CONDITION

Lung cancer

Lung cancer is cancer that begins when abnormal cells grow uncontrollably in the lungs.

WHAT IT IS
Cancer beginning in lung cells

BODY SYSTEM
Lungs and breathing

MAIN SYMPTOMS
Persistent cough, breathlessness, chest pain, coughing blood

WHAT CAUSES IT
DNA damage, often linked to tobacco smoke

HOW IT IS DIAGNOSED
Chest imaging and biopsy of abnormal tissue

MAIN TREATMENT
Surgery, radiotherapy, medicines, and supportive care

CAN IT BE CURED?
Sometimes - mainly when found before spreading

IS IT AN EMERGENCY?
Sometimes - severe breathlessness or substantial bleeding

LONG-TERM OUTLOOK
Best when found early; advanced cancer is usually not curable

Overview

Lung cancer develops when cells in the lungs acquire changes that make them grow and divide without normal control. These cells may form a tumour, damage nearby tissue, and spread to other parts of the body.

There are two main groups. Non-small cell lung cancer is the more common group and includes several cell types. Small cell lung cancer usually grows and spreads more quickly. Knowing the type is important because the treatments are different.

The stage describes the cancer's size, whether nearby lymph nodes contain cancer, and whether it has spread. Lymph nodes are small structures that help the immune system filter fluid. Lung cancer may spread to areas such as the other lung, brain, bones, liver, or adrenal glands.

Some lung cancers are found during screening or imaging performed for another reason, before symptoms begin. Others are found after a new or changing symptom. Finding lung cancer at an earlier stage can provide more treatment options, but symptoms alone cannot show whether cancer is present.

Symptoms

Early lung cancer may cause no symptoms. When symptoms occur, they can overlap with infections, asthma, chronic obstructive pulmonary disease, and other conditions.

Possible symptoms include:

Cancer that has spread can cause other symptoms. Bone pain may occur if it reaches a bone. Spread to the brain can cause headaches, weakness, seizures, confusion, or changes in vision. These symptoms also have many non-cancerous causes, but some require urgent assessment.

A persistent cough does not automatically mean lung cancer. It is still worth arranging a medical review, particularly if the cough is new, changing, or accompanied by blood, weight loss, chest pain, or breathlessness.

- A new cough that does not settle or a long-term cough that changes
- Coughing up blood, including small streaks
- Breathlessness, wheezing, or a hoarse voice
- Chest or shoulder pain, especially with coughing or deep breathing
- Repeated chest infections or an infection that does not clear
- Unexplained weight loss, reduced appetite, or ongoing tiredness

Causes and risk factors

Lung cancer begins after genetic material inside a lung cell becomes damaged. This damage can build up over time. Often there is no single event that explains why one person develops cancer and another does not.

Tobacco smoke is the leading preventable cause. Risk generally rises with the amount and length of exposure. Cigarettes cause most tobacco-related cases, but cigars, pipes, and other burned tobacco also expose the lungs to cancer-causing chemicals. Secondhand smoke can increase risk as well.

People who have never smoked can develop lung cancer. Important risk factors include:

Having a risk factor does not mean that lung cancer is certain. Some people develop it without a clear risk factor. Lung cancer is not caused by an injury, and it cannot be passed between people.

- Radon, a naturally occurring radioactive gas that can collect indoors
- Workplace exposure to asbestos, diesel exhaust, arsenic, chromium, nickel, or silica
- Outdoor air pollution
- Previous radiation treatment involving the chest
- Increasing age
- A personal or family history of lung cancer

Diagnosis

The assessment usually begins with questions about symptoms, smoking and work exposures, followed by an examination. A chest X-ray may show an abnormal area, but it cannot reliably confirm or exclude lung cancer. A computed tomography, or CT, scan provides more detailed pictures.

A biopsy is usually needed to confirm the diagnosis. During a biopsy, a small sample of tissue or fluid is removed and examined by a pathologist under a microscope. The sample may be obtained through:

The biopsy identifies the cancer type. For many non-small cell lung cancers, the sample is also tested for specific genetic or protein features. These are called biomarkers. They can help show whether a targeted medicine or immunotherapy may be useful.

Further scans establish the stage. These may include PET-CT, which shows areas of increased cell activity, and MRI of the brain. Breathing tests, blood tests, and heart checks may be used to assess which treatments are likely to be safe.

- Bronchoscopy, using a thin camera passed through the mouth or nose
- Endobronchial ultrasound, which helps sample lymph nodes near the airways
- A needle guided through the chest using CT images
- Removal of fluid that has collected around a lung
- Surgery, when a less invasive test cannot provide enough tissue

Treatment and management

Treatment is based on the cancer type and stage, biomarker results, general health, lung function, and what matters to you. A team involving cancer, lung, surgery, radiology, pathology, and specialist nursing professionals usually reviews the options.

For an early non-small cell lung cancer, surgery may remove part of a lung or, less often, an entire lung. Nearby lymph nodes are normally checked. Radiotherapy may be used when surgery is not suitable or is not preferred. Some people receive chemotherapy, immunotherapy, or targeted treatment before or after local treatment to reduce the chance of cancer returning.

Locally advanced non-small cell lung cancer may be treated with combinations of chemotherapy, radiotherapy, immunotherapy, or surgery in selected cases. When it has spread to distant organs, medicines are usually the main treatment. These can include chemotherapy, immunotherapy, or targeted medicines chosen for a tumour's biomarkers.

Small cell lung cancer is commonly treated with chemotherapy and radiotherapy. Immunotherapy may be combined with chemotherapy when it has spread more widely. Surgery is used only in uncommon, very early cases.

Radiotherapy can also shrink tumours that are causing pain, bleeding, airway pressure, or symptoms from spread to the brain or bones.

Supportive and palliative care can be provided at any stage, alongside cancer treatment. It focuses on symptoms and quality of life rather than only on the tumour. It may help with pain, breathlessness, fatigue, appetite, anxiety, sleep, and practical concerns. Palliative care is not limited to the last days of life.

Treatment can cause side effects, but these differ by therapy. Possible effects include fatigue, nausea, infection risk, skin irritation, inflammation of the lungs, or immune reactions. The treatment team monitors for these and may adjust or pause treatment when needed.

Complications

A lung tumour may narrow an airway, leading to breathlessness, infection, or collapse of part of the lung. Fluid can collect between the lung and chest wall, known as a pleural effusion. This may make breathing uncomfortable and can sometimes be drained.

Coughing blood can range from light streaks to heavier bleeding. Lung cancer can also increase the chance of blood clots, including a clot that travels to the lungs.

Cancer that spreads may cause bone pain or fractures, liver problems, or neurological

symptoms. Some tumours release substances that disturb hormone or mineral levels in the blood, which can lead to weakness, confusion, thirst, or nausea.

Treatment itself can have lasting effects. Surgery may reduce breathing capacity. Radiotherapy or some medicines may inflame or scar lung tissue. New or worsening symptoms should be reported rather than assumed to be an expected treatment effect.

Prevention

Lung cancer cannot always be prevented, including in people who have never smoked. Risk can still be reduced.

Not smoking is the most effective step. If you smoke, stopping lowers future risk even after many years of smoking. Support may include counselling, stop-smoking services, and approved medicines.

Testing a home for radon can identify raised levels that may need professional reduction. Workplace safety measures can reduce exposure to asbestos, diesel exhaust, and other harmful substances.

Low-dose CT screening can find some lung cancers before symptoms begin. It is intended for people at higher risk because of age and smoking history, not for everyone. Eligibility rules differ between countries and programmes. Screening also has possible harms, including false alarms and follow-up procedures, so it should involve informed discussion.

Living with it and what to expect

The course over months and years is shaped mainly by the cancer type, stage, response to treatment, and overall health. Early lung cancer may sometimes be removed or destroyed with treatment intended to cure it. Follow-up then looks for recurrence and helps manage lasting effects.

Follow-up may include clinic visits and regular scans. The schedule is based on the treatment received and local guidance. Report new symptoms between planned visits rather than waiting for the next appointment.

Recovery after surgery or intensive treatment often takes time. Breathlessness and fatigue may improve gradually, but some reduction in stamina can remain. Pulmonary rehabilitation, which combines supervised exercise with breathing and health education, may help selected people. Nutrition, sleep, activity, and emotional support can also affect recovery.

Advanced lung cancer is usually not curable, but treatment may slow its growth, relieve symptoms, and extend life. Some cancers respond for long periods, while others stop responding sooner. Treatment may be continued, changed, paused, or stopped according to scans, symptoms, side effects, and personal priorities.

Living with uncertainty can be difficult. Specialist nurses, counsellors, social workers, rehabilitation services, and palliative care teams can help with emotional, family, financial, and practical concerns. Support is also available for people who have stopped smoking; blame has no useful role in cancer care.

When to get medical help

Arrange a routine medical appointment if you have a cough that lasts, a long-term cough that changes, unexplained weight loss, repeated chest infections, ongoing hoarseness, chest discomfort, or increasing breathlessness. These symptoms are often caused by something other than cancer, but they should be assessed.

Seek urgent same-day medical advice if you cough up any blood, even small streaks, or develop a significant new breathing problem.

Call emergency services for:

During treatment, follow the urgent-contact instructions provided by the cancer team. Fever, uncontrolled vomiting, sudden breathlessness, or marked weakness may need prompt assessment, especially when treatment can lower infection-fighting blood cells.

- Severe or rapidly worsening difficulty breathing
- More than a few streaks or spots of coughed-up blood
- Coughing blood with chest pain, faintness, or a very fast heartbeat
- Sudden chest pain or collapse
- A new seizure, severe confusion, or sudden weakness on one side

Common questions

Can lung cancer be cured?

Sometimes. Cure is more likely when the cancer is found before it has spread and can be completely removed or treated with focused radiotherapy. Some locally advanced cancers can also be treated with curative intent. Cancer that has spread widely is usually managed rather

than cured.

Can I get lung cancer if I have never smoked?

Yes. Radon, secondhand smoke, air pollution, workplace exposures, previous chest radiation, and inherited susceptibility can contribute. In some people who have never smoked, no clear cause is found.

Does a persistent cough mean I have lung cancer?

Usually not. Coughs have many possible causes, including infections, reflux, asthma, and other lung conditions. A cough that persists, changes, or occurs with blood, weight loss, chest pain, or breathlessness needs medical assessment.

How fast does lung cancer spread?

There is no single speed. Small cell lung cancer often grows and spreads faster than non-small cell types. Within each group, behaviour also differs. Scans over time, the stage, and biopsy findings give more useful information than general averages.

Is lung cancer contagious?

No. You cannot catch lung cancer through coughing, touch, shared food, sex, or close contact.

How long can someone live with lung cancer?

Survival cannot be predicted accurately from the diagnosis alone. It is influenced by type, stage, biomarkers, health, and response to treatment. Population statistics describe groups and cannot tell an individual person what will happen.

Sources

- National Cancer Institute: Non-Small Cell Lung Cancer Treatment-Patient Version
- National Cancer Institute: Small Cell Lung Cancer Treatment-Patient Version
- National Cancer Institute: Lung Cancer Screening-Patient Version
- Centers for Disease Control and Prevention: Lung Cancer Risk Factors
- National Institute for Health and Care Excellence: Lung Cancer-Diagnosis and Management, Guideline NG122
- US Preventive Services Task Force: Screening for Lung Cancer Recommendation Statement