GOAL I: PREVENTION INFORMATION & SERVICES

Texans will have the most current information and the opportunities necessary to reduce their risks for developing cancer.

Objective A - Increase Availability Of Effective Cancer Prevention Materials And Programs

What Is Cancer Prevention?

Year by year, evidence grows stronger that a majority of cancers in thousands of Texans could have been prevented by modification of the choices each person makes every day: what to put on the dinner table, whether to take a brisk walk, when to stop smoking cigarettes, how often to visit the doctor to be screened. Of the nearly 33,000 lives lost to cancer in Texas each year between 1997 and 2001, the American Cancer Society estimated that 10,500 of those residents died because of tobacco use, 30 percent of the total deaths. Scientific evidence also suggests that it may be possible to reduce cancer deaths by up to another 30-35 percent by improving nutrition and physical activity behaviors, and by keeping a normal body weight.

Given what scientific evidence suggests, that up to two-thirds of the 85,000 cancer cases estimated to occur in Texas in 2004 could have been prevented if behavioral changes had been made, cancer “prevention” plays a key role in the fight against cancer in Texas. The fact that it can reduce the human and economic toll of cancer on Texans makes cancer prevention an urgent priority. Cancer prevention includes activities aimed at eliminating or reducing the risk of developing cancer as well as minimizing the effects of the disease.

Goal I of the Texas Cancer Plan is dedicated to primary prevention. Primary prevention seeks to keep a cancer from ever occurring. It is the front line in promoting health and reducing risk in the general public. Such prevention activities include avoiding tobacco and using sunscreen to prevent skin cancer.

Goal II of the Plan addresses secondary and tertiary prevention. Secondary prevention seeks to identify and treat Texans who are at risk for developing cancer, but who have no symptoms of the disease. An example is use of a Pap smear to detect cervical dysplasia before it develops into cervical cancer. Tertiary prevention is defined as treating and supporting people diagnosed with cancer in order to minimize clinical complications and the chance that the cancer will come back, and to limit disability, and promote rehabilitation.

Cancer prevention programs are challenging. To be effective, these efforts must be comprehensive, sustained, and culturally relevant. Experiences in the field, to date, have shown that merely providing Texans with information about the dangers of tobacco use, unhealthy diets, and excessive sun exposure does not alter personal choices on a day-to-day basis. Immediate gratification from unhealthy behaviors is often an easier choice than lifelong risk reduction efforts. Despite extensive public information campaigns, many Texans continue lifestyles and personal behaviors that place them at increased risk for cancer. Prevention measures usually take years of continued reinforcement before their effect on overall morbidity is evident. Preventive measures taken today will not guarantee that an individual will be cancer-free during his or her lifetime; however, they will greatly reduce future risks of disease.

Studies also have shown that prevention efforts can be successful. They are preferable by far to even the most effective and advanced early detection and treatment methods because they can keep cancer from initially occurring.

Why Is Cancer Prevention Important?

Cancer is the second leading cause of death in Texas, as well as in the United States. In 2004 an estimated 37,000 Texans will die from cancer, as will more than 500,000 other Americans. The most powerful tool in the fight against cancer is prevention, which can significantly reduce both morbidity and mortality from the disease as well as boost overall life expectancy and health status. Prevention that starts early, with programs designed for children to help them develop healthy habits, can reduce cancer risks as well as avoid...
other health problems such as obesity and alcohol abuse. When these children become adults, the lifelong healthy habits and prevention behaviors they have adopted will serve as a model for their own children and for future generations.

**Cancer Risks**

Cancer risks include external factors that increase a person’s chance of developing cancer, such as choices and lifestyle patterns set at a young age. These can be minimized through early intervention. External risks also include carcinogens — chemicals and substances such as asbestos and ionizing radiation — that may be present in the environment or at the work site, and also can be minimized or curtailed through vigilant surveillance. Internal predispositions to cancer are either passed down genetically or develop as a result of aging, and present a much more difficult prevention problem.

**Delivery of Prevention Education**

Educators, parents, health care professionals, insurance companies, the media, government agencies, and employers all have important roles to play in cancer prevention education. Consequently, prevention education can be conducted in a wide range of settings, such as homes, schools, health care agencies, communities, and workplaces. Such education should utilize appealing and effective teaching methods that increase understanding of cancer risk factors and encourage adoption of behaviors that reduce risks. Reduction of cancer risks, however, cannot be done merely through education programs alone. Texans must take personal responsibility for changing behaviors that increase their risks of cancer. Yet, government agencies and community organizations can enhance cancer risk reduction by providing culturally relevant education about cancer and prevention. They can identify and prevent workplace and environmental hazards, restrict advertising and use of unsafe products, and enact public policies that promote cancer prevention. The Harvard Center for Cancer Prevention concludes that for prevention to be successful, changes must be implemented through all components of the social strategy. These experts found that for “major reductions in the burden of cancer to be achieved, we need broad-scale interventions that will shift the behavior of the whole population.”

To promote sweeping change that can impact the burden of cancer, information about cancer risks and the benefits of prevention must be broadly and effectively communicated. All Texans, regardless of ethnicity, income, or geographic location, need access to cancer prevention information and resources that they can understand, and which motivates them. The context and format of cancer prevention education materials are, therefore, crucial to delivering messages effectively to many audiences. To succeed, prevention education materials must be:

- Clear
- Accurate
- Culturally and linguistically competent
- Considerate of literacy level
- Tailored for public or professional audiences

To be most effective, cancer prevention education must do more than provide information on cancer prevention and risk reduction. Educational programs should foster positive attitudes and beliefs toward cancer prevention, impart appropriate risk-reduction skills, try to reduce psychosocial and physical barriers, and emphasize the benefits of long-term adherence to prevention strategies.
Cancer prevention programs should foster positive attitudes and beliefs, impart appropriate risk-reduction skills, try to reduce psychosocial and physical barriers, and emphasize the benefits of long-term adherence to prevention strategies.

Prevention programs should be easily available and accessible so that as many people as possible can benefit from them. A clearinghouse of materials should be developed, and all effective, high-quality available materials that are well targeted to specific population groups should be identified and inventoried so that educators and health care professionals know they exist and how they can be accessed. To produce new prevention education material, collaboration between public and private groups and institutions is needed so that limited resources are not wasted on duplicative efforts. Clinicians trained in cancer prevention programs and messages can make valuable contributions to the design and content of these materials, especially when they specifically address priority populations. Speakers’ bureaus also should be coordinated in order to provide the speakers with up-to-date cancer risk-reduction information that is best targeted to specific audiences. Efforts should be made to draw health care professionals from diverse ethnic and racial populations into these speakers’ bureaus, because, as role models, they can be especially effective educators.

Health Disparities & Prevention

If the risk of developing cancer is to be minimized in Texas, then the message that is delivered is the key to success. The materials delivered on paper, the words spoken in schools and churches, community organizations and neighborhood associations, and by expert speakers must be culturally and scientifically relevant to the person receiving the information and of the appropriate literacy level. Certain groups, such as African-Americans, or those who are economically disadvantaged, have disproportionately higher death rates than others from cancer. Cancer prevention programs and information must be specifically designed to address the diversity of Texas citizens.

Educational messages and programs should, therefore, be tailored for people according to their different ages, cultural backgrounds and beliefs, educational levels, economic status, and geographic regions. Many Texans do not speak English as their primary language; almost one-third of Texans speak a language other than English at home. That means prevention information should be translated into Spanish, Korean, Chinese, and many other languages. Additionally, people with mental and physical disabilities are often overlooked in cancer prevention programs, thereby reducing the likelihood that they will take steps toward cancer risk reduction. People with lower than average literacy levels also require specific attention. In order to design effective programs for the diversity of Texas’s population, a better understanding of cancer incidence, risk factors, attitudes, and utilization of cancer services by specific priority populations is essential.

Socioeconomic factors greatly influence cancer disparity. Poverty drives health disparities more than any other factor. Poverty is associated with a lack of resources, information, and knowledge; substandard living conditions; risk-promoting lifestyle; and diminished access to health care.7

Age is another key consideration in designing cancer prevention programs. Cancer prevention education for children should be suited to a child’s age because children learn developmentally, over time, and in different ways during each stage of their development.8 Children who develop healthy habits at an early age are more likely to continue those behaviors into adulthood and throughout life.9 Older Texans, who have the highest cancer incidence and mortality rates, also should have access to age-appropriate information. For them it makes sense, for example, for printed materials and posters to include photographs or drawings of mature individuals with whom they can relate, in a layout that is easy to read.

The inability to read or to read well presents another challenge to prevention education. People who conceal lack of these skills from health care professionals miss an opportunity to discuss with their physician or nurse the risk-reduction recommendations contained in printed literature.

Even for Texans who are literate, attention must be given to vocabulary and the reading level when developing printed materials for cancer prevention programs. A study conducted by Texas A&M University in 1996 found the mean reading level of nationally available cancer prevention materials for African-Americans to be at the ninth grade level.10 The National
Library of Medicine MedlinePlus guidelines “How to Write Easy to Read Health Materials” generally recommends keeping the reading level to a fourth to sixth grade level, while keeping the target audience in mind. Without a contextual explanation, many people do not understand the technical jargon used by health care professionals, such as “mammogram,” “Pap smear,” and “risk reduction.” Medical terms and procedures must be explained.

Health literacy, the ability to understand written or oral instructions given by health care professionals, also must be considered. People without functional health literacy may experience medication errors, have adverse drug reactions, and exhibit poor compliance with medical recommendations, all of which can affect their cancer experience from prevention to follow-up.

The challenges that low-literacy patients face are compounded when English is not their native language. Educational needs of people who face language barriers are often overlooked or are not fully understood by health care professionals. For example, Spanish translations and word preferences vary greatly between geographic areas and people of different national origins. Many words in Spanish have different interpretations, depending on a person’s cultural background or country of origin. In order to avoid using words inappropriately or offending people, care must be given to word choices. Community leaders must alert health care professionals and educational programs about problematic word choices and advocate for culturally competent and linguistically appropriate messages. Only when prevention interventions take into account the educational and societal needs and the cultural beliefs of specific population groups can they lead to increased knowledge and changed health behaviors.

Once prevention messages are tailored to meet individual cultural, age, literacy, and language needs, care must be taken to ensure that the messages are communicated effectively. Special attention must be given to the teaching methodology used to deliver prevention messages so that specific audiences receive the maximum benefit from interventions. For example, older women may be more receptive to hearing about breast self-examination from a female educator who is of a similar age and socioeconomic level. Teenagers may be more receptive to tobacco use prevention messages from their peers. All prevention materials and programs must be rigorously evaluated to ensure they convey accurate information in a manner that is well received by the specific intended audience.

Attention also must be given to selecting the right medium in which to deliver the message, be it church groups, literacy programs, civic and community organizations, or neighborhood associations. For specific priority populations, such delivery “channels” must be chosen with care.

For example, prevention information broadcast on a radio station that serves primarily a Hispanic audience and is given by a physician who is known in that community is much more likely to influence a listener than a brochure that is published for a general audience. Other examples of culturally relevant programs include producing a television public service announcement aimed at African-American men with the message delivered by a person who is considered a role model by African-American males. For an Asian audience, Asian foods can be featured in cancer prevention publications, posters, and videos as an example.

The Community Based Model for Enhancing African-American Women’s Breast Cancer Screening Outreach and Case Management Services (AABCO) in Texas is an example of a culturally sensitive, community-based model to enhance African-American women’s participation in early detection and follow-up services for breast cancer. The program uses three core components: (1) the utilization of outreach coordinators; (2) the development of site community and professional advisory committees; and (3) the development of community coalitions to promote education and awareness within specific communities. The program is successful because cultural awareness, sensitivity, and competence have been infused into the project from its inception. Success of the program relies on establishing positive alliances with respected members of the community, planning activities around important cultural holidays, and reaching the target population in places like churches, beauty shops, and community centers. Identifying barriers also was crucial to program success. The AABCO project staff found that the most effective way to get a woman to go for screening was to have one or more friends go with her. The project also found that it was important for African-American people to see themselves represented within the organization that is seeking to provide services for them. The AABCO program

The Cultivando la Salud (Cultivating Health) Program for breast and cervical cancer screening is an example of a culturally and linguistically effective educational program. Cultivando la Salud (CLS) was developed by the National Center for Farmworker Health with funding from the Centers for Disease Control and Prevention (CDC) and in collaboration with researchers from the Center for Health Promotion and Prevention Research at the School of Public Health, University of Texas Health Science Center at Houston. The program developed a series of materials (including a video and flipchart) directed at the target population of Hispanic farmworker women and also developed training materials for lay health workers, including a program manual, training curriculum, and teaching guide. The effectiveness of the program was evaluated using an intervention trial and was found to be effective in increasing the use of mammography, clinical breast exams, and Pap test screening.

**Workplace Issues & Cancer Prevention**

Employers and health insurance companies have an economic incentive to prevent cancer.

Since the treatment and rehabilitation of cancer patients is expensive, employers and health insurance companies have an economic incentive to prevent cancer. These companies can serve a valuable role in cancer prevention education by supporting health education and by making materials and programs available to their employees or subscribers, but few have taken such an active role. That may change, however, when insurers understand the cost benefit and potential long-term savings that result from prevention efforts and utilization of educational resources that are available.

Some of the avenues for cancer prevention in the workplace include industrial health promotion programs, hygiene practices and policies, tobacco use restrictions, protective clothing and device requirements, and legal and administrative approaches to reducing carcinogen exposure, including ensuring that indoor air is clean. The workplace has the added advantage of being an excellent setting for some medical screening programs, such as mobile mammography services and skin cancer screening. Many employers, however, especially small-business owners, may need technical assistance in developing and/or strengthening work site policies and programs that foster cancer prevention. There are many relatively simple things that can be done: inserting health promotion tips with paychecks; displaying educational posters throughout the work area; or inviting local health agencies to make presentations. Even newsletters with health tips and telephone numbers for local educational programs can reinforce other community health efforts and positively affect cancer trends.

Since prevention efforts generally improve overall health, employers and communities that provide prevention education programs receive other benefits besides cancer prevention. Company morale and health can be improved, and reduction of sick days will improve employee productivity and work quality. Prevention education promotes good public relations, and when employers “partner” with community groups to deliver a unified prevention message, limited resources can be shared, and healthy behaviors can be reinforced.

The Systems Approach

Everybody knows it is wrong to drink and drive; the message is reinforced in schools, on television, and in the movies, by law enforcement and community businesses, and by “MADD” mothers who fueled a national movement. This prevention message is a good example of the “systems approach” that is necessary to alter behavior and to keep this new standard reinforced day to day. Cancer prevention can work in the same way, especially since so many people worry about developing the disease. A recent Gallup poll revealed that American workers believe that cancer is the single most important health problem they could face in the future; therefore, information that teaches them how to reduce their chance of developing cancer can succeed.

The American Cancer Society stresses the value of using a systems approach to reach these individuals. Systems are networks of independent parts connected by a common goal, such as school systems or hospitals.

**American workers believe that cancer is the single most important health problem they could face in the future.**
or businesses. An initiative that encourages hospitals, clinics, and other health care agencies to provide culturally competent cancer prevention and risk reduction materials and programs is an example of a systems approach.

Systems can work with other systems to effectively spread the prevention message. A particularly relevant example is a Texas health promotion program called Top Priority, which has trained more than 400 businesses in the state to establish self-sustaining, long-term, in-house employee teams that support company-focused worksite health promotion activities with minimal investment of staff, equipment, and funds. Community Resource Exchange Networks were established to provide a forum for businesses to share information and programming resources. Systems can interact with other systems to promote cancer prevention: Tenneco, Inc., The University of Texas at Austin, the American Cancer Society, Texas Division, and the Texas Cancer Council were partners in the Top Priority program, which became a statewide initiative. The coordination and sharing of information and programming resources through this public-private sector partnership made it possible for many businesses throughout the state to learn about cancer prevention and risk reduction.

Objective A - Increase Availability Of Effective Cancer Prevention Materials And Programs

Strategy 1: Design culturally competent campaigns on cancer risk awareness and risk reduction for Texas’s diverse communities.

Action Steps:

a. Assess gaps in the availability, accuracy, and cultural appropriateness of campaigns and materials for all populations in Texas.

b. Consider literacy level in development of materials.

c. Identify media outlets for specific priority populations and use the outlets to promote prevention education messages in culturally relevant ways.

d. Inform specific priority population groups of the availability of cancer information materials and programs that are specifically tailored to meet their needs.

e. Use existing guidelines for developing effective print and audiovisual cancer prevention information for specific populations and develop guidelines where none exist.

f. Evaluate the effectiveness of methods used to reach specific audiences.

g. Encourage hospitals, clinics, and other health care agencies to increase their ability to provide culturally competent cancer prevention and risk reduction materials and programs.

Strategy 2: Promote the availability and accessibility of cancer prevention resources that are based on the best scientific evidence and best practices.

Action Steps:

a. Develop a clearinghouse of cancer prevention resources.

b. Promote open access to culturally and linguistically effective programs and materials.

c. Promote community-based ownership in planning and sponsoring programs.

d. Implement awareness campaigns to promote the dissemination of materials/resources through appropriate collaborations, particularly community partners.

e. Support the development and use of resource materials for promotion by Texas media.

Strategy 3: Implement cancer prevention awareness campaigns through appropriate collaborations.

Action Steps:

a. Promote collaboration with community systems such as workplaces, faith-based groups, and schools to deliver cancer prevention awareness campaigns.

b. Coordinate speakers’ bureaus and facilitate dissemination of up-to-date information to speakers.

c. Develop cancer prevention television programs for children that broadcasters can use to fulfill educational programming requirements.
d. Involve community leaders and other cancer control stakeholders in the planning of and the dissemination of appropriate educational approaches for specific populations.

**Objective B - Increase Awareness Of And Access To Cancer Prevention Services**

**Barriers to Prevention Services**

The value of screening for certain cancers is clear. Cancers that can be detected earlier by screening account for about half of all new cases of cancers, including those of the breast, colon, rectum, cervix, prostate, oral cavity, and skin. Early detection of these cancers leads to more successful treatment. If all cancers were diagnosed when they are confined locally (and have not metastasized or spread), the relative five-year survival rate would increase from 84 percent to 95 percent. Cancer screening has led to verifiable reductions in cancer deaths in the state; Texans who aren’t screened for cancer have poorer outcomes once the cancer is detected and treated.

Barriers to screening have long existed, and in Texas that has led, in part, to serious cancer disparities. Evidence has consistently shown that minorities and the poor are less likely to receive screenings. Cancers among these groups are more frequently diagnosed after the cancer has spread and is, therefore, harder to treat. Studies have found, for example, that minority women aged 40 or over are less likely to receive mammograms than are Caucasian women, and that only 38 percent of Hispanic women in that age range have regular screening mammograms. Newer data reveals, however, that screening differences between older members of these groups depends less on the race than on differences in education (which includes literacy), income, and insurance status. Population groups that experience disparities also may be defined by geography (urban or rural residence) and issues related to distance from screening facilities, clinics, and even primary care physicians. In fact, more than three million Texans who live in the state’s 190 rural counties are considered medically underserved.

In this complex interaction of economic, social, geographic, and cultural factors that influence individual health, poverty in Texas is a critical factor. High poverty levels are associated with a lower proportion of cancers diagnosed at an early stage, when they are most treatable, suggesting that routine screening is at a sub-par level. It is estimated that, statewide, about one-third of Texans had an annual income of less than $25,000 in 2003. In 2002, the overall poverty rate was about 16 percent; 3.4 million Texans lived below the poverty line. The composition of this group was 60 percent Hispanic, 22 percent non-Hispanic white, 13 percent African-American, and 5 percent other racial/ethnic groups.

Lack of health insurance also limits access to early detection screening. A recent Robert Wood Johnson Foundation study found that Texas leads the nation in the percentage of working people who have no health insurance, and studies document that people who lack health care insurance have reduced access to preventive care and are less likely to get timely cancer screening examinations. The insurance gap in Texas is especially acute among Hispanics (53 percent are without health insurance) and those who have less than a high school diploma (63 percent are without insurance).

Barriers to optimal cancer screenings also arise from social and cultural factors, aside from issues of poverty or insurance status. One example adequately illustrates these myriad influences: the American Cancer Society reported in 2004 that although 82 percent of non-Hispanic white women over the age of 18 reported receiving a Pap test for cervical cancer in the last three years, rates were lower among Asian-Americans (68 percent), women with no health insurance (64 percent), and women who had been in the United States for less than 10 years (59 percent).

In some cases, participation in chemoprevention clinical trials may help Texans overcome issues of insurance and health care access. Cancer researchers in Texas are leading some of the top national studies on cancer prevention, and state participation is generally high in most of these trials. For example, the Southwest Oncology Group in Texas is leading a national study that looks at whether the dietary supplements...
selenium and vitamin E can prevent development of prostate cancer in the 35,000 men who have been enrolled. Particular attention has been placed on enrolling African-American men into the study because they have the highest incidence of prostate cancer in the world.

**The Media’s Role in Prevention Education**

To take advantage of the entire host of cancer prevention programs in place or being developed, Texans need to know about them. One of the best ways to spread such awareness is through use of the media. Almost every Texan is influenced by the information obtained through the media — newspapers, television, radio, magazines, online news — but news reporting about health advances can be incomplete and, therefore, misleading. Confusion exists on all levels, from the simple debate as to the health benefits of margarine versus butter, to the discussion among screening experts about whether mammography and PSA screening picks up non-lethal breast or prostate tumors. Superficial media reports on the screening issue, for example, could baffle the general public, convincing some people to skip these screenings, a recommendation no clinician would make. By improving coordination and interpretation of cancer-related news alerts, such uncertainty can be minimized.

Moreover, the media offer the ideal opportunity to reach large numbers of people at once with powerful prevention education messages that are culturally relevant, informative, and tailored to the audience. Tight coordination between the media and cancer prevention experts can help spread accurate news about new cancer prevention research and programs, and spokespersons and volunteers representing health care organizations can be trained to provide compelling cancer prevention messages. At the least, organizations can draw up a list of experts for the media’s use in cancer-related news stories; at best, a coordinated regional or statewide listing of cancer experts could lead to unified prevention education that positively influences the adoption of healthy habits and public policies.

For example, a message that “five-to-nine-a-day” servings of fruits and vegetables will help prevent some forms of cancer can be spread ubiquitously through the media (which will help fulfill federal requirements to provide educational programming for children), reinforced with posters in school lunchrooms, and through grocery sack reminders. Television, radio, and newspaper series that examine the cancer-nutrition connection, and which also offer recipes or show chefs cooking healthy meals, can be launched along with Internet sites that coordinate all these messages and offer free CD-ROMs to the public.

Another example is that African-American men are not offered screening for prostate cancer as frequently as they should be, compared to other groups. A message that encourages discussion of screening could be coordinated between the media that are popular in African-American communities, be they radio or television, and businesses that will sponsor free screenings in cooperation with local clinics. In this campaign, African-American physicians can serve as expert media contacts, and telephone hotlines to answer questions and concerns can be established.

The A Su Salud program is a good example of how the media can be used effectively to reinforce cancer prevention messages for specific populations.
Developed by cancer researchers at The University of Texas Health Science Center at San Antonio and funded by the National Cancer Institute, A Su Salud uses local community members as role models in both print and broadcast media presentations. The media events and the use of local role models reinforce the prevention messages being disseminated concurrently through an organized community education campaign.

Objective B - Increase Awareness Of And Access To Cancer Prevention Services

Strategy 1: Promote awareness of culturally and linguistically appropriate cancer prevention services, particularly among high-risk groups, such as ethnically and culturally diverse populations and the medically underserved.

Action Steps:

a. Encourage use of comprehensive media campaigns that are tailored to the appropriate populations.

b. Promote cancer awareness observances as a way to disseminate information through community systems.

c. Identify and address barriers that limit effectiveness of awareness and outreach programs, particularly for high-risk groups, such as diverse populations and the medically underserved.

Strategy 2: Improve access to cancer prevention services.

Action Steps:

a. Support insurance coverage of and reimbursement for cancer prevention services.

b. Support efforts to identify and reduce barriers to prevention services at a community level, particularly among diverse and medically underserved populations.

c. Promote the development and dissemination of public nutrition education programs to include portion control and healthy food choices.

d. Promote dissemination of existing evidence-based model programs that effectively bridge gaps and reduce barriers among diverse and medically underserved populations.

e. Promote increased dissemination and availability of tobacco cessation programs and counseling.

f. Promote awareness of risk assessment counseling, including genetic testing and counseling.

g. Promote dissemination and availability of nutrition counseling.

h. Ensure that prevention services and programs are culturally and linguistically appropriate.

Strategy 3: Increase awareness of, access to, and participation in prevention clinical trials.

Action Steps:

a. Increase the participation of high-risk groups, such as ethnically and culturally diverse populations and the medically underserved, through collaborations at the community level.

b. Ensure that high-risk groups, such as diverse populations and the medically underserved, are included in recruitment strategies at the beginning and throughout the research process.

c. Create mechanisms to increase participation in clinical trials, such as increased funding for recruitment and retention of diverse populations, creation of linguistically appropriate patient information and informed consent, use of incentives, and ensuring that medical and associated costs are covered.

d. Encourage funders and researchers to include grant support for an effective communication plan to aid in clinical trial recruitment.

e. Promote better methods of communicating information about clinical trials available in Texas.

f. Develop culturally and linguistically appropriate messages regarding clinical trials and deliver them through population-appropriate channels.

g. Support efforts to reduce financial barriers, such as encouraging health benefit plans to provide access to available clinical trials through ACOS- or NCI-approved facilities.

h. Promote collaboration among the public, the research community, and diverse communities to increase knowledge of and participation in clinical trials.
i. Increase funders’ and health care professionals’ awareness of barriers to participation, particularly for underrepresented populations.

j. Encourage the inclusion of all clinical trials in registries.

Objective C - Promote Healthy Lifestyles And Behaviors In Children, Particularly Those At High Risk For Developing Cancer, Such As Ethnically And Culturally Diverse Populations And The Medically Underserved

Youth & Cancer Prevention

Habits acquired in youth strongly shape behavior in the adults they will become. The majority of children and adolescents who are overweight will become overweight adults. Children who don’t exercise stay physically inactive throughout life. Almost 90 percent of adult smokers acquired their habit as a child or teenager, and one-third of them will die from a tobacco-related disease, including a wide variety of cancers. The formative years of youth offer many opportunities to influence the development of lifelong skills and healthy behaviors needed for cancer prevention and risk reduction. Children who adopt healthy habits at an early age are more likely to continue these behaviors throughout life. Additionally, children who have good health knowledge and skills perform more effectively in school, and they achieve a better lifelong health status.

Children who adopt healthy habits at an early age are more likely to continue these behaviors throughout life.

Comprehensive School Health Education

The 129,000 schools that teach more than 50 million K-12 students in the United States provide a ready and available organizational structure through which to deliver cancer prevention programs that will shape those lifelong habits. Schools are logical places to both improve the health of students through physical activity and nutrition and to arm youngsters with strategies that empower them to avoid health risks in the future. Students who have had comprehensive school health education are less likely to drink, smoke, take drugs, or ride with drivers who have been drinking than are students with little or no health education.

Thus, a number of health, education, and social service agencies, along with the American Cancer Society, promote “comprehensive” school health education, along with National Health Education Standards. Among other goals, these standards are designed to give students the skills to practice behaviors that reduce health risks. National standards are not a federal mandate, nor do they define a national curriculum, but they are intended to serve as a framework for organizing health knowledge to produce health “literate” schoolchildren. The standards also are designed to help parents, the schools, and the communities create an instructional program that will help students become, and stay, healthy.

To help ensure that these standards are followed, comprehensive school health education is a planned health education curriculum for preschool through grade 12. Experts recommend that students receive at least 50 classroom hours of instruction per year in health and that the following 10 areas should be included in any comprehensive school health program: community health, consumer health, environmental health, family life, mental and emotional health, nutrition, personal health, chronic and infectious disease prevention and control, safety and accident prevention, and substance use and abuse. The skills children acquire to prevent lifelong cancer risks are similar to those needed for other health issues. For example, risk factors like smoking, poor diet, and little exercise are the same for several chronic diseases.

Innovative Health Promotion Strategies

Working with a population that is more focused on short-term needs, and for which there is limited time for health promotion during the school day, presents a challenge. One way to address the issue is to engage children in their own health through youth advocacy. Results from a qualitative evaluation of a youth advocacy program demonstrate that engaging youth as catalysts for change may lead to solutions that are meaningful and enduring to the intended audience.

A team approach also is effective. A strategy pioneered in 1986 by the Texas Cancer Council to promote
lifelong cancer risk reduction behavior in school-children has grown into the Texas School Health Network that links all the state’s school districts. The network, a collaboration between the Texas Cancer Council, the Department of State Health Services, and the Regional Education Services Centers, provides School Health Specialists who offer integrated, coordinated approaches for health education to schools within their districts. For example, School Health Specialists collaborate with regional professional organizations to:

- Sponsor training and networking opportunities for school personnel
- Offer school nurse institutes and academies
- Plan conferences for physical education professionals
- Sponsor workshops for food service staff

For cancer prevention, school districts rely on their School Health Specialist for assistance on tobacco education, policies, smoking cessation, and wellness promotion programs. The Texas School Health Network has become the primary mechanism for strengthening health promotion activities for school-children and has provided a way for state agencies, volunteer health organizations, education organizations, and many others to unite in a common purpose of strengthening school health education throughout Texas.

School Health Specialists also assist schools in the development of school health advisory councils. These councils, established by state law, have a variety of roles, depending on how school systems use them. Some assume cancer risk prevention roles by initiating policies related to smoking and the sale of nutritious foods in school. Furthermore, recent changes in state law allow these advisory councils to have a representative from nonprofit health organizations, like the American Cancer Society, appointed to the group, giving them a definable role in risk prevention.

State policies concerning physical activity in schools can advance healthy behaviors in children. Knowing that the number of overweight children in the state has doubled in the past 20 years and that excess body weight increases the risk of developing a number of diseases, including cancer, the Texas legislature passed a law in 2001 that requires school districts to offer 30 minutes of daily physical activity for students in grades K-6. Texas law currently requires physical education classes for grades 9-12.

Tailoring Health Messages

Since young people learn developmentally, it is important that cancer prevention education be appropriate for the child’s age and prior learning experiences. Each lesson in cancer prevention and risk reduction should build on the achievements and knowledge gained from previous lessons. The learning skills and behaviors for cancer prevention instruction also should be developed for each level in school, tailored for different cultures, languages, and ages of students, and spread throughout all regions in Texas. To illustrate, puppets can be used to reinforce health messages for children who have not yet learned to read. For older children, peer-driven programs in which teens serve as advocates for cancer prevention and healthy lifestyles may be the most effective method of instruction.

The Project S.A.F.E.T.Y. CD-ROM and Teacher’s Guide are a science-based skin cancer awareness and prevention curriculum developed by The University of Texas M. D. Anderson Cancer Center for grades 4-12. Based on an earlier multimedia module developed with Texas Cancer Council funding, the Project S.A.F.E.T.Y. CD-ROM and Teacher’s Guide have been in classroom use since 2002. The highly effective curriculum delivers information via animated graphics, video clips, colorful
charts, and activities. The 90-page Teacher’s Guide contains pre- and post-achievement tests, additional activities, a glossary, a resource list for students and teachers, and lesson correlations with the Texas Science TAKS (Texas Assessment of Knowledge and Skills), Health TEKS (Texas Essential Knowledge and Skills), and the National Science and Health Education Standards. In 2002, the module earned a Silver Award at the HSCA (Health Sciences Communications Association) International Media Festival.

In the mid-1990s, the Texas Education Agency undertook an extensive review of public education curriculum and knowledge, skills, and performance expectations for students, known as Texas Essential Knowledge and Skills (TEKS). In 1997, the State Board of Education adopted the health and physical education components of TEKS. The curricula guidelines parallel those developed by the Joint Committee on National Health Education Standards, which address serious health problems through planned, sequential, and developmentally appropriate instruction. The standards seek to improve student learning by providing a foundation for curriculum development, instruction, and assessment of student performance. Further, they outline ways in which students can increase their health literacy. According to the Joint Committee on National Health Education Standards, four characteristics define a person as health literate: critical thinking and problem solving; responsible and productive citizenship; self-directed learning; and effective communication.

The Role of School Personnel

Given that the school setting provides the single most effective setting for accessing Texas’s youth to deliver cancer prevention messages, the role of educator naturally falls to classroom and physical education teachers. Still, comprehensive school health education is required to be taught by school personnel who are trained, certified, or credentialed to teach the subject matter. As of 1997, middle and high school teachers in Texas are required to be certified to teach health, as they would in any other area of certification. Health certification is not required, however, for elementary school teachers. Other school staff play important roles, such as school counselors and nurses, who perform cancer screening and risks assessments, and even food service employees, who are the guardians of healthy student nutrition. Coaches are influential role models for young athletes and can readily sway student attitudes about exercise, nutrition, and tobacco use. In fact, all school staff, including administrators, can support cancer prevention education by serving as positive role models for children and demonstrating healthy behaviors. School health programs can be further enhanced by establishing linkages between schools and community organizations, sharing new and innovative ways to teach cancer prevention.

While education aimed at preventing cancer should occur within all facets of the school, parent and community involvement, such as sports groups and summer camps, also is required to promote cancer risk prevention. Parent and community involvement can reinforce health instruction on a day-to-day level through a multitude of creative ways. Parents who work in health care can serve on school district health advisory committees, which then integrate the health interests of parent groups, businesses, and civic clubs. To increase student awareness and practice of risk reduction behaviors and healthy lifestyles, it is important that youth be recognized as health consumers and be given the information and tools needed to maximize their health status.

Objectives:

Objective C - Promote Healthy Lifestyles And Behaviors In Children, Particularly Those At High Risk For Developing Cancer, Such As Ethnically And Culturally Diverse Populations And The Medically Underserved

Strategy 1: Promote cancer prevention through Texas educational systems.

Action Steps:

a. Promote the adoption of healthy behaviors by working with parent groups, educational systems, and other organizations aimed at children.
b. Promote the increased use of effective cancer curricula in Texas education systems.

c. Target promotions particularly to those children at high risk for developing cancer, such as ethnically and culturally diverse populations and the medically underserved.

d. Work with state-mandated School Health Advisory Councils (SHACs) to promote cancer prevention information through schools as part of a comprehensive school health curriculum.

**Strategy 2: Facilitate the development and implementation of culturally competent and linguistically appropriate innovative health promotion strategies to encourage children to adopt healthy lifestyles.**

**Action Steps:**

a. Continue collaborative efforts among state agencies, Regional Education Service Centers, health and education organizations, and universities in designing, implementing, and promoting effective health promotion strategies.

b. Encourage use of “best practice” strategies to local school boards and other educational systems.

c. Involve community, civic, and business groups in developing, implementing, and supporting innovative cancer prevention programs, curricula, and resource materials for school-aged children.

**Objective D - Promote Policies And Programs Aimed At Reducing Tobacco Use And Exposure To Secondhand Smoke**

**Tobacco’s Link to Cancer**

Tobacco use is widespread, and it is deadly. In 2002, more than one in five adults in America, 22.5 percent of the U.S. population, or 45.8 million adults, smoked cigarettes. The majority of these individuals, almost 82 percent, smoke every day. Yet smoking is the most preventable cause of death in the world today. Worldwide, there were about 4.9 million smoking-related premature deaths in 2001, and these were divided evenly between industrialized and developing nations. The toll is exceedingly high in the United States, as well. Tobacco use is responsible for nearly one in five deaths, or an estimated 440,000 deaths per year during 1995-1999. Approximately half of all Americans who continue to smoke will die from their habit. Smoking accounts for at least 30 percent of all cancer deaths and 87 percent of lung cancer deaths. Lung cancer is now the leading cause of cancer death in both men and women. Smoking is associated with increased risk for cancers of the mouth, larynx, pharynx, esophagus, stomach, liver, pancreas, kidney, bladder, uterine and cervical cancers, as well as myeloid leukemia.

Cigarette smoking in the United States causes other serious diseases among an estimated 8.6 million people. These include heart disease, stroke, emphysema, and bronchitis, as well as adverse outcomes in pregnancy. These diseases impose substantial costs; for each of the approximately 22 billion packs of cigarettes sold in the United States in 1999, $3.45 was spent on medical care linked to smoking and $3.45 was lost in productivity. The harmful effects of smoking are not just confined to the smoker. It is estimated that secondhand smoke has been responsible for about 3,000 lung cancer deaths and more than 35,000 deaths from heart disease among nonsmokers in the nation. Researchers have firmly established that there is no safe level of secondhand smoke, which contains more than 4,000 substances, including at least 40 known carcinogens.

Texas is equally impacted by tobacco’s profile of disease and death. Lung cancer, the leading cause of cancer-related death in Texans of both sexes, is projected to cause 10,505 deaths in 2004. Lung cancer is the second most common cancer diagnosed in the state. More men (27 percent) than women (18 percent) smoke in Texas, with the result that lung cancer incidence and mortality rates among men are almost twice those of women in the state. In Texas, the burden of lung cancer is disproportionately borne by African-American males, and those who are undereducated also are at risk: in Texas, adults aged 25 and older with less than a high school diploma have smoking rates higher than the state average. Nationally, smoking prevalence is higher among adults living below the poverty line.
Youth & Tobacco Use

Addiction to cigarettes and other tobacco products begins in youth. The American Cancer Society reports that 90 percent of adult smokers became addicted to tobacco before the age of 18. The average age at which people begin smoking is 13 years, and the reality is that those who start a tobacco habit young become hooked, despite their desire to stop. Most youth smokers believe they will not be smoking in five years, and more than half report trying to quit within the past year. But without intervention, young smokers will most likely become adult smokers. In fact, studies show that among high school seniors, 73 percent of daily smokers remained daily smokers five to six years later.

Tobacco use also is associated with a range of behavioral problems during adolescence, according to the U.S. Surgeon General. It is considered to be a “gateway” drug, the first drug used by youth who experiment with alcohol, marijuana, or narcotics. Youth who smoke cigarettes also are more likely to get into fights, carry weapons, attempt suicide, and engage in high-risk sexual behaviors. For these reasons, the National Cancer Institute says that decreasing cigarette smoking among adolescents is a major public health objective for the nation. It is critical to the prevention of future tobacco-related cancers as well as other high-risk behaviors, says the American Cancer Society.

Past success in convincing the young not to smoke has been mixed, although recent data show the lowest levels of teenage smoking since national trends in tobacco use began to be studied in 1991. Cigarette smoking among U.S. high school students has fluctuated in past years. It increased significantly from 28 percent in 1991 to 36 percent in 1997, but declined to 29 percent in 2001. In Texas, smoking incidence in students recently dropped, but still remains high. When asked in 2001, fewer middle and high school students reported that they had ever tried smoking, compared to rates found by a survey taken in 1999, according to the federal Centers for Disease Control and Prevention (CDC) and the Department of State Health Services. Data were analyzed from the Youth Risk Behavior Surveillance System surveys to again examine the prevalence of tobacco use among Texas youth. They found that the rate of “ever” smoking a cigar, in addition to ever having tried smoking, also declined in both middle and high school students. Between 1999 and 2001, 27 percent fewer middle school students reported that they had tried smoking cigarettes at least once (48 percent versus 35 percent). Also between those two years, 11 percent fewer high school students said they had smoked (71 percent in 1999, compared to 64 percent in 2001). Additionally, fewer middle school students also reported having tried smokeless or “spit” tobacco in 2001, but the rate remained the same in high school.

The survey also found that current use of tobacco, defined as within the 30 days preceding the survey, had declined for most, but not all, forms of the product:

- In middle and high school, current use of any tobacco product declined.
- Current use of cigarettes declined among middle school students and those in high school.
- Use of cigars, smokeless tobacco, and tobacco with a pipe either remained the same or did not significantly decline in both middle and high school students.

Although the school survey showed that more boys used tobacco than girls, current use had declined among both sexes in middle and high school. Tobacco use among racial and ethnic groups differed, however. According to the survey:

- Hispanic middle school students continued to be more likely than white and African-American students to be current users of tobacco.
- White and Hispanic high school students were again more likely than African-American students to be current users of tobacco.
The survey also found that both in 1999 and in 2001, the number of students using tobacco generally increased with each grade level, although the comparable rate between these two time periods had decreased. For example, in 2001, 17 percent of students in grade 7 said they currently used tobacco, down from the 26 percent that reported grade 7 use in 1999.

Cigarette use among high school students nationally has continued to decline, according to the most recent study. In 2003, approximately one in 5 high school students were current smokers, and one in 10 defined themselves as frequent smokers.74

**Youth Tobacco Control**

Recent declines in tobacco use among America’s youth are due to effective mass media and school-based tobacco prevention efforts and to the increasing cost of cigarettes, a jump of 90 percent since 1997, according to the CDC.75 Reducing smoking rates further will require continuing efforts on the part of states, communities, schools, and parents. The U.S. Healthy People 2010 objectives, for example, suggest the following targets: reduce the current use of any tobacco product to 21 percent; reduce youth cigarette smoking to 16 percent; increase the proportion of daily smokers who attempt to quit to 84 percent.76

Reaching such a goal requires the following steps, according to the CDC: targeted and effective media campaigns, reducing depictions of tobacco use in the entertainment media, promoting smoke-free homes, decreasing adult smokers so children have good role models, discouraging adults from providing cigarettes to youth, and instituting comprehensive community and school-based programs and policies that encourage smoking cessation.77

Progress has been made in many of these areas, and some states serve as models for others to follow. However, many programs that aim for the critical goal of smoking cessation are unsuccessful.78 Much attention has been paid to such programs, which also have been fueled financially by tobacco taxes and the settlements that states have made from tobacco industry lawsuits, but there is little scientific evidence that these programs work.79 Experts say that unlike the extensive research that has been undertaken to evaluate tobacco cessation treatments in adults, there is a dearth of scientific studies that judge effective treatment for youth tobacco users.80 Several major reviews of available evidence suggest that cognitive behavioral treatments, which have been found effective for adult cessation, have shown promise in convincing the young to quit.81 Such programs involve much more than just having the right “content.” 82

**Reducing Youth Access**

During the mid-1990s, sweeping federal and state laws were enacted to prevent youth access to tobacco products. Many studies indicated that youth had little trouble obtaining tobacco products despite laws prohibiting the sale of tobacco to minors.83 Nationally, minors who try to buy tobacco are generally successful in purchasing it over the counter 50 to 75 percent of the time.84 Despite state laws prohibiting the sale of tobacco products to minors, Texas children can successfully access these products through vending machines, self-service displays, free samples, mail-order sales, and other kids. U.S. regulations require tobacco-sales compliance checks. Yet, there is controversy as to their effectiveness. Even when checks produce single-digit violation rates, adolescent tobacco use often fails to decline.85 Although statewide vendor compliance surveys conducted by the Department of State Health Services show a decrease in sales to minors, retail purchase remains the usual way that addicted adolescents get their cigarettes, as well as the cigarettes they give experimenting peers.86

Active enforcement of age verification policies is needed. Tobacco products are widely available at a variety of retail stores, making them easily accessible to youth. The placement of tobacco products in prominent displays and behind checkout counters falsely reinforces the idea that tobacco is safe, in great demand, and a part of everyday life.87 Restrictions to limit access to cigarette vending machines and the “We Card” programs can deter youth from easily obtaining cigarettes, but it doesn’t stop them. In its 1998-1999 youth tobacco survey, the Texas Department of State Health Services found that while access to commercial sources of cigarettes was down, access to alternate sources had increased significantly, largely by stealing cigarettes or getting them from adults.88 Public health experts in Texas say that to reduce youth access to cigarettes, stricter policies prohibiting the sale of tobacco to minors are needed, and retailer and community education should be intensified. Similarly, the CDC concluded that giving retailers information was less effective in reducing illegal sales than active enforcement, but that still no strategy achieved complete compliance.89
Two primary ways to prevent and reduce tobacco use among children is through effective educational programs and enforcement of laws restricting sales of tobacco products. Comprehensive school health education is an excellent vehicle for reinforcing the dangers of tobacco use in a systematic way for grades K-12. As with the other components of comprehensive school health education, tobacco use prevention education must be age and culturally relevant and meet the developmental needs of students. Proven and effective teaching methodologies should be used, such as peer instruction. Peer influence seems to be especially important in the early stages of tobacco use. Schools and school districts can underscore tobacco use prevention messages to youth by enforcing policies that ban tobacco use on school grounds and at school functions.

The effectiveness of school-based programs appears to be enhanced by involving parents, youth-oriented media, and community organizations. Influential adults, such as coaches, the clergy, neighbors, scout leaders, and other role models for youth, should set a good example for youth and enforce the anti-tobacco message that is taught in schools. Adults also should support programs that seek to reduce tobacco use among youth and educate retailers about the importance of enforcing tobacco laws. Sports professionals can be especially powerful educators and should take it upon themselves to set a good example for youth by not using tobacco products. Tobacco use prevention education must do more than teach children about the health hazards. Children also must be made aware of the ways in which tobacco companies influence them with promotion and advertising of tobacco products. Marketing techniques, advertisements, product names, and packaging also influence youth attitudes about tobacco products. Children are highly susceptible to repetitive advertising of retail products, including tobacco.

Active enforcement of local, state, and federal laws is an essential component of tobacco prevention and control efforts. In Texas, an increasing number of laws limit youth access to tobacco products. Four laws passed in the state legislature since 1999 strengthened youth restrictions to tobacco products. The 2003 House Bill number 3139, for example, prohibits the delivery sale to minors and imposes requirements addressing age verification, notification, shipping, and reporting, and also specific penalties for violating these rules. The 2001 House Bill 2767 elevates the penalty for violating the existing sign-posting requirement for retail tobacco sale. The Texas Education Code prohibits tobacco use and possession by students at school-related or school-sanctioned activities, on or off of school property. It also gives school personnel the responsibility of enforcing these prohibitions on school property.

Studies indicate that higher costs of tobacco products discourage youth from purchasing them. When the price of cigarettes goes up, it has been found that youth smoking rates go down. The American Lung Association reports that for every 10 percent increase in price, youth smoking rates will drop by about 7 percent. Price elasticity estimates also vary by study and range from $.25 to $1.31. Differences in sensitivity to price also have been found, with youth being more sensitive than young adults. There also have been similar estimates for the effect of price on smokeless tobacco use. Since 2001, the Texas excise tax rates are $.41 per pack of cigarettes and 35 percent of the retail price of spit tobacco.

During the 1990s, the federal government focused increased attention on youth access to tobacco, most notably through the 1992 “Synar Amendment” and the Food and Drug Administration rules enacted in 1996. The Synar Amendment requires states to enact and enforce laws that prohibit the sale of tobacco products to people under the age of 18. It also requires states to conduct random, unannounced inspections to assess compliance with the law, and to develop a strategy for achieving an inspection failure rate of less than 20 percent. Further, states are required to annually report on their enforcement activities and success rates in reducing tobacco availability to minors. The Synar Amendment authorizes the U.S. Secretary of Health and Human Services to withhold federal Substance Abuse Prevention and Treatment Block Grant funds if states do not comply with the enforcement and reporting requirements.

**Regulations & Litigations**

Comprehensive Food and Drug Administration (FDA) tobacco regulations, released in 1996, regulate the access and appeal of tobacco products to children and adolescents. The FDA rules regulate tobacco sales, restrict outdoor advertising and ads in print media, and prohibit brand-name sponsorship of sporting or entertainment events, among other measures.
Further restrictions on advertising and sales were included in the spate of lawsuits filed by states in the 1990s. Texas sued the tobacco industry in 1996, and in 1998, Texas reached an agreement for $17.3 billion. In June 1997, the tobacco industry reached the “Master Settlement Agreement” for $206 billion with 46 other states and with U.S. territories. Much of those funds was to be earmarked for recovering the cost of treating patients for smoking-related illnesses, as well as for conducting tobacco control programs, although many states use the funds to supplement their general revenue. For example, in 2001, the average state received $28.35 per resident from the tobacco settlement, but allocated only 6 percent of these funds to tobacco control programs.95 Only 48 percent of tobacco control settlement funds that year were spent on health care, long-term care, and medical research.96

**Adult Tobacco Use & Control**

While the Texas Cancer Plan places priority focus on the prevention of tobacco use among youth, efforts also are needed to reduce tobacco use among adults. In 2003, more than 24,000 Texans died from tobacco-related diseases, an average of 66 Texans a day.97

In 2002, almost 23 percent of adults in Texas were smokers, the same percentage as seen nationally.98 Smoking prevalence is higher among men than women, and it varies by race, ethnicity, socioeconomic status, and, now, by education. The reversal in education status has been dramatic. In the early 1960s, college-educated adults had the highest smoking prevalence, but by 2001, only 10.8 percent of college graduates smoked, compared to 30.9 percent of those who did not graduate from high school.99 Cigarette smoking prevalence rates also vary substantially across population subgroups, according to a recent report by the CDC.100 The prevalence of smoking was higher among men (25 percent) than women (20 percent) and inversely related to age, from 28 percent for those aged 18-24 years to 9 percent for those aged 65 or older.

Because the largest disparities exist between certain racial and ethnic groups and between education levels among smokers, experts suggest that efforts be made to target tobacco control programs to these seriously affected groups. In 2002, as in previous years, Asians (13.3 percent) and Hispanics (16.7 percent) had the lowest prevalence, and American Indians/Alaska Natives had the highest (40.8 percent). The gap in smoking prevalence between those living beneath the poverty line and those living at or above it has grown, and the percentage of people who have successfully stopped smoking is higher for people at or above the poverty line.101

Tobacco control programs are crucial to the future health of smokers. Many who use cigarettes try to quit, but are unsuccessful. Among the 50 states and Washington, D.C., the median proportion of “everyday” smokers who tried to quit smoking in 2001 was 52 percent.102 Many Texans also attempted to give up their habit that year; nearly 69 percent received advice to quit and more than 47 percent tried to quit.103 The effort, as difficult as it is, saves lives: the CDC reports that smokers who quit before age 50 cut in half their risk of dying in the next 50 years.104

Although tobacco control programs have had an effect in the past decade, especially through increased cigarette taxes and reduced indoor smoking, smokers who wish to quit can avail themselves of various effective treatments for tobacco dependence. One of the newest strategies is to use medication, such as Bupropion, that “resets” brain chemistry involved in addictive behaviors. Another is to use products that help replace nicotine and ease withdrawal for those who have recently stopped smoking. These are nicotine gum, inhalers, lozenges, nasal sprays, and patches. These strategies double the chance of quitting for good;105 moving to “lighter” cigarettes or spit tobacco, however, is not a recommended strategy for quitting. Since the mid-1990s, smokers have been able to purchase some of these replacement strategies without a physician’s prescription, but experts say that attention needs to be given to financial barriers that low-income Texans may face in obtaining nicotine replacement therapy, prescription medication, and access to cessation programs.

Counseling and behavioral therapies also can help. An evidence-based clinical practice guideline on cessation issued by the Agency for Healthcare Research and Quality (AHRQ) states that even brief advice to quit smoking, if given by medical providers, can work.106 More intensive interventions, through individual, group, or telephone counseling, are even more effective. Studies

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**In 2003, more than 24,000 Texans died from tobacco-related diseases — an average of 66 Texans a day.**
have shown that counseling sessions as brief as three minutes are effective, but longer and more intensive efforts improve cessation outcomes.107 AHRQ guidelines recommend that insurers, purchasers, and hospital and managed care administrators work together to incorporate smoking cessation services into health plans, to implement them systematically, and to reimburse providers accordingly.

New prevention control efforts are needed, however, to close the smoking gap seen between people below and above the poverty line. Reaching such a high risk population will require comprehensive tobacco-control programs that discourage smoking initiation and promote smoking cessation.108 These programs, at local, state, and national levels, must ensure that their intervention efforts reach persons with inadequate resources and limited access to health care.109 These efforts also should address the needs of the uninsured, for example, by providing treatment through telephone quit-lines and community health centers; increase coverage for tobacco-use treatment programs; and improve workplace and social environments to better support smoking cessation, especially for low-income and blue-collar workers.110

**Best Practices**

California has become a national model for tobacco prevention control. Whereas 23 percent of the U.S. population smokes, only 16.4 percent of California’s population use cigarettes, the lowest rate in America next to Utah.111 The California Tobacco Control Program, approved in 1988, emphasizes a comprehensive approach to tobacco control, prevention, and education. It also includes strategies to change social norms related to tobacco use, and experts say that those have been crucial to the state’s success.112 California’s program included novel and culturally appropriate interventions, including television and billboard advertising against smoking, and innovative and research projects to prevent youth tobacco use, as well as counseling and treatment for young people and adults.113 As a result of this all-inclusive approach, per capita consumption declined 52 percent faster in California than in other states.

California also successfully declared communities to be smoke-free, a strategy that is being adopted in towns and states across the country now that the risks of secondhand smoke are more completely understood. Secondhand smoke includes at least 60 known carcinogens and has been linked to lung cancer, nasal sinus cavity cancer, and cervix, breast, and bladder cancer, as well as other illnesses, such as heart disease.114 Children of parents who smoke have more respiratory symptoms and acute lower respiratory tract infections, as well as evidence of reduced lung function, than do children of non-smoking parents.115

Based on the successes seen in tobacco control programs across the country, the CDC is promoting the implementation of a comprehensive approach to community tobacco control as best practice. In Texas, the Texas Tobacco Prevention Initiative (TTPI) has taken on that mandate, using funds from the tobacco settlement monies. Initial funding was not adequate to implement a statewide program, so a pilot study that included 18 counties in the East Texas area examined the most effective ways to prevent tobacco use and promote cessation among Texans of all ages. In the study, a combination of interventions in school, community, enforcement, cessation, and mass media were examined. Initial findings showed that a comprehensive program, funded at only $3 per person, that included school, community, enforcement, cessation, and mass media was effective in reducing tobacco use. Lower level media campaigns and single-focus community programs did not have measurable effects on tobacco use among children and adults. TTPI was expanded so that comprehensive programming funded at $3 per person was provided in the Houston/Beaumont/Port Arthur pilot areas, and implementation of the Comprehensive Program in the pilot areas has shown tremendous reductions in tobacco use. From 1998 to 2003, current use of any tobacco products showed a 32 percent reduction among middle school students (from 24.5 percent to 16.6 percent) and a 41 percent reduction among high school students (from 40.1 percent to 23.6 percent). The prevalence of adult smoking in the comprehensive pilot area decreased 18.7 percent (from 22.6 percent in 1999 down to 18.4 percent in 2002).

As seen in California, city ordinances on indoor air quality in workplaces and other public places can help
prevent cancer by reducing exposure to environmental tobacco smoke. As of 1997, Texas had few state-level restrictions on smoke-free indoor air in places such as government and private work sites, restaurants, and other sites. Current state law permits local governments to adopt city ordinances on tobacco control to protect nonsmokers from environmental tobacco smoke.

The effort to help Texans stop smoking, and to protect those who have never smoked from indoor pollution, has reaped unexpected benefits. Bar and restaurant owners were nervous when El Paso, a town of more than 563,000 Texans, banned all smoking in public places and workspaces on January 2, 2002. The smoking ban was the strongest smoke-free indoor air ordinance in Texas at the time and included rules that it be enforced by firefighters and law enforcement agencies at up to $500 per violation. The ban, however, did not reduce revenues in bars or restaurants, and in fact, in some places, sales went up.

**Objective D - Promote Policies And Programs Aimed At Reducing Tobacco Use And Exposure To Secondhand Smoke**

**Strategy 1: Increase awareness of the risks of tobacco use by youth, particularly youth from high-risk groups.**

**Action Steps:**

a. Educate parents, teachers, coaches, clergy, and other influential adults on the importance of being positive role models for youth by not using tobacco.

b. Conduct media campaigns to educate youth about the risks of tobacco use and cancer and to encourage youth to be tobacco-free.

c. Include effective educational curricula and peer-driven programs on tobacco use prevention as part of comprehensive school health education in grades K-12.

d. Distribute age-appropriate prevention messages through existing youth-oriented community-based channels, such as organized athletics, youth councils, and scouts.

**Strategy 2: Reduce access to and use of tobacco products by youth.**

**Action Steps:**

a. Increase participation in campaigns that enforce state tobacco laws.

b. Support efforts in the media and arts to curb tobacco use.

c. Promote tobacco-free environments where youth congregate, such as arcades, recreational facilities, restaurants, malls, and on college campuses.

d. Encourage local health and law enforcement agencies to take an active role in enforcing laws related to tobacco sales and distribution across Texas.

e. Strongly discourage the promotion and use of tobacco products at sporting or entertainment events that are for youth younger than 18.

f. Encourage and support additional research and data to better understand drivers of tobacco use and cessation in ethnically and culturally diverse populations and medically underserved youth.

**Strategy 3: Reduce the use of tobacco products by adults.**

**Action Steps:**

a. Educate health care professionals and the public about the influence that the marketing of tobacco products has on health behavior.

b. Disseminate effective and culturally and linguistically appropriate tobacco cessation programs to communities statewide.

c. Educate policy makers about the importance of tobacco prevention and control in an effort to direct more state funding toward comprehensive tobacco cessation services for all Texans.

d. Encourage state and local, public and private entities to collaborate with one another in an effort to expand “best practice” programs statewide.

e. Promote the translation of research regarding addiction in diverse populations to improve prevention and cessation programs.
Strategy 4: Increase awareness of the risks and limit exposure to secondhand smoke.

**Action Steps:**

a. Target educational campaigns to bar/restaurant owners and other hospitality venues about going smoke-free.

b. Support statewide smoking ordinances that ensure that all public places are smoke-free.

c. Educate parents about the effects of secondhand smoke through community childcare programs such as Head Start and daycare centers.

d. Collaborate with local fire departments to educate the public about the dangers of smoking as it relates to the cause of fires and deaths.

e. Raise awareness and promote use of tobacco Web sites and their resources, including databases.

**Objective E - Promote Policies And Programs Aimed At Addressing Cancer Risk Related To Obesity**

**Obesity & Cancer**

The relationship between cancer, what a person eats, and how active they are, is becoming clearer and more alarming. A recent report in *The New England Journal of Medicine*, based on a 16-year study of 900,000 Americans, found that the heaviest participants had death rates from all cancers combined that were 52 percent higher for men and 62 percent higher for women than the rates for men and women of normal weight. Based on these findings, the researchers estimate that excess weight and obesity in Americans could account for 14 percent of all deaths from cancer in men and 20 percent of those in women. They conclude that 90,000 cancer deaths a year are related to excess body weight, 16 percent of the expected 563,700 deaths expected from cancer in 2004. Researchers conclude that 90,000 cancer deaths a year are related to excess body weight.

A study estimated that if current trends continue, 20 million adults in Texas — 75 percent — might be overweight or obese by the year 2040, and the direct and indirect costs to the state would be up to $39 billion a year.

This study has been a “wake-up” call to public health experts who have documented the unprecedented rate which the majority of Americans are putting on weight. A recent government survey found that 64 percent of U.S. adults are either overweight or obese. Nearly one-third of all adults are now classified as obese, a condition in which a person has abnormally high amounts of unhealthy body fat that is medically defined as a body mass index of 30 or greater. Recent reports indicate that obesity in the United States increased by 61 percent between 1991 and 2000. Such excess weight comes at a high price: The direct costs of inactivity and obesity account for more than 9 percent of the national health care expenditures in the United States.

Obesity in Texas mirrors the national trend. A study by the Department of State Health Services found that during 2002, an estimated 10 million, or 63 percent, of adults in Texas were overweight or obese, an increase of 17 percent over 10 years. Rates of obesity alone almost doubled between 1991 and 2001, from 13 percent to 25 percent. The study estimated that if current trends continue, 20 million adults in Texas, or 75 percent, might be overweight or obese by the year 2040, and the direct and indirect costs to the state would be up to $39 billion a year.

Children also are suffering from the obesity epidemic. Nationally, three times as many children are overweight today as in 1980. In 2000, 9 million children aged 6 to 19 (or 15 percent of the childhood population) were overweight. In Texas, about 35 percent of school-aged children are overweight or severely overweight, a rate that is higher than the national average. According to a 2004 study, overweight prevalence in Texas schools is highest among Hispanic boys, Hispanic girls in grade 4, and African-American girls in grades 4-8, respectively. Researchers say that childhood obesity in Texas is worsening, perhaps at a faster rate than was previously thought. Estimates of overweight prevalence for girls and boys in grade 4 in Texas are now almost 50 percent higher than previously reported in a 1999-2000 national survey.
Humans deposit fat on their bodies for a number of reasons, including health status, metabolism, diet, physical exercise, hormonal factors, race, and heredity.\textsuperscript{125} Most researchers believe that increased access to food, decreased physical activity, and genetic susceptibility are the main contributors to increases in obesity. The problem cuts across all socioeconomic levels and ethnicities.

Increased body weight is a known risk factor for several leading cancers, and is associated with increased death rates from all cancers combined. In 2001, experts concluded that obesity and physical inactivity may account for between 25-30 percent of colon, breast (in postmenopausal women), endometrial, kidney, and esophageal cancers.\textsuperscript{126} Some studies also have reported links between obesity and cancers of the gallbladder, ovaries, and pancreas, while others have found a link with lymphoma and cancer of the larynx.

**Obesity’s Link to Major Cancers**

Excessively heavy women face as much as a 50 percent higher chance of developing breast cancer, the most prevalent cancer among American women, than do women who are not obese.\textsuperscript{127} Given that many breast cancer risk factors are not subject to intervention, avoiding weight gain is one way older women may reduce their risk of developing the cancer. Obesity seems to increase the risk of breast cancer among postmenopausal women because fat tissue can produce estrogen, and an increased level of circulating estrogen in the body is a risk factor for estrogen-receptive breast tumors. Estrogen levels in postmenopausal women are 50 to 100 percent higher among heavy versus lean women.\textsuperscript{128} Breast cancer also is more difficult to detect in heavier versus lean women, so the disease is more likely to be diagnosed at a later stage in overweight women. Although studies that look at obesity and breast cancer in different racial/ethnic populations have been limited, recent reports have suggested that obese Hispanic women are twice as likely to develop breast cancer as non-obese Hispanic women, and that obese African-American women are more likely to have an advanced stage of breast cancer at diagnosis.\textsuperscript{129}

Obese women also have a two to four times greater risk of developing endometrial cancer, regardless of whether or not they are postmenopausal. In fact, obesity is estimated to account for 40 percent of endometrial cancer in the United States.\textsuperscript{130} Women who are overweight, but not obese, also are at greater risk. Colon cancer also occurs more frequently in people who are obese than in those of a healthy weight, and the association is especially strong in men with a high body mass index. A diet high in fats and low in fruits and vegetables increases a person’s chance of developing colorectal cancer, the second leading cause of cancer-related deaths in the United States.\textsuperscript{131} In 2004, an estimated 130,200 cases of colorectal cancer will be diagnosed, and 56,300 deaths are expected to occur. Obese men are twice as likely to develop colorectal cancer as men with normal weight. Kidney cancer also is a risk factor: obese men and women are as much as three times more likely to develop kidney cancer.\textsuperscript{132}

**Healthy Food & Prevention**

In contrast to factors such as fat and calories, which appear to increase cancer risk, other components of the diet may decrease cancer risk. The most compelling evidence has been for fruits and vegetables, whose consumption has been strongly correlated with a reduction in cancer risk. The most extensive review to date has been by the World Cancer Research Fund, which looked at 217 observational epidemiological studies that evaluated at least one association of fruit or vegetable intake with incidence of any type of cancer.\textsuperscript{133} The review concluded that 78 percent of the studies showed a significant decrease in cancer risk when fruit and vegetables are eaten. Of the studies that looked at vegetable consumption, 69 to 80 percent of them found an inverse association with cancer risk. For fruit in general and citrus fruit in particular, 64 and 66 percent of studies, respectively, also found an inverse association with cancer risk.\textsuperscript{134} The evidence was most conclusive for vegetables and fruit and cancers of the mouth and pharynx, esophagus, lung, and stomach, and for vegetables alone and cancers of the colon and rectum. The association of vegetables and fruit with cancer incidence was judged to be strong, particularly for vegetables. The overall risk was nearly halved in association with the consumption of at least five servings of vegetables and fruit per day, as compared to only one or two servings.\textsuperscript{135}

Although the chemical components in these foods responsible for this protective effect have yet to be identified, eating at least five servings of fruits and vegetables each day is recommended by many groups, including the National Cancer Institute, which launched a “5 A Day” program in 1991. Despite this 13-year national campaign, it is estimated that only one
fourth of adults are following the government’s advice. In fact, the frequency of fruit and vegetable consumption has changed little across the country in recent years. A food questionnaire completed four times between 1994 and 2000 by more than 430,000 adults in 49 states and the District of Columbia found that the proportion of people who ate fruit or vegetables five or more times a day did not substantially change from an average of about 3.4 servings a day.

A national campaign to change dietary habits is likely to have only a small prolonged effect, according to the researchers. Part of the reason is that any campaign, even one that is seemingly well funded, is overshadowed by a food industry that markets its products aggressively, according to researchers. From 1992 to 1999, the National Cancer Institute spent approximately $40 million on all aspects of its “5 A Day” program, compared with approximately $10 billion spent in 1999 alone on industry marketing of food, fast food, and beverages.

A child’s diet, of course, also is influenced by the media. Even brief exposures to televised food commercials can influence a preschooler’s food preference. The easy availability of high-fat foods and the positive social environment associated with some nonnutritious foods also contribute to childhood obesity. A joint study of the American Dietary Association, the Society for Nutrition Education, and the American School Food Association found that more than 84 percent of school-aged children eat too much fat. More than half of them eat less than one serving of fruit a day, and 29 percent eat less than one serving a day of vegetables that are not fried. Of course, how parents eat has a strong influence on the nutrition of their children. A study that observed nutritional habits in 191 white families, each with a 5-year-old daughter, demonstrated that girls eat more fruits and vegetables if her parents do, and that this higher intake of nutritious foods leads to less consumption of fat.

Because excess weight in youth often persists throughout life, the prevention of obesity should begin early in life. Educators, health professionals, and families should all set a positive example for young people to help them reach this prevention objective. Schools can emphasize the importance of healthy food and nutrition, as well as an active lifestyle, by providing healthy meals and sports facilities. Texas schools serve more than 400 million lunches and 200 millionbreakfasts a year, and together these meals should provide 60 percent of a student’s dietary meals, according to the Texas Department of Agriculture. U.S. schools generate more than $750 million a year in revenues from vending machine sales alone. Schools must be given the tools they need to assume their role as community leaders in providing children with a healthy environment in which to learn and grow. States also must develop policies that limit the sale of competitive foods or less healthy food choices.

Physical Activity & Cancer

Lack of physical exercise contributes as much to higher prevalence of overweight and obesity as unhealthy eating behaviors. But physical activity may have an independent effect on disease development. Some studies indicate that regular physical activity reduces cancer risk exclusive of changes in body weight; others have estimated that 30-60 minutes of physical activity a day may reduce the risk of developing colon, breast, endometrial, and prostate cancers by 20-40 percent. For example, a major review of observational trials published in 2002 found that physical activity reduced colon cancer risk by 50 percent. This risk reduction occurred even with moderate levels of physical activity,
such as brisk walking for 3 to 4 hours per week. Most studies have found that the protective effect of physical activity extends to both lean and obese people.

The link between physical activity and breast cancer risk is somewhat different. A recent study from the national 15-year Women’s Health Initiative clinical trial found that physical activity among postmenopausal women at a level of walking about 30 minutes per day was associated with a 20 percent reduction in breast cancer risk. However, this reduction in risk was greatest among women who were of normal weight. For these women, physical activity was associated with a 37 percent decrease in risk. The protective effect of physical activity was not found among overweight or obese women.

Sedentary Adults & Children

About half of the adult population of industrialized countries is insufficiently active in their leisure time, and one fourth to one third can be classified as totally inactive. In the United States, the situation is even worse; 40 percent of adults over age 18 are completely sedentary in their leisure time, a statistic that has not changed in the last decade despite numerous campaigns, such as Healthy People 2010, designed to convince adults to exercise five times a week for 30 minutes.

The young also are less active than they need to be. Although the CDC and the Office of the Surgeon General both recommend daily school-based physical education as the best solution to the growing youth obesity epidemic, very few schools offer such daily exercise. According to the CDC’s School Health Policies and Programs Study 2000, only 8 percent of elementary schools, 6.4 percent of middle/junior high schools, and 5.8 percent of senior high schools provide daily physical education or its equivalent for the entire school year for students in all grades in the school. Children and adolescents also may not be exercising at home. According to a Nielsen Media Research report cited in Education World, U.S. children between the ages of 8 and 18 spend more than three hours a day watching television and another three to four hours using the Internet and playing video games. The more they sit, the heavier they get.

The situation can be reversed if children are reached through a multifaceted approach that involves schools, parents, sports organizations, and extramural activities to help stem the rising tide of obesity and a widespread sedentary lifestyle. Physical activity programs that do not rely on schools but are based in community organizations may be particularly promising, because children who participate have voluntarily chosen to do so, and thus have a sense of ownership. An example of such a successful program is “Lively Ladies,” a physical education and activity intervention targeted to low-income, preadolescent African-American girls in a community-based youth services organization. The girls participated in novel activities, such as soccer, relays, jogging, basketball, circuit training, and gymnastics, kept a fitness journal, were exposed to positive role models, and received a variety of reinforcements.

Promoting nutritional and physical activity behavioral change in adults is more complex. Because low-income families spend, on average, about $25 per person per week on food, many families find it difficult to afford a diet rich in vegetables, fruit, and lean meat. They often resort to fast food because it is cheaper and filling, as are most high-fat, high-calorie foods that are low in nutritional value. Additionally, less affluent areas may not have traditional grocery stores with their stocked produce aisles, but may have to rely on convenience stores that carry chips and soda. Physical activity also may be limited by monetary resources, which discourages participation in health clubs and classes, and constrains the ability to purchase equipment for home use. In surveys, women attribute their reluctance to exercise to inconvenience, inaccessible program locations, unwillingness to use public facilities, work conflicts, lack of energy, medical problems, lack of time, family, and lack of social support.

Educational materials on the risks of obesity and inactivity for adults need to be both culturally competent and linguistically appropriate. At the population level, obesity cannot be prevented by simply issuing information. Change is difficult without a supportive environment. Governmental and community organizations, the food industry, media, employers, schools, health professionals, and educators all have a responsibility to work together to produce an
environment that is less conducive to weight gain and more conducive to exercise.\textsuperscript{156} Such an approach can tackle societal barriers that exist in the “\textit{built environment},” such as residential areas that are far from work sites and shopping areas, and neighborhoods that have no sidewalks. Culturally sensitive programs can address disparities, such as teaching women who are forbidden from exercising in public how to incorporate physical activity into their lifestyle in non-threatening ways. And sometimes simple solutions work: A program that reminded women to exercise through telephone counseling appeared to be a good way to help women begin a walking program.\textsuperscript{157}

**Objective E - Promote Policies And Programs Aimed At Addressing Cancer Risk Related To Obesity**

**Strategy 1: Increase awareness of the cancer-related risks of obesity.**

**Action Steps:**

a. Educate the public about the link between diet and cancer, particularly among the ethnically and culturally diverse populations.

b. Increase awareness about reducing the consumption of nonnutritive foods high in sugar.

c. Educate women about the cancer-related risks of weight gain and breast cancer.

d. Encourage programs to utilize best practices, such as peer mentoring.

e. Address cultural perceptions of obesity among priority populations.

f. Promote collaboration among state and local, public and private entities that are working on the issues of obesity.

g. Promote programs through systems that address barriers to healthy nutrition and exercise.

h. Promote the translation of research into practice regarding obesity in ethnically and culturally diverse communities and the medically underserved.

i. Tailor messages and programs to better address individual populations, particularly those in high-risk groups.

**Strategy 2: Improve access to and use of healthy food choices.**

**Action Steps:**

a. Educate Texans about balanced nutrition and making healthy food choices.

b. Encourage restaurants to offer and promote healthy menu choices and smaller portion sizes.

c. Promote public education that encourages healthy nutritive food practices.

d. Support the state’s school nutrition guidelines.

e. Educate and encourage teachers to promote healthy nutrition.

f. Work with parents’ organizations to address child nutrition issues and promote healthy nutrition programs.

g. Promote policies that enable schools to provide good nutrition.

**Strategy 3: Promote creative approaches for re-integrating physical activity into everyday life.**

**Action Steps:**

a. Educate the public about the link between physical activity and cancer, particularly for ethnically and culturally diverse populations.

b. Encourage health promotion programs in the workplace.

c. Promote physical activity that is culturally sensitive to disparity populations.

d. Increase focus on how the built environment can enable increased daily exercise.

e. Use mass media to promote culturally appropriate physical activities for all ages and levels.

f. Promote public/private partnerships to increase access to physical activity programs and equipment for the public.
g. Advocate for increasing the quality of health and physical education programs in Texas schools, grades K-12.

h. Promote the translation of research into practice regarding the effectiveness of programs promoting physical activity, with emphasis on programs tailored for high-risk populations.

**Objective F - Increase Public Awareness Of And Protection From Carcinogens In The Environment**

**Environmental Carcinogens**

Most cancers develop because of interplay between the human body and the environment in which it lives. Cancers that arise solely from nonenvironmental factors, such as those that are purely genetic in origin, are rare, as are cancers that are triggered only by exposure to the environment.

Environmental causes of cancer include both lifestyle factors, such as smoking, diet, and physical inactivity, tobacco and alcohol use, and environmental factors, such as exposure to radiation, infectious microbes, and agents in the air and water. Most epidemiologists and cancer researchers agree that the relative contribution from the environment toward cancer risk is about 80-90 percent.\(^{158}\) Even though it is known that certain lifestyle and environmental factors increase a person’s chance of developing cancer, an individual’s genetic profile also contributes to that risk. Patterns of gene alterations and environmental exposures make people either more susceptible or more resistant to cancer,\(^{159}\) but relatively few of these “susceptibilities” have been uncovered so far, although this is a growing area of research. To date, researchers cannot predict why, given exposure to the same environment, one person will develop cancer while another will not.

Nevertheless, reducing exposure to **carcinogens** found in the environment is an important component of cancer prevention. The degree of cancer risk a person may have depends on the concentration or intensity, and the exposure dose of a particular carcinogen,\(^{160}\) and so public awareness educational campaigns, as well as regulatory efforts to reduce exposures to known environmental carcinogens, such as **toxins**, are important in reducing individual cancer risk.\(^{161}\)

Yet, only a handful of the many commonly used chemicals has been adequately tested for the ability to cause or promote cancer, according to the National Academy of Sciences.\(^{162}\) While not much is known about the possible additive effects of simultaneous or sequential chemical exposures and cancer,\(^{163}\) some risks are greatly increased when particular exposures occur together.\(^{164}\)

Exposures to high-frequency radiation, ionizing radiation, X-rays, **radon**, and ultraviolet radiation from the sun have been proven to cause cancer.\(^{165}\) Chemicals such as benzene, asbestos, vinyl chloride, and arsenic are proven cancer-causing agents,\(^{166}\) and levels of many of these agents have been successfully reduced in the environment. Carcinogens found in food and beverages, including alcoholic beverages, are involved in the development of certain cancers, as are foods that are preserved with nitrates or smoke, contaminated with mold, or too salty. Of special concern are chemicals known as **heterocyclic amines (HCAs)** that develop when meat is cooked at high temperatures; researchers have identified 17 different HCAs that may pose human cancer risk.\(^{167}\) Several environmental microbes, such as the human immunodeficiency virus (HIV) and human papilloma virus (HPV), are significant risk factors for certain cancers, and the bacterium **H pylori** is an important risk factor in stomach cancer. Some medications, such as estrogens and progesterone, tamoxifen and diethylstilbestrol (DES), a synthetic form of estrogen, also have been proven to increase risk of cancer.\(^{168}\)

Radon, a radioactive gas released from the normal decay of uranium in rocks and soil, is the second leading cause of lung cancer in the United States. It is associated with 15,000-22,000 lung cancer deaths a year.\(^{169}\) Most radon-related cancer deaths, however, occur in smokers.\(^{170}\) In Texas, the public health risk from radon is minimized: on a statewide basis, Texan homes have a relatively low level of radon, and counties with the highest rates have the lowest populations.
Not all carcinogenic agents are created equal, of course. Tobacco use is the biggest risk, responsible for 30 percent of cancer deaths. The proportion of cancers due to occupational exposure, air and water pollution, medicines, and medical procedures is individually much smaller — each accounting for 5 percent of the risk or less.\(^{171}\)

Public concern about environmental cancer risk often focuses on agents that have suspected links to cancer, but which have not been proven. High doses of pesticides, for example, have been shown to cause cancer in animals, but the very low concentrations found in some foods, such as fruits and vegetables, have not been associated with increased cancer risk.\(^{172}\) Older, banned pesticides such as DDT also have not shown definable cancer risks, although research on these substances still continues. Some studies have suggested an association between cancer and non-ionizing radiation, but most research has not found such a link.\(^{173}\) Sources of non-ionizing radiation, including electromagnetic radiation from power lines and, at low frequency, microwaves, radar, and magnetic fields associated with electric currents, household appliances, and cellular phones, have not been found to contribute to cancer in the majority of studies.\(^{174}\)

### Monitoring Environmental Carcinogens

There are several federal agencies that are charged with establishing permissible levels of exposure to chemical substances in the general environment, home and workplace, and in food, water, and pharmaceuticals. These include the Consumer Product Safety Commission (CPSC), Environmental Protection Agency (EPA), the Food and Drug Administration (FDA), the Occupational Safety and Health Administration (OSHA), and the U.S. Department of Agriculture (USDA).\(^{175}\) The Agency for Toxic Substances and Disease Registry (ATSDR) additionally has broad jurisdiction over hazardous waste issues.

State governments also play a key role in establishing allowable exposure levels. In Texas, the Texas Commission on Environmental Quality is responsible for regulating water, air, solid waste, sewage, waste treatment, and radioactive waste disposal. Texas has long had a reputation as a major polluter. In 1993 and 1994, the EPA found in its annual Toxic Release Inventory that of the country’s 60 states, Texas released the largest amount of carcinogens into the air, water, and land.\(^{176}\) However, Texas has made progress in cleaning up its toxic releases. The state led the nation in short-term reductions from 1995 to 2001, and in long-term reductions from 1998 to 2001. In 2000 and 2001, the state’s national rank for on- and off-site releases was fifth.\(^{177}\)

Communities should be made aware of federal and state environmental regulatory agencies, and form networks with government agencies to strengthen local efforts to protect against carcinogens in the environment. Because numerous governmental agencies have a role in environmental protection, it is essential that information and regulations be reviewed regularly to ensure compatibility and to minimize conflicts.

### Workplace Carcinogens

Although carcinogens found in industrial settings also are present in the environment, industrial workers have more intense and prolonged exposures to these chemicals than the general public.\(^{178}\) Most widely known workplace carcinogens, such as asbestos, certain pesticides, and dyes, have been removed from common usage. The use of ventilation, protective clothing, breathing masks, and other safeguards helps keep exposures to carcinogens at permissible levels.\(^{179}\)

In the face of uncertainty, public health agencies operate under the principle that protection of public health is paramount and requires acceptable levels of exposure that are as much as 1,000 times below the level that causes a substantial increase of cancer in laboratory animals.\(^{180}\)

The right of employees, and citizens, to know about carcinogens in their workplace or region has been established under both federal and state “right-to-know” laws. To protect communities, facilities in Texas that store significant quantities of hazardous chemicals must share this information with state and local emergency responders and planners.\(^{181}\) The worker right-to-know program is administered by the Texas Hazard Communication Act (THCA), which

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**The worker right-to-know program is administered by the Texas Hazard Communication Act (THCA), which requires public employers to provide information, training, and appropriate personal protective equipment to their employees who may be exposed to hazardous chemicals in the workplace.**
requires public employers to provide information, training, and appropriate personal protective equipment to their employees who may be exposed to hazardous chemicals in the workplace.\textsuperscript{182}

**Objective F - Increase Public Awareness Of And Protection From Carcinogens In The Environment**

**Strategy 1: Monitor data on exposure to carcinogens released into the air, land, and water and on exposure to radiation.**

**Action Steps:**

a. Encourage collaboration among agencies, businesses, and environment and health organizations to coordinate monitoring of exposure to carcinogens.

b. Evaluate scientific information about carcinogens in work sites and the environment.

c. Ensure the compatibility of state and federal information and regulations on carcinogens in the workplace, with continuing reviews of policies of all levels of government.

**Strategy 2: Increase awareness of and compliance with the federal and state hazard communication laws to promote worksite safety.**

**Action Steps:**

a. Promote annual training to review information for employees on carcinogens used or manufactured at the work site.

b. Encourage employers to provide protective clothing and recommended safety aids for their employees.

c. Ensure that latest scientific data are available to businesses and employees regarding carcinogens in the workplace.

d. Promote enforcement of regulations on the production, storage, disposal, and cleanup of carcinogens.

e. Increase employer awareness of potential carcinogens in the workplace and encourage them to adopt safe practices for their employees.