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Patient information: Lung cancer prevention and screening (Beyond the Basics)

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LUNG CANCER SCREENING OVERVIEW

Lung cancer is the leading cause of cancer death in both men and women in the United States. The number of people who die from lung cancer each year has risen over the past 25 years. The number of people who die from lung cancer is greater than the number of people who die from breast cancer, prostate cancer, and colorectal cancer combined. Several factors increase the risk of lung cancer, particularly cigarette smoking.

This topic review discusses ways to prevent lung cancer and discusses the benefits and risks of screening for lung cancer. Other topics about lung cancer are available separately. (See "Patient information: Lung cancer risks, symptoms, and diagnosis (Beyond the Basics)" and "Patient information: Non-small cell lung cancer treatment; stage I to III cancer (Beyond the Basics)" and "Patient information: Non-small cell lung cancer treatment; stage IV cancer (Beyond the Basics)" and "Patient information: Small cell lung cancer treatment (Beyond the Basics)".)

PREVENTING LUNG CANCER

Cigarette smoking is responsible for almost 90 percent of cases of lung cancer. Exposure to certain substances, such as asbestos, has also been linked to the development of lung cancer. Exposure to secondhand smoke and other environmental factors such as radon and asbestos also increase the risk of lung cancer.

The best way to avoid getting lung cancer is not to smoke. Some smokers believe that once they have smoked for a long while, it does little good to quit. However, studies have shown that smokers who quit decrease their risk of lung cancer when compared to those who continue to smoke. Smokers who quit for more than 15 years have an 80 to 90 percent reduction in their risk of lung cancer compared to people who continue to smoke. (See "Patient information: Quitting smoking (Beyond the Basics)".)

IS SCREENING WORTHWHILE?

Screening is a way to detect a disease in its earliest stages, before a person becomes ill. To be recommended, it must be clear that screening is useful in identifying patients who have the disease in the early stages, and that this discovery can reduce the number of patients who die from the disease.

Some screening exams have proven to make a clear difference in outcomes. Examples are the Pap smear for detection of cervical cancer in women, and colonoscopy for detection of colon or rectal cancer in people over 50 years old. These exams are now part of routine healthcare in the United States.

Screening for lung cancer with low-dose CT scan has been shown to decrease the risk of death for selected people (over age 55) who have a long history of smoking. However, screening is not as important as quitting smoking because quitting smoking will reduce your risks of other cancers and heart disease as well. Also, screening can lead to the need for additional testing in many people who do not have lung cancer and should not be done for people who are not in a high-risk group.

LUNG CANCER SCREENING EXAMS

Research studies have been done to determine if screening for lung cancer makes sense. In these studies, smokers (who are at the highest risk) are divided into groups. Some groups have screening tests while others have no screening. The groups are then followed over many years. Data are gathered on how many patients in each group are diagnosed with lung cancer, how the cancer was treated, how long the patients with lung cancer survived after treatment, and how many patients died from the disease (mortality).

Computed tomography (CT scan) — A large randomized trial (the National Lung Screening Trial or NLST) in the United States compared the benefits of screening by low-dose CT scan or chest x-ray in smokers (at least a 30 pack-year history, including current smokers or people who had quit in the previous 15 years). Compared to chest x-ray, low-dose CT scan reduced the risk of death from lung cancer by 20 percent, and the overall risk of death by about 7 percent. However, nearly a quarter of the patients who had annual CT screening for three years had an abnormal test, and more than 95 percent of the abnormal tests were “false positive” meaning that they did not represent cancer.

False positive tests require follow-up tests, such as more x-rays or biopsies, and these follow-up tests carry risks such as increasing radiation exposure, and complications from biopsy procedures. Thus, there are significant downsides to screening.

Annual screening with low-dose CT scan is now recommended by many organizations, for current or former smokers (within the past 15 years) with a long smoking history. Guidelines vary between organizations related to the specific criteria, including age and smoking history (table 1). UpToDate authors suggest annual screening for patients in good health who are felt to have a risk for lung cancer at least as great as those in the NLST randomized trial (age 55 to 74 years, a history of smoking at least 30 pack-years, and, if former smokers, have quit within the previous 15 years). They also note that patients who wish to avoid the high risk of false-positive results can reasonably choose not to be screened.

Chest x-ray — Although many healthcare providers recommend an annual chest x-ray for patients who smoke, studies to date have not shown a benefit. In a large study comparing chest

x-ray to CT for lung cancer screening, only CT showed reduced risk of death. Current guidelines recommend against screening at-risk subjects by chest x-ray in favor of screening by CT scan.

Sputum tests — Some studies have looked at the efficacy of analyzing a patient's sputum for evidence of cancer cells in order to detect lung cancer. So far, no clear benefit to this approach has been found. Additional studies that use new technologies to examine the sputum are underway.

PET scan — Researchers are looking at a number of other tools in an effort to help identify patients with lung cancer. Positron Emission Tomography (or PET scanning, which uses a small amount of radioactivity to provide a detailed picture of an organ's function) has been used in combination with CT scanning (PET/CT). However it involves a higher dose of radiation than CT alone and benefit has not been shown for screening purposes.

Other studies — Direct visualization of the lungs with bronchoscopy and breath analysis for cancer markers are two tests that may be used in future studies.

SUMMARY

- Patients who smoke are at significantly increased risk of developing lung cancer. The best way to avoid lung cancer is not to smoke. Even long-term smokers can benefit from quitting.
- Screening with yearly low-dose CT scan decreased mortality in a randomized trial of patients with increased risk due to smoking. However, many patients had abnormal tests that did not turn out to be lung cancer. Whether or not to be screened should be based on a discussion of risks and benefits with a healthcare provider. Screening annually with low-dose CT scan is suggested for patients who are at highest risk (age 55 to 74 years, a history of smoking at least 30 pack-years, and, if former smokers, have quit within the previous 15 years). If you choose to be screened, it is important to have this done in a center with expertise in lung cancer screening and treatment. Screening with chest x-rays is not recommended.

WHERE TO GET MORE INFORMATION

Your healthcare provider is the best source of information for questions and concerns related to your medical problem.

This article will be updated as needed on our web site (www.uptodate.com/patients). Related topics for patients, as well as selected articles written for healthcare professionals, are also available. Some of the most relevant are listed below.

Patient level information — UpToDate offers two types of patient education materials.

The Basics — The Basics patient education pieces answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials.

Patient information: Lung cancer screening (The Basics)
Patient information: Cancer screening (The Basics)
Patient information: Non-small cell lung cancer (The Basics)

Patient information: Lung cancer (The Basics)
Patient information: Small cell lung cancer (The Basics)

Beyond the Basics — Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are best for patients who want in-depth information and are comfortable with some medical jargon.

Patient information: Lung cancer risks, symptoms, and diagnosis (Beyond the Basics)
Patient information: Non-small cell lung cancer treatment; stage I to III cancer (Beyond the Basics)
Patient information: Non-small cell lung cancer treatment; stage IV cancer (Beyond the Basics)
Patient information: Small cell lung cancer treatment (Beyond the Basics)
Patient information: Quitting smoking (Beyond the Basics)

Professional level information — Professional level articles are designed to keep doctors and other health professionals up-to-date on the latest medical findings. These articles are thorough, long, and complex, and they contain multiple references to the research on which they are based. Professional level articles are best for people who are comfortable with a lot of medical terminology and who want to read the same materials their doctors are reading.

Cancer prevention
Chemoprevention of lung cancer
Cigarette smoking and other risk factors for lung cancer
Fluorescence bronchoscopy
Overview of smoking cessation management in adults
Screening for lung cancer
Secondhand smoke exposure: Effects in adults
Women and lung cancer

The following organizations also provide reliable health information.

- National Cancer Institute

(www.cancernet.nci.nih.gov/)

- The American Society of Clinical Oncology

(www.cancer.net/portal/site/patient)

- The American Cancer Society

(www.cancer.org)

- Lung Cancer Alliance

(www.lungcanceralliance.org)

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Literature review current through: Oct 2013. | This topic last updated: Aug 20, 2013.

References

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1. Truong MT, Munden RF. Lung cancer screening. Curr Oncol Rep 2003; 5:309.
2. Nawa T, Nakagawa T, Kusano S, et al. Lung cancer screening using low-dose spiral CT: results of baseline and 1-year follow-up studies. Chest 2002; 122:15.
3. Bastarrika G, García-Velloso MJ, Lozano MD, et al. Early lung cancer detection using spiral computed tomography and positron emission tomography. Am J Respir Crit Care Med 2005; 171:1378.
4. Siegel R, Ward E, Brawley O, Jemal A. Cancer statistics, 2011: the impact of eliminating socioeconomic and racial disparities on premature cancer deaths. CA Cancer J Clin 2011; 61:212.