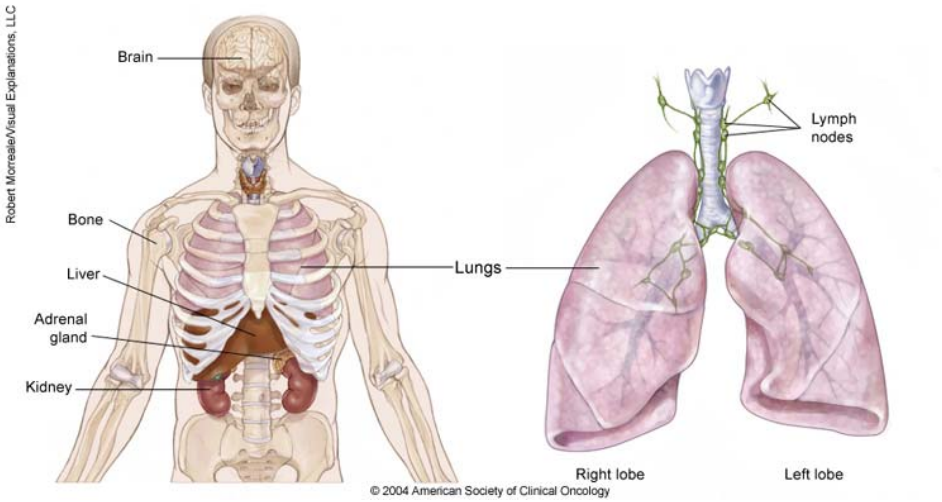
NON-SMALL CELL LUNG CANCER

The lungs are a pair of sponge-like, cone-shaped organs. The right lung has three lobes, and is larger than the left lung, which has two lobes. Oxygen is brought into the lungs when air is inhaled. Lung tissue transports oxygen to the bloodstream to go to the rest of the body. Cells release carbon dioxide as they use oxygen. The bloodstream carries carbon dioxide back to the lungs and the carbon dioxide leaves the body when air is exhaled.



Lung cancer is a disease of abnormal cells multiplying and growing into a tumor. Cancer cells can be carried away from the lungs in blood, or lymph fluid that surrounds lung tissue. Lymph flows through lymphatic vessels, which drain into lymph nodes located in the lungs and in the center of the chest. Lung cancer often spreads toward the center of the chest because the natural flow of lymph out of the lungs is toward the center of the chest. Metastasis occurs when a cancer cell leaves the site where it began and moves into a lymph node or to another part of the body through the bloodstream.

There are three main types of non-small cell lung cancer. They are named for the type of cells in which the cancer develops: squamous cell carcinoma, adenocarcinoma, and large cell carcinoma.

Risk Factors
Most causes of lung cancer are related to the use of tobacco including cigarettes, cigars, and pipes. Risk is also increased with exposure to Environmental Tobacco Smoke (ETS), radiation, radon, asbestos, and certain air and industrial pollutants; as well as a history of tuberculosis (TB).

The most important way to prevent lung cancer is to avoid tobacco smoke.
Anyone can develop lung cancer. **10-15% of patients have never smoked.**

Symptoms to report:
Cough that doesn't go away, but gets worse over time; constant chest pain;
coughing up blood; shortness of breath, wheezing, or hoarseness;
repeated episodes of pneumonia or bronchitis; swelling of the neck and face;
loss of appetite or weight; or fatigue.
These symptoms may be caused by lung cancer or by other conditions.

Screening:
Spiral Computed Tomography scans have been used in clinical trials to find early stage lung cancers for patients at risk. There is presently no proof that screening changes the cure rate for lung cancer. Care providers should be consulted for advice about risk of lung cancer and any need for screening tests.

Stage for lung cancer refers to the size of the tumor and how much the disease has spread.

Non-small cell lung cancer Stages I and II are present only in lung tissue and lymph nodes within the surrounding lung. It is possible to completely remove these tumors.
Stage IIIA cancer has spread to lymph nodes in the center of the chest, on the same side as where the cancer started.
Stage IIIB cancer has spread to lymph nodes on the opposite side of the chest or above the collarbone or into fluid surrounding the lung or other vital structures in the chest.
Stage IV has spread to different lobes of the lung, or to other parts of the body. The tendency is to spread to the brain, bones, liver, and adrenal glands.
Surgery is not usually possible for any stage IIIB or IV lung cancer.
Diagnosis and staging of lung cancer may be made by these medical tests:

Sputum cytology is an examination of mucus by microscope.

Biopsy A doctor removes a piece of tissue from the body, either with a needle through the skin or with surgery. A pathologist then examines the tissue under a microscope to check for cancer cells. If cancer cells are present, the pathologist will determine if it is small cell or non-small cell cancer, based on its appearance.

Bronchoscopy is a procedure with a thin, flexible tube with a light on the end inserted through the mouth or nose, through the windpipe, and into the breathing passages of the lungs. Cells or small samples or tissues or fluid can be collected through the tube. Mild anesthesia is given during a bronchoscopy.

Needle aspiration is the insertion of a small needle through numbed skin on the chest directly into the tumor to remove a sample of tissue.

Bone marrow biopsy is a procedure done with local anesthetic using a special needle to remove a piece of bone (typically from the hip) in order to determine whether small cell cancer is present within the bones.

Thoracentesis is a procedure with a small needle inserted through numbed skin on the chest to withdraw fluid from the area between the lung and the wall of the chest.

Thoracotomy is a major operation, performed in a hospital, under general anesthesia, to make an incision in the chest, examine the lung directly, and take biopsies. This is the procedure most often performed to completely remove a lung tumor.

Thoracoscopy uses small video cameras to assist in examination of the inside of the chest through small incisions. Patients still require general anesthesia, but recovery time may be shorter because of the smaller incisions.

Mediastinoscopy is surgery to examine and sample lymph nodes in the center of the chest through a small incision made at the top of the breastbone. This also requires general anesthesia.

Radiology
Radiologic scans are also vital to the diagnosis and care of lung cancer.
Computerized tomography (CT) and **magnetic resonance imaging (MRI) scans** produce images of size and location of tumors and/or metastases.

Bone scan uses a tracer of radioactive molecules that concentrate in damaged bone, which may indicate the presence of bone metastases, or other conditions.

Positron emission tomography (PET) scan uses radioactive sugar molecules injected intravenously. Lung cancer cells absorb sugar more quickly than normal cells, so they "light up" on the PET scan.

Treatment Options
Treatment depends on the type, size, location, and extent of the tumor, and the general health of the patient. Many different treatments and combinations of treatments may be used to control lung cancer, and/or to improve quality of life by reducing symptoms. Lung cancer is always treatable, no matter the size, location, or whether the cancer has spread.

Treatment for Nonsmall Cell Lung Cancer
Stage I and II: surgery or cryosurgery, a treatment that freezes and destroys cancer tissue, may be used to control symptoms in the later stages of non-small cell lung cancer. Radiation therapy and chemotherapy may also be used to slow the progress of the disease and to manage symptoms.

Stage IIIA: chemotherapy before surgery or a combination of chemotherapy and radiation, possibly followed by surgery

Stage IIIB: a combination of chemotherapy and radiation therapy

Stage IV: patients are at very high risk for metastases; most patients are only treated with drugs. The goal of chemotherapy is to shrink the cancer, relieve discomfort caused by the cancer, and prevent further spread. Rarely, chemotherapy can cause metastatic lung cancer to disappear completely. However, doctors know from experience that the cancer will eventually return. Therefore, patients with stage IV disease, or stage IIIB with malignant effusion, are never considered "cured" of their cancer no matter how well the chemotherapy works. These patients must be followed closely by their doctors and require lifelong chemotherapy to control their disease. Chemotherapy has been proven to improve quantity and quality of life for patients with non-small cell lung cancer.

Surgery
Wedge resection: removes only a small part of lung
Lobectomy: removes an entire lobe of one lung
Pneumonectomy: removal of an entire lung

Chemotherapy is use of anticancer drugs to kill cancer cells, control cancer growth or relieve symptoms. It is given by injection into a vein or as pills taken by mouth.

Radiation therapy uses high-energy rays, externally from a machine or internally from an implant, to kill cancer cells. The rays are directed to a limited area and affect only the cells in that area. It can be used before surgery to shrink a tumor or after surgery to destroy any remaining cancer cells. It can also be used as the main treatment instead of surgery or to relieve symptoms.

Photodynamic therapy (PDT) is a type of laser therapy that involves the use of a special chemical that is injected into the bloodstream and absorbed by cells all over the body. The chemical rapidly leaves normal cells but remains in cancer cells for a longer time. A laser light aimed at the cancer activates the chemical, which then kills the cancer cells that have absorbed it.

UNC
N.C. CANCER HOSPITAL
LINEBERGER COMPREHENSIVE CANCER CENTER

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