown that exercise interventions can improve survivors’ physical and emotional health, functional well-being, and quality of life. Moreover, evidence now shows that physical activity interventions can alter the course of disease recurrence or death. Two recent NCI studies found that patients with early- to later-stage colorectal cancer (but not distant metastases) who engaged in regular activity after diagnosis decreased the chance of cancer recurrence and mortality by 40 to 50 percent or more, compared with patients who engaged in little to no activity.
- > **Lowering Dietary Fat to Reduce Breast Cancer Recurrence.** Similarly, the first evidence of a positive effect of dietary change on cancer has been reported. The NCI-sponsored Women’s Intervention Nutrition Study (WINS) was the first large-scale intervention trial to study the influence of dietary fat on breast cancer outcomes in postmenopausal women treated for early-stage breast cancer. WINS investigators reported that lowering dietary fat may lower the risk of breast cancer recurrence in this population.

These behavioral change studies hold the promise of reducing cancer-related morbidity and promoting general health. At the same time, these interventions also appear to have great appeal to cancer survivors eager to reduce the stress in their lives and to regain control of their lives and bodies after cancer diagnosis and treatment.

Overcoming Cancer Health Disparities

We will study and identify factors contributing to disparities, develop culturally appropriate approaches, and disseminate interventions to overcome those disparities across the cancer control continuum from disease prevention to end-of-life care.

Today's Research

It is well known that many population groups across the United States and around the world suffer more severely from cancer and its sequelae (after-effects). Overcoming cancer health disparities is one of the best opportunities we have for lessening the burden of cancer. NCI's investments are speeding the development and use of interventions to combat disparities across the cancer control continuum and among all underserved populations. Examples of NCI research include:

- > Supporting health disparities research through NCI's biology, etiology, prevention, detection, and treatment research portfolios
- > Addressing economic, social, cultural, psychological, behavioral, and biologic factors that contribute to cancer health disparities
- > Developing and supporting resources and infrastructure for health disparities research
 - Informatics
 - Specimens, drug, and reagent resources
 - Clinical trials groups
 - Statistical methodology
 - Centers and consortia
- > Supporting education and training for careers in cancer health disparities research

Tomorrow's Strategies

Addressing the needs of the medically underserved by applying emerging evidence-based findings and research resources is a critical component of NCI's strategies to reduce cancer health disparities. Specifically, we will:

- > Build on our understanding of the factors that cause cancer health disparities.
- > Work with communities to develop interventions targeted to the specific needs of underserved populations.
- > Provide the knowledge base for and develop interventions to better coordinate and integrate cancer services for underserved populations.
- > Develop innovative, educationally- and culturally-appropriate approaches for disseminating information on research results to underserved populations. Work with others to put these approaches into practice.
- > Examine the role of health policy in reducing and eliminating cancer health disparities.
- > Work with others to develop a workforce of researchers and clinicians who will address cancer health disparities.

Moving Research Forward ***...by Addressing the Causes of Cancer Health Disparities***

With support from NCI, scientists are learning more about why some population groups have higher cancer incidence and mortality rates than others. For example, we know that many evidenced-based interventions, including cancer screening, are not adequately reaching all populations. Other research shows that, in addition to uneven access to cancer care interventions, there may be a genetic component to some cancer health disparities.

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- > **Interventions to Improve Cancer Screening.** An NCI study found that centralized telephone care management increases screening rates for breast, cervical, and colorectal cancer in women. The study included more than 1,400 women who obtained care at community and migrant health centers in New York City. Women who were overdue for cancer screening were randomly assigned to one of two groups. Women in the usual care group received one telephone call to answer questions and review their status. Women in the intervention group received a series of telephone calls that provided information about screening, scheduled appointments, and motivational support. Screening rates in the intervention group increased by 10 percent for Pap testing for cervical cancer, 17 percent for mammography, and 60 percent for colorectal cancer screening. The findings show how a modest intervention can increase screening rates in largely minority populations.
- > **Differences in Smoking-related Lung Cancer Risk.** In one of the largest prospective studies of its kind, NCI researchers found significant racial and ethnic differences in smoking-related lung cancer risk, after ruling out differences in diet, occupation, and education level. Analyzing data from almost 200,000 study participants, researchers found that among individuals who smoked 10 cigarettes or less a day, Whites had a 55 percent lower risk of lung cancer than Blacks, and among those who smoked 11 to 20 cigarettes daily, the risk was 43 percent lower. Among Hispanics and Japanese Americans, the percentages were lower still. However, the risk difference was minimal among people who smoked 30 cigarettes or more a day. While research into the environmental factors that influence lung cancer risk across populations is still vital, the investigators suggest that genomic research may eventually pinpoint genes that increase susceptibility to smoking-related lung cancer and may help explain these racial and ethnic differences.