Lung Cancer Screening with Low-Dose CT

An Aid for Patient and Physician Shared Decision-Making

This information is provided to assist you in deciding if low-dose computed tomography (CT) lung cancer screening is right for you. Together, you and your doctor should determine if you are at significant risk for lung cancer, and if so, are you healthy enough to undergo treatment. We hope this brochure can answer some important questions so you and your doctor can decide if lung cancer screening could be beneficial for you.

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Cancer Institute

The National Comprehensive Cancer Network and Centers for Medicare and Medicaid Services recommend lung cancer screening for individuals who meet all of the following criteria:

- Ages 50-77
- Current smoker, or former smoker who has quit within the last 15 years; and
- Smoking history of at least 20 pack years (the equivalent of 1 pack of cigarettes per day for 20 years).

It is important to remember that screening does not prevent lung cancer. However, it may detect lung cancers at an earlier stage when treatment is most effective.

There are some important points to understand before you and your doctor decide lung cancer screening is right for you.

1. You should not have active signs or symptoms suggesting you have lung cancer. Screening should only be done on healthy people who are at risk for cancer, not those who have been diagnosed. If you have symptoms suggesting cancer, you still might receive a CT scan but it would not be the same low-dose screening type of CT.
2. You should understand this screening should be done every year, and not just once. Once is better than never being screened, but the real benefit of avoiding an advanced lung cancer is to be screened every year until your late 70s.
3. You should understand the most important thing you can do to reduce your risk of dying from lung cancer is to stop smoking. If you have already quit, the most important thing is to continue not smoking. Hoag sponsors smoking cessation interventions which can be accessed through your doctor.
4. You should only be screened if you are healthy enough and willing to be treated for lung cancer. Ideally, the best treatment for an early lung cancer would be lung surgery to remove the tumor. If you are too sick from other causes to have treatment for lung cancer, or if you are expected to die soon from some other cause, screening will not likely benefit you.
5. You can only be screened if you agree it would be beneficial for you and if you obtain a written or computer-generated referral from your doctor.

The remainder of this handout will discuss these points in more detail and cover other important risks and benefits to aid in your decision.

About Lung Cancer

Lung cancer is the leading cause of cancer death in the United States. Lung cancer kills about 160,000 people a year in the United States. Approximately 85% of lung cancer occurs in current or former cigarette smokers. Unfortunately, by the time lung cancer produces symptoms, it has often spread so that treatment is more difficult and less successful. Lung cancer detected early, before causing symptoms and before spreading to other parts of the body, is most successfully treated.

Screening CT with Stage 1 lung cancer

About Lung Cancer Screening

A screening exam is a medical test to find a disease before symptoms begin. The goal of lung cancer screening is to detect lung cancer at an early and most treatable stage. In lung cancer screening, individuals with a high risk of developing lung cancer but no signs or symptoms of the disease undergo “Low-dose Computed Tomography” (Low Dose CT or LDCT) scanning of the chest once a year.

CT scanning is a form of X-ray imaging. Patients having a scan, lie on a table which is passed through the middle of a large “doughnut-shaped” camera. The study results in cross-sectional images of the chest. The actual exam is completed in less than a minute and requires the subject to hold their breath for about 10 seconds. The examination uses much less radiation than a standard CT because only the lungs need to be seen well. This is different than a conventional CT scan, where enough radiation is used to see other structures in the chest like major blood vessels and bone.

How We Know Lung Cancer Screening Works

In order for a medical screening test to be widely accepted and recommended by doctors, the test must be shown to reduce the number of deaths from a disease.

Current recommendations for lung cancer screening followed publication of the National Lung Screening Trial, a large nationwide randomized clinical trial sponsored by the National Cancer Institute. This trial demonstrated screening chest CT exams could reduce deaths from lung cancer among those at high risk for lung cancer. The trial studied more than 53,000 participants aged 55-74 who were current or former heavy smokers. Participants were recruited from 33 academic medical centers across the country. Each subject was randomly assigned to receive screenings with either low dose chest CT (LDCT) or a standard chest X-Ray once per year for three consecutive years. Patients were offered treatment if a lung cancer was diagnosed, and all patients were followed for an average of slightly more than 6 years. The trial demonstrated 20 percent fewer lung cancer deaths among the trial participants screened with low-dose CT.

What Organizations Recommend Lung Cancer Screening?

Annual lung cancer screening with low-dose chest CT scanning is now recommended for individuals at risk for lung cancer by numerous medical professional societies and governmental advisory organizations. These include the American Cancer Society, US Preventive Services Task Force, Centers for Medicare & Medicaid Services, American Lung Association, National Comprehensive Cancer Network, American Society of Clinical Oncologists, American Association for Thoracic Surgery, American College of Chest Physicians, and the American Thoracic Society.

Who Should Be Screened For Lung Cancer?

The National Comprehensive Cancer Network currently recommends annual low-dose screening CT for current or former smokers who are 50 years and older and who have smoked the equivalent of a pack a day for 20 years (20 pack years). Former smokers are included in the recommendation if they quit smoking within the last 15 years. The recommendation is these individuals should have LDCT every year.

Patients with lesser smoking histories are also at risk for lung cancer, so it stands to reason these patients might also be helped with screening. The Lung Cancer Screening Program at Hoag has found many cancers in patients who have smoked less than the equivalent of 20 pack years, or in former smokers who quit smoking more than 15 years ago. However, insurance or Medicare may not pay for your exam if you are not between the ages of 50 and 77, if you have a less than 20 pack year smoking history, or if you quit smoking more than 15 years ago. It is important to discuss with your personal physician whether lung cancer screening makes sense for you given your specific risk factors.

How To Determine Your Pack Year Smoking History

Your smoking history in “pack years” is determined by multiplying the number of years you smoked by the number of cigarette packs you smoked per day (1 pack = 20 cigarettes). If you smoked 1 pack per day for 30 years, you have a 30 pack year smoking history (1 × 30 = 30 pack years). Someone who smoked 2 packs per day for 15 years also has a 30 pack year smoking history (2 × 15 = 30 pack years).

Lung Cancer Screening At Hoag

Hoag has been involved with Lung Cancer Screening since 2000, and has performed thousands of low-dose CT exams through its Lung Cancer Early Detection Program. Hoag Radiology has extensive experience performing low-dose CT for screening and follows national American College of Radiology guidelines for performance and interpretation of low-dose CT. Low-dose CT is available at most of Hoag’s outpatient radiology sites.

What Are The Benefits And Risks Of Lung Cancer Screening?

Benefits

- CT scans are able to detect very small nodules in the lung. LDCT of the chest may diagnose lung cancer at its earliest, most treatable stage.
- CT scanning is painless, noninvasive and fast (a few seconds).
- No radiation remains in a patient’s body after a CT examination.
- X-rays used in LDCT of the chest scans have no immediate side effects.
- Low-dose CT scans of the chest use up to two-thirds less ionizing radiation than a conventional chest CT scan, but still produce images of sufficient quality to detect most lung abnormalities.
- Lung cancer screening with LDCT has been proven to reduce the number of deaths from lung cancer in patients at high risk.
- Lung cancer found by screening with LDCT is often at an earlier stage of disease.
- When cancer is found with screening, patients can more often undergo minimally invasive surgery and have less extensive surgery.

Risks

- False-positive results occur when a test appears to be abnormal but no lung cancer is present. Many people have small nodules in the lungs from prior infections or scarring. Some of these nodules may be indistinguishable from an early lung cancer. Abnormal findings may require additional testing or follow-up scans to determine if cancer is present. These tests, such as additional CT exams or more invasive tests in which a piece of lung tissue is removed (called a biopsy), have risks and may cause a patient anxiety. In most cases, differentiation between a scar and an early lung cancer can be done with follow-up scans, without an invasive procedure.
- The CT scan may appear normal even when lung cancer is present. This is called a false-negative result. A person who receives a false-negative test result may delay seeking medical care. CT scanning may not detect all cancers.
- Not all of the cancers detected by LDCT will be found in the early stage of the disease. Screening that detects lung cancer may not improve your health or help you live longer if the disease has already spread beyond the lungs to other places in the body.
- LDCT lung screening and all other screening exams can lead to the detection and treatment of cancer which may never have harmed you. This could happen in the setting of low-grade lung cancers, particularly if your life span is limited. This can result in unnecessary treatment, complications, and cost.
- Health insurance companies and Medicare may not cover the cost of an LDCT scan to screen for lung cancer if you do not meet the Medicare criteria of age 50-77 with at least a 20 pack year history.
- There is a theoretical small risk of cancer from exposure to low-dose radiation. In heavy smokers or former smokers, the risk of lung cancer from smoking far outweighs the small theoretical risk of a radiation induced cancer, even if screening is done every year for 25 years.

More About Radiation From Lung Cancer Screening With Low-Dose CT

The scientific unit of measurement for radiation dose, commonly referred to as effective dose, is the millisievert (mSv). Because different tissues and organs have varying sensitivity to radiation exposure, the actual radiation risk to different parts of the body from an X-ray procedure varies. The term “effective dose” is used when referring to the radiation risk averaged over the entire body.

The effective dose accounts for the relative sensitivities of the different tissues exposed. More importantly, it allows for quantification of risk and comparison to more familiar sources of exposure that range from natural background radiation to radiographic medical procedures.

We are all exposed to radiation. According to recent estimates, the average person in the U.S. receives an effective dose of about 3 mSv per year from naturally occurring radioactive materials and cosmic radiation from outer space. These natural “background” doses vary throughout the country.

People living in the high altitudes of Colorado or New Mexico receive about 1.5 mSv more per year than those living near sea level. The added dose from cosmic rays during a coast-to-coast round trip flight in a commercial airplane is about 0.03 mSv. The second largest source of background radiation comes from radon gas in the environment (about 2 mSv per year). Like other sources of background radiation, exposure to radon varies widely from one part of the country to another.

We can compare the radiation exposure from one chest X-ray with an effective radiation dose of 0.1 mSv as equivalent to the amount of radiation exposure one experiences from our natural surroundings in 10 days.

A conventional CT scan of the chest would typically result in an effective radiation dose of approximately 6 mSv. Low-dose CT scans used for lung cancer screening use much less radiation, an approximate effective radiation dose of 1.5 mSv. That effective dose is approximately the same dose one gets from 6 months of background radiation.

More information regarding radiation can be obtained from the radiation safety page at www.acr.org.

Where Can I Find More Information About Lung Cancer Screening?

You can find more information on lung cancer screening at:

- Lung Cancer Alliance (www.lungcanceralliance.org)
- National Comprehensive Cancer Network (www.nccn.org/patients/guidelines/lung-nsclc/index.html)
- American Lung Association (www.lung.org)
- The American Cancer Society (www.cancer.org)
- The National Cancer Institute (www.cancer.gov)

If you have additional questions, please contact Hoag’s Lung Cancer Nurse Navigator, **Amanda Gutierrez, R.N., at 949-7-CANCER (722-6237).**

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