

LUNG CANCER SCREENING PROGRAMS



CDC funds states, tribes, U.S. Affiliated Pacific Islands, and territories through the National Comprehensive Cancer Control Program (NCCCP) to form or support coalitions to fight cancer in their communities. The purpose of this report is to describe how NCCCP grantees can increase awareness about lung cancer screening programs, including cigarette smoking cessation, for persons at high risk for lung cancer. Examples of lung cancer screening-related activities conducted by some NCCCP grantees are also provided.

Lung cancer is the leading cause of cancer deaths among adults in the United States. In 2012, there were 210,828 cases of and 157,423 deaths from lung cancer.¹ Some groups have higher rates of new cases and death rates of lung cancer than others. The risk of lung cancer increases with age; therefore, older persons have higher rates than younger persons. Current cigarette smokers have higher rates of new lung cancer cases than persons who never smoked or who quit smoking.² Ten years after a person quits cigarette smoking, his or her

risk for lung cancer drops by half.³ If lung cancer is diagnosed before it has spread to other parts of the body, the 5-year survival rate is 55%.⁴ Lung cancer is frequently diagnosed after it has spread, with survival rates ranging from 4.2% to 27.4%.⁴ While lung cancer death rates have decreased over the past decade, many people continue to die from the disease.¹

The goal of lung cancer screening is to enable detection of lung cancer before it has spread. Treatment can then be provided, which may reduce the likelihood of dying from lung cancer. However, lung cancer screening does not prevent the development of lung cancer. The best ways to reduce the risk of lung cancer are to not start smoking cigarettes, to quit if you smoke, and to avoid secondhand smoke.⁵ Thus, lung cancer screening programs need to promote cessation of cigarette smoking among current smokers, and continued abstinence among former smokers.



CIGARETTE SMOKING CESSATION

What Resources are Available to NCCCP Grantees and Partners?

CDC has many resources to help people quit smoking (see www.cdc.gov/tobacco), including fact sheets, information about quitlines, free multimedia items that can be downloaded, and links to resources for state and community tobacco control programs. Tips from former smokers living with smoking-related diseases and conditions (Tips from Former Smokers campaign) are also available and may be accessed at www.cdc.gov/tobacco/campaign/tips/index.html. Resources for locating evidence-based strategies for reducing cigarette smoking and secondhand smoke exposure are found in Box 1.

BOX 1. RESOURCES FOR EVIDENCE-BASED COMMUNITY-BASED STRATEGIES FOR CIGARETTE SMOKING CESSATION

- Cessation Materials for State Tobacco Control Programs (www.cdc.gov/tobacco/quit_smoking/cessation/index.htm)
- Best Practices for Comprehensive Tobacco Control Programs, 2014 (www.cdc.gov/tobacco/stateandcommunity/best_practices/index.htm)
- The Community Guide to Reducing Tobacco Use and Secondhand Smoke Exposure (www.thecommunityguide.org/tobacco/index.html)

What Effective Cessation Treatments are Available?

Concerns about smoking-related health conditions, including lung cancer, could provide a powerful motivation for smokers to quit smoking. Because smoking is highly addictive, most smokers try to quit several times before succeeding, which means that health care providers often need to provide repeated help in this process. Smokers can improve their chances of quitting by using effective cessation treatments. These treatments include individual, group, and telephone counseling and seven FDA-approved cessation medications (including over-the-counter and prescription medications and nicotine and non-nicotine medications). As a result of the Affordable Care Act, coverage of cessation treatments is improving, but is still not comprehensive for all private insurance, Medicaid, and Medicare beneficiaries.⁶ The CDC (www.cdc.gov/tobacco/quit_smoking/cessation/coverage/pdfs/coverage-508-1019.pdf) and the American Lung Association (<http://www.lung.org/assets/documents/tobacco/helping-smokers-quit-2014.pdf>) have summarized guidance from the U.S. Department of Health and Human Services on insurance coverage of tobacco cessation as a preventive service, including the types of health plans that are required to provide this coverage.



What Could Health Care Providers Do?

- Physicians and other health care providers play a critical role in motivating and helping smokers to quit. The 2008 Public Health Service Clinical Practice Guideline on Treating Tobacco Use and Dependence outlines a “5 A’s” approach that clinicians should follow with patients who smoke, including (1) asking about tobacco use at every visit, (2) advising patients to quit, (3) assessing patients’ willingness to make a quit attempt, (4) assisting patients in quit attempts, and (5) arranging follow-up.⁷ Even brief advice to smokers improves quit rates, with more intensive advice and assistance having a progressively greater impact.
- In addition to providing direct counseling and assistance, health care providers and their teams could prescribe cessation medications for eligible smokers and refer them to other resources for more intensive help. One such resource is telephone quitlines, which have been shown to increase quit rates, to have broad reach, and to be effective with diverse populations.⁷ Quitlines provide callers with counseling, practical assistance, and, in many cases, free nicotine replacement therapy.⁸ Quitlines exist in all 50 states, the District of Columbia, Guam, and Puerto Rico; smokers can access their state quitline by calling 1-800-QUIT-NOW. In addition to telephone services, most U.S. quitlines offer web-based cessation services.^{11, 12} Quitlines referrals should be seen as a complement to, rather than a substitute for, direct cessation intervention performed by clinicians.

What Could NCCCP Grantees Do?

- NCCCP grantees could continue to collaborate with their tobacco control partners to implement evidence-based interventions for reducing cigarette smoking and secondhand smoke exposure identified in the Community Guide and in CDC’s Best Practices for Tobacco Control Programs.
- Grantees could also work with comprehensive cancer control coalitions to increase awareness among health care providers about the importance of collecting information on current cigarette smoking status and smoking pack years in their medical record systems. This information could then be used to help health care providers identify and monitor persons who are at high risk for lung cancer, as well as to consistently advise patients to quit smoking and to offer them assistance in doing so. Clinical practice guidelines for treating tobacco use and dependence, including among older smokers, are available for health care providers (www.ahrq.gov/professionals/clinicians-providers/guidelines-recommendations/tobacco/clinicians/update/index.html).
- NCCCP grantees could explore partnerships with health care providers to develop stronger and more effective cigarette smoking cessation programs in the context of lung cancer screening. Referring smokers to quitlines is a strongly recommended strategy for providing tobacco cessation assistance. Quitlines can be authorized to follow up directly with a patient if the health care provider asks the patient to sign a release and then sends the release to the quitline.



Lung Cancer Screening

- Lung cancer screening needs to be thought of as a process, rather than a single test.
- The only recommended screening test for lung cancer is helical low-dose computed tomography (also called low-dose CT or LDCT) for persons who are at high risk for lung cancer because of their age and cigarette smoking history.
- The National Lung Screening Trial, a clinical research study in which participants at high risk for lung cancer were randomly assigned to receive lung cancer screening with LDCT or chest x-ray, found that screening with LDCT reduced lung cancer deaths.⁹ In this test, an x-ray machine scans the body in a spiral path and uses low doses of radiation to make detailed pictures of the lungs.
- If an LDCT scan reveals a pulmonary nodule, additional evaluation may be needed to determine whether lung cancer is present.¹⁰
- The American College of Radiology has developed a Lung Imaging Reporting and Data System (Lung-RADS) to help classify nodules and standardize the interpretation of LDCT scans. A nodule may be monitored with serial CTs, evaluated further (for example with a PET scan or biopsy), or managed surgically depending on its size and chance of becoming cancer.¹⁰
- Clinical settings that have high rates of diagnostic accuracy using LDCT, appropriate follow-up protocols for positive results, and clear criteria for doing invasive procedures are more likely to duplicate the results found in carefully controlled research studies such as the National Lung Screening Trial.

Who Should Be Screened?

The U.S. Preventive Services Task Force (USPSTF) recommends (www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/lung-cancer-screening) annual lung cancer screening with LDCT for persons who—

- Have a history of heavy smoking (i.e., a smoking history of 30 pack years or more), *and*
- Smoke now or have quit within the past 15 years, *and*
- Are between 55 and 80 years old.

A pack year is defined as smoking an average of one pack of cigarettes per day for one year. A person can have a 30 pack-year history by smoking one pack a day for 30 years or two packs a day for 15 years.

A list of resources about lung cancer screening, including guidelines published by other organizations, is found in Box 2.



What are Benefits of Screening?

A lung cancer screening test can:

- **Detect cancer early:** Lung cancer treatments are more effective, leading to improved survival, when cancer is detected at an early stage.
- **Reduce deaths from lung cancer:** Results from the National Lung Screening Trial showed that screening was associated with a 16% reduction in mortality from lung cancer among people with a history of heavy smoking.
- **Increase opportunities for tobacco cessation:** A quality lung cancer screening program should include a comprehensive tobacco cessation treatment program.

What are Risks of Screening?

A lung cancer screening test can lead to:

- **False-positive test results:** Screening could show that cancer is present when it is not, which may lead to anxiety and follow-up procedures that also have risks.
- **False-negative test results:** Screening could show that cancer is not present when it is, which may result in delays in seeking care.
- **Overdiagnosis:** Screening may lead to detection of lung cancer and unnecessary treatment in persons who would have died of other causes.
- **Increased radiation exposure:** There is a small chance that radiation from repeated LDCT tests can cause cancer in otherwise healthy people.
- **False reassurance:** A negative test result could lead to a smoker deciding to forego quitting cigarette smoking and to rely instead on ongoing screening as a risk reduction strategy.

What is the Status of Health Insurance Coverage for Screening?

The Centers for Medicare and Medicaid Services provides coverage for a lung cancer screening counseling and shared decision making visit, and if appropriate, annual screening for lung cancer with LDCT, as an additional preventive service benefit under the Medicare program, for persons who:

- Are Medicare (Part B) eligible;
- Are between 55-77 years old;
- Have a history of heavy smoking (at least 30 pack-years),
- Are a current smoker or stopped smoking within the past 15 years;
- Have no signs or symptoms of lung cancer (asymptomatic); and
- Receive a written order from their health care provider for LDCT lung cancer screening.

The lung cancer screening counseling and decision making visit includes counseling on the importance of maintaining cigarette smoking abstinence among former smokers and of smoking cessation among current smokers. If appropriate, information about tobacco cessation interventions is provided.

USPSTF uses four letter grades (A, B, C, D) and an I statement (insufficient evidence) to categorize recommendations based on the strength of the evidence and the balance of benefits and harms of a preventive service. The USPSTF's recommendation for screening persons at high risk for lung cancer with LDCT received a Grade B. The grade B for lung cancer screening means coverage is required with no cost-sharing in many private or employer-sponsored health insurance plans and by Medicaid in states that have accepted Medicaid expansion.⁴

BOX 2. RESOURCES FOR LUNG CANCER SCREENING

Recommendations and Guidelines

- U.S. Preventive Services Task Force (USPSTF) Lung Cancer Screening Recommendation (<http://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/lung-cancer-screening>)
- Centers for Medicare and Medicaid Services Decision Memo for Screening for Lung Cancer with Low Dose Computed Tomography (LDCT) (CAG-00439N) (<https://www.cms.gov/medicare-coverage-database/details/nca-decision-memo.aspx?NCAId=274>)
- Comparison Chart of Lung Cancer Screening Guidelines and Recommendations (<http://www.cdc.gov/cancer/lung/pdf/guidelines.pdf>)

Information for Consumers

- Lung Cancer: What Screening Tests Are There? (CDC) (www.cdc.gov/cancer/lung/basic_info/screening.htm)
- Lung Cancer Screening (PDQ®) (NCI) (www.cancer.gov/types/lung/patient/lung-screening-pdq)
- Screening for Lung Cancer Consumer Fact Sheet (USPSTF) (<http://www.uspreventiveservicestaskforce.org/Home/GetFileById/1892>)
- Screening for Lung Cancer (Veterans Affairs) (www.prevention.va.gov/docs/LungCancerScreeningHandout.pdf)
- National Comprehensive Cancer Network Guidelines for Patients. Lung Cancer Screening. Version 1.2015 (www.nccn.org/patients/guidelines/lung_screening/index.html)



How Could NCCCP Grantees Address Lung Cancer Screening?

Evidence-based strategies have not yet been identified for community implementation of lung cancer screening with LDCT. First, sufficient information about specific and appropriate strategies for community implementation of lung cancer screening must be developed for inclusion in The Community Guide. Until then, here are some potential activities that might be reasonable for NCCCP grantees and coalitions to consider.

Collect and Analyze Data

- Use cancer registry data to examine incidence and death rates for lung cancer and monitor changes in these indicators over time.
- Collaborate with state Behavioral Risk Factor Surveillance Survey (BRFSS) coordinators to add questions to enable calculation of smoking pack-years. Since current BRFSS surveys do not include questions to determine if a person has smoked 30 or more pack-years, this will help identify those who may be eligible for lung cancer screening. A potential source for question wording would be the 2015 National Health Interview Survey Cancer Control Supplement (http://www.cdc.gov/nchs/nhis/quest_data_related_1997_forward.htm), which includes questions to measure cigarette pack-years; to assess the prevalence of chest x-rays for lung cancer screening (chest x-rays are not recommended as a screening test so their use for screening would suggest the need for provider education); and to evaluate whether persons at high risk for lung cancer are being screened with LDCT. If resources permit, some states also should explore cognitive testing and validation of question wording. The results of cognitive testing for the 2015 NHIS Cancer Control Supplement Questions are available at: <http://www.cdc.gov/qbank/>.
- Encourage electronic medical records systems to add information on pack years smoked. Information on cigarette pack years is necessary to identify persons eligible for screening.
- Analyze health care provider survey data on knowledge, attitudes, and practices about lung cancer screening and smoking cessation counseling among primary care providers.

Educate Existing Partners and Identify and Engage Potential Partners

- Educate cancer coalition members about lung cancer screening, cigarette smoking trends, and lung cancer rates (e.g., give presentations at conferences or provide webinars).
- Survey key partners to identify their needs and what resources they can add to your efforts.
- Identify potential partners (Box 3) at local, state and national levels and ask them to help you educate key stakeholders on strategies to implement high quality lung cancer screening for eligible groups.
- Work with radiation control departments to identify master lists of facilities that offer LDCT screening within the state, and to obtain technical information on the machines used and the amount of radiation exposure during LDCT imaging. State radiology departments already collect information on CT equipment, but existing lists may not allow easy identification of LDCT for lung cancer screening.
- Convene advisory panels that include experts from pulmonary medicine, thoracic radiology, thoracic surgery, radiation oncology, medical oncology, and primary care. These groups might advise on development of lung cancer screening operational policies that are evidence-based and help address questions that will occur as lung cancer screening is implemented in community practices.
- Collaborate with partners to promote smoking quitlines and develop or enhance lung cancer prevention and early detection efforts. For example, quitline providers could collaborate with their partners to develop educational materials for quitline staff about integrating assessment for lung cancer screening eligibility with tobacco cessation counseling.

Measure Your Effects

- Develop and implement an evaluation plan to measure the effect of programmatic efforts. Effective evaluation can also help track progress toward meeting cancer plan goals, can help set examples or guide other states, and may potentially inform development of Community Guide strategies for lung cancer screening implementation.
- The NCCCP Evaluation Toolkit provides guidance on how to plan and conduct evaluations. Evaluations need to be planned at the beginning of a program's lung cancer screening efforts. This ensures appropriate evaluation questions are developed, and data sources are in place to capture baseline information before intervention activities begin. Behavioral surveillance systems already in place (BRFSS, Library of Indicators and Data Sources [LIDS]) can be used to monitor changes in key indicators over time among adults.

The activities described above would help:

- Assess the community prevalence of lung cancer screening and patient-provider discussions about screening.
- Increase smoking cessation among current cigarette smokers who undergo screening.
- Inform plans to develop or enhance organized lung cancer screening programs in communities, continuing medical education opportunities for health care providers on lung cancer screening and tobacco cessation, and electronic medical record systems that track smoking history and lung cancer screening.
- Add evidence for appropriate and effective community implementation strategies for lung cancer screening programs.



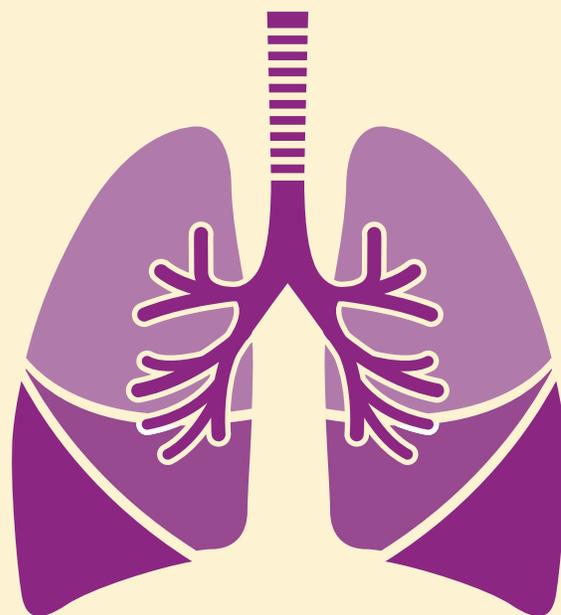
BOX 3. POTENTIAL PARTNERS TO ENGAGE IN LUNG CANCER SCREENING PROGRAM EFFORTS

Consider working with:

- Health care providers, clinics, and medical associations to increase lung cancer screening and cigarette smoking cessation among persons at high risk for lung cancer.
- State and local health departments, who can provide crucial support by identifying, tracking, and providing data (outcome measures) and mapping community problems. They can also provide forums for community planning and conduct and sponsor education of community leaders.
- State and local tobacco control programs to provide unified messages about the importance of tobacco control to prevent lung cancer and lung cancer screening to reduce lung cancer deaths.

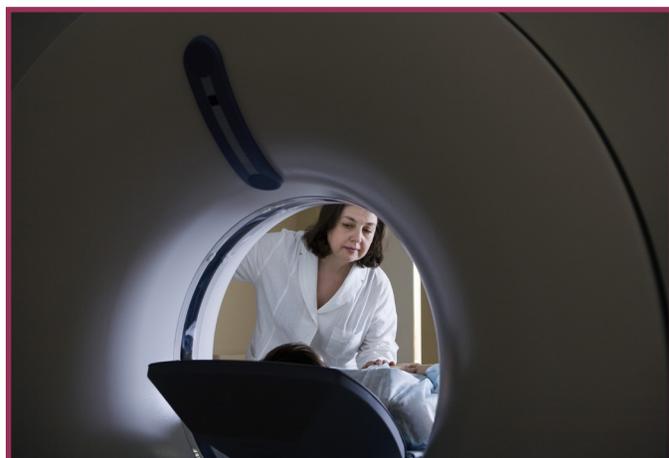
Other organizations to consider include:

- Professional and non-profit organizations
 - American Cancer Society
 - American College of Radiology (local chapter)
 - American Lung Association
 - Lung Cancer Alliance
 - National Association of Chronic Disease Directors
 - National Behavioral Health Network for Tobacco and Cancer Control
 - National Comprehensive Cancer Control Network
 - Tobacco control programs, radiation control departments, professional medical organizations (pulmonary medicine, thoracic radiology and surgery, radiation therapy, medical oncology, and lung pathology), health care systems or other health care providers with electronic medical record systems, and environmental health agencies to promote smoking quitlines and develop or enhance lung cancer prevention and early detection efforts.
- Federal and international agencies and organizations
 - National Cancer Institute
 - Centers for Disease Control and Prevention: Tips Campaign
 - Substance Abuse & Mental Health Services Administration
 - World Health Organization



How Have Selected NCCCP Grantees Addressed Lung Cancer Screening?

- Delaware launched an initiative using small and large media to educate health care providers and current and former smokers about lung cancer screening services offered to eligible adults by the state's Screening for Life Program. Providers also received a tool kit, which includes a waiting room poster, a script pad with the direct line of a lung cancer screening nurse navigator, a screening authorization form, and a referral form to Delaware's quitline.
- Kansas added questions to the state's 2012-13 Adult Tobacco Survey (ATS) and 2015 BRFSS to collect baseline data on the prevalence of health care provider discussions about lung cancer screening with patients at high risk for lung cancer. The survey data will be used to identify priorities and inform strategies to increase lung cancer screening across the state. Findings from the ATS were presented at CDC's 2014 cancer grantee meeting, as well as the 2015 annual meeting of the Council of State and Territorial Epidemiologists.
- Kentucky formed a Lung Cancer Screening and Early Detection Network that has more than 38 organizations working together toward lung cancer screening, tobacco cessation treatment, secondhand smoke and radon prevention. Several of these partner organizations are working on research projects designed to: (1) expand awareness of lung cancer screening in communities, (2) promote shared decision making among screening candidates, (3) train primary care providers about appropriate referral patterns for lung cancer screening, and (4) facilitate implementation of high quality lung cancer screening among programs across the state.
- South Carolina collaborated with partners on a dissemination project to advance lung cancer screening across the state. The project included development and dissemination of a shared decision-making aid to assist health care providers in their discussions about lung cancer screening with patients at high risk for lung cancer, as well as a lung cancer screening fact sheet for decision makers and stakeholders. In collaboration with the South Carolina American Academy of Family Physicians, a quantitative survey of primary care providers was conducted to assess their knowledge, attitudes, and practices regarding lung cancer screening with LDCT.
- Vermont partnered with the American Lung Association and University of Vermont College of Medicine staff and students to conduct a survey and focus group to assess awareness of lung cancer screening and barriers to screening among residents at high risk for lung cancer. They also worked with the American Lung Association to develop training on lung cancer screening for primary care providers, and assisted the Medicaid Clinical Utilization Board in estimating the number of Medicaid recipients that meet the U.S. Preventive Services Task Force criteria for lung cancer screening eligibility.



REFERENCES

1. U.S. Cancer Statistics Working Group. United States Cancer Statistics: 1999-2012 Incidence and Mortality Web-based Report. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2015. Available at: www.cdc.gov/uscs. Accessed December 10, 2015.
2. CDC. What Are the Risk Factors for Lung Cancer? Available at: www.cdc.gov/cancer/lung/basic_info/risk_factors.htm. Accessed December 10, 2015.
3. U.S. Department of Health and Human Services. How Tobacco Smoke Causes Disease: What it Means to You. Atlanta, U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2010. Available at: www.cdc.gov/tobacco/data_statistics/sgr/2010/consumer_booklet/pdfs/consumer.pdf. Accessed December 10, 2015.
4. Howlader N, Noone AM, Krapcho M, et al. SEER Cancer Statistics Review, 1975-2012. National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2012/, based on November 2014 SEER data submission, posted to the SEER website, April 2015. Accessed December 10, 2015.
5. U.S. Department of Health and Human Services. The Health Consequences of Smoking – 50 Years of Progress: A Report of the Surgeon General. Available at: <http://www.surgeongeneral.gov/library/reports/50-years-of-progress/index.html>. Accessed December 10, 2015.
6. McAfee T, Babb S, McNabb S, Fiore MC. Helping smokers quit—opportunities created by the Affordable Care Act. *New Engl J Med* 2015;372:5-7.
7. Fiore MC, Jaen CR, Baker TB, et al. Treating tobacco use and dependence: update 2008. Clinical practice guideline. Rockville, MD: US Department of Health and Human Services, Public Health Service; Available at: <http://www.ahrq.gov/professionals/clinicians-providers/guidelines-recommendations/tobacco/index.html>. Accessed December 10, 2015.
8. CDC. Quitline FAQs for Health Care Providers. Available at: <http://www.cdc.gov/tobacco/campaign/tips/partners/health/hcp-quitline-faq.html>. Accessed December 10, 2015.
9. The National Lung Screening Trial Research Team. Reduced lung-cancer mortality with low-dose computed tomographic screening. *New Engl J Med* 2011; 365: 395-409.
10. Gould MK, Donington J, Lynch WR, et al. Evaluation of individuals with pulmonary nodules: When is it lung cancer? Diagnosis and management of lung cancer, 3rd ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. *Chest* 2013;143(Suppl5):e93S-120S.
11. Momin B, Neri A, McCausland K, et al. Traditional and innovative promotional strategies of tobacco cessation services: a review of the literature.
12. Puckett M, Neri A, Thompson T, et al. Tobacco cessation among users of telephone and web-based interventions – four states, 2011-2012. *MMWR Morb Mortal Wkly Report* 2015;63:1217-1221.

More Information

Division of Cancer Prevention and Control
National Center for Chronic Disease Prevention and Health Promotion
Centers for Disease Control and Prevention

4770 Buford Hwy NE, Mailstop F-76, Atlanta GA 30341-3717

800-CDC-INFO (800-232-4636) • TTY: (888) 232-6348

www.cdc.gov/cancer/promoting_prevention.htm • Twitter: @CDC_Cancer