

Non-Small Cell Lung Cancer

Overview

There are two primary types of lung cancer, known as non-small cell lung cancer (NSCLC) and [small cell lung cancer](#) (SCLC). Named initially for how the cancer cells look under the microscope, these two account for 230,000 newly diagnosed cases of lung cancer in the U.S. each year.

The vast majority (85 percent) of lung cancers fall into the category called non-small cell lung cancer. Though this form of lung cancer progresses more slowly than SCLC, 40 percent of NSCLCs will have spread beyond the lungs by the time it is diagnosed.

“While many non-smokers can get lung cancer, the most prevalent risk factor for NSCLC is smoking,” explains Yale Medicine’s [Roy S. Herbst, MD, PhD, Yale Cancer Center](#)’s chief of medical oncology.

Your overall exposure to smoking—the longer you smoke and the more packs you smoke in your lifetime—increases the risk for developing this type of cancer. Early detection offers the best prognosis for this type of lung cancer, because so many cases of NSCLC are not detected until they have spread (metastasized) to other areas of the body. Treatments for NSCLC include [surgery](#), [chemotherapy](#), radiation therapy and targeted therapy.

“The standard of care for lung cancer treatment has changed just in the last five years, due to advances in clinical research that our patients have contributed to,” says [Anne Chiang, MD, PhD](#), a Yale Medicine [medical oncologist](#) who treats lung cancers. “There is real hope in the field that we are able to improve and extend patients’ lives.”

What is non-small cell lung cancer?

NSCLC is the most common type of lung cancer. Like all cancers, NSCLC begins at the cellular level and causes abnormal cells in the lungs to reproduce rapidly and out of control. NSCLCs are carcinomas, which are cancers of the cells lining the surface of the lung airways. These include the bronchi, bronchioles, and alveoli.

How many kinds of non-small cell lung cancer are there?

There are three primary types of NSCLC, categorized by the type of cells affected by cancer:

- **Adenocarcinoma** represents 40 percent of all NSCLC diagnoses. Adenocarcinoma affects both smokers and nonsmokers. Adenocarcinoma usually begins in the outer areas of the lung, in mucus-producing cells that line the small airways, called bronchioles. Adenocarcinoma tends to grow more slowly than other types of lung cancer, which can help lead to a better prognosis.

- **Squamous cell carcinoma**, also called epidermoid carcinoma, is the second most common type of NSCLC, representing 25 to 30 percent of all NSCLC diagnoses. Squamous cells, thin flat cells lining the surfaces of organs, are found in the lining of the bronchi. These cancers are more likely to spread to other areas of the body, making them more difficult to treat. Squamous cell carcinoma is more closely associated with smoking than any other type of lung cancer.
- **Large cell carcinoma** is a rare form of NSCLC, accounting for only 10 to 15 percent of all diagnoses. It can occur anywhere in the lung and tends to be aggressive.

What are the risks for developing non-small cell lung cancer?

The leading risk for developing NSCLC is smoking cigarettes. The more you smoke and the earlier in life you begin smoking, the greater your risk for developing NSCLC. Other risk factors include second-hand smoke, exposure to workplace carcinogens, radiation exposure, environmental pollution, family history of lung cancer and previous infection of HIV.

What are the symptoms of non-small cell lung cancer?

Symptoms of NSCLC are common to all lung cancers and include the following:

- A cough that doesn't go away or gets worse over time
- Coughing up blood
- Chest pain or discomfort
- Trouble breathing
- Wheezing
- Hoarseness
- Loss of appetite
- Weight loss for no reason
- Fatigue
- Trouble swallowing
- Swelling in the face and/or veins in the neck

How is non-small cell lung cancer diagnosed?

Early diagnosis offers the best prognosis for NSCLC. But, NSCLC and other lung cancers can be difficult to diagnose because, often, these cancers have symptoms that are mistaken for common illnesses or the effects of long-term smoking. Because of this, 80 percent of people diagnosed with NSCLC have already progressed to advanced stages, making it more difficult to treat. Annual screenings (imaging tests) are therefore

recommended if you are between the ages of 55 and 80 and have a long and heavy history of smoking tobacco.

If lung cancer is suspected, your doctor will recommend imaging tests (CT, PET or [MRI](#) scans) to identify abnormalities in and around your lungs. Your doctor may also take a sample of your mucus for examination under the microscope.

If these initial tests identify cancer, a lung biopsy can be conducted. This involves inserting a needle or making an incision in your chest to remove tissue from the lung for further inspection. A bronchoscopy is a common technique that allows the doctor to not only visualize but also remove tissue. If lung cancer is confirmed, genetic testing can be done on your lung tissue to identify details about your cancer that can help inform treatment.

What are the treatments for non-small cell lung cancer?

Treatment for NSCLC will depend on whether the cancer has spread to other areas of the body, your overall health and age, and the presence of certain proteins that make treatments more effective. If your NSCLC is detected early (before it has spread to other areas), surgery to remove the affected tissue or tumor is the treatment of choice.

Other treatments include the following:

- **Radiation therapy.** This uses high-energy rays to kill cancer cells and keep new ones from growing. It can be used to treat cancer that has not metastasized. It may also be used to reduce symptoms and improve your quality of life.
- **Chemotherapy.** This uses anti-cancer drugs administered either through injection into the vein, or orally (by taking a pill) to kill cancer cells. Chemotherapy can prolong survival and treat symptoms of NSCLC.
- **Targeted therapy.** This uses anti-cancer drugs to kill specific cancer cells without causing harm to normal cells. These therapies are usually given if you have specific gene mutations, as determined by genetic testing.
- **Immunotherapy.** This activates your body's immune system to specifically kill cancer cells and is usually recommended for late-stage lung cancer, specifically Stage IV NSCLC. "When immunotherapy was first introduced, the effects were dramatic," says Dr. Herbst. "Now we are using combined therapies such as immunotherapy with chemotherapy and exploring other immunotherapy or targeted therapies in combination, and we are seeing results."

What is Yale Medicine's approach to treating non-small cell lung cancer?

Patients who come to [Yale Cancer Center](#) at Smilow Cancer Hospital have access to new cancer therapies that are in development. Through clinical trials, patients may be able to benefit from groundbreaking treatment options not available elsewhere. At Yale, "we have led the way in developing important therapies for lung cancer patients by designing and implementing clinical trials that try to improve outcomes for our patients," says Dr. Chiang. "We put the patient first and engage them as an important part of developing ground-breaking research."

Since NSCLC is one of the world's most prevalent and lethal forms of cancer, research is being conducted through Yale Cancer Center's Specialized Program of Research Excellence (SPORC) for lung cancer, one of the three lung cancer-focused SPORCs funded by the National Cancer Institute.

"The program brings together experts in oncology, immunotherapy, pharmacology, molecular biology, pathology, epidemiology and addiction science to attack this disease," says Dr. Herbst. "We aim to bring results from the lab to the clinic and back again. We need to raise the bar with innovative new ideas and quality translated to the clinic."