About Small Cell Lung Cancer

Overview

If you have been diagnosed with small cell lung cancer or are worried about it, you likely have a lot of questions. Learning some basics is a good place to start.

- What Is Small Cell Lung Cancer?

Research and Statistics

See the latest estimates for new cases of small cell lung cancer and deaths in the US and what research is currently being done.

- Key Statistics for Small Cell Lung Cancer
- What's New in Small Cell Lung Cancer Research?

What Is Small Cell Lung Cancer?

Lung cancer starts when cells of the lung become abnormal and begin to grow out of control. As more cancer cells develop, they can form into a tumor and spread to other areas of the body. To learn more about how cancers start and spread, see What Is Cancer?[1]

Types of lung cancer

The 2 main types of lung cancer are:

- **Small cell lung cancer (SCLC)**, which is sometimes called *oat cell cancer*. About 10% to 15% of lung cancers are SCLC.
- **Non-small cell lung cancer (NSCLC)**, which makes up about 80% to 85% of lung cancers. The 3 main types of NSCLC are adenocarcinoma, squamous cell carcinoma, and large cell carcinoma.

Small cell and non-small cell lung cancers are treated differently. **The information here focuses on small cell lung cancer.** See Lung Cancer (Non-Small Cell)[2] for information about that type of lung cancer.

Other types of lung cancer and tumors

Lung carcinoid tumors: Less than 5% of lung tumors are carcinoid tumors of the lung. Most of these grow slowly. For more information about these tumors, see Lung Carcinoid Tumor[3].

Other lung tumors: Other types of lung cancer such as adenoid cystic carcinomas, lymphomas, and sarcomas, as well as benign lung tumors such as hamartomas are rare. These are treated differently from the more common lung cancers and are not discussed here.

Cancers that spread to the lungs: Cancers that start in other organs (such as the breast[4], pancreas[5], kidney[6], or skin[7]) can sometimes spread (metastasize) to the lungs, but these are not lung cancers. For example, cancer that starts in the breast and spreads to the lungs is still breast cancer, not lung cancer. Treatment for metastatic cancer to the lungs is based on where it started (the primary cancer site).

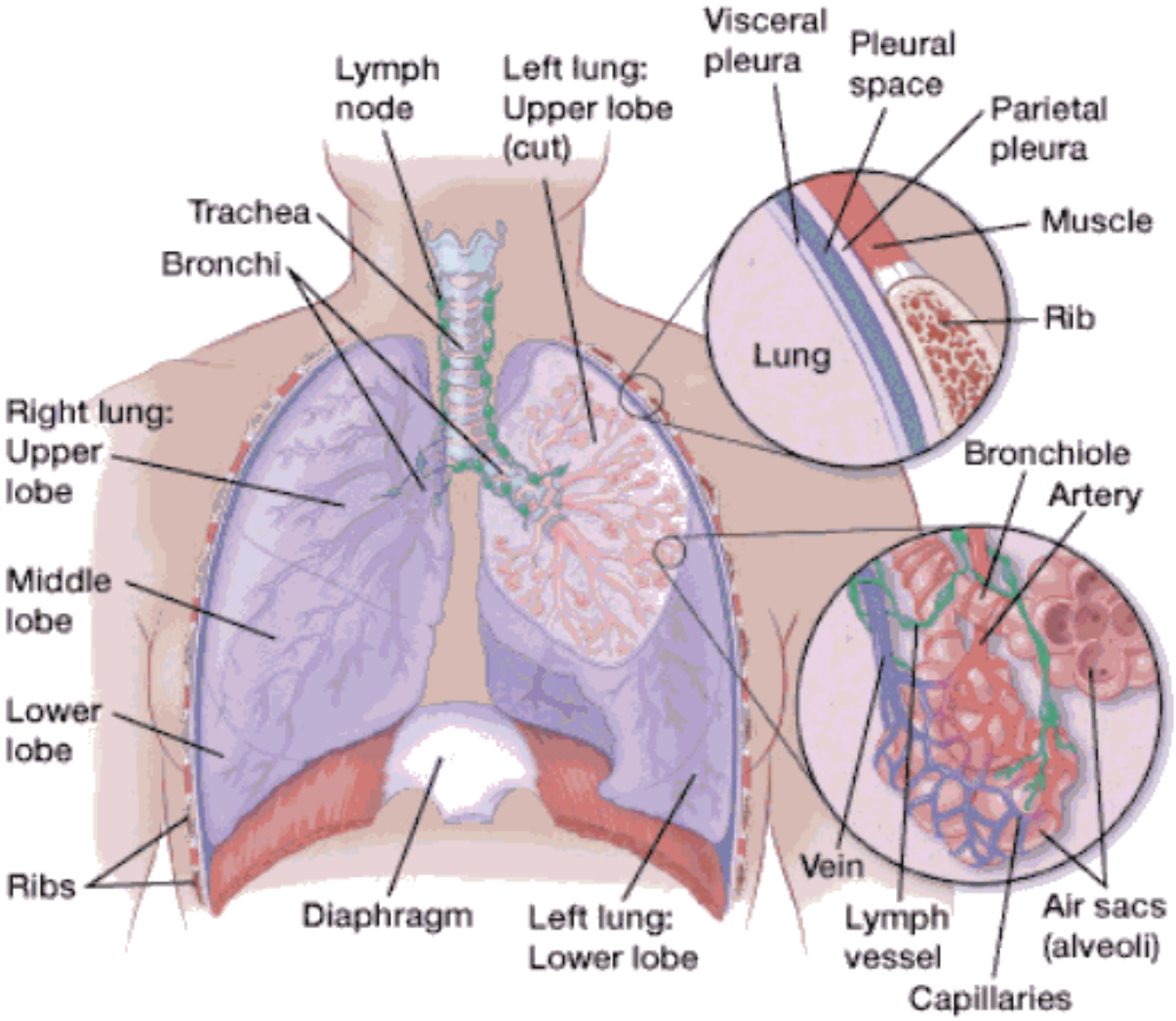
About the lungs

Your lungs are 2 sponge-like organs in your chest. Your right lung has 3 sections, called *lobes*. Your left lung has 2 lobes. The left lung is smaller because your heart takes up more room on that side of the body.

When you breathe in, air enters through your mouth and nose and goes into your lungs through the *trachea* (windpipe). The trachea divides into tubes called the *bronchi* (singular, *bronchus*), which enter the lungs and divide into smaller branches called bronchioles. At the end of the bronchioles are tiny air sacs known as *alveoli*.

The alveoli absorb oxygen from the inhaled air into your blood and remove carbon dioxide from the blood. This leaves the body when you exhale. Taking in oxygen and getting rid of carbon dioxide are your lungs' main functions.

Lung cancers typically start in the cells lining the bronchi and parts of the lung such as the bronchioles or alveoli.



A thin lining called the *pleura* surrounds the lungs. The pleura protects your lungs and helps them slide back and forth against the chest wall as they expand and contract during breathing.

Below the lungs, a thin, dome-shaped muscle called the *diaphragm* separates the chest from the abdomen. When you breathe, the diaphragm moves up and down, forcing air in and out of the lungs.

Hyperlinks

1. www.cancer.org/cancer/cancer-basics/what-is-cancer.html
2. www.cancer.org/cancer/non-small-cell-lung-cancer.html
3. www.cancer.org/cancer/lung-carcinoid-tumor.html
4. www.cancer.org/cancer/breast-cancer.html
5. www.cancer.org/cancer/pancreatic-cancer.html
6. www.cancer.org/cancer/kidney-cancer.html
7. www.cancer.org/cancer/skin-cancer.html

References

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

Last Medical Review: February 22, 2016 Last Revised: May 16, 2016

Key Statistics for Small Cell Lung Cancer

Most lung cancer statistics include both small cell lung cancer (SCLC) and non-small cell lung cancer (NSCLC). In general, SCLC accounts for about 10% to 15% of all lung cancers.

How common is lung cancer?

Lung cancer (both small cell and non-small cell) is the second most common cancer in both men and women (not counting skin cancer[1]). Prostate cancer[2] is more common in men, while breast cancer[3] is more common in women. About 14% of all new cancers are lung cancers.

The American Cancer Society's estimates for lung cancer (including both small cell and non-small cell) in the United States for 2019 are:

- About 228,150 new cases of lung cancer (116,440 in men and 111,710 in women)
- About 142,670 deaths from lung cancer (76,650 in men and 66,020 in women)

Lung cancer is by far the leading cause of cancer death among both men and women. Each year, more people die of lung cancer than from colon[4], breast, and prostate cancers combined.

Lung cancer mainly occurs in older people. Most people diagnosed with lung cancer are 65 or older, while a very small number of people diagnosed are younger than 45. The average age at the time of diagnosis is about 70.

Lifetime chance of getting lung cancer

Overall, the chance that a man will develop lung cancer in his lifetime is about 1 in 15; for a woman, the risk is about 1 in 17. Smoking can greatly affect these lifetime risks. For smokers the risk is much higher, while for non-smokers the risk is lower.

- Black men are about 20% more likely to develop lung cancer (including all types) than are white men. The rate is about 10% lower in black women than in white women.
- Women (black and white) have lower rates than men, but the gap is closing. This is because the lung cancer rate has been dropping among men over the past few decades, but only for about the last decade in women.
- Despite their overall risk of lung cancer being higher, black men are about 15% *less* likely to develop SCLC than are white men, and the risk is about 30% lower in black women than in white women.

Statistics on survival in people with SCLC vary depending on the stage (extent) of the cancer when it is diagnosed. For survival statistics by stage, see Small Cell Lung Cancer Survival Rates, By Stage[5].

Visit the American Cancer Society's Cancer Statistics Center for more key statistics.

Hyperlinks

1. www.cancer.org/cancer/skin-cancer.html
2. www.cancer.org/cancer/prostate-cancer.html
3. www.cancer.org/cancer/breast-cancer.html

4. www.cancer.org/cancer/colon-rectal-cancer.html
5. www.cancer.org/cancer/small-cell-lung-cancer/detection-diagnosis-staging/survival-rates.html

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American Cancer Society. *Facts & Figures 2019*. American Cancer Society. Atlanta, Ga. 2019.

Howlader N, Noone AM, Krapcho M, Miller D, Bishop K, Kosary CL, Yu M, Ruhl J, Tatalovich Z, Mariotto A, Lewis DR, Chen HS, Feuer EJ, Cronin KA (eds). SEER Cancer Statistics Review, 1975-2014, National Cancer Institute. Bethesda, MD, https://seer.cancer.gov/csr/1975_2014/, based on November 2016 SEER data submission, posted to the SEER web site, April 2017.

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What's New in Small Cell Lung Cancer Research?

Research into the prevention[1], early detection[2], and treatment[3] of small cell lung cancer (SCLC) is being done in many medical centers throughout the world.

Prevention

Tobacco

Prevention offers the greatest opportunity to fight lung cancer. Although decades have passed since the link between smoking and lung cancers became clear, smoking is still responsible for most lung cancer deaths. Research is continuing on:

- Ways to help people quit smoking[4] and stay tobacco-free through counseling, nicotine replacement, and other medicines
- Ways to convince young people to never start smoking
- Inherited differences in genes that may make some people much more likely to get lung cancer if they smoke or are exposed to someone else's smoke

Environmental causes

Researchers also continue to look into some of the other causes of lung cancer, such as exposure to radon[5] and diesel exhaust[6]. Finding new ways to limit these exposures could potentially save many more lives.

Diet, nutrition, and medicines

Researchers are looking for ways to use vitamins or medicines to help prevent lung cancer in people at high risk, but so far none have been shown clearly to reduce risk.

Some studies have suggested that a diet high in fruits and vegetables may offer some protection, but more research is needed to confirm this. While any protective effect of fruits and vegetables on lung cancer risk is likely to be much smaller than the increased risk from smoking, following the American Cancer Society Dietary Recommendations[7] (such as staying at a healthy weight and eating a diet high in fruits, vegetables, and whole grains) may still be helpful.

Early detection

As mentioned in the section Can Small Cell Lung Cancer Be Found Early?[8], screening with spiral CT scans in people at high risk of lung cancer (due to smoking history) has been found to lower the risk of death from lung cancer, when compared to chest x-rays.

Another approach now being studied uses newer, sensitive tests to look for cancer cells in sputum samples. Researchers have found several changes often seen in the DNA of lung cancer cells. Studies are looking at tests that can spot these DNA changes to see if they can find lung cancers at an earlier stage.

Diagnosis

Fluorescence bronchoscopy

Also known as *autofluorescence bronchoscopy*, this technique might help doctors find some lung cancers earlier, when they are likely to be easier to treat. For this test, the doctor inserts a bronchoscope through the mouth or nose and into the lungs. The end of the bronchoscope has a special fluorescent light on it, instead of a normal (white) light.

The fluorescent light causes abnormal areas in the airways to show up in a different color than healthy parts of the airway. Some of these areas might not be visible under white light, so the color difference can help doctors find these areas sooner. Some cancer centers now use this technique to look for early lung cancers, especially if there are no obvious tumors seen with normal bronchoscopy.

Virtual bronchoscopy

This imaging test uses a chest CT scan to create a detailed 3-dimensional picture of the airways in the lungs. The images can be seen as if the doctor were actually using a bronchoscope.

Virtual bronchoscopy has some possible advantages over standard bronchoscopy. First, it is non-invasive and doesn't require anesthesia. It also helps doctors look at some airways that they might not be able to reach with standard bronchoscopy, such as those being blocked by a tumor. But this test has some drawbacks as well. For example, it doesn't show color changes in the airways that might indicate a problem. It also doesn't let a doctor take samples of suspicious areas like bronchoscopy does. Still, it may be a useful tool in some situations, such as in people who might be too sick to get a standard bronchoscopy.

This test will probably become more available as the technology improves.

Treatment

Real-time tumor imaging

Researchers are looking to use new imaging techniques, such as four-dimensional computed tomography (4DCT), to help improve treatment. In this technique, the CT machine scans the chest continuously for about 30 seconds. It shows where the tumor is in relation to other structures as a person breathes, as opposed to just giving a

'snapshot' of a point in time, like a standard CT does.

4DCT can be used to determine exactly where the tumor is during each part of the breathing cycle, which can help doctors deliver radiation to a tumor more precisely. This technique might also be used to help show if a tumor is attached to or invading important structures in the chest, which could help doctors determine if a patient might be eligible for surgery.

Radiation therapy

Several newer methods for giving radiation therapy[9] have become available in recent years, For example, some newer radiation therapy machines have imaging scanners built into them. This advance, known as *image guided radiation therapy* (IGRT), lets the doctor take pictures of the lung and make minor adjustments in aiming just before giving the radiation. This may help deliver the radiation more precisely, which might result in fewer side effects.

Chemotherapy

Clinical trials[10] are looking at newer chemotherapy drugs and combinations of drugs to determine which are the safest and most effective. This is especially important in patients who are older and have other health problems.

Doctors are also searching for better ways to combine chemotherapy with radiation therapy and other treatments.

Targeted therapy drugs

Researchers are learning more about the inner workings of lung cancer cells that control their growth and spread. This is being used to develop new targeted therapy drugs. These drugs work differently from standard chemotherapy drugs. They might work in some cases when standard chemo drugs don't, and they often have different (and less severe) side effects. Many of these treatments are being tested in clinical trials to see if they can help people with lung cancer live longer or relieve their symptoms.

Some of the targeted drugs now being studied include alisertib and linsitinib.

Immune treatments

Researchers are developing immunotherapy[11] drugs that can help the body's immune

system fight the cancer.

Immune checkpoint inhibitors: Cancer cells can sometimes avoid being attacked by the body's immune system by using certain "checkpoints" that normally keep the immune system in check. For example, cancer cells often have a lot of a protein called PD-L1 on their surface that helps them evade the immune system. Newer drugs that block the PD-L1 protein, or the corresponding PD-1 protein on immune cells called T cells, can help the immune system recognize the cancer cells and attack them.

Nivolumab (Opdivo) and **atezolizumab (Tecentriq)** are checkpoint inhibitors that can now be used to treat some people with advanced SCLC. In clinical trials, these drugs have been shown to shrink some small cell lung cancers and help some people live longer.

Several other checkpoint inihibitors are now being studied for use in SCLC as well.

Vaccines: Several types of vaccines for boosting the body's immune response against lung cancer cells are being tested in clinical trials. Unlike vaccines against infections like measles or mumps, these vaccines are designed to help treat, not prevent, lung cancer. These types of treatments seem to have very limited side effects, so they might be useful in people who can't tolerate other treatments. At this time, vaccines are only available in clinical trials.

Hyperlinks

1. www.cancer.org/cancer/small-cell-lung-cancer/causes-risks-prevention/prevention.html
2. www.cancer.org/cancer/small-cell-lung-cancer/detection-diagnosis-staging/detection.html
3. www.cancer.org/cancer/small-cell-lung-cancer/treating.html
4. www.cancer.org/healthy/stay-away-from-tobacco/guide-quitting-smoking.html
5. www.cancer.org/cancer/cancer-causes/radiation-exposure/radon.html
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7. www.cancer.org/healthy/eat-healthy-get-active/acs-guidelines-nutrition-physical-activity-cancer-prevention.html
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11. www.cancer.org/cancer/small-cell-lung-cancer/treating/immunotherapy.html

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Small Cell Lung Cancer Causes, Risk Factors, and Prevention

Risk Factors

A risk factor is anything that affects your chance of getting a disease such as cancer. Learn more about the risk factors for small cell lung cancer.

- Small Cell Lung Cancer Risk Factors
- What Causes Small Cell Lung Cancer?

Prevention

There is no way to completely prevent cancer. But there are things you can do that might lower your risk. Learn more.

- Can Small Cell Lung Cancer Be Prevented?
- Lung Cancer Prevention and Early Detection[1]

Small Cell Lung Cancer Risk Factors

A risk factor is anything that affects your chance of getting a disease such as cancer. Different cancers have different risk factors. Some risk factors, like smoking, can be changed. Others, like a person's age or family history, can't be changed.

But having a risk factor, or even several, does not mean that you will get the disease. And some people who get the disease may have few or no known risk factors.

Several risk factors can make you more likely to develop lung cancer. (These factors are related to the risk of lung cancer in general, so it's possible that some of these might not apply to small cell lung cancer.)

Tobacco smoke

Smoking[1] is by far the leading risk factor for lung cancer. About 80% of all lung cancer deaths are thought to result from smoking, and this number is probably even higher for small cell lung cancer (SCLC). It's very rare for someone who has never smoked to have SCLC. The risk for lung cancer among smokers is many times higher than among non-smokers. The longer you smoke and the more packs per day you smoke, the greater your risk.

Cigar smoking[2] and pipe smoking are almost as likely to cause lung cancer as cigarette smoking. Smoking low-tar or "light" cigarettes increases lung cancer risk as much as regular cigarettes. Smoking menthol cigarettes might increase the risk even more, as the menthol may allow smokers to inhale more deeply.

Secondhand smoke[3]**:** If you don't smoke, breathing in the smoke of others (called secondhand smoke or environmental tobacco smoke) can increase your risk of developing lung cancer. Secondhand smoke is thought to cause more than 7,000 deaths from lung cancer each year.

If you or someone you care about needs help quitting, see our Guide to Quitting Smoking[4] or call the American Cancer Society at 1-800-227-2345.

Exposure to radon

Radon is a radioactive gas that occurs naturally when uranium in soil and rocks breaks down. It cannot be seen, tasted, or smelled. According to the US Environmental Protection Agency (EPA), radon is the second leading cause of lung cancer, and is the leading cause among non-smokers.

Outdoors, there is so little radon that it is not likely to be dangerous. But indoors, radon can become more concentrated. Breathing it in exposes your lungs to small amounts of radiation. This might increase your risk of lung cancer.

Homes and other buildings in nearly any part of the United States can have high indoor

radon levels (especially in basements).

For more information, see Radon and Cancer[5]

Exposure to asbestos

People who work with asbestos (such as in some mines, mills, textile plants, places that use insulation, and shipyards) are several times more likely to die of lung cancer. Lung cancer risk is much greater in workers exposed to asbestos who also smoke. It's not clear how much low-level or short-term exposure to asbestos might raise lung cancer risk.

People exposed to large amounts of asbestos also have a greater risk of developing mesothelioma, a type of cancer that starts in the pleura (the lining surrounding the lungs). For more on this type of cancer, see Malignant Mesothelioma[6].

In recent years, government regulations have greatly reduced the use of asbestos in commercial and industrial products. It's still present in many homes and other older buildings, but it's not usually considered harmful as long as it's not released into the air by deterioration, demolition, or renovation. For more information, see Asbestos and Cancer Risk[7].

Other cancer-causing substances in the workplace

Other carcinogens (cancer-causing substances) found in some workplaces that can increase lung cancer risk include:

- Radioactive ores such as **uranium**
- **Inhaled chemicals** such as arsenic[8], beryllium, cadmium, silica, vinyl chloride, nickel compounds, chromium compounds, coal products, mustard gas, and chloromethyl ethers
- Diesel exhaust[9]

The government and industry have taken steps in recent years to help protect workers from many of these exposures. But the dangers are still there, so if you work around these products, be careful to limit your exposure whenever possible.

Air pollution

In cities, air pollution (especially near heavily trafficked roads) appears to raise the risk of lung cancer slightly. This risk is far less than the risk caused by smoking, but some researchers estimate that worldwide about 5% of all deaths from lung cancer may be due to outdoor air pollution.

Arsenic in drinking water

Studies of people in parts of Southeast Asia and South America with high levels of arsenic[10] in their drinking water have found a higher risk of lung cancer. In most of these studies, the levels of arsenic in the water were many times higher than those typically seen in the United States, even in areas where arsenic levels are above normal. For most Americans who are on public water systems, drinking water is not a major source of arsenic.

Radiation therapy to the lungs

People who have had radiation therapy to the chest for other cancers[11] are at higher risk for lung cancer, particularly if they smoke. Examples include people who have been treated for Hodgkin disease[12] or women who get chest radiation after a mastectomy for breast cancer[13]. Women who receive radiation therapy to the breast after a lumpectomy do not appear to have a higher than expected risk of lung cancer.

Personal or family history of lung cancer

If you have had lung cancer, you have a higher risk of developing another lung cancer.

Brothers, sisters, and children of those who have had lung cancer may have a slightly higher risk of lung cancer themselves, especially if the relative was diagnosed at a younger age. It's not clear how much of this risk might be due to shared genes among family members and how much might be from shared household exposures (such as tobacco smoke or radon).

Researchers have found that genetics does seem to play a role in some families with a strong history of lung cancer. (See What Causes Small Cell Lung Cancer?) Research is ongoing in this area.

Certain dietary supplements

Studies looking at the possible role of vitamin supplements in reducing lung cancer risk

have not been promising so far. In fact, 2 large studies found that smokers who took beta carotene supplements actually had an increased risk of lung cancer. The results of these studies suggest that smokers should avoid taking beta carotene supplements.

Factors with uncertain or unproven effects on lung cancer risk

Marijuana smoke

There are some reasons to think that smoking marijuana might increase lung cancer risk:

- Marijuana smoke contains tar and many of same the cancer-causing substances that are in tobacco smoke. (Tar is the sticky, solid material that remains after burning, which is thought to contain most of the harmful substances in smoke.)
- Marijuana cigarettes (joints) are typically smoked all the way to the end, where tar content is the highest.
- Marijuana is inhaled very deeply and the smoke is held in the lungs for a long time, which gives any cancer-causing substances more opportunity to deposit in the lungs.
- Because marijuana is still illegal in many places, it may not be possible to control what other substances it might contain.

Those who use marijuana tend to smoke fewer marijuana cigarettes in a day or week than the amount of tobacco consumed by cigarette smokers. The lesser amount smoked would make it harder to see an impact on lung cancer risk.

It’s been hard to study whether there is a link between marijuana and lung cancer because marijuana has been illegal in many places for so long, and it’s not easy to gather information about the use of illegal drugs.

Also, in studies that have looked at past marijuana use in people who had lung cancer, most of the marijuana smokers also smoked cigarettes. This can make it hard to know how much any increase in risk is from tobacco and how much might be from marijuana. More research is needed to know the cancer risks from smoking marijuana.

Talc and talcum powder

Talc is a mineral that in its natural form may contain asbestos. Some studies have suggested that talc miners and millers might have a higher risk of lung cancer and other

respiratory diseases because of their exposure to industrial grade talc. But other studies have not found an increase in lung cancer rate.

Talcum powder[14] is made from talc. By law since the 1970s, all home-use talcum products (baby, body, and facial powders) in the United States have been asbestos-free. The use of cosmetic talcum powder has not been found to increase lung cancer risk.

Hyperlinks

1. www.cancer.org/cancer/cancer-causes/tobacco-and-cancer.html
2. www.cancer.org/cancer/cancer-causes/tobacco-and-cancer/is-any-type-of-smoking-safe.html
3. www.cancer.org/cancer/cancer-causes/tobacco-and-cancer/secondhand-smoke.html
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What Causes Small Cell Lung Cancer?

We don't know what causes each case of lung cancer. But we do know many of the risk factors for these cancers (see Small Cell Lung Cancer Risk Factors) and how some of them can cause cells to become cancerous.

Smoking

Tobacco smoking[1] is by far the leading cause of small cell lung cancer (SCLC). Most small cell lung cancer deaths are caused by smoking or exposure to secondhand smoke.

Smoking is clearly the strongest risk factor for lung cancer, but it often interacts with other factors. Smokers exposed to other known risk factors such as radon[2] and asbestos[3] are at even higher risk. Not everyone who smokes gets lung cancer, so other factors like genetics probably play a role as well (see below).

Lung cancer in non-smokers

It is rare for someone who has never smoked to be diagnosed with SCLC, but it can happen. Lung cancer in non-smokers can be caused by exposure to radon[4], secondhand smoke[5], air pollution, or other factors. Workplace exposures to asbestos[6], diesel exhaust[7], or certain other chemicals can also cause lung cancers in some people who don't smoke.

A small portion of lung cancers occur in people with no known risk factors for the disease. Some of these might just be random events that don't have an outside cause, but others might be due to factors that we don't yet know about.

Gene changes that may lead to lung cancer

Some of the risk factors for lung cancer can cause certain changes in the DNA of lung cells. These changes can lead to abnormal cell growth and, sometimes, cancer. DNA is the chemical in each of our cells that makes up our genes, which control how our cells function. We usually look like our parents because they are the source of our DNA. But DNA also can influence our risk for developing certain diseases, such as some kinds of cancer.

Some genes help control when cells grow, divide into new cells, and die:

- Genes that help cells grow, divide, or stay alive are called *oncogenes*.
- Genes that help control cell division or cause cells to die at the right time are called *tumor suppressor genes*.

Cancers can be caused by DNA changes that turn on oncogenes or turn off tumor suppressor genes.

Inherited gene changes

Some people inherit DNA mutations (changes) from their parents that greatly increase their risk for developing certain cancers. But inherited mutations alone are not thought to cause very many lung cancers.

Still, genes do seem to play a role in some families with a history of lung cancer. For example, some people seem to inherit a reduced ability to break down or get rid of certain types of cancer-causing chemicals in the body, such as those found in tobacco smoke. This could put them at higher risk for lung cancer.

Other people may inherit faulty DNA repair mechanisms that make it more likely they will end up with DNA changes. People with DNA repair enzymes that don't work normally might be especially vulnerable to cancer-causing chemicals and radiation.

Researchers are developing tests that may help identify such people, but these tests are not yet used routinely. For now, doctors recommend that all people avoid tobacco smoke and other exposures that might increase their cancer risk.

Acquired gene changes

Gene changes related to SCLC are usually acquired during life rather than inherited. Acquired mutations in lung cells often result from exposure to factors in the environment, such as cancer-causing chemicals in tobacco smoke. But some gene changes may just be random events that sometimes happen inside a cell, without having an outside cause.

Acquired changes in certain genes, such as the *TP53* and *RB1* tumor suppressor genes, are thought to be important in the development of SCLC. Changes in these and other genes may also make some lung cancers more likely to grow and spread than others. Not all lung cancers share the same gene changes, so there are undoubtedly changes in other genes that have not yet been found.

Hyperlinks

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Can Small Cell Lung Cancer Be Prevented?

Not all lung cancers can be prevented. But there are things you can do that might lower your risk, such as changing the risk factors that you can control.

Stay away from tobacco

The best way to reduce your risk of lung cancer is not to smoke and to avoid breathing in other people's smoke.

If you stop smoking before a cancer develops, your damaged lung tissue gradually starts to repair itself. No matter what your age or how long you've smoked, quitting may lower your risk of lung cancer and help you live longer. If you would like help quitting smoking, see our Guide to Quitting Smoking[1] or call the American Cancer Society at 1-800-227-2345.

Avoid radon

Radon is an important cause of lung cancer. You can reduce your exposure to radon by having your home tested and treated, if needed. For more information, see Radon and Cancer[2].

Avoid or limit exposure to cancer-causing chemicals

Avoiding exposure to known cancer-causing chemicals, in the workplace and elsewhere, might also be helpful (see Small Cell Lung Cancer Risk Factors). People working where these exposures are common should try to keep exposure to a minimum when possible.

Eat a healthy diet

A healthy diet[3] with lots of fruits and vegetables may also help reduce your risk of lung cancer. Some evidence suggests that a diet high in fruits and vegetables may help protect against lung cancer in both smokers and non-smokers. But any positive effect of fruits and vegetables on lung cancer risk would be much less than the increased risk from smoking.

Trying to reduce the risk of lung cancer in current or former smokers by giving them high doses of vitamins or vitamin-like drugs has not been successful so far. In fact, some studies have found that supplements of beta-carotene, a nutrient related to vitamin A, appear to increase the rate of lung cancer in these people.

Some people who get lung cancer do not have any clear risk factors. Although we know how to prevent most lung cancers, at this time we don't know how to prevent all of them.

Hyperlinks

1. www.cancer.org/healthy/stay-away-from-tobacco/guide-quitting-smoking.html
2. www.cancer.org/cancer/cancer-causes/radiation-exposure/radon.html
3. www.cancer.org/healthy/eat-healthy-get-active/acs-guidelines-nutrition-physical-activity-cancer-prevention.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 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

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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
6. www.cancer.org/cancer/small-cell-lung-cancer/treating/surgery.html
7. /content/cancer/en/treatment/understandingyourdiagnosis/understandingyourpathologyreport/lungpathology/lung-pathology.html
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)

Last Medical Review: February 22, 2016 Last Revised: May 16, 2016

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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Pietanza MC, Krug LM, Wu AJ, et al. Chapter 42: Small cell and neuroendocrine tumors of the lung. In: DeVita VT, Lawrence TS, Rosenberg SA, eds. *DeVita, Hellman, and Rosenberg's Cancer: Principles and Practice of Oncology*. 10th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2015.

Last Medical Review: December 18, 2017 Last Revised: December 18, 2017

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

References

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Last Medical Review: February 22, 2016 Last Revised: February 4, 2019

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

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Treating Small Cell Lung Cancer

If you've been diagnosed with small cell lung cancer (SCLC), your cancer care team will discuss your treatment options with you. It's important to weigh the benefits of each treatment option against the possible risks and side effects.

How is small cell lung cancer treated?

Treatments for SCLC can include:

- Chemotherapy for Small Cell Lung Cancer
- Immunotherapy for Small Cell Lung Cancer
- Radiation Therapy for Small Cell Lung Cancer
- Surgery for Small Cell Lung Cancer
- Palliative Procedures for Small Cell Lung Cancer

Common treatment approaches

The treatment options for SCLC are based mainly on the stage (extent) of the cancer, but other factors, such as a person’s overall health and lung function are also important. Sometimes, more than one of type of treatment is used. If you have SCLC, you will probably get chemotherapy if you are healthy enough. If you have limited stage disease, radiation therapy and – rarely – surgery may be options as well.

- Treatment Choices by Stage for Small Cell Lung Cancer

Who treats small cell lung cancer?

You may have different types of doctors on your treatment team, depending on the stage of your cancer and your treatment options. These doctors could include:

- A **medical oncologist:** a doctor who treats cancer with medicines such as chemotherapy
- A **pulmonologist:** a doctor who specializes in medical treatment of diseases of the lungs
- A **radiation oncologist:** a doctor who treats cancer with radiation therapy
- A **thoracic surgeon:** a doctor who treats diseases in the lungs and chest with surgery

Many other specialists may be involved in your care as well, including nurse practitioners, nurses, psychologists, social workers, rehabilitation specialists, and other health professionals.

- Health Professionals Associated With Cancer Care[1]

Making treatment decisions

It's important to discuss all of your treatment options as well as their possible side effects with your family and your treatment team to make the choice that best fits your needs. If there's anything you don't understand, ask to have it explained.

If time permits, it is often a good idea to seek a second opinion. A second opinion can give you more information and help you feel more confident about the treatment plan you choose.

- What Should You Ask Your Health Care Team About Small Cell Lung Cancer?[2]
- Seeking a Second Opinion[3]

Thinking about taking part in a clinical trial

Clinical trials are carefully controlled research studies that are done to get a closer look at promising new treatments or procedures. Clinical trials are one way to get state-of-the art cancer treatment. In some cases they may be the only way to get access to newer treatments. They are also the best way for doctors to learn better methods to treat cancer. Still, they're not right for everyone.

If you would like to learn more about clinical trials that might be right for you, start by asking your doctor if your clinic or hospital conducts clinical trials.

- Clinical Trials[4]

Considering complementary and alternative methods

You may hear about alternative or complementary methods that your doctor hasn't mentioned to treat your cancer or relieve symptoms. These methods can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few.

Complementary methods refer to treatments that are used along with your regular medical care. Alternative treatments are used instead of a doctor's medical treatment. Although some of these methods might be helpful in relieving symptoms or helping you feel better, many have not been proven to work. Some might even be harmful.

Be sure to talk to your cancer care team about any method you are thinking about using. They can help you learn what is known (or not known) about the method, which can help you make an informed decision.

- Complementary and Alternative Medicine[5]

Help getting through cancer treatment

Your cancer care team will be your first source of information and support, but there are other resources for help when you need it. Hospital- or clinic-based support services are an important part of your care. These might include nursing or social work services, financial aid, nutritional advice, rehab, or spiritual help.

The American Cancer Society also has programs and services – including rides to treatment, lodging, and more – to help you get through treatment. Call our National Cancer Information Center at 1-800-227-2345 and speak with one of our trained specialists.

- Find Support Programs and Services in Your Area[6]

Choosing to stop treatment or choosing no treatment at all

For some people, when treatments have been tried and are no longer controlling the cancer, it could be time to weigh the benefits and risks of continuing to try new treatments. Whether or not you continue treatment, there are still things you can do to help maintain or improve your quality of life.

Some people, especially if the cancer is advanced, might not want to be treated at all.

There are many reasons you might decide not to get cancer treatment, but it's important to talk to your doctors and you make that decision. Remember that even if you choose not to treat the cancer, you can still get supportive care to help with pain or other symptoms.

- If Cancer Treatments Stop Working[7]
- Palliative or Supportive Care[8]

The treatment information given here is not official policy of the American Cancer Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor. Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask him or her questions about your treatment options.

Chemotherapy for Small Cell Lung Cancer

Chemotherapy (chemo) is treatment with anti-cancer drugs injected into a vein or taken by mouth. These drugs enter the bloodstream and go throughout the body, making this treatment useful for cancer anywhere in the body.

When might chemotherapy be used?

Chemo is typically part of the treatment for small cell lung cancer (SCLC). This is because SCLC has usually already spread by the time it is found (even if the spread can't be seen on imaging tests), so other treatments such as surgery or radiation therapy would not reach all areas of cancer.

- For people with limited stage SCLC, chemo is often given along with radiation therapy. This is known as *chemoradiation*.
- For people with extensive stage SCLC, chemo alone is usually the main treatment (although sometimes radiation therapy is given as well).

Some patients in poor health might not be able to tolerate intense doses of chemo. But older age by itself is not a reason to not get chemo.

Drugs used to treat SCLC

SCLC is generally treated with combinations of chemotherapy drugs. The combinations most often used are:

- Cisplatin and etoposide
- Carboplatin and etoposide
- Cisplatin and irinotecan
- Carboplatin and irinotecan

Doctors give chemo in cycles, with a period of treatment (usually 1 to 3 days) followed by a rest period to allow your body time to recover. Each cycle generally lasts about 3 to 4 weeks, and initial treatment is typically 4 to 6 cycles.

If the cancer progresses (get worse) during treatment or returns after treatment is finished, other chemo drugs may be tried. The choice of drugs depends to some extent on how soon the cancer begins to grow again. (The longer it takes for the cancer to return, the more likely it is to respond to further treatment.)

- If cancer returns more than 6 months after treatment, it might respond again to the same chemo drugs that were given the first time, so these can be tried again.
- If the cancer comes back sooner, or if it keeps growing during treatment, further treatment with the same drugs isn't likely to be helpful. If further chemo is given, most doctors prefer treatment with a single, different drug to help limit side effects. Topotecan, which can either be given into a vein (IV) or taken as pills, is the drug most often used, although others might also be tried.

SCLC that progresses or comes back can be hard to treat, so taking part in a clinical trial[1] of newer treatments might be a good option for some people.

Possible side effects of chemotherapy

Chemo drugs can cause side effects[2]. These depend on the type and dose of drugs given and how long they are taken. Some of the more common side effects of chemo include:

- Hair loss
- Mouth sores
- Loss of appetite
- Nausea and vomiting[3]
- Diarrhea or constipation
- Increased chance of infections[4] (from having too few white blood cells)
- Easy bruising or bleeding (from having too few blood platelets)
- Fatigue[5] (from having too few red blood cells)

These side effects usually go away after treatment. There are often ways to lessen these side effects. For example, drugs can help prevent or reduce nausea and vomiting.

Some drugs can have specific side effects. For example:

- Drugs such as cisplatin and carboplatin can damage nerve endings. This is called [6]*peripheral neuropath*[7]*y*. It can sometimes lead to symptoms (mainly in the hands and feet) such as pain, burning or tingling sensations, sensitivity to cold or heat, or weakness. In most people this goes away or gets better after treatment is stopped, but it may last a long time in some people.
- Cisplatin can also cause kidney damage. To help prevent this, doctors give lots of IV fluids before and after each dose of the drug is given.

To learn more about chemo, see Chemotherapy[8].

Hyperlinks

1. www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html
2. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/nausea-and-vomiting.html
3. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/infections.html
4. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/fatigue.html
5. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/peripheral-neuropathy.html
6. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/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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Immunotherapy for Small Cell Lung Cancer

Immunotherapy is the use of medicines to stimulate a person's own immune system to recognize and destroy cancer cells more effectively. It can be used to treat some people with small cell lung cancer (SCLC).

Immune checkpoint inhibitors

An important part of the immune system is its ability to keep itself from attacking normal cells in the body. To do this, it uses "checkpoints", which are proteins on immune cells that need to be turned on (or off) to start an immune response. Cancer cells sometimes use these checkpoints to avoid being attacked by the immune system. But drugs called *immune checkpoint inhibitors* target the these proteins, helping to restore the immune response against cancer cells.

- **Nivolumab (Opdivo)** targets PD-1, a protein on T cells(a type of immune system cell) that normally helps keep these cells from attacking other cells in the body. By blocking PD-1, this drug boosts the immune response against cancer cells. It is used to treat advanced SCLC in people whose cancer continues to grow after getting at least two previous lines of treatment, including chemotherapy with either cisplatin or carboplatin.
- **Atezolizumab (Tecentriq)** targets PD-L1, a protein related to PD-1 that is found on some tumor cells and immune cells. Blocking this protein can also help boost the immune response against cancer cells. This drug can be used as part of the first-line treatment for advanced SCLC, along with the chemo drugs carboplatin and etoposide.

These drugs are given as an intravenous (IV) infusion, typically every 2 or 3 weeks.

Possible side effects

Side effects of these drugs can include fatigue[1], cough, nausea[2], skin rash,[3] decreased appetite[4], constipation[5], joint pain[6], and diarrhea[7].

Other, more serious side effects occur less often. These drugs work by removing one of the safeguards that normally helps keep the immune system in check. Sometimes the immune system starts attacking other parts of the body, which can cause serious or even life-threatening problems in the lungs, intestines, liver, hormone-making glands, kidneys, or other organs.

It's very important to report any new side effects to your health care team promptly. If serious side effects do occur, treatment may need to be stopped and you may get high doses of corticosteroids to suppress your immune system.

To learn more about this type of treatment, see Cancer Immunotherapy.[8]

Hyperlinks

1. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/fatigue.html
2. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/nausea-and-vomiting.html
3. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/skin-problems.html
4. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/eating-problems/poor-appetite.html
5. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/stool-or-urine-changes/constipation.html
6. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/pain.html
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8. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/immunotherapy.html

References

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

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Radiation Therapy for Small Cell Lung Cancer

Radiation therapy uses high-energy rays (such as x-rays) or particles to kill cancer cells.

When is radiation therapy used?

Depending on the stage[1] of small cell lung cancer (SCLC) and other factors, radiation therapy might be used in several situations:

- In limited stage SCLC, radiation therapy can be given at the same time as chemotherapy (chemo) to treat the tumor and lymph nodes in the chest. Giving chemo and radiation together is called *concurrent chemoradiation*. The radiation may be started with the first or second cycle of chemo.
- Radiation can also be given after the chemo is finished. This is sometimes done for patients with extensive stage disease, or it can be used for people with limited stage disease who have trouble getting chemotherapy and radiation at the same time (as an alternative to chemoradiation).
- SCLC often spreads to the brain. Radiation can be given to the brain to help lower the chances of problems from cancer spread there. This is called *prophylactic cranial irradiation*. This is most often used to treat people with limited stage SCLC, but it can also help some people with extensive stage SCLC.
- Radiation can be used to shrink tumors to relieve (palliate) symptoms of lung cancer such as pain, bleeding, trouble swallowing, cough, shortness of breath, and problems caused by spread to other organs such as the brain.

Types of radiation therapy

The type of radiation therapy most often used to treat SCLC is called *external beam radiation therapy* (EBRT). It delivers radiation from outside the body and focuses it on the cancer.

Before treatments start, your radiation team will take careful measurements to find the correct angles for aiming the radiation beams and the proper dose of radiation. This planning session, called *simulation*, usually includes getting imaging tests such as CT scans.

Treatment is much like getting an x-ray, but the radiation is more intense. The procedure itself is painless. Each treatment lasts only a few minutes, although the setup time – getting you into place for treatment – usually takes longer.

Most often, radiation as part of the initial treatment for SCLC is given once or twice daily, 5 days a week, for 3 to 7 weeks. Radiation to relieve symptoms and prophylactic cranial radiation are given for shorter periods of time, typically less than 3 weeks.

In recent years, newer EBRT techniques have been shown to help doctors treat lung cancers more accurately while lowering the radiation exposure to nearby healthy tissues. These include:

Three-dimensional conformal radiation therapy (3D-CRT): 3D-CRT uses special computer programs to precisely map the location of the tumor(s). Radiation beams are shaped and aimed at the tumor(s) from several directions, which makes it less likely to damage normal tissues.

Intensity modulated radiation therapy (IMRT): IMRT is an advanced form of 3D therapy. It uses a computer-driven machine that moves around the patient as it delivers radiation. Along with shaping the beams and aiming them at the tumor from several angles, the intensity (strength) of the beams can be adjusted to limit the dose reaching nearby normal tissues. This technique is used most often if tumors are near important structures such as the spinal cord. Many major cancer centers now use IMRT.

A variation of IMRT is called *volumetric modulated arc therapy* (VMAT). It uses a machine that delivers radiation quickly as it rotates once around the body. Each treatment is given over just a few minutes.

Possible side effects of radiation therapy

If you are going to get radiation therapy, it's important to ask your doctor beforehand about the possible side effects so that you know what to expect. Common side effects of radiation therapy can include:

- Skin changes in the area being treated, which can range from mild redness to blistering and peeling
- Hair loss (in the area where the radiation enters the body)
- Fatigue[2] (tiredness)
- Nausea and vomiting[3]
- Loss of appetite and weight loss

Most of these side effects go away after treatment, but some can last a long time. When chemotherapy is given with radiation, the side effects are often worse.

Radiation therapy to the chest may damage your lungs, which might cause a cough, problems breathing, and shortness of breath. These usually improve after treatment is over, although sometimes they may not go away completely.

Your esophagus, which is in the middle of your chest, may be exposed to radiation, which could cause a sore throat and trouble swallowing during or shortly after treatment. This might make it hard to eat anything other than soft foods or liquids for a while.

Radiation therapy to large areas of the brain can sometimes cause memory loss, fatigue, headaches, trouble thinking, or reduced sexual desire. Usually these symptoms are minor compared with those caused by cancer that has spread to the brain, but they can affect your quality of life.

For more information, see Radiation Therapy[4].

Hyperlinks

1. www.cancer.org/cancer/small-cell-lung-cancer/detection-diagnosis-staging/staging.html
2. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/fatigue.html
3. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/nausea-and-vomiting.html
4. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation.html

References

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

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Surgery for Small Cell Lung Cancer

Surgery is rarely used as part of the main treatment for small cell lung cancer (SCLC), as the cancer has usually already spread by the time it is found.

Occasionally (in fewer than 1 out of 20 patients), the cancer is found as only a single lung tumor, with no spread to lymph nodes or other organs. Surgery may be an option for these early-stage cancers, usually followed by additional treatment (chemotherapy, often with radiation therapy).

If your doctor thinks the lung cancer can be treated with surgery, pulmonary function tests will be done first to see if you would still have enough healthy lung tissue left after surgery. Other tests will check the function of your heart and other organs to be sure you're healthy enough for surgery.

Because surgery isn't helpful for more advanced stage lung cancers, your doctor will also want to make sure the cancer hasn't already spread to the lymph nodes between the lungs. This is often done just before surgery with mediastinoscopy or with some of the other techniques described in Tests for Small Cell Lung Cancer[1]. If cancer cells are in the lymph nodes, then surgery is not likely to be helpful.

Types of lung surgery

Different operations can be used to treat SCLC:

- **Pneumonectomy:** An entire lung is removed in this surgery.
- **Lobectomy:** The lungs have 5 lobes (3 in the right lung and 2 in the left). In this surgery, the entire lobe containing the tumor is removed.
- **Segmentectomy or wedge resection:** In these operations, only the part of the

lobe with the tumor is removed.
- **Sleeve resection:** A section of a large airway is removed, and the lung is reattached.

In general, lobectomy is the preferred operation for SCLC if it can be done, because it offers a better chance of removing all of the cancer than segmentectomy or wedge resection.

With any of these operations, nearby lymph nodes are also removed to look for possible spread of the cancer. These operations require general anesthesia (where you are in a deep sleep) and are usually done through a surgical incision between the ribs in the side of the chest (called a *thoracotomy*).

When you wake up from surgery, you will have a tube (or tubes) coming out of your chest and attached to a special canister to allow excess fluid and air to drain out. The tube(s) will be removed once the fluid drainage and air leak stop. Most people will spend about a week in the hospital after the surgery.

Possible risks and side effects of lung surgery

Surgery for lung cancer is a major operation and can have serious side effects, which is why surgery isn't a good idea for everyone. While all surgeries carry some risks, they depend to some degree on the extent of the surgery and a person's health beforehand.

Possible complications during and soon after surgery can include reactions to anesthesia, excess bleeding, blood clots in the legs or lungs, wound infections, and pneumonia. While it is rare, in some cases people may not survive the surgery.

Recovering from lung cancer surgery typically takes weeks to months. When the surgery is done through a thoracotomy, the surgeon must spread the ribs to get to the lung, so the area near the incision will hurt for some time after surgery. Your activity will be limited for at least a month.

If your lungs are in good condition (other than the presence of the cancer) you can usually return to normal activities after some time if a lobe or even an entire lung has been removed.

If you also have another lung disease such as emphysema or chronic bronchitis (which are common among heavy smokers), you might become short of breath with activity after surgery.

For more general information about surgery, see Cancer Surgery[2].

Hyperlinks

1. www.cancer.org/cancer/small-cell-lung-cancer/detection-diagnosis-staging/how-diagnosed.html
2. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/surgery.html

References

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

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Palliative Procedures for Small Cell Lung Cancer

Palliative, or supportive care, is aimed at relieving symptoms and improving a person's quality of life.

People with small cell lung cancer (SCLC) often benefit from procedures to help with problems caused by the cancer. For example, people with advanced lung cancer can be short of breath. This can be caused by many things, including fluid around the lung or an airway that is blocked by a tumor. Although treating the cancer with chemotherapy or other drugs may help with this over time, other treatments may be needed as well.

Treating an airway blocked by a tumor

Tumors can sometimes grow into the lung airways, blocking them and causing problems such as pneumonia or shortness of breath. Sometimes this is treated with radiation therapy (described in Radiation Therapy for Small Cell Lung Cancer), but other

techniques can also be used.

Photodynamic therapy (PDT)

Photodynamic therapy is sometimes used to help open up airways blocked by tumors to help people breathe better.

For this technique, a light-activated drug called porfimer sodium (Photofrin) is injected into a vein. This drug collects more in cancer cells than in normal cells. After a couple of days (to give the drug time to build up in the cancer cells), a bronchoscope is passed down the throat and into the lung. This can be done with either local anesthesia (numbing the throat) and sedation, or with general anesthesia (which puts you in a deep sleep). A special laser light on the end of the bronchoscope is aimed at the tumor, which activates the drug and kills the cells. The dead cells are then removed a few days later during a bronchoscopy. This process can be repeated if needed.

PDT can cause swelling in the airway for a few days, which may lead to some shortness of breath, as well as coughing up blood or thick mucus. Some of this drug also collects in normal cells in the body, such as skin and eye cells. This can make you very sensitive to sunlight or strong indoor lights. Too much exposure can cause serious skin reactions (like a severe sunburn), so doctors recommend staying out of any strong light for several weeks after the injection.

For more information on PDT, see Photodynamic Therapy[1].

Laser therapy

Lasers can sometimes be used to help open up airways blocked by tumors to help people breathe better.

You are usually asleep (under general anesthesia) for this type of treatment. The laser is on the end of a bronchoscope, which is passed down the throat and next to the tumor. The doctor then aims the laser beam at the tumor to burn it away. This treatment can usually be repeated, if needed.

Stent placement

If a lung tumor has grown into an airway and is causing problems, sometimes a bronchoscope is used to put a hard silicone or metal tube called a *stent* in the airway to help keep it open. This is often done after other treatments such as PDT or laser therapy.

Treating fluid buildup in the area around the lung

Sometimes fluid can build up in the chest outside of the lungs. This is called a *pleural effusion*. It can press on the lungs and cause trouble breathing.

Thoracentesis

This is done to drain the fluid. For this procedure, the doctor will numb an area in the chest, and then place a hollow needle into the space between the lungs and the ribs to drain the fluid. This is often done using ultrasound to guide the needle into the fluid.

Pleurodesis

This procedure might be done to remove the fluid and keep it from coming back.

One way to do this is to make a small cut in the skin of chest wall, and place a hollow tube (called a *chest tube*) into the chest to remove the fluid. Then a substance is instilled into the chest through the tube that causes the linings of the lung (visceral pleura) and chest wall (parietal pleura) to stick together, sealing the space and limiting further fluid buildup. A number of substances can be used for this, such as talc, the antibiotic doxycycline, or a chemotherapy drug like bleomycin. The tube is often left in for a couple of days to drain any new fluid that might collect.

Another way to do this is to blow talc into the space around the lungs during an operation. This is done through a small incision using thoracoscopy

Catheter placement

This is another way to control the buildup of fluid. One end of the catheter (a thin, flexible tube) is placed in the chest through a small cut in the skin, and the other end is left outside the body. This is done in a doctor’s office or hospital. Once in place, the catheter can be attached to a special bottle or other device to allow the fluid to drain out on a regular basis.

Treating fluid buildup around the heart

Lung cancer can sometimes spread to the area around the heart. This can lead to fluid buildup inside the sac around the heart (called a *pericardial effusion*), which can press on the heart and affect how well it works.

Pericardiocentesis

In this procedure, the fluid is drained with a needle placed into the space around the heart. This is usually done using an echocardiogram (an ultrasound of the heart) to guide the needle.

Creating a pericardial window

This procedure can be done to keep the fluid from building up again. During surgery, a piece of the sac around the heart (the pericardium) is removed to allow the fluid to drain into the chest or belly.

Hyperlinks

1. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/photodynamic-therapy.html

References

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

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Treatment Choices by Stage for Small Cell Lung Cancer

For practical reasons, small cell lung cancer (SCLC) is usually staged[1] as either limited or extensive. In most cases, SCLC has already spread by the time it is found[2] (even if the spread is not seen on imaging tests), so chemotherapy (chemo) is usually part of treatment if a person is healthy enough.

If you smoke, one of the most important things you can do to be ready for treatment is to try to quit[3]. Studies have shown that patients who stop smoking after a diagnosis of

lung cancer tend to have better outcomes than those who don't.

Treating limited stage SCLC

Stage I cancers

If you only have one small tumor in your lung and there is no evidence of cancer in lymph nodes or elsewhere, your doctors may recommend surgery to remove the tumor and the nearby lymph nodes.

Very few patients with SCLC are treated this way. This is only an option if you are in fairly good health and can withstand having all or part of a lung removed.

Before the operation, the lymph nodes in your chest will be checked for cancer spread with mediastinoscopy or other tests[4], because surgery is unlikely to be a good option if the cancer has spread.

Surgery is generally followed by chemotherapy. If cancer is found in the lymph nodes that were removed, radiation therapy to the chest is usually advised as well. The radiation is often given at the same time as the chemo. Although this increases the side effects of treatment, it appears to be more effective than giving one treatment after the other. You might not be given radiation therapy if you already have severe lung disease (in addition to your cancer) or other serious health problems.

In about half of people with SCLC, the cancer will eventually spread to the brain if no preventive measures are taken. For this reason, you may be given radiation therapy[5] to the head (called *prophylactic cranial irradiation*, or PCI) to try to prevent this. The radiation is usually given in low doses. Still, some patients may have side effects from the radiation.

Other limited stage cancers

For most people with limited stage SCLC, surgery is not an option because the tumor is too large, it's in a place that can't be removed easily, or it has spread to nearby lymph nodes or other places in the lung. If you are in good health, the standard treatment is chemo plus radiation to the chest given at the same time (called *concurrent chemoradiation*). The chemo drugs used are usually etoposide plus either cisplatin or carboplatin.

Concurrent chemoradiation can help people with limited stage SCLC live longer and give them a better chance at cure than giving one treatment (or one treatment at a

time). The downside is that this combination has more side effects than either chemo or radiation alone, and it can be hard to take.

People who aren't healthy enough for chemoradiation are usually treated with chemo by itself. This may be followed by radiation to the chest.

If no measures are taken to prevent it, about half of people with SCLC will have cancer spread to their brain. If your cancer has responded well to initial treatment, you may be given radiation therapy to the head (called *prophylactic cranial irradiation*, or PCI) to try to prevent this. The radiation is usually given in lower doses than what is used if the cancer had already spread to brain, but some patients may still have side effects from the radiation.

Most people treated with chemo (with or without radiation) for limited stage SCLC will have their tumors shrink significantly. In many, the cancer will shrink to the point where it can no longer be seen on imaging tests. Unfortunately, for most people, the cancer will return at some point.

Because these cancers are hard to cure, clinical trials[6] of newer treatments may be a good option for some people. If you think you might want to take part in a clinical trial, talk to your doctor.

Treating extensive stage SCLC

Extensive stage SCLC has spread too far for surgery or radiation therapy to be useful as the initial treatment. If you have extensive SCLC and are in fairly good health, chemotherapy (chemo), possibly along with an immunotherapy drug, is typically the first treatment. This can often shrink the cancer, treat your symptoms, and help you live longer.

The most common combination of chemo drugs is etoposide plus either cisplatin or carboplatin. The immunotherapy drug atezolizumab (Tecentriq) can be used along with etoposide and carboplatin. Most people will have their cancer shrink significantly with treatment, and in some the cancer might no longer be seen on imaging tests. Unfortunately, the cancer will still return at some point in almost all people with extensive stage SCLC.

If the cancer responds well to the initial treatment, radiation to the chest may be given. This can help people with extensive stage SCLC live longer. Radiation to the brain (known as *prophylactic cranial irradiation*, or PCI) may also be considered to help prevent cancer progression in the brain.

Because these cancers are hard to treat, clinical trials[7] of newer chemo drugs and combinations, as well as other new treatments, may be a good option for some people. If you think you might be interested in taking part in a clinical trial, talk to your doctor.

If cancer growth within the lungs is causing symptoms such as shortness of breath or bleeding, radiation therapy or other types of treatment, such as laser surgery, can sometimes be helpful radiation therapy can also be used to relieve symptoms if the cancer has spread to the bones or brain.

If your overall health is poor, you might not be able to withstand the side effects of standard doses of chemo. If this is the case, your doctor may treat you with lower doses of chemo or palliative/supportive care[8] alone. This would include treatment of any pain[9], breathing problems, or other symptoms you might have.

Cancer that progresses or recurs after treatment

If the cancer continues to grow during treatment or comes back, any further treatment will depend on the location and extent of the cancer, what treatments you've had, and on your health and desire for further treatment. It's always important to understand the goal of any further treatment before it starts – if it's to try to cure the cancer, to slow its growth, or to help relieve symptoms – as well as the likelihood of benefits and risks.

If a cancer continues to grow during the initial chemotherapy treatment, another type of chemo may be tried, although it may be less likely to be effective. For cancers that come back after initial treatment is finished, the choice of chemo drugs depends on how long the cancer was in remission (see Chemotherapy for Small Cell Lung Cancer). Another option for people whose cancer continues to grow after two or more lines of treatment (including chemo with either carboplatin or cisplatin) is the immunotherapy drug nivolumab (Opdivo).

For more on dealing with a recurrence, see *Coping With Cancer*[10].

The treatment information in this document is not official policy of the American Cancer Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor. Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask him or her questions about your treatment options.

Hyperlinks

1. www.cancer.org/cancer/small-cell-lung-cancer/detection-diagnosis-

staging/staging.html
2. www.cancer.org/cancer/small-cell-lung-cancer/detection-diagnosis-staging/how-diagnosed.html
3. www.cancer.org/healthy/stay-away-from-tobacco/guide-quitting-smoking.html
4. www.cancer.org/cancer/small-cell-lung-cancer/detection-diagnosis-staging/how-diagnosed.html
5. www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation.html
6. www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html
7. www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html
8. www.cancer.org/treatment/treatments-and-side-effects/palliative-care.html
9. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/pain.html
10. www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-recurrence/coping-with-cancer-recurrence.html

References

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

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Our team is made up of doctors and oncology certified nurses with deep knowledge of cancer care as well as journalists, editors, and translators with extensive experience in medical writing.

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After Small Cell Lung Cancer Treatment

Living as a Cancer Survivor

For many people, cancer treatment often raises questions about next steps as a survivor.

- Living as a Small Cell Lung Cancer Survivor

Cancer Concerns After Treatment

Treatment may remove or destroy the cancer, but it is very common to have questions about cancer coming back or treatment no longer working.

- Second Cancers After Small Cell Lung Cancer

Living as a Small Cell Lung Cancer Survivor

For some people with lung cancer, treatment[1] may remove or destroy the cancer. Completing treatment can be both stressful and exciting. You may be relieved to finish treatment, but find it hard not to worry about cancer growing or coming back. This is very common if you've had cancer.

For other people, the lung cancer may never go away completely. Some people may

get regular treatments with chemotherapy, radiation therapy, or other therapies to try to keep the cancer in check for as long as possible. Learning to live with cancer that does not go away can be difficult and very stressful.

Follow-up care

If you have completed treatment, your doctors will still want to watch you closely. It's very important to go to all of your follow-up appointments. During these visits, your doctors will ask if you are having any problems and may do exams and lab tests or imaging tests to look for signs of cancer or treatment side effects[2].

Almost any cancer treatment can have side effects. Some might only last for a few days or weeks, but others might last a long time. Some side effects might not even show up until years after you have finished treatment. Your doctor visits are a good time to ask questions and talk about any changes or problems you notice or concerns you have.

It's important for all lung cancer survivors, to let their health care team know about any new symptoms or problems, because they could caused by the cancer coming back[3] or by a new disease or second cancer[4].

Doctor visits and tests

In people with no signs of cancer remaining, many doctors recommend follow-up visits (which may include CT scans and blood tests) about every 3 months for the first couple of years after treatment, about every 6 months for the next several years, then at least yearly after 5 years. Some doctors may advise different follow-up schedules.

Ask your doctor for a survivorship care plan

Talk with your doctor about developing a survivorship care plan for you. This plan might include:

- A suggested schedule for follow-up exams and tests
- A list of potential late or long-term side effects from your treatment, including what to watch for and when you should contact your doctor
- A schedule for other tests you might need, such as tests to look for long-term health effects from your cancer or its treatment
- Suggestions for things you can do that might improve your health, including possibly lowering your chances of the cancer coming back

Keeping health insurance and copies of your medical records

Even after treatment, it's very important to keep health insurance[5]. Tests and doctor visits cost a lot, and even though no one wants to think of their cancer coming back, this could happen.

At some point after your cancer treatment, you might find yourself seeing a new doctor who doesn't know about your medical history. It's important to keep copies of your medical records to give your new doctor the details of your diagnosis and treatment. Learn more in Keeping Copies of Important Medical Records[6].

Can I lower the risk of my cancer progressing or coming back?

Staying as healthy as possible is more important than ever after lung cancer treatment. Quitting smoking and eating right may help you lower your risk of your lung cancer coming back, and may help protect you from other health problems.

Quitting smoking

If you smoke, quitting is important. Quitting has been shown to help people with lung cancer live longer, even if the cancer has spread. It also lowers the chance of getting another lung cancer, which is especially important for people with early-stage lung cancer.

Of course, quitting smoking can have other health benefits as well, including lowering your risk of some other cancers. If you need help quitting, talk to your doctor or call the American Cancer Society at 1-800-227-2345.

Diet, nutrition, and dietary supplements

The possible link between diet and lung cancer growing or coming back is much less clear. Some studies have suggested that diets high in fruits and vegetables might help prevent lung cancer from developing in the first place, but this hasn't been studied in people who already have lung cancer.

Some early studies have suggested that people with early-stage lung cancer who have higher vitamin D levels might have better outcomes, but so far no study has shown that taking extra vitamin D (as a supplement) helps. On the other hand, studies have found that beta carotene supplements may actually increase the risk of lung cancer in smokers.

Dietary supplements are not regulated like medicines in the United States – they do not have to be proven effective (or even safe) before being sold, although there are limits on what they're allowed to claim they can do. If you're thinking about taking any type of nutritional supplement, talk to your health care team. They can help you decide which ones you can use safely while avoiding those that could be harmful.

If the cancer comes back

If cancer does come back at some point, your treatment options will depend on where the cancer is, what treatments you've had before, and your health. Surgery[7], radiation therapy[8], chemotherapy[9], targeted therapy[10], immunotherapy[11], or some combination of these might be options. Other types of treatment[12] might also be used to help relieve any symptoms from the cancer. For more on how recurrent cancer is treated, see Treatment Choices By Stage of Small Cell Lung Cancer[13]. For more general information on dealing with a recurrence, you may also want to read Coping With Cancer[14].

Could I get a second cancer after lung cancer treatment?

People who've had lung cancer can still get other cancers, although most don't get cancer again. Lung cancer survivors are at higher risk for getting another lung cancer, as well as some other types of cancer. Learn more in Second Cancers After Small Cell Lung Cancer.

Moving on after lung cancer

Emotional support

Some amount of feeling depressed, anxious, or worried[15] is normal when small cell lung cancer is a part of your life. Some people are affected more than others. But everyone can benefit from help and support from other people, whether friends and family, religious groups, support groups, professional counselors, or others. Learn more in *Emotions After Cancer Treatment*

Hyperlinks

1. www.cancer.org/cancer/small-cell-lung-cancer/treating.html
2. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html
3. www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-

recurrence/coping-with-cancer-recurrence.html
4. www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/second-cancers-in-adults.html
5. www.cancer.org/treatment/finding-and-paying-for-treatment/understanding-health-insurance/managing-your-health-insurance.html
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14. www.cancer.org/treatment/treatments-and-side-effects/emotional-side-effects.html

References

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

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Second Cancers After Small Cell Lung Cancer

Small cell lung cancer survivors can be affected by a number of health problems, but often a major concern is facing cancer again. Cancer that comes back after treatment is called a *recurrence*. But some cancer survivors develop a new, unrelated cancer later. This is called a *second cancer*.

Unfortunately, being treated for lung cancer doesn't mean you can't get another cancer. People who have had lung cancer can still get the same types of cancers that other people get. In fact, they might be at higher risk for certain types of cancer.

Survivors of small cell lung cancer can get any type of second cancer, but they have an increased risk of:

- A second lung cancer (This is different from the first cancer coming back.)
- Cancer of the larynx (voice box)[1]
- Cancer of the mouth and throat[2]
- Esophagus cancer[3]
- Pancreas cancer[4]
- Bladder cancer[5]
- Thyroid cancer[6]
- Acute myeloid leukemia (AML)[7]

Lung cancer is the most common second cancer in someone with a previous lung cancer. Smoking is a risk factor for many of these cancers, and the risks of a second cancer are especially high among lung cancer survivors who continue to smoke. The risk of cancer of the esophagus is higher among people treated with radiation therapy to the chest.

Follow-up after lung cancer treatment

After completing treatment, you should still see your doctor regularly[8]. Report any new symptoms or problems, because they could be caused by the cancer spreading or coming back, or by a new disease or second cancer.

Lung cancer survivors should also follow the American Cancer Society guidelines for the early detection of cancer[9], such as those for colorectal, breast, cervical, and prostate cancer. Screening tests can find some cancers early, when they are likely to be treated more successfully. For people who have had lung cancer, most experts don't recommend any additional testing to look for second cancers unless you have symptoms.

Can I lower my risk of getting a second cancer?

There are steps you can take to lower your risk and stay as healthy as possible. For example, people who have had lung cancer should do their best to stay away from

tobacco products[10]. Smoking increases the risk of dying from lung cancer, as well as the risk of many of the second cancers seen after lung cancer.

To help maintain good health, lung cancer survivors should also:

- Try to get to and stay at a healthy weight[11]
- Stay physically active[12]
- Eat a healthy diet[13], with an emphasis on plant foods
- Limit alcohol[14] to no more than 1 drink per day for women or 2 per day for men

These steps may also lower the risk of some other health problems.

See Second Cancers in Adults[15] for more information about causes of second cancers.

Hyperlinks

1. www.cancer.org/cancer/laryngeal-and-hypopharyngeal-cancer.html
2. www.cancer.org/cancer/oral-cavity-and-oropharyngeal-cancer.html
3. www.cancer.org/cancer/esophagus-cancer.html
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