Small Cell Lung Cancer Early Detection, Diagnosis, and Staging

Detection and Diagnosis

Catching cancer early often allows for more treatment options. Some early cancers may have signs and symptoms that can be noticed, but that is not always the case.

- Can Small Cell Lung Cancer Be Found Early?
- Lung Cancer Prevention and Early Detection[1]
- Signs and Symptoms of Small Cell Lung Cancer
- Tests for Small Cell Lung Cancer
- Understanding Your Pathology Report[2]

Stages and Outlook (Prognosis)

After a cancer diagnosis, staging provides important information about the extent of cancer in the body and anticipated response to treatment.

- Small Cell Lung Cancer Stages
- Small Cell Lung Cancer Survival Rates

Questions to Ask About Small Cell Lung Cancer

Here are some questions you can ask your cancer care team to help you better understand your cancer diagnosis and treatment options.

- What Should You Ask Your Health Care Team About Small Cell Lung Cancer?

Can Small Cell Lung Cancer Be Found Early?

In the United States, lung cancer is the second most common cancer in both men and women. It's also the leading cause of death from cancer.

Lung cancer can be serious. However, some people with early stage lung cancer can be successfully treated. This is because tests and treatments for cancer are being studied and improved. If lung cancer is found at an earlier stage when it is small and before it has spread, people have a better chance of living longer.

Current and former smokers are at a higher risk of getting lung cancer as they get older. If they quit, smokers can lower their risk of getting and dying from lung cancer.

Usually symptoms of lung cancer do not appear until the disease is already at an advanced stage, when it is very hard to cure. Even when lung cancer does cause symptoms, many people may mistake them for other problems, such as an infection or long-term effects from smoking. This may delay the diagnosis.

Some lung cancers are found early by accident as a result of tests for other medical conditions. For example, lung cancer may be found by tests done for other reasons in people with heart disease, pneumonia, or other lung conditions. A small number of these people do very well and may be cured of lung cancer.

Screening is the use of tests or exams to find a disease in people who don't have symptoms. Small cell lung cancer tends to spread very early, so most lung cancers that are found before they have spread are the non-small cell type. Regular chest x-rays have been studied for lung cancer screening, but they did not help most people live longer. In recent years, a test known as a low-dose CAT scan or CT scan (LDCT) has been studied in people at a higher risk of getting lung cancer. LDCT scans can help find abnormal areas in the lungs that may be cancer. Research has shown that using LDCT scans to screen people at higher risk of lung cancer saved more lives compared to chest x-rays. For higher risk people, getting yearly LDCT scans before symptoms start helps lower the risk of dying from lung cancer.

The National Lung Screening Trial

The National Lung Screening Trial (NLST) was a large clinical trial that looked at using LDCT of the chest to screen for lung cancer. CT scans of the chest provide more detailed pictures than chest x-rays and are better at finding small abnormal areas in the

lungs. Low-dose CT of the chest uses lower amounts of radiation than a standard chest CT and does not use intravenous (IV) contrast dye.

The NLST compared LDCT of the chest to chest x-rays in people at high risk of lung cancer to see if these scans could help lower the risk of dying from lung cancer. The study included more than 50,000 people ages 55 to 74 who were current or former smokers and were in fairly good health. To be in the study, they had to have at least a 30 pack-year history of smoking. A pack-year is the number of cigarette packs smoked each day multiplied by the number of years a person has smoked. Someone who smoked a pack of cigarettes per day for 30 years has a 30 pack-year smoking history, as does someone who smoked 2 packs a day for 15 years. Former smokers could enter the study if they had quit within the past 15 years. The study did not include people who had a history of lung cancer or lung cancer symptoms, if they had part of a lung removed, if they needed to be on oxygen at home to help them breathe, or if they had other serious medical problems.

People in the study got either 3 LDCT scans or 3 chest x-rays, each a year apart, to look for abnormal areas in the lungs that might be cancer. After several years, the study found that people who got LDCT had a 20% lower chance of dying from lung cancer than those who got chest x-rays. Overall, they were 7% less likely to die from any cause than those who got chest x-rays.

Screening with LDCT is also known to have some downsides that need to be considered. One drawback of this test is that it also finds a lot of abnormalities that have to be checked out with more tests, but that turn out not to be cancer. (About 1 out of 4 people in the NLST had such a finding.) This may lead to additional tests such as other CT scans or more invasive tests such as needle biopsies or even surgery to remove a portion of lung in some people. These tests can sometimes lead to complications (like a collapsed lung) or rarely, death, even in people who do not have cancer (or who have very early stage cancer).

LDCT scans also expose people to a small amount of radiation with each test. It is less than the dose from a standard CT, but it is more than the dose from a chest x-ray. Some people who are screened may end up needing further CT scans, which means more radiation. When done in tens of thousands of people, this radiation may cause a few people to develop breast, lung, or thyroid cancers later on.

The NLST was a large study, but it left some questions that still need to be answered. For example, it’s not clear if screening with LDCT scans would have the same effect if different people were allowed in the study, such as those who smoke less (or not at all) or people younger than age 55 or older than 74. Also, in the NLST, patients got a total of 3 scans over 2 years. It’s not yet clear what the effect would be if people were

screened for longer than 2 years. Plus, the lung cancers that were found early were mainly of the non-small cell type, so it is not yet clear how helpful this test is in finding small cell lung cancer early.

These factors, and others, need to be taken into account by people and their doctors who are considering lung cancer risk and the decision to be screened.

American Cancer Society's guidelines for lung cancer screening

The American Cancer Society (ACS) has a lung cancer screening guideline for people with a higher risk of getting lung cancer. The ACS recommends yearly lung cancer screening with LDCT scans for people who are 55 to 74 years old, are in fairly good health, and who also meet the following conditions:

- Are current smokers or smokers who have quit in the past 15 years. ***and***
- Have at least a 30 pack-year smoking history. (This is the number of years you smoked multiplied by the number of packs of cigarettes per day. For example, someone who smoked 2 packs per day for 15 years [2 x 15 = 30] has 30 pack-years of smoking. A person who smoked 1 pack per day for 30 years [1 x 30 = 30] also has 30 pack-years of smoking.) ***and***
- Receive counseling to quit smoking if they are current smokers. ***and***
- Have been told by their doctor about the possible benefits, limits, and harms of screening with LDCT scans. ***and***
- Have a facility where they can go that has experience in lung cancer screening and treatment.

For patients

The main benefit of screening is a lower chance of dying of lung cancer, which accounts for many deaths in current and former smokers. Still, it's important to be aware that screening with LDCT will not find all lung cancers, and not all of the cancers that are found will be found early. Even if a cancer is found by screening, you could still die from lung cancer. Also, LDCT often finds things that turn out not to be cancer, but have to be checked out with more tests to know what they are. You might need more CT scans, or even invasive tests such as a lung biopsy, in which a piece of lung tissue is removed with a needle or during surgery. These tests have risks of their own (see above).

If you are at a higher risk, your doctor can explain your risk and how you fit into the ACS lung cancer screening guideline. Your doctor can also talk with you about what happens

during screening and the best places to get the yearly screening test. Lung cancer screening is covered by Medicare and by many private health insurance plans. Your health care team can help you find out if your insurance will provide coverage.

Screening should only be done at facilities that have the right type of CT scanner and that have experience in LDCT scans for lung cancer screening. The facility should also have a team of specialists that can give patients the appropriate care and follow-up if there are abnormal results on the scans. You might not have the right kind of facility nearby, so you may need to travel some distance to be screened.

If you are at higher risk and should be screened, you should get a LDCT every year until you reach the age of 74, as long as you are still in good health.

If you smoke, you should get counseling about stopping. You should be told about your risk of lung cancer and referred to a smoking cessation program. Screening is not a good alternative to stopping smoking. For help quitting, see our Guide to Quitting Smoking[1] or call the American Cancer Society at 1-800-227-2345.

What does “in fairly good health” mean?

Screening is meant to find cancer in people who do not have symptoms of the disease. People who already have symptoms that might be caused by lung cancer may need tests such as CT scans to find the underlying cause, which in some cases may be cancer. But this kind of testing is for diagnosis and is not the same as screening. Some of the possible symptoms of lung cancer that kept people out of the NLST were coughing up blood and weight loss without trying.

To get the most potential benefit from screening, patients need to be in good health. For example, they need to be able to have surgery and other treatments to try to cure lung cancer if it is found. Patients who need home oxygen therapy most likely couldn’t withstand having part of a lung removed, and so are not candidates for screening. Patients with other serious medical problems that would shorten their lives or keep them from having surgery might not benefit enough from screening for it to be worth the risks, and so should also not be screened.

Metal implants in the chest (like pacemakers) or back (like rods in the spine) can interfere with x-rays and lead to poor quality CT images of the lungs. People with these types of implants were also kept out of the NLST, and so should not be screened with CT scans for lung cancer according to the ACS guidelines.

If something abnormal is found during screening

Sometimes screening tests will show something abnormal in the lungs or nearby areas that might be cancer. Most of these abnormal findings will turn out not to be cancer, but more CT scans or other tests will be needed to be sure. Some of these tests are described in Exams and tests that look for lung cancer[2].

CT scans of the lungs can also sometimes show problems in other organs that just happen to be in the field of view of the scans. Your doctor will discuss any such findings with you if they are found.

Hyperlinks

1. www.cancer.org/healthy/stay-away-from-tobacco/guide-quitting-smoking.html
2. www.cancer.org/cancer/lung-cancer/prevention-and-early-detection/exams-and-tests.html

References

Smith RA, Andrews KS, Brooks D, Fedewa SA, Manassaram-Baptiste D, Saslow D, Brawley OW, Wender RC. Cancer screening in the United States, 2018: A review of current American Cancer Society guidelines and current issues in cancer screening. *CA: Cancer J Clin*. 2018 [Epub ahead of print].

See all references for Small Cell Lung Cancer (www.cancer.org/cancer/small-cell-lung-cancer/references.html)

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Signs and Symptoms of Small Cell Lung Cancer

Most lung cancers do not cause any symptoms until they have spread, but some people with early lung cancer do have symptoms. If you go to your doctor when you first notice symptoms, your cancer might be diagnosed at an earlier stage, when treatment[1] is more likely to be effective.

Most of these symptoms are more likely to be caused by something other than lung cancer. Still, if you have any of these problems, it's important to see your doctor right away so the cause can be found and treated, if needed. The most common symptoms of lung cancer are:

- A cough that does not go away or gets worse
- Coughing up blood or rust-colored sputum (spit or phlegm)
- Chest pain that is often worse with deep breathing, coughing, or laughing
- Hoarseness
- Weight loss and loss of appetite
- Shortness of breath
- Feeling tired or weak
- Infections such as bronchitis and pneumonia that don't go away or keep coming back
- New onset of wheezing

When lung cancer spreads to other parts of the body, it may cause:

- Bone pain (like pain in the back or hips)
- Nervous system changes (such as headache, weakness or numbness of an arm or leg, dizziness, balance problems, or seizures), from cancer spread to the brain
- Yellowing of the skin and eyes (jaundice), from cancer spread to the liver
- Lumps near the surface of the body, due to cancer spreading to the skin or to lymph nodes (collection of immune system cells) such as those in the neck or above the collarbone

Some lung cancers can cause **syndromes**, which are groups of specific symptoms.

Horner syndrome

Cancers of the upper part of the lungs are sometimes called *Pancoast tumors.* These tumors are more likely to be non-small cell lung cancer (NSCLC) than small cell lung cancer (SCLC).

Pancoast tumors can affect certain nerves to the eye and part of the face, causing a group of symptoms called *Horner syndrome*:

- Drooping or weakness of one eyelid
- A smaller pupil (dark part in the center of the eye) in the same eye

- Reduced or absent sweating on the same side of the face

Pancoast tumors can also sometimes cause severe shoulder pain.

Superior vena cava syndrome

The superior vena cava (SVC) is a large vein that carries blood from the head and arms back to the heart. It passes next to the upper part of the right lung and the lymph nodes inside the chest. Tumors in this area can press on the SVC, which can cause the blood to back up in the veins. This can lead to swelling in the face, neck, arms, and upper chest (sometimes with a bluish-red skin color). It can also cause headaches, dizziness, and a change in consciousness if it affects the brain. While SVC syndrome can develop gradually over time, in some cases it can become life-threatening, and needs to be treated right away.

Paraneoplastic syndromes

Some lung cancers make hormone-like substances that enter the bloodstream and cause problems with distant tissues and organs, even though the cancer has not spread to those tissues or organs. These problems are called *paraneoplastic syndromes*. Sometimes these syndromes may be the first symptoms of lung cancer. Because the symptoms affect other organs, patients and their doctors may first suspect that a disease other than lung cancer is causing them.

Some of the more common paraneoplastic syndromes associated with SCLC are:

- **SIADH (syndrome of inappropriate anti-diuretic hormone):** In this condition, the cancer cells make a hormone (ADH) that causes the kidneys to retain (hold) water. This lowers salt levels in the blood. Symptoms of SIADH can include fatigue, loss of appetite, muscle weakness or cramps, nausea, vomiting, restlessness, and confusion. Without treatment, severe cases may lead to seizures and coma.
- **Cushing syndrome:** In this condition, the cancer cells make ACTH, a hormone that makes the adrenal glands secrete cortisol. This can lead to symptoms such as weight gain, easy bruising, weakness, drowsiness, and fluid retention. Cushing syndrome can also cause high blood pressure and high blood sugar levels, or even diabetes.
- **Nervous system problems:** SCLC can sometimes cause the body's immune system to attack parts of the nervous system, which can lead to problems. One example is a muscle disorder called *Lambert-Eaton syndrome*. In this syndrome,

muscles around the hips become weak. One of the first signs may be trouble getting up from a sitting position. Later, muscles around the shoulder may become weak. A rarer problem is *paraneoplastic cerebellar degeneration*, which can cause loss of balance and unsteadiness in arm and leg movement, as well as trouble speaking or swallowing. SCLC can also cause other nervous system problems, such as muscle weakness, sensation changes, vision problems, or even changes in behavior.

Again, many of these symptoms can also be caused by something other than lung cancer. Still, if you have any of these problems, it's important to see your doctor right away so the cause can be found and treated, if needed.

Hyperlinks

1. www.cancer.org/cancer/small-cell-lung-cancer/treating.html

References

See all references for Small Cell Lung Cancer (www.cancer.org/cancer/small-cell-lung-cancer/references.html)

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Tests for Small Cell Lung Cancer

Screening[1] can find some lung cancers, but most lung cancers are found because they are causing problems. If you have possible signs or symptoms of lung cancer, see your doctor, who will examine you and may order some tests. The actual diagnosis of lung cancer is made after looking at a sample of your lung cells under a microscope.

Medical history and physical exam

Your doctor will ask about your medical history to learn about your symptoms and

possible risk factors[2]. You will also be examined for signs of lung cancer or other health problems.

If the results of your history and physical exam suggest you might have lung cancer, you will have tests to look for it. These could include imaging tests and/or biopsies of lung tissue.

Imaging tests to look for lung cancer

Imaging tests use x-rays, magnetic fields, sound waves, or radioactive substances to create pictures of the inside of your body. Imaging tests might be done for a number of reasons both before and after a diagnosis of lung cancer, including:

- To look at suspicious areas that might be cancer
- To learn if and how far cancer has spread
- To help determine if treatment is working
- To look for possible signs of cancer coming back after treatment

Chest x-ray

This is often the first test your doctor will do to look for any abnormal areas in the lungs. Plain x-rays of your chest can be done at imaging centers, hospitals, and even in some doctors' offices. If the x-ray result is normal, you probably don't have lung cancer (although some lung cancers may not show up on an x-ray). If something suspicious is seen, your doctor will likely order more tests.

Computed tomography (CT) scan

A CT scan[3] combines many x-rays to make detailed cross-sectional images of your body.

A CT scan is more likely to show lung tumors than a routine chest x-ray. It can also show the size, shape, and position of any lung tumors and can help find enlarged lymph nodes that might contain cancer that has spread from the lung. Most people with small cell lung cancer (SCLC) will get a CT of the chest and abdomen to look at the lungs and lymph nodes, and to look for abnormal areas in the adrenal glands, liver, and other organs that might be from the spread of lung cancer. Some people will get a CT of the brain to look for cancer spread, but an MRI is more likely to be used when looking at the brain.

CT guided needle biopsy: If a suspected area of cancer is deep within your body, a CT scan can be used to guide a biopsy needle precisely into the suspected area.

Magnetic resonance imaging (MRI) scan

Like CT scans, MRI scans[4] show detailed images of soft tissues in the body. But MRI scans use radio waves and strong magnets instead of x-rays.

Most patients with SCLC will have an MRI scan of the brain to look for possible cancer spread, although a CT scan may be used instead. MRI may also be used to look for possible spread to the spinal cord if the patients have certain symptoms.

Positron emission tomography (PET) scan

For a PET scan[5], you are injected with a slightly radioactive form of sugar, which collects mainly in cancer cells. A special camera is then used to create a picture of areas of radioactivity in the body.

A PET scan can be a very important test if you appear to have early stage (or *limited*) SCLC. Your doctor can use this test to see if the cancer has spread to lymph nodes or other organs, which can help determine your treatment options. A PET scan can also give a better idea whether an abnormal area on a chest x-ray or CT scan might be cancer. PET scans are also useful if your doctor thinks the cancer may have spread but doesn't know where.

PET/CT scan: Some machines can do both a PET scan and a CT scan at the same time. This lets the doctor compare areas of higher radioactivity on the PET scan with the more detailed appearance of that area on the CT scan. For people with SCLC, PET/CT scans are used more often than PET scans alone.

Bone scan

A bone scan[6] can help show if a cancer has spread to the bones. This test is done mainly when there is reason to think the cancer may have spread to the bones (because of symptoms such as bone pain) and other test results aren’t clear.

For this test, you are injected with a slightly radioactive chemical that collects mainly in abnormal areas of bone. A special camera is then used to create a picture of areas of radioactivity in the body..

PET scans can also usually show if the cancer has spread to the bones, so you usually

won’t need a bone scan if a PET scan has already been done.

Tests to diagnose lung cancer

Symptoms and the results of imaging tests might suggest that a person has lung cancer, but the actual diagnosis is made by looking at cells from your lung with a microscope.

The cells can be taken from lung secretions (sputum or phlegm), fluid removed from the area around the lung (*thoracentesis*), or from a suspicious area (*biopsy*). The choice of which test(s) to use depends on the situation.

Sputum cytology

For this test, a sample of sputum (mucus you cough up from the lungs) is looked at under a microscope to see if it has cancer cells. The best way to do this is to get early morning samples from you 3 days in a row. This test is more likely to help find cancers that start in the major airways of the lung, such as most small cell lung cancers and squamous cell lung cancers. It may not be as helpful for finding other types of lung cancer.

Thoracentesis

If fluid has built up around your lungs (called a *pleural effusion*), doctors can use thoracentesis to relieve symptoms and to see if it is caused by cancer spreading to the lining of the lungs (pleura). The buildup might also be caused by other conditions, such as heart failure or an infection.

For this procedure, the skin is numbed and a hollow needle is inserted between the ribs to drain the fluid. (In a similar test called *pericardiocentesis*, fluid is removed from within the sac around the heart.) A microscope is used to check the fluid for cancer cells. Chemical tests of the fluid are also sometimes useful in telling a malignant (cancerous) pleural effusion from one that is not.

If a malignant pleural effusion has been diagnosed, thoracentesis may be repeated to remove more fluid. Fluid buildup can keep the lungs from filling with air, so thoracentesis can help a person breathe better.

Needle biopsy

Doctors can often use a hollow needle to get a small sample from a suspicious area (mass).

- In a **fine needle aspiration (FNA)**biopsy, the doctor uses a syringe with a very thin, hollow needle to withdraw (aspirate) cells and small fragments of tissue.
- In a **core biopsy**, a larger needle is used to remove one or more small cores of tissue. Samples from core biopsies are larger than FNA biopsies, so they are often preferred.

An advantage of needle biopsies is that they don't require a surgical incision, but in some cases they might not provide enough of a sample to make a diagnosis.

Transthoracic needle biopsy: If the suspected tumor is in the outer part of the lungs, the biopsy needle can be inserted through the skin on the chest wall. The area where the needle is to be inserted may be numbed with local anesthesia first. The doctor then guides the needle into the area while looking at the lungs with either fluoroscopy (which is like an x-ray, but the image is shown on a screen rather than on film) or CT scans. Unlike fluoroscopy, CT doesn't give a constant picture, so the needle is inserted toward the mass, a CT image is taken, and the direction of the needle is guided based on the image. This is repeated a few times until the needle is within the mass.

A possible complication of this procedure is that air may leak out of the lung at the biopsy site and into the space between the lung and the chest wall. This is called a *pneumothorax*. It can cause part of the lung to collapse and could cause trouble breathing. If the air leak is small, it often gets better without any treatment. Larger air leaks are treated by putting a small tube into the chest space and sucking out the air over a day or two, after which it usually heals on its own.

Other approaches to needle biopsies: An FNA biopsy may also be done to check for cancer in the lymph nodes between the lungs:

- *Transtracheal FNA* or *transbronchial FNA* is done by passing the needle through the wall of the trachea (windpipe) or bronchi (the large airways leading into the lungs) during bronchoscopy or endobronchial ultrasound (described below).
- Some patients have an FNA biopsy done during endoscopic esophageal ultrasound (described below) by passing the needle through the wall of the esophagus.

Bronchoscopy

Bronchoscopy can help the doctor find some tumors or blockages in the larger airways of the lungs. It may be used to find a lung tumor or to take a sample of a tumor to see if it is cancer.

For this exam, a lighted, flexible fiber-optic tube (called a *bronchoscope*) is passed through the mouth or nose and down into the windpipe and bronchi. The mouth and throat are sprayed first with a numbing medicine. You may also be given medicine through an intravenous (IV) line to make you feel relaxed.

Small instruments can be passed down the bronchoscope to take biopsy samples. The doctor can also sample cells that line the airways by using a small brush (bronchial brushing) or by rinsing the airways with sterile saltwater (bronchial washing). These tissue and cell samples are then looked at under a microscope.

Tests to find lung cancer spread

If lung cancer has been found, it's often important to know if it has spread to the lymph nodes in the space between the lungs (mediastinum) or other nearby areas. This can affect a person's treatment options.

Several types of tests might be done to look for cancer spread if surgery could be an option for treatment, but this is not often the case for small cell lung cancer. These tests are used more often for non-small cell lung cancer.

Endobronchial ultrasound

Ultrasound is a type of imaging test that uses sound waves to create pictures of the inside of your body. For this test, a small, microphone-like instrument called a transducer gives off sound waves and picks up the echoes as they bounce off body tissues. The echoes are converted by a computer into an image on a computer screen.

For endobronchial ultrasound, a bronchoscope is fitted with an ultrasound transducer at its tip and is passed down into the windpipe. This is done with numbing medicine (local anesthesia) and light sedation.

The transducer can be pointed in different directions to look at lymph nodes and other structures in the mediastinum (the area between the lungs). If suspicious areas such as enlarged lymph nodes are seen on the ultrasound, a hollow needle can be passed through the bronchoscope to get biopsy samples of them. The samples are then sent to a lab to be looked at with a microscope.

Endoscopic esophageal ultrasound

This test is like endobronchial ultrasound, except the doctor passes an endoscope (a lighted, flexible scope) down the throat and into the esophagus (the tube connecting the throat to the stomach). This is done with numbing medicine (local anesthesia) and light sedation.

The esophagus is just behind the windpipe and is close to some lymph nodes inside the chest to which lung cancer may spread. As with endobronchial ultrasound, the transducer can be pointed in different directions to look at lymph nodes and other structures inside the chest that might contain lung cancer. If enlarged lymph nodes are seen on the ultrasound, a hollow needle can be passed through the endoscope to get biopsy samples of them. The samples are then sent to a lab to be looked at under a microscope.

Mediastinoscopy and mediastinotomy

These procedures may be done to look more directly at and get samples from the structures in the mediastinum (the area between the lungs). They are done in an operating room by a surgeon while you are under general anesthesia (in a deep sleep). The main difference between the two is in the location and size of the incision.

Mediastinoscopy: A small cut is made in the front of the neck and a thin, hollow, lighted tube is inserted behind the sternum (breast bone) and in front of the windpipe to look at the area. Instruments can be passed through this tube to take tissue samples from the lymph nodes along the windpipe and the major bronchial tube areas. Looking at the samples under a microscope can show if they contain cancer cells.

Mediastinotomy: The surgeon makes a slightly larger incision (usually about 2 inches long) between the second and third ribs next to the breast bone. This lets the surgeon reach some lymph nodes that cannot be reached by mediastinoscopy.

Thoracoscopy

This procedure can be done to find out if cancer has spread to the spaces between the lungs and the chest wall, or to the linings of these spaces (called *pleura*). It can also be used to sample tumors on the outer parts of the lungs as well as nearby lymph nodes and fluid, and to assess whether a tumor is growing into nearby tissues or organs. This procedure is not often done just to diagnose lung cancer, unless other tests such as needle biopsies are unable to get enough samples for the diagnosis.

Thoracoscopy is done in an operating room while you are under general anesthesia (in a deep sleep). A small cut (incision) is made in the side of the chest wall. (Sometimes more than one cut is made.) The doctor then puts a thin, lighted tube with a small video camera on the end through the incision to view the space between the lungs and the chest wall. Using this, the doctor can see possible cancer deposits on the lining of the lung or chest wall and remove small pieces of the tissue to be looked at under the microscope. (When certain areas can't be reached with thoracoscopy, the surgeon may need to make a larger incision in the chest wall, known as a *thoracotomy*.)

Thoracoscopy can also be used as part of the treatment to remove part of a lung in some early-stage lung cancers. This type of operation, known as *video-assisted thoracic surgery* (VATS), is described in more detail in Surgery for Small Cell Lung Cancer[7].

Bone marrow aspiration and biopsy

These tests look for spread of the cancer into the bone marrow. Bone marrow is the soft, inner part of certain bones where new blood cells are made.

The two tests are usually done at the same time. The samples are most often taken from the back of the pelvic (hip) bone.

In **bone marrow aspiration**, you lie on a table (either on your side or on your belly). The skin over the hip is cleaned. Then the skin and the surface of the bone are numbed with local anesthetic, which may cause a brief stinging or burning sensation. A thin, hollow needle is then inserted into the bone, and a syringe is used to suck out a small amount of liquid bone marrow. Even with the anesthetic, most people still have some brief pain when the marrow is removed.

A **bone marrow biopsy** is usually done just after the aspiration. A small piece of bone and marrow is removed with a slightly larger needle that is pushed down into the bone. The biopsy will likely also cause some brief pain.

Bone marrow aspiration and biopsy are sometimes done in patients thought to have early (limited) stage SCLC but who have blood test results suggesting the cancer might have reached the bone marrow. In recent years, PET scans have been used more often for staging, so these tests are now rarely done for SCLC.

Lab tests of biopsy and other samples

Samples that have been collected during biopsies or other tests are sent to a pathology

lab. A pathologist, a doctor who uses lab tests to diagnose diseases such as cancer, will look at the samples under a microscope and may do other special tests to help better classify the cancer. (Cancers from other organs can spread to the lungs. It's very important to find out where the cancer started, because treatment is different depending on the type of cancer.)

The results of these tests are described in a pathology report, which is usually available within about a week. If you have any questions about your pathology results or any diagnostic tests, talk to your doctor..

For more information on understanding your pathology report, see Lung Pathology[8].

Blood tests

Blood tests are not used to diagnose lung cancer, but they can help to get a sense of a person's overall health. For example, they can be used to help tell if a person is healthy enough to have surgery.

A **complete blood count (CBC)** determines whether your blood has normal numbers of different types of blood cells. For example, it can show if you are anemic (have a low number of red blood cells), if you could have trouble with bleeding (due to a low number of blood platelets), or if you are at increased risk for infections (due to a low number of white blood cells). This test will be repeated regularly if you are treated with chemotherapy[9], because these drugs can affect blood-forming cells of the bone marrow.

Blood chemistry tests can help spot abnormalities in some of your organs, such as the liver or kidneys. For example, if cancer has spread to the bones, it may cause higher than normal levels of calcium and alkaline phosphatase.

Lung function tests

Lung (or pulmonary) function tests (PFTs) may be done after lung cancer is diagnosed to see how well your lungs are working. They are generally only needed if surgery might be an option in treating the cancer, which is rare in small cell lung cancer. Surgery to remove lung cancer requires removing part or all of a lung, so it's important to know how well the lungs are working beforehand.

There are different types of PFTs, but they all basically have you breathe in and out through a tube that is connected to a machine that measures airflow.

Hyperlinks

1. www.cancer.org/cancer/small-cell-lung-cancer/causes-risks-prevention/risk-factors.html
2. www.cancer.org/treatment/understanding-your-diagnosis/tests/ct-scan-for-cancer.html
3. www.cancer.org/treatment/understanding-your-diagnosis/tests/mri-for-cancer.html
4. www.cancer.org/treatment/understanding-your-diagnosis/tests/nuclear-medicine-scans-for-cancer.html
5. www.cancer.org/treatment/understanding-your-diagnosis/tests/nuclear-medicine-scans-for-cancer.html
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8. www.cancer.org/cancer/small-cell-lung-cancer/treating/chemotherapy.html

References

See all references for Small Cell Lung Cancer (www.cancer.org/cancer/small-cell-lung-cancer/references.html)

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Small Cell Lung Cancer Stages

After someone is diagnosed with small cell lung cancer (SCLC), doctors will try to figure out if it has spread, and if so, how far. This process is called *staging*. The stage of a cancer describes how much cancer is in the body. It helps determine how serious the cancer is and how best to treat[1] it. Doctors also use a cancer's stage when talking about survival statistics.

The stage of SCLC is based on the results of physical exams, biopsies, imaging tests, and any other tests that have been done (as described in Tests for Small Cell Lung Cancer).

Limited versus extensive stage

For treatment purposes, most doctors use a 2-stage system that divides SCLC into limited stage and extensive stage. This helps determine if a person might benefit from more aggressive treatments such as chemotherapy[2] combined with radiation therapy[3] to try to cure the cancer (for limited stage cancer), or whether chemotherapy alone is likely to be a better option (for extensive stage cancer).

Limited stage

This means that the cancer is only on one side of the chest and can be treated with a single radiation field. This generally includes cancers that are only in one lung (unless tumors are widespread throughout the lung), and that might have also reached the lymph nodes on the same side of the chest.

Cancer in lymph nodes above the collarbone (called *supraclavicular nodes*) might still be considered limited stage as long as they are on the same side of the chest as the cancer. Some doctors also include lymph nodes at the center of the chest (*mediastinal lymph nodes*) even when they are closer to the other side of the chest.

What is important is that the cancer is confined to an area that is small enough to be treated with radiation therapy in one “port.” Only about 1 out of 3 people with SCLC have limited stage cancer when it is first found.

Extensive stage

This describes cancers that have spread widely throughout the lung, to the other lung, to lymph nodes on the other side of the chest, or to other parts of the body (including the bone marrow). Many doctors consider SCLC that has spread to the fluid around the lung to be extensive stage as well. About 2 out of 3 people with SCLC have extensive disease when their cancer is first found.

The TNM staging system

A more formal system to describe the growth and spread of lung cancer is the American Joint Committee on Cancer (AJCC) **TNM** staging system, which is based on 3 key pieces of information:

- The size and extent of the main **tumor (T):** How large is the tumor? Has it grown into nearby structures or organs?
- The spread to nearby (regional) lymph **nodes (N):** Has the cancer spread to nearby lymph nodes?

- The spread **(metastasis) (M)** to other organs of the body: Has the cancer spread to distant organs such as the brain, bones, adrenal glands, kidneys, liver, or the other lung?

Numbers or letters appear after T, N, and M to provide more details about each of these factors. Higher numbers mean the cancer is more advanced. Once the T, N, and M categories have been determined, this information is combined in a process called *stage grouping*, to assign an overall stage. For more information, see Cancer Staging[4].

In the TNM system, the earliest stage is stage 0 (also called *carcinoma in situ*, or CIS). The other main stages range from I (1) through IV (4). Some of these stages are broken down further with letters or numbers. As a rule, the lower the stage number, the less the cancer has spread. A higher number, such as stage IV, means cancer has spread more. And within a stage, an earlier letter (or number) means a lower stage.

The same TNM staging system is used for both SCLC and non-small cell lung cancer (NSCLC), although it's generally not as important for SCLC. For more detailed information about this system, see Non-Small Cell Lung Cancer Stages[5]. Staging with the TNM system can be complex, so if your health care team is using it, ask them to explain it to you in a way you understand.

Hyperlinks

1. www.cancer.org/cancer/small-cell-lung-cancer/treating.html
2. www.cancer.org/cancer/small-cell-lung-cancer/treating/chemotherapy.html
3. www.cancer.org/cancer/small-cell-lung-cancer/treating/radiation-therapy.html
4. www.cancer.org/treatment/understanding-your-diagnosis/staging.html
5. www.cancer.org/cancer/non-small-cell-lung-cancer/detection-diagnosis-staging/staging.html

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Small Cell Lung Cancer Survival Rates

Survival rates can give you an idea of what percentage of people with the same type and stage of cancer are still alive a certain amount of time (usually 5 years) after they were diagnosed. They can't tell you how long you will live, but they may help give you a better understanding of how likely it is that your treatment will be successful.

Keep in mind that survival rates are estimates and are often based on previous outcomes of large numbers of people who had a specific cancer, but they can't predict what will happen in any particular person's case. These statistics can be confusing and may lead you to have more questions. Talk with your doctor about how these numbers may apply to you, as he or she is familiar with your situation.

What is a 5-year relative survival rate?

A **relative survival rate** compares people with the same type and stage of cancer to people in the overall population. For example, if the **5-year relative survival rate** for a specific stage of small cell lung cancer (SCLC) is 30%, it means that people who have that cancer are, on average, about 30% as likely as people who don't have that cancer to live for at least 5 years after being diagnosed.

Where do these numbers come from?

The American Cancer Society relies on information from the SEER* database, maintained by the National Cancer Institute (NCI), to provide survival statistics for different types of cancer.

The SEER database tracks 5-year relative survival rates for SCLC in the United States, based on how far the cancer has spread. The SEER database, however, does not group cancers by AJCC TNM stages (stage 1, stage 2, stage 3, etc.). Instead, it groups

cancers into localized, regional, and distant stages:

- **Localized:** There is no sign that the cancer has spread outside of the lung.
- **Regional:** The cancer has spread outside the lung to nearby structures or lymph nodes.
- **Distant:** The cancer has spread to distant parts of the body, such as the brain, bones, liver, or the other lung.

5-year relative survival rates for small cell lung cancer

(Based on people diagnosed with SCLC between 2008 and 2014.)

SEER stage	5-year relative survival rate
Localized	29%
Regional	15%
Distant	3%
All SEER stages combined	6%

Understanding the numbers

- **These numbers apply only to the stage of the cancer when it is first diagnosed.** They do not apply later on if the cancer grows, spreads, or comes back after treatment.
- **These numbers don't take everything into account.** Survival rates are grouped based on how far the cancer has spread. But other factors, such as your age and overall health, and how well the cancer responds to treatment, can also affect your outlook.
- **People now being diagnosed with SCLC may have a better outlook than these numbers show.** Treatments improve over time, and these numbers are based on people who were diagnosed and treated at least five years earlier.

*SEER = Surveillance, Epidemiology, and End Results

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Noone AM, Howlader N, Krapcho M, Miller D, Brest A, Yu M, Ruhl J, Tatalovich Z, Mariotto A, Lewis DR, Chen HS, Feuer EJ, Cronin KA (eds). SEER Cancer Statistics Review, 1975-2015, National Cancer Institute. Bethesda, MD, https://seer.cancer.gov/csr/1975_2015/, based on November 2017 SEER data submission, posted to the SEER web site, April 2018.

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What Should You Ask Your Health Care Team About Small Cell Lung Cancer?

It's important to have honest, open discussions with your cancer care team. You should feel free to ask any question, no matter how small it might seem. Here are some questions you might want to ask:

When you're told you have lung cancer

- What kind of lung cancer[1] do I have?
- Where exactly is the cancer? Has it spread beyond where it started?
- What is the stage of my cancer, and what does that mean in my case?
- Will I need any other tests before we can decide on treatment?
- Do I need to see any other doctors or health professionals?
- If I'm concerned about the costs and insurance coverage for my diagnosis and treatment, who can help me?

When deciding on a treatment plan

- How much experience do you have treating this type of cancer?
- What are my treatment choices[2]?
- What do you recommend and why?
- What is the goal of treatment?

- Should I get a second opinion? How do I do that? Can you recommend someone?
- What is my expected survival rate, based on my cancer as you see it?
- How quickly do we need to decide on treatment?
- What should I do to be ready for treatment?
- How long will treatment last? What will it be like? Where will it be done?
- What are the risks or side effects with the treatments you suggest? How long are they likely to last?
- How might treatment affect my daily activities?
- What would my options be if the treatment doesn't work or if the cancer comes back?

During treatment

Once treatment begins, you'll need to know what to expect and what to look for. Not all of these questions may apply to you, but asking the ones that do may be helpful.

- How will we know if the treatment is working?
- Is there anything I can do to help manage side effects?
- What symptoms or side effects should I tell you about right away?
- How can I reach you on nights, holidays, or weekends?
- Do I need to change what I eat during treatment?
- Are there any limits on what I can do?
- What kind of exercise should I do, and how often?
- Can you suggest a mental health professional I can see if I start to feel overwhelmed, depressed, or distressed?

After treatment

- Are there any limits on what I can do?
- What symptoms should I watch for?
- What kind of exercise should I do now?
- What type of follow-up will I need after treatment?
- How often will I need to have follow-up exams and imaging tests?
- Will I need any blood tests?
- How will we know if the cancer has come back? What should I watch for?
- What will my options be if the cancer comes back?

Along with these sample questions, be sure to write down some of your own. For instance, you might want to ask about second opinions or about clinical trials[3] for which you may qualify.

Doctors aren't the only ones who can give you information. Other health care professionals, such as nurses and social workers, can answer some of your questions. To find out more about speaking with your health care team, see The Doctor-Patient Relationship[4].

Hyperlinks

1. www.cancer.org/cancer/small-cell-lung-cancer/about/what-is-small-cell-lung-cancer.html
2. www.cancer.org/cancer/small-cell-lung-cancer/treating.html
3. www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html
4. www.cancer.org/treatment/understanding-your-diagnosis/talking-about-cancer/the-doctor-patient-relationship.html

References

See all references for Small Cell Lung Cancer (www.cancer.org/cancer/small-cell-lung-cancer/references.html)

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