

MACMILLAN
CANCER SUPPORT

UNDERSTANDING LUNG CANCER



● If my Macmillan Benefits Adviser hadn't been there, I wouldn't like to think what would have happened. I really don't know. She caught me as I was falling and picked me back up. ●

Lloyd, diagnosed with lung cancer



About this booklet

This booklet is about cancer that starts in the lung. This is called primary lung cancer. We can send you separate information about cancer that starts in another part of the body and spreads to the lung, which is called secondary lung cancer.

The booklet explains what lung cancer is, and how it is diagnosed and treated. It also talks about your feelings when you are diagnosed with cancer and has practical advice on dealing with work and finances.

We hope it helps you deal with some of the questions or feelings you may have.

We cannot give advice about the best treatment for you. You should talk to your doctor, who knows your medical history.

How to use this booklet

This booklet is split into sections to help you find what you need. You do not have to read it from start to finish. You can use the contents list on page 3 to help you.

It is fine to skip parts of the booklet. You can always come back to them when you feel ready.

On pages 114 to 122, there are details of other organisations that can help.

Quotes

In this booklet, we have included quotes from people who have had lung cancer, which you may find helpful. Some are from our Online Community ([macmillan.org.uk/community](https://www.macmillan.org.uk/community)). This includes Lloyd, who is on the cover of this booklet. The others are from people who have chosen to share their story with us. To share your experience, visit [macmillan.org.uk/shareyourstory](https://www.macmillan.org.uk/shareyourstory)

For more information

If you have more questions or would like to talk to someone, call the Macmillan Support Line free on **0808 808 00 00**, 7 days a week, 8am to 8pm, or visit [macmillan.org.uk](https://www.macmillan.org.uk)

If you would prefer to speak to us in another language, interpreters are available. Please tell us, in English, the language you want to use.

If you are deaf or hard of hearing, call us using NGT (Text Relay) on **18001 0808 808 00 00**, or use the NGT Lite app.

We have some information in different languages and formats, including audio, eBooks, easy read, Braille, large print and translations. To order these, visit [macmillan.org.uk/otherformats](https://www.macmillan.org.uk/otherformats) or call **0808 808 00 00**.

Contents

The lungs and lung cancer	5
Diagnosing lung cancer	20
Treating lung cancer	37
After treatment	98
Further information	109



THE LUNGS AND LUNG CANCER

What is cancer?	6
The lungs	8
The respiratory system	9
Risk factors and causes of lung cancer	11
Symptoms of lung cancer	16
Types of lung cancer	18

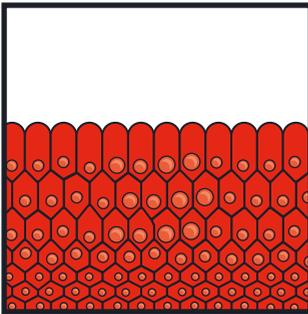
What is cancer?

Cells are tiny building blocks that make up the body's organs and tissues. Cells receive signals from the body, telling them when to grow and when to divide to make new cells. This is how our bodies grow and heal. These cells can become old, damaged, or no longer needed. When this happens, the cell gets a signal from the body to stop working and die.

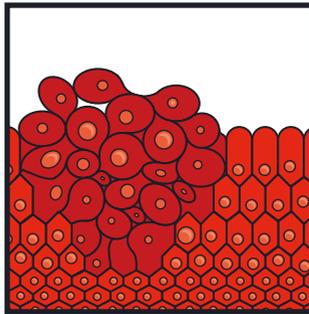
Sometimes these signals can go wrong, and the cell becomes abnormal. The abnormal cell may keep dividing to make more and more abnormal cells. These can form a lump, called a tumour.

Cells forming a tumour

Normal cells



Cells forming a tumour



Not all tumours are cancer. Doctors can tell if a tumour is cancer by taking a small sample of cells from it. This is called a biopsy. The doctors examine the sample under a microscope to look for cancer cells.

A tumour that is not cancer (a benign tumour) may grow, but it cannot spread to anywhere else in the body. It usually only causes problems if it grows and presses on nearby organs.

A tumour that is cancer (a malignant tumour) can grow into nearby tissue

Sometimes cancer cells spread from where the cancer started (the primary site) to other parts of the body. They can travel around the body in the blood or through lymph fluid which is part of the lymphatic system (see page 10). When these cancer cells reach another part of the body, they may grow and form another tumour. This is called a secondary cancer or a metastasis.

The lungs

The lungs are the parts of the body that we use to breathe. We have two lungs (right and left). They supply oxygen to the organs and tissues of the body. The lungs are divided into areas called lobes. The right lung has three lobes and the left lung has two lobes.

The lungs are covered by a lining called the pleura, which has two layers. The inner layer covers the lungs. The outer layer lines the ribcage and the diaphragm. The diaphragm is a sheet of muscle that separates the chest from the upper tummy (abdomen).

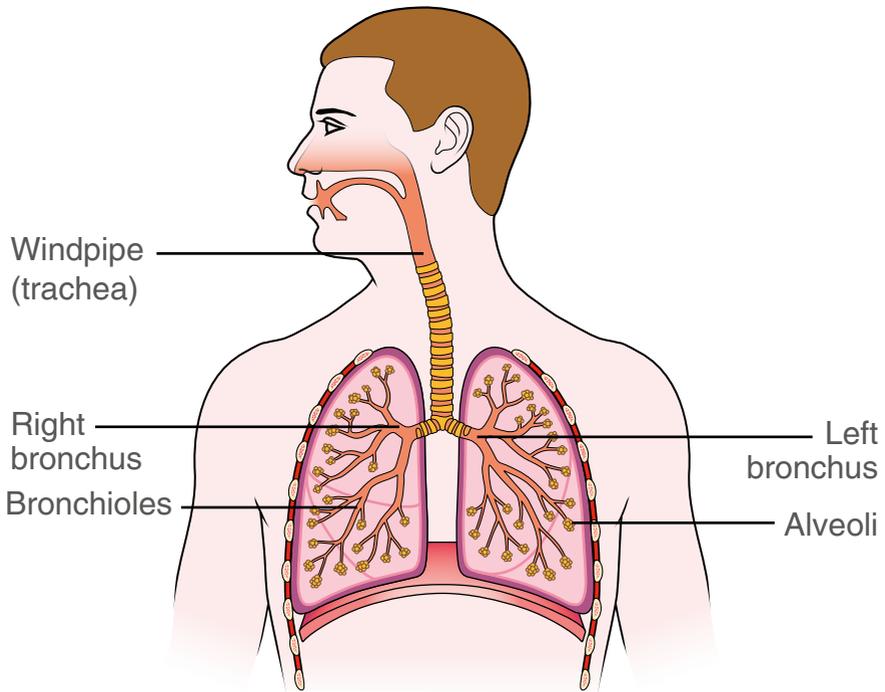
The lungs are part of our respiratory (breathing) system. This system includes the:

- nose and mouth
- windpipe (trachea)
- two tubes (bronchi) that branch from the windpipe going into each lung
- lungs.

When we breathe in, air passes from our nose or mouth through to the windpipe (trachea). The trachea divides into two tubes (airways) that go to each lung. These tubes are called the right and left bronchus.

The respiratory system

The lungs



Air passes through each bronchus into the lungs through smaller tubes called bronchioles. At the end of the bronchioles, there are tiny air sacs called alveoli. This is where oxygen from the air we have breathed in (inhaled) passes into the blood. The oxygen is then circulated through the blood around the body.

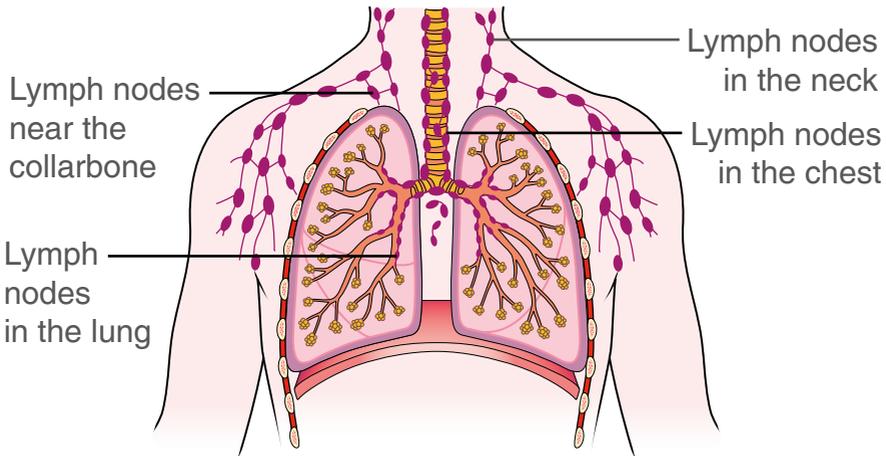
A waste gas called carbon dioxide passes from the blood into the air sacs (alveoli). We get rid of carbon dioxide when we breathe out (exhale).

The lymphatic system

The lymphatic system helps protect us from infection and disease. It drains lymph fluid from the tissues of the body and then returns it to the blood. The lymphatic system is made up of fine tubes called lymphatic vessels that connect to groups of lymph nodes throughout the body. Lymph nodes (sometimes called lymph glands) are small and bean-shaped. They filter bacteria (germs) and disease from the lymph fluid. When you have an infection, lymph nodes often swell as they fight it.

Sometimes, cancer can spread through the lymphatic system. If the cancer cells spread outside the lungs, they are most likely to go to lymph nodes nearby in the chest.

Lymph nodes close to the lungs



Risk factors and causes of lung cancer

Lung cancer is the third most common cancer in the UK. About 47,000 people are diagnosed with it each year. The number of men diagnosed with lung cancer is going down. But the number of women diagnosed with lung cancer is going up.

Most lung cancers are caused by smoking. There are also other risk factors that can increase the chances of getting lung cancer. But smoking remains the biggest risk.

Smoking

Smoking tobacco is the cause of most lung cancers and the biggest risk factor. This includes smoking cigarettes, cigars and pipes. The more you smoke, the bigger your risk.

- Around 9 out of 10 people who get lung cancer (90%) are smokers or ex-smokers. Starting smoking at a younger age increases the risk. In the UK, 72% of lung cancer cases are caused by smoking.
- When people stop smoking, their risk of lung cancer gets lower over time. After 12 years of not smoking, the risk of getting lung cancer is about 70% lower than it is for people who still smoke. After about 15 years, it is almost the same as a non-smoker.
- People who do not smoke can also get lung cancer, but their risk is much lower. About 1 in 10 people who get lung cancer (10%) have never smoked.

Smoking is also a risk factor for several other cancers. These include cancer of the:

- bladder
- gullet (oesophagus)
- larynx (voice box)
- head and neck.

You can get more information about giving up smoking (see pages 114 to 115).

Passive smoking

Breathing in other people's cigarette smoke is called passive or second-hand smoking. It can slightly increase the risk of lung cancer. The risk is much lower than if you smoke yourself. In the UK, smoking is now banned in enclosed public places and workplaces.

Age

Lung cancer is more common in older people. More than 4 in 10 people (44%) who are diagnosed are aged 75 and over. Lung cancer can affect younger people, but it is rare in anyone under 40.

Asbestos

Asbestos is a material that was previously used in the building industry. People who have been in prolonged or close contact with asbestos have a higher risk of getting lung cancer. The risk is greater if they smoke.

Exposure to asbestos also increases the risk of cancer of the pleura. This is called mesothelioma. The pleura are the membranes that cover the lungs.

If you worked with asbestos and have lung cancer or mesothelioma, you may be able to claim compensation. Your lung cancer specialist nurse can give you advice on this.

Radon gas

In certain parts of the UK, a natural gas called radon can pass from the soil into the foundations of buildings. Exposure to high levels of radon is not common. But it can increase the risk of developing lung cancer, particularly in people who also smoke.

Air pollution

Recent research has shown that air pollution can increase the risk of lung cancer. The risk is linked to air quality and how much pollution a person is exposed to. For most people, the risk is very small. Smoking is the major risk factor for lung cancer.

Chemicals and other substances at work

Rarely, contact with certain chemicals and substances can increase the risk of lung cancer. Contact with these substances is usually through work. For example, you have an increased risk if you work with:

- asbestos
- silica
- arsenic
- radiation.

Being exposed to diesel fumes through work can also increase lung cancer risk. For most people, the risk is very small.

Previous cancer treatment

People have a slightly increased risk of lung cancer if they have previously had radiotherapy to the chest to treat:

- lymphoma
- testicular cancer that has spread.

The risk is higher if they smoke. The benefits of this treatment far outweigh the risk of developing lung cancer, especially as these cancers can be cured.

Lowered immunity

Having lowered immunity because of illness or treatment can increase the risk of lung cancer. People have a lowered immune system if they:

- have HIV or Aids
- take immunosuppressant drugs after an organ transplant.

Family risk

People with a parent who had lung cancer have an increased risk of developing it. People who have a brother or sister with lung cancer have a higher risk, especially if they were diagnosed at a younger age.

Doctors do not know why this is. It could be caused by a lung cancer gene that runs in the family (inherited). Or it could be caused by shared risk factors such as smoking.

If you are worried about lung cancer in your family, you may find it helpful to talk to your GP.

Our booklet **Cancer and genetics – how cancer can sometimes run in families** has more information that you might find useful (see page 110).

Symptoms of lung cancer

The symptoms of lung cancer can include:

- a cough for 3 weeks or more
- a change in a cough you have had for a long time
- a chest infection that does not get better, or repeated chest infections
- feeling breathless and wheezy for no reason
- coughing up blood
- chest or shoulder pain that does not get better
- a hoarse voice for 3 weeks or more.

Other possible symptoms are:

- loss of appetite
- losing weight for no obvious reason
- feeling tired.

If you have any of these symptoms, it is important to get them checked by your GP.

Many of these symptoms can be caused by other lung conditions or by smoking.

Lung cancer may not always have symptoms early on. Sometimes it is found by chance when a person is having tests for another condition.

Less common symptoms

These may include:

- the tips of fingers becoming more curved or larger – called finger clubbing
- pain in the shoulder travelling down the arm.

If lung cancer is more advanced, it may cause different conditions that have their own symptoms (see pages 93 to 95). For example, a condition called superior vena cava obstruction (SVCO) may happen if the cancer presses on a vein in the chest (see page 97). Symptoms include swelling in the face, neck and arms. It needs to be treated straight away.



Types of lung cancer

There are two main types of primary lung cancer. They behave in different ways and your treatment will depend on the type you have. They are named after:

- how the cancer cells look under a microscope
- the type of cells the cancer started in.

Non-small cell lung cancer (NSCLC)

Non-small cell lung cancer (NSCLC) is the most common lung cancer. There are three main types:

- Adenocarcinoma is the most common type of NSCLC. It develops from cells that make mucus. It is more often found in the outer area of the lung. Although the main cause is still smoking, this type of NSCLC is more common in non-smokers.
- Squamous cell carcinoma develops in the cells that line the airways. It is more often found in the main airways in the centre of the lungs.
- Large cell lung cancer is a very uncommon type that usually starts in the centre of the lungs.

Non-small cell lung cancer not otherwise specified (NOS) is when the expert doctor in cell types (pathologist) cannot say for certain which type of NSCLC it is. This is uncommon.

Small cell lung cancer (SCLC)

Small cell lung cancer (SCLC) is much less common than NSCLC. About 10% to 15% of lung cancers are SCLC. It gets its name from how the cancer cells look under a microscope. It is usually found in the main airways (bronchi) in the centre of the lungs. It has often spread outside the lungs when it is diagnosed.

Other cancers that can affect the lungs

There are other types of cancer that can start in the lung or spread to the lung.

Mesothelioma

This is a cancer of the covering of the lungs (the pleura). It is caused by exposure to asbestos. It is less common than lung cancer.

We have more information about mesothelioma on our website and in our booklet **Understanding mesothelioma** (see page 110).

Rarer types of lung cancer

There are some rarer types of cancers that can start in the lung. They include neuroendocrine tumours. These are sometimes called carcinoid tumours.

We have more information about neuroendocrine tumours on our website (see page 110).

Secondary lung cancer

Cancers that start in another part of the body, such as in the breast, bowel or bladder may sometimes spread to the lungs. This is called secondary lung cancer. It is not treated in the same way as cancer that starts in the lung (primary lung cancer).

We have more information about secondary lung cancer on our website (see page 110).

DIAGNOSING LUNG CANCER

How lung cancer is diagnosed	22
Staging	32
Your data and the cancer registry	35



How lung cancer is diagnosed

People may be diagnosed with lung cancer after seeing their GP about their symptoms. But some people are diagnosed after being admitted to hospital as an emergency. This may be when the cancer is more advanced and causing serious symptoms.

If your GP thinks your symptoms could be caused by lung cancer, they arrange a chest x-ray. If this shows anything abnormal, your GP will refer you to a chest specialist urgently. You should see the specialist within 2 weeks.

Sometimes, GPs make an urgent referral before getting the result of the chest x-ray. Or they may arrange a CT scan instead of an x-ray.

At the hospital

A specialist nurse or doctor will ask you about your general health and any previous medical problems. They will examine you and talk to you about the tests you need. You usually see a specialist lung cancer nurse before or after you have tests.

Chest x-ray

If you have not already had one, you may have a chest x-ray to check your lungs.

CT scan

Most people have a CT (computerised tomography) scan. If you have certain symptoms you might have a CT scan, even if your chest x-ray is normal.

A CT scan makes a three-dimensional (3D) picture of the inside of the body using x-rays taken by the CT scanner. It uses a small amount of radiation. This is very unlikely to harm you. It will not harm anyone you come into contact with.

You will get an appointment letter telling you if you need to do anything before the scan. You may be asked not to eat or drink for a few hours before the scan. If this is a problem for you, call the number on your appointment letter.



Having a CT scan

You have the scan at the hospital. The person who works the scanner is called a radiographer. They help you prepare for the scan. You may have a drink or injection of a dye. This is called a contrast. It helps show certain areas of the body more clearly. The contrast may make you feel hot all over for a few minutes. It is important to let your doctor know if you are allergic to iodine or have asthma. This is because you could have a more serious reaction.

The scan takes 5 to 10 minutes, but you may be in the department for longer. You will lie very still on a narrow bed. The bed moves slowly back and forward through the donut-shaped scanner.

PET-CT scan

This is a combination of a CT scan and a PET (positron emission tomography) scan. A PET scan uses low-dose radiation to measure the activity of cells in different parts of the body. PET-CT scans give more detailed information about the part of the body being scanned.

This type of scan may be done instead of a CT scan. It is usually done before a biopsy. A PET-CT scan can also provide information to help your doctors plan your treatment.

You cannot eat for 6 hours before the scan, although you may be able to drink.

About an hour before the scan, the radiographer will inject a mildly radioactive substance into a vein, usually in the arm. This is called a tracer. The scan itself usually takes 30 to 90 minutes.

PET-CT scanners are not available in every hospital, so you may have to travel to have one.

Biopsy

You usually have a biopsy to find out for certain if you have lung cancer. A doctor or nurse takes samples of cells or tissue from the abnormal area. They look at the biopsy samples under a microscope to check for cancer cells.

There are different ways of doing a biopsy. Your cancer doctor or nurse will talk to you about the type of biopsy you will have.

Bronchoscopy biopsy

A doctor or nurse uses a thin, flexible tube (bronchoscope) to look inside your airways and lungs. The tube has a tiny camera on the end. The camera shows a picture of the area on a screen. They can take samples of cells (biopsies) from your lung or airways using the bronchoscope.

Before the test, you should not eat or drink anything for a few hours.

The nurse or doctor gives you a sedative to help you relax. They also spray a local anaesthetic onto the back of your throat to numb it. After this, they pass the bronchoscope through your nose or mouth and down into your windpipe (trachea) – see page 9.

A bronchoscopy usually takes up to 30 minutes. Afterwards, you should not eat or drink for at least 1 hour. You can go home as soon as the sedation has worn off.

You cannot drive for 24 hours after the sedation. You may have a sore throat for a couple of days.

CT scan and biopsy

CT scans can be used to guide a biopsy. You can usually have this as a day patient (see pages 23 to 24).

Lung biopsy through the skin

You usually have this test during a CT scan. This helps the doctor find the exact area to take the biopsy from. It is sometimes called a percutaneous biopsy.

Your doctor gives you an injection of local anaesthetic into the skin to numb the area. They pass a thin needle through the skin (percutaneous) into your lung and take the biopsy. You may feel a pushing sensation, but it only takes a few minutes.

After the biopsy, you stay in hospital for a few hours to make sure there are no problems. You may also have a chest x-ray, because there is a small risk of air getting into the space between the pleura. If this happens, it can make the lung collapse (pneumothorax). Tell your doctor or nurse if you:

- have any tightness or pain in your chest
- become more breathless.

If you get a pneumothorax, it is usually minor and gets better by itself. If it does not get better, your doctor can treat it with a simple procedure.

Endobronchial ultrasound scan (EBUS)

Some people have an EBUS to diagnose lung cancer. An EBUS lets the doctor look into the lungs through the walls of the airways. They use an ultrasound to see the area. An ultrasound uses soundwaves to produce a picture. The doctor takes biopsy samples of the lymph nodes in the centre of your chest.

Before the test, the doctor will give you a sedative. This helps you relax and feel drowsy. They also spray a local anaesthetic on to the back of your throat to numb it. The procedure is the same as having a bronchoscopy biopsy, but uses an ultrasound scan to show the area.

The doctor will pass a thin, flexible tube (bronchoscope) through your mouth into your windpipe (trachea). It has a tiny camera and ultrasound on the end which shows a picture of the area on a screen. The doctor passes a needle through the wall of the airway and takes samples (biopsies) of the lung and lymph nodes.

An EBUS takes less than an hour. You can usually go home on the same day.

Endoscopic ultrasound (EUS)

This is like an EBUS. A EUS takes a biopsy from the lymph nodes in the middle of the chest. But the doctor does this by passing a small, flexible tube (endoscope) through your mouth and into your gullet (oesophagus). The gullet is behind your windpipe and close to lymph nodes in the chest. The doctor passes a thin needle along the endoscope to take biopsies from the lymph nodes.

Biopsy of neck lymph nodes

Sometimes the doctor takes a sample of cells from the lymph nodes in the neck. They use an ultrasound scan to examine the lymph nodes. The doctor passes a thin needle into a lymph node and takes a sample of cells. You can have this test as an outpatient and go home on the same day.

Biopsy results

An expert doctor in cell types (pathologist) examines the biopsy samples in the laboratory. The results of the biopsy tell your doctor if there is a cancer and the type of lung cancer it is. These results help your doctor to decide which treatments might work well for you.

Molecular testing

If you have non-small cell lung cancer your doctors may arrange more detailed tests on cancer cells. This is sometimes called molecular testing. The results tell your cancer doctor if certain targeted and immunotherapy drugs are likely to work for you.

A pathologist does the test in the laboratory. They look for certain gene changes (mutations) in the cancer cell. This can show if the cancer cell is making an abnormal protein or has too much of a certain protein.

Liquid biopsy

This test is rarely done and is still being researched. Doctors take a blood sample and look for pieces of cancer cells and of the tumour DNA. This helps them find out more about the genetics of the cancer. The results may help with treatment decisions.

Further tests

If tests show you have lung cancer, your specialist usually arranges further tests to find out:

- what the size and position of the cancer is
- if it has spread outside the lung.

This is called the stage of the cancer (see pages 32 to 34). Knowing the stage helps you and your doctor decide on the best treatment for you. Some of these tests also include taking samples of tissue (biopsies).

Mediastinoscopy

This is sometimes done instead of an EBUS or EUS (see pages 26 to 27). It lets the doctor look at the area in the middle of your chest (the mediastinum) and nearby lymph nodes. You have it under a general anaesthetic. You may need to stay overnight in hospital to have it done.

The doctor makes a small cut in the skin at the base of your neck. They pass a thin, flexible tube with a tiny camera on the end through the cut into your chest. It shows a picture of the area on a screen. Your doctor can take a biopsy of the tissue and lymph nodes in the area.

Thoracoscopy

This lets the doctor look at the lining of the lungs (pleura). It is usually done under a general anaesthetic.

The doctor makes one or two small cuts in your chest. They pass a thin, flexible tube called a thoracoscope into your chest through a cut and take a biopsy of the pleura. They can also remove any fluid that may have collected there.

Video-assisted thoracoscopy

Sometimes the surgeon attaches a video camera to the thoracoscope. This lets them see the area more clearly.

MRI scan

An MRI scan uses magnetism to build up a detailed picture of areas of your body.

The scanner is a powerful magnet. You will be asked to complete and sign a checklist to make sure it is safe for you. The checklist asks about any metal implants you may have, such as a pacemaker or surgical clips. You should also tell your doctor if you have ever worked with metal or in the metal industry. Tiny fragments of metal can sometimes lodge in the body.

You have the scan in the x-ray department at the hospital. A person called a radiographer works the scanner. They may give you an injection of a dye, called a contrast. It helps show certain areas of the body more clearly.

During the test, you need to lie very still on a bed inside a long cylinder (tube). If you are worried about feeling claustrophobic, you may be able to have a sedative to help you relax. Talk to your GP or doctor about this before the scan.

The scan takes 15 to 90 minutes. It is painless but you may find it uncomfortable to lie still for that long. After the scan is finished you can usually go home.

Breathing tests

If your treatment plan involves having surgery or radiotherapy your doctor will arrange:

- breathing tests (lung-function tests)
- exercise tests.

These help doctors see how well your lungs are working. You may also have tests to check how well your heart is working. The results of these tests can, for example, tell the surgeon if surgery is a good option for you.

Waiting for test results

Waiting for test results can be a difficult time. It may take from a few days to a couple of weeks for the results of your tests to be ready. You may find it helpful to talk with your partner, your family or a close friend. Your specialist nurse or a support organisation can also provide support (see pages 117 to 118). You may find it helpful to talk to one of our cancer support specialists on **0808 808 00 00** (7 days a week, 8am to 8pm).



Staging

The stage of a cancer describes its size and position, and if it has spread from where it started. Knowing the stage helps your doctors advise the best treatment for you.

Doctors use the same staging system for non-small cell lung cancer and small cell lung cancer. Your doctor may tell you the stage of the cancer using a number staging system, from 1 to 4.

The staging looks at:

- the size of the tumour
- if the cancer has spread into nearby parts of the lung, or outside the lung
- if the cancer is in lymph nodes nearby, in the chest, or further away
- if the cancer has spread further outside the lung or to other parts of the body.

The staging also looks at other things, such as whether the lung has partly or fully collapsed.

Most of the number stages are also sub-divided. We have not included these here, to try to keep it simple. Your doctor or nurse can explain more about your stage of lung cancer.

Stage 1

This is when the cancer is no bigger than 4cm. It has not spread outside the lung or to any lymph nodes.

Stage 1 lung cancer is called early or localised lung cancer.

Stage 2

The cancer can be different sizes. It may have spread to nearby lymph nodes, other parts of the lung, or areas just outside the lung.

Stage 3

The cancer can be any size and has usually spread to lymph nodes. It may also be growing into:

- other parts of the lung
- the airway
- surrounding areas outside the lung.

The cancer may also have spread to tissues and structures further from the lung. But it has not spread to other parts of the body.

Stage 2 and 3 lung cancer is called locally advanced lung cancer.

Stage 4

The cancer can be any size. It may have spread to lymph nodes, and one or more of the following:

- The cancer has spread to the lung on the other side.
- There are cancer cells in fluid in the pleura or around the heart.
- The cancer has spread to another part of the body – such as the liver, bones or brain.

Stage 4 lung cancer is called metastatic or secondary lung cancer.

Small cell lung cancer

Doctors may also divide small cell lung cancers into two stages:

- Limited stage – the cancer cells can be seen in one lung and in nearby lymph nodes.
- Extensive stage – the cancer has spread outside the lung, to the chest area or to other parts of the body.

Small cell lung cancer (SCLC) can spread outside the lung quite early on. Some cancer cells are likely to have spread through the blood or lymphatic system. But this can be too small to show up on scans. Because of this, doctors usually treat SCLC as if it has spread, even if scans do not show this.

Your data and the cancer registry

When you are diagnosed with cancer in the UK, some information about you, your cancer diagnosis and your treatment is collected in a cancer registry. This is used to plan and improve health and care services. Your hospital will usually give this information to the registry automatically. There are strict rules to make sure the information is kept safely and securely. It will only be used for your direct care or for health and social care planning and research. Talk to your doctor or nurse if you have any questions. If you do not want your information included in the registry, you can contact the cancer registry in your country to opt out.





TREATING LUNG CANCER

Treatment overview for lung cancer	38
Surgery	47
Tumour ablation	60
Chemotherapy	62
Radiotherapy	73
Chemoradiation	81
Targeted therapies and immunotherapies	82
Targeted therapy drugs for NSCLC	83
Immunotherapy drugs	87
Controlling blocked airways	91
Controlling symptoms of lung cancer	93

Treatment overview for lung cancer

Treatment for lung cancer can include:

- surgery
- chemotherapy
- radiotherapy
- targeted and immunotherapy drugs.

You may have a combination of treatments. Sometimes people have different treatments one after the other to help to keep the cancer under control.

The treatment you have will depend on:

- the stage of the cancer (see pages 33 to 35)
- the type of the lung cancer (see pages 18 to 19)
- your general health.

The treatment you have also depends on how your health affects you being able to do day-to-day things. Your doctor or nurse may ask how active you are, or if you need help to look after yourself.

These things can affect how well some treatments might work for you. Doctors want to make sure you get the most effective treatment. They need to make sure it is right for you, and that the risks do not outweigh the possible benefits.

Your cancer doctor and nurse will involve you in treatment decisions, so you can talk about your choices. They can also help you if you need to make decisions about treatment.

Our booklet **Making treatment decisions** has more information that you might find helpful (see page 110).

Newer treatments are being developed. Your cancer doctor may talk to you about having treatment as part of a clinical trial. We have more information about clinical trials on our website (see page 110).

Surgery

If you have non-small cell lung cancer (NSCLC), it may be possible to remove the cancer with surgery (see pages 47 to 59). The type of operation depends on the stage and position of the cancer.

For some people, surgery may not be suitable. This could be because of other health problems that make surgery unsafe or make it difficult to cope with a major operation.

Surgery is rarely used to treat small cell lung cancer (SCLC), unless the cancer is small and has not spread outside the lung. Other treatments are usually more suitable for SCLC.

Chemotherapy

Chemotherapy is used for both NSCLC and SCLC. It is often the first treatment for SCLC (see pages 62 to 63). If the cancer has not spread to other parts of the body, it can be given with radiotherapy. This is called chemoradiation (see page 81). But you need to be well enough to cope with the side effects of both treatments.

If you are having lung surgery, you may have chemotherapy after the operation. This is called adjuvant treatment.

Chemotherapy can also be given along with targeted or immunotherapy drugs, or on its own, to control the cancer and relieve symptoms.

Radiotherapy

Radiotherapy can be used to treat both NSCLC and SCLC (see pages 73 to 80).

It may be given in the following ways:

- Radiotherapy given on its own instead of surgery, to try to cure early-stage NSCLC. This is called radical radiotherapy. Sometimes a type of radiotherapy called SABR is used.
- Radiotherapy given with chemotherapy (chemoradiation), or after it, for both NSCLC and SCLC.
- Radiotherapy to the head, to stop any lung cancer cells that have spread from growing into a secondary cancer in the brain. This is for people with SCLC.
- Radiotherapy to control symptoms. This may be done if the cancer is more advanced or has spread to other parts of the body. It is called palliative radiotherapy.

Targeted therapies and immunotherapies

Targeted therapy or immunotherapy drugs are often used to treat advanced NSCLC (see pages 82 to 90). Immunotherapy may be given to help reduce the risk of lung cancer coming back after chemoradiation. Newer targeted and immunotherapy drugs are being developed.

Specialised tests are done on the cancer cells to find out if certain drugs are suitable for you. Some of these drugs may be given as your first treatment. They may be given alone, or with chemotherapy.

You have targeted therapy drugs for as long as they are controlling the cancer. You take immunotherapy drugs for up to 2 years.

Other treatments

Tumour ablation treatments destroy cancer cells using:

- heat (radiofrequency ablation)
- microwaves (microwave ablation)
- laser light (photodynamic therapy).

Doctors sometimes use these treatments to treat very early-stage lung cancers (see pages 32 to 33). They also use them if the cancer is blocking an airway, to relieve breathlessness.

Your care also involves having treatments and drugs that help relieve your symptoms (see pages 93 to 97). You can see a specialist doctor or nurse for expert help with your symptoms.

Multi-disciplinary team (MDT)

In most hospitals, a team of specialists will plan the treatment they think is best for your situation. This multi-disciplinary team (MDT) will include:

- a surgeon who specialises in lung cancer
- an oncologist (a cancer doctor) who specialises in radiotherapy, chemotherapy and targeted therapies
- a doctor who is an expert in chest and breathing conditions
- a specialist nurse
- radiologists who analyse x-rays and scans
- pathologists who advise on the type and extent of the cancer.

The team may also include other healthcare professionals, such as:

- a palliative care doctor or nurse, who specialises in symptom control
- a dietitian
- a physiotherapist
- an occupational therapist (OT)
- a psychologist or counsellor.

After the MDT meeting, your doctor and specialist nurse will talk to you about the best treatment plan for your situation. They will explain the benefits and disadvantages of different treatments.

Advice on smoking

If you smoke, your doctor will usually advise you to stop smoking.

Giving up smoking can:

- make your treatment more effective
- reduce side effects
- improve your long-term health.

Your hospital or GP can offer different treatments to help you stop. But if you do not stop smoking, this should not affect the treatment plan your doctors offer you. There is information available to help you give up smoking (see pages 114 to 115).

Giving your consent

Before you have any treatment, your doctor will explain its aims. They will usually ask you to sign a form saying that you give permission (consent) for the hospital staff to give you the treatment. No medical treatment can be given without your consent, and before you are asked to sign the form you should be given full information about:

- the type and extent of the treatment
- its advantages and disadvantages
- any significant risks or side effects
- any other treatments that may be available.

If you do not understand what you have been told, let the staff know straight away, so they can explain again. Some cancer treatments are complex, so it is not unusual to need repeated explanations. It is a good idea to have a relative or friend with you when the treatment is explained, to help you remember the discussion. You may also find it useful to write a list of questions before your appointment.

People sometimes feel that hospital staff are too busy to answer their questions, but it is important for you to know how the treatment is likely to affect you. The staff should be willing to make time for your questions.

You can always ask for more time if you feel that you can't make a decision when your treatment is first explained to you.

You are also free to choose not to have the treatment. The staff can explain what may happen if you do not have it. It is essential to tell a doctor or the nurse in charge, so they can record your decision in your medical notes. You do not have to give a reason for not wanting treatment, but it can help to let the staff know your concerns so they can give you the best advice.

The benefits and disadvantages of treatment

Many people worry about the idea of having cancer treatments because of the side effects that can happen. But these can usually be controlled with medicines.

Treatment can be given for different reasons. The possible benefits will depend on your individual situation.

In people with early-stage lung cancer, surgery or radiotherapy may be done with the aim of curing the cancer (see pages 32 to 33). If the cancer has spread outside the lung, treatments can help shrink the cancer. This can improve your symptoms and help you live longer.

If the cancer has spread to other parts of the body, treatment may help control it and improve symptoms and quality of life. For some people, the treatment may have no effect on the cancer, but can still cause side effects.

When the aim of treatment is to try to cure the cancer, deciding whether to accept it may be easy. But if a cure is not possible and the aim is to control the cancer for a time, it may be harder to decide. You may want to talk it over with your cancer doctor, nurse and people close to you. If you decide not to have treatment, you will be given medicines to control any symptoms. This is sometimes called supportive or palliative care.

Second opinion

Your multidisciplinary team (MDT) uses national treatment guidelines to decide the most suitable treatment for you. Even so, you may want another medical opinion. If you feel it will be helpful, you can ask either your specialist or GP to refer you to another specialist for a second opinion.

Getting a second opinion may delay the start of your treatment, so you and your doctor need to be confident that it will give you useful information. If you do go for a second opinion, it may be a good idea to take a relative or friend with you, and have a list of questions ready, so that you can make sure your concerns are covered during the discussion.



Surgery

Your doctor will explain if surgery is a possible treatment for you.

It depends on:

- the type of lung cancer
- its stage
- your general health.

Lung cancer surgery is a serious operation and you need to be well enough to cope with it. Before you have surgery, your doctor arranges tests to check how well your lungs and heart are working.

Your operation will be done by a surgeon who is an expert in lung surgery. Surgery for lung cancer involves removing the cancer and the lymph nodes in the chest.

Surgery may be possible if you have:

- non-small cell lung cancer (NSCLC) stage 1 or 2, or occasionally stage 3
- small cell lung cancer (SCLC) that is very small and has not spread outside the lung.

After surgery, the doctor will be able to let you know more about the stage of the cancer (see pages 32 to 35).

You may have other treatments before or after surgery. Some people have chemotherapy or radiotherapy after surgery (see pages 62 to 81). But if the cancer is bigger (stage 3a) you may have combined chemotherapy and radiotherapy before surgery. The operation is done 3 to 5 weeks after chemoradiation, to allow you time to recover before surgery.

Small cell lung cancer (SCLC)

Surgery is rarely possible for small cell lung cancer (SCLC) because it has often spread outside the lung when it is diagnosed. If the cancer is very small, and your doctor is confident it has not spread, surgery may be possible. You will have chemotherapy afterwards.

Types of operation

The operation you have depends on the size and position of the cancer. The three main types of operations to remove lung cancer are.

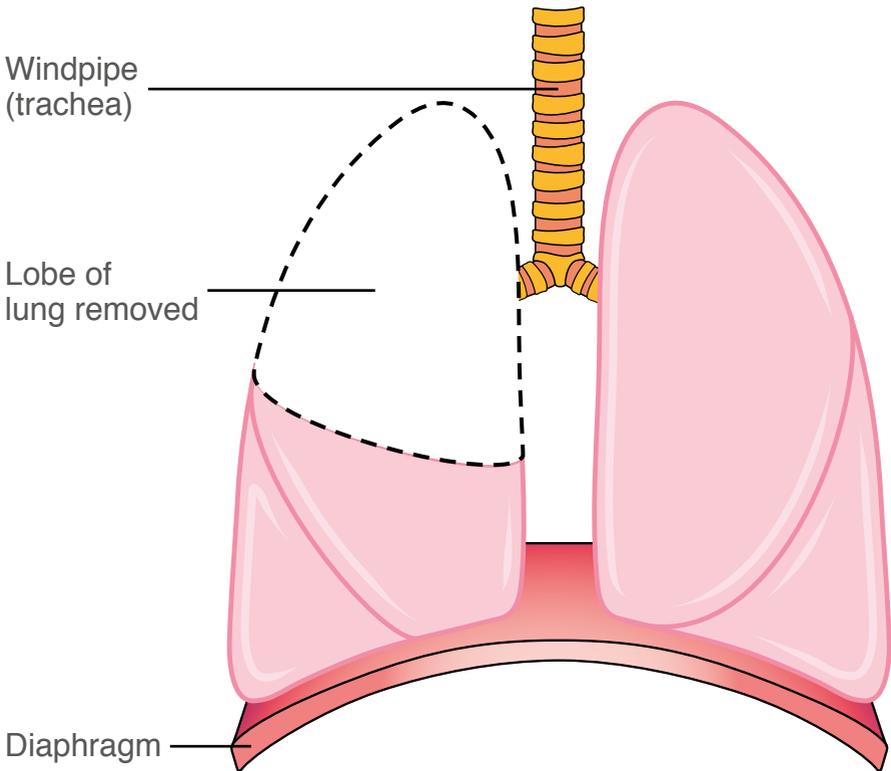
Removing a lobe of the lung (lobectomy)

This is an operation to remove one of the lobes of the lung (called a lobectomy). About a third to a half of your lung (30% to 50%) will be removed. It is the most common operation for lung cancer.

An operation was suggested soon after I was diagnosed. It was scheduled for a few weeks later. For me it was a pretty short time to decide whether to have the surgery or just try chemotherapy. It was a massive decision to make.

Lloyd, diagnosed with lung cancer

Removing a lobe of the lung (lobectomy)



Removing two lobes of the lung

This operation is done when more lung tissue needs to be removed. It may be done if the tumour has spread to two lobes next to each other. The operation is sometimes called a bilobectomy.

Removing all the lung

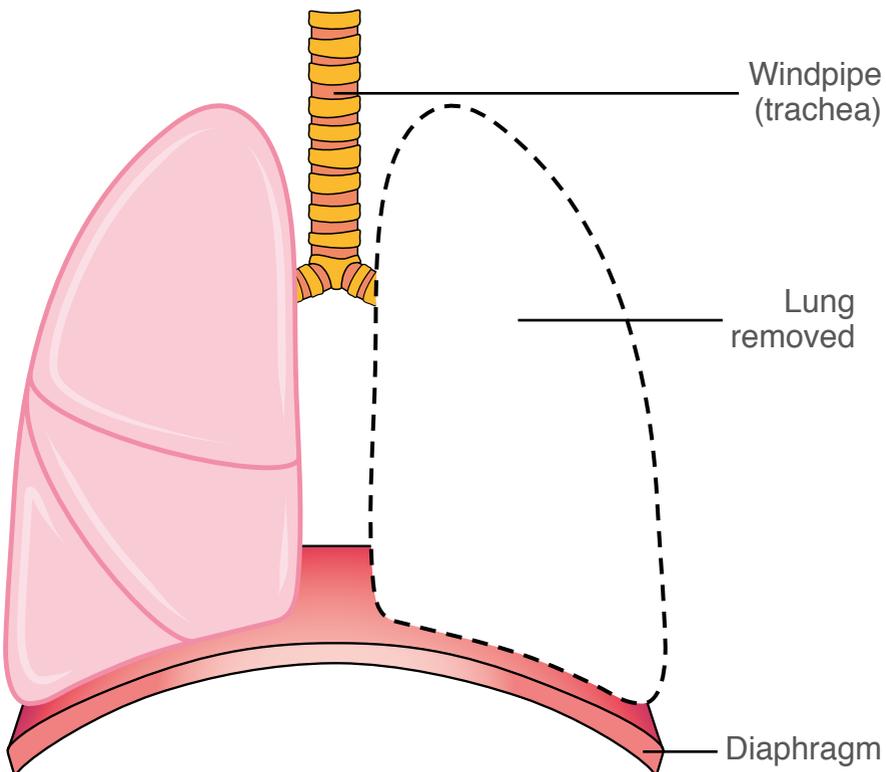
Some people may need to have the whole lung removed.

The operation is called a pneumonectomy. It may be done when:

- the cancer is near where the airways enter the lung
- more than one lobe of the lung is affected.

You can still breathe normally with only one lung. If you had breathing difficulties before the operation, you may still have them afterwards.

Removing one of the lungs (pneumonectomy)



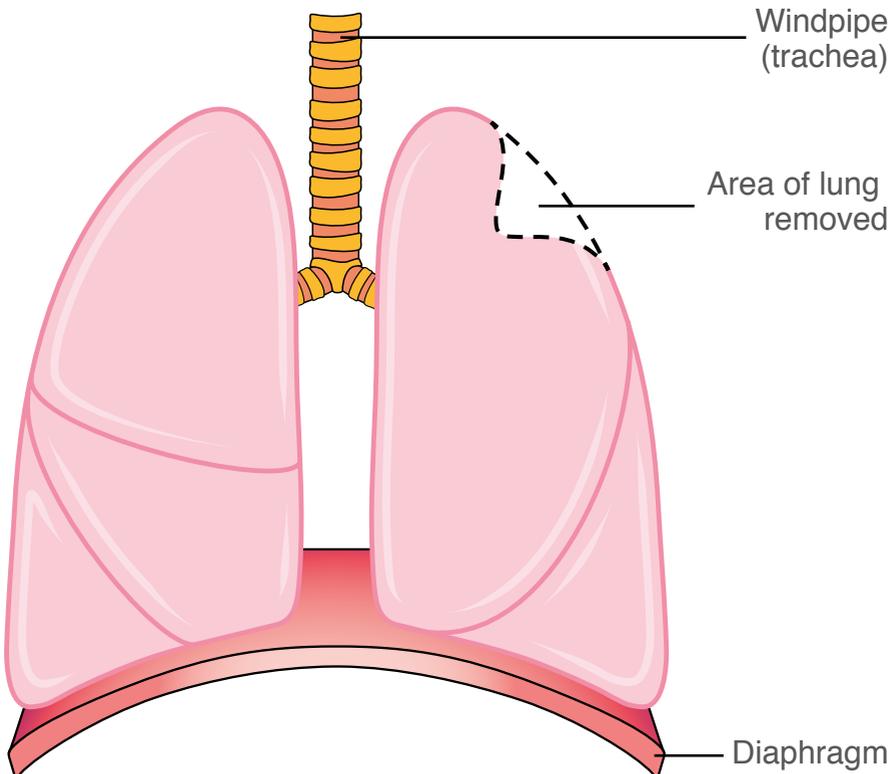
Removing a small part of the lung

Sometimes the surgeon removes a very small amount of a lobe of the lung. This operation is sometimes called a sublobar resection or a wedge resection. You may have this operation if:

- you have a very early-stage lung cancer (see page 32)
- the lung is too damaged for you to safely have a lobectomy.

A segmentectomy is another type of operation that removes a slightly larger part of the lung than a wedge resection.

Removing a small part of the lung (wedge resection)



Removing the lymph nodes

During surgery to remove the cancer, the surgeon also removes lymph nodes close to the cancer. These are examined under a microscope to check for cancer cells. Knowing if the cancer has spread to the lymph nodes tells your doctor more about the stage of the cancer. It also tells your doctor if you need further treatment.

How the surgery is done

There are different ways of doing surgery for lung cancer. Your surgeon will explain which one is most suitable for you.

Open surgery

Surgery for lung cancer usually involves opening the chest between your ribs and sometimes cutting a rib. This is called a thoracotomy. You will have a scar around the side of your chest afterwards. The scar will be 10cm to 20cm long.

Video-assisted thoracoscopic surgery (VATS)

Sometimes surgeons use a type of keyhole surgery called video-assisted thoracoscopic surgery (VATS). It is only done by surgeons who are specially trained. This type of surgery may be more suitable for people with early stage lung cancer.

The surgeon makes one or several small (2cm) cuts in the skin and puts a thoracoscope (tube) with a video camera attached into the chest. The camera sends images of the inside of the chest to a computer screen. The surgeon then passes small instruments through the cuts to remove the cancer.

After VATS you have a much smaller scar than with open surgery. You may have less pain and recover faster than with open surgery. Your stay in hospital is usually shorter.

Your doctor and nurse will tell you what to expect after VATS surgery.

Before your operation

Before your operation, you may have an appointment at a pre-operative assessment clinic. You have tests to check how well your lungs are working and tests to check your general health (see pages 22 to 30). These may include:

- blood and urine tests
- lung function (breathing) tests
- a chest x-ray
- a recording of your heart (ECG).

Some people have more heart tests. Your doctor will explain if you need this. At this appointment, you can ask questions and talk about any concerns you have about the operation. The nurse may show you some simple breathing exercises to help with your recovery after surgery.

When you have the surgery, you go into hospital on the day of your operation or the day before. The nurses give you elastic stockings (TED stockings) to wear during and after surgery, to help prevent blood clots.

Stopping smoking

If you smoke, your doctor and nurse will advise you to stop smoking a few weeks before your operation. This reduces the risk of breathing problems and other complications after surgery. It may help you recover more quickly and spend less time in hospital.

Your doctor or nurse can give you information and support to help you stop. There are also organisations that can help (see pages 114 to 115).

After your operation

After your operation, you usually go back to the same ward you were admitted to. Or you may be looked after in an intensive-care or high-dependency unit for a few days.

The nurses and your physiotherapist will encourage you to start moving around as soon as possible. This is very important to help with your recovery. They will encourage you to go for short walks as soon as you can.

Even if you have to stay in bed, it is important to move your legs regularly. This helps your circulation and prevents blood clots.

Your breathing

The nurse may give you oxygen through a mask over your mouth and nose, or thin soft tubes in each nostril.

A physiotherapist or nurse will show you some simple breathing exercises to do. This helps prevent chest infections and other possible complications.

You will have regular x-rays to make sure your lung is working properly.

Pain

It is normal to have some pain or discomfort. But there are different ways it can be managed.

Your nurse will assess you to make sure your pain is well controlled. This is also important to allow you to do your breathing exercises. Tell your nurse or doctor if the pain is not controlled. They can increase your painkillers.

For the first few days after surgery, you may have painkillers in one of the following ways:

- Into a vein (intravenously) in your hand or arm, through a drip (infusion) or a syringe connected to a small pump. This is set to give you a continuous dose of painkillers safely. You may be able to give yourself more painkiller when you need it by pressing a button. This is called patient-controlled analgesia (PCA).
- Into the space around your spinal cord (an epidural) through a thin tube the surgeon puts into your back during surgery.
- Into the chest area (a paravertebral block) through a thin tube the surgeon puts into your chest during surgery.

By the time you go home, you will be taking painkiller tablets, which you will continue to take at home. You may have mild discomfort or pain in your chest. This can last for up to several weeks or months after surgery.

Some people get new pain or an unusual sensation weeks or months after their operation. This is usually caused by nerves starting to repair after surgery. Tell your doctor or nurse about any new pain or sensations. They can check it and make sure you have the right painkillers.

Drips and drains

After your operation, you will probably have the following tubes:

- A drip (infusion) into a vein in your hand or arm to give you fluids. This is removed once you are eating and drinking normally again.
- A chest drain – you may have one or more tubes into your chest to drain fluid and air into a big bottle. They are usually removed after a few days.
- A small tube (catheter) into your bladder to drain urine into a bag. This is removed when you start walking.

Your wound

You usually have your stitches, clips or staples removed about 7 to 10 days after your operation. Or if you have dissolvable stitches, they disappear over a few weeks.

Your nurses and surgeon check your wound regularly while you are in hospital. Tell them if:

- you have any redness, pain or swelling
- the wound feels hot
- there is any fluid leaking
- you are feeling unwell with a fever.

These are possible signs of a wound infection. Tell your nurse or doctor if you have any of these symptoms after you go home.

Going home

You will usually be ready to go home 3 to 7 days after your operation.

You will have an appointment to come back to the outpatient clinic a few weeks later. At this appointment, the doctor checks to see if your wound is healing and you are recovering well. They talk to you about the results of your operation and any more treatment you might need. You can also ask any questions you have.



Recovering

It may take weeks or months to recover, depending on the operation you had. Recovery takes time and it is faster for some people than others. Try to pace yourself and do not do too much too soon.

Your doctor and nurse will give you advice on what you can do to help your recovery. You need to avoid any heavy lifting, or straining your arm on the affected side. It is also important to keep doing the exercises the physiotherapist showed you. For example, they may have shown you breathing exercises to do at home.

You can slowly build up your strength and fitness with light exercise, such as short walks.

Try to:

- eat healthily
- get enough rest
- do light exercise.

Keep taking your painkillers as you were told to by the pharmacist. Contact the hospital if the pain is not controlled, or if you have any problems with your wound.

You can have sex again when you feel comfortable doing so.

Driving

Your doctor will tell you when it is safe to drive after your operation. It can take about 4 to 6 weeks for you to be fit enough. At first, you may find the seatbelt presses on your wound and makes it sore. You can buy padding for seatbelts that may help reduce this.

Some car insurance policies give specific time limits for not driving after chest surgery. Check with your insurance company.

After having my surgery, I don't think I did anything for two months. The only thing I did was go to the hospital, or to the bank. I've never had cancer before, so I didn't know how to deal with it. Having Macmillan there supporting me, walking me through it step by step was the best thing that could have happened.

Lloyd, diagnosed with lung cancer

Tumour ablation

Tumour ablation involves treatments that destroy cancer cells using:

- heat (radiofrequency or microwave ablation)
- laser light (photodynamic therapy).

Doctors sometimes use these treatments for very early stage lung cancer, if surgery is not suitable (see page 32). This is usually when someone has other lung conditions or chooses not to have surgery.

Other ablation treatments are used to relieve breathlessness when the cancer is blocking the airways into the lungs. We have more information about controlling symptoms of lung cancer (see pages 93 to 97).

Radiofrequency ablation (RFA)

RFA uses heat to destroy cancer cells. It is sometimes given at the same time as radiotherapy or chemotherapy.

Before having RFA, you may have a local anaesthetic and sedative to make you sleepy. Some people have a general anaesthetic. You usually need to stay in hospital overnight to have the treatment. You might have RFA for one or more sessions.

The doctor puts a needle into the tumour. They usually use a CT scan to make sure it is in the right place. An electrical current (radio-waves) passes through the needle into the tumour. The current heats the cancer cells to a high temperature. This destroys (ablates) them. You may have some pain or discomfort after having RFA. You will be given painkillers to control this. You may also feel tired afterwards. Always contact your doctor if you become more breathless after having RFA.

Microwave ablation

Microwave ablation is done in a similar way to RFA.

The doctor sends microwave energy through the needle and into the tumour. This heats and destroys the cancer cells.

Photodynamic therapy (PDT)

This treatment destroys cancer cells using lasers or other light sources, together with a light-sensitive drug. You can have PDT on its own, but you are more likely to have it with other treatments. PDT is only available at some hospitals.

How it is given

You have PDT in two stages:

- First, a nurse gives you a light-sensitive drug as an injection into a vein. They do this at the hospital. The drug makes the cancer cells more sensitive to the laser.
- Second, you have the laser light treatment. This is done a few hours after the light-sensitive drug is injected. This gives it time to be taken up by the cancer cells. The doctor may give you a drug to help you to relax. Then they direct the laser light at the tumour using a bronchoscope. The laser makes the light-sensitive drug destroy cancer cells.

Side effects

The light-sensitive drug makes you temporarily sensitive to light. You may need to avoid bright light, by covering your skin and wearing sunglasses in daylight. How long you need to do this for depends on the drug you have. The nurse will explain what you need to do.

Side effects of PDT include breathlessness and a cough. Your doctor can give you more information.

Chemotherapy

Chemotherapy is the use of anti-cancer (cytotoxic) drugs to destroy cancer cells. These drugs interfere with the way cancer cells grow and divide. They also affect normal cells. This causes side effects.

Your cancer doctor and nurse will talk to you about the aims of your treatment. Chemotherapy can be used along with other treatments or on its own.

The chemotherapy you have depends on:

- the type of lung cancer
- the stage of the cancer
- how side effects are likely to affect you.

Your doctor may talk to you about having chemotherapy as part of a clinical trial.

Small cell lung cancer (SCLC)

Chemotherapy is usually the first treatment for small cell lung cancer (SCLC). You may have it:

- at the same time as radiotherapy (chemoradiation), if the cancer has not spread to other parts of the body
- before radiotherapy to try to shrink the cancer
- on its own to control advanced cancer, help you live longer and improve symptoms.

Chemotherapy may also be given after surgery to try to get rid of any remaining cancer cells. But surgery is not usually possible for SCLC.

Limited-stage SCLC (Stage 1 to 3)

If the cancer is small enough and you are well enough to cope with side effects, chemoradiation is the most effective treatment. If you cannot have both treatments at the same time, you can have chemotherapy first followed by radiotherapy.

The chemotherapy drugs used for SCLC are usually cisplatin or carboplatin, along with a second chemotherapy drug such as etoposide.

We have more information about these drugs on our website (see page 110).

Extensive-stage SCLC (Stage 4)

At first, you usually have chemotherapy on its own. Some people may have it along with an immunotherapy drug, such as atezolizumab.

If chemotherapy has helped reduce the cancer you may have radiotherapy to the chest afterwards.

Your doctor may also talk to you about having radiotherapy to the brain to help prevent a secondary cancer. This is called prophylactic cranial radiotherapy (PCR).

We have more information about PCR on our website (see page 110).

Non-small cell lung cancer (NSCLC)

Chemotherapy to treat non-small cell lung cancer may be given:

- on its own, or with a targeted or immunotherapy drug – this can help control advanced cancer, help you live longer and improve symptoms
- after surgery or radiotherapy to reduce the risk of the cancer coming back – this is called adjuvant chemotherapy
- before surgery or radiotherapy to shrink the cancer – this is called neo-adjuvant chemotherapy
- with radiotherapy (chemoradiation) if surgery is not suitable and the cancer is locally advanced
- with radiotherapy (chemoradiation) before surgery
- after treatment with targeted therapy drugs if they are no longer working.

Maintenance chemotherapy for NSCLC

If chemotherapy with pemetrexed and cisplatin helped shrink or control the cancer, some people may continue with chemotherapy. This is sometimes called maintenance treatment.

Instead of stopping chemotherapy after a few cycles, you carry on having pemetrexed every 3 weeks. You have it for as long as it is controlling the cancer, and the side effects are not causing you problems.

The chemotherapy drugs used

Most people have a combination of at least two drugs. Some people can have treatment with one drug.

For both types of lung cancer, you usually have either cisplatin or carboplatin with one of the following drugs:

- docetaxel
- etoposide
- gemcitabine
- paclitaxel
- pemetrexed
- vinorelbine.

Other chemotherapy drugs may also be used. Your doctor or nurse will give you more information. We have more information about individual chemotherapy drugs and some combined drugs on our website (see page 110).

If you need more treatment

If the cancer comes back or is growing, and you are well enough, you can usually have more chemotherapy with different drugs.

Small cell lung cancer (SCLC)

For small cell lung cancer, your doctor may recommend a combination of the chemotherapy drugs cyclophosphamide, adriamycin, and vincristine (CAV). Or you may have a drug called topotecan instead of CAV. You take topotecan as a tablet.

Non-small cell lung cancer (NSCLC)

For NSCLC that comes back, your doctor may recommend docetaxel on its own, or with a targeted therapy called nintedanib. Chemotherapy may also be given with an immunotherapy drug.

Your treatment will depend on the drugs you had for your first treatment. If the cancer comes back some time after it was first treated, your doctor may advise having cisplatin or carboplatin again.

How you have chemotherapy

Chemotherapy can be given in different ways, depending on your treatment plan. Your chemotherapy nurse will explain what is involved.

Usually chemotherapy is given in a chemotherapy day unit or outpatient clinic. But depending on the type of chemotherapy, some people may stay in hospital to have it.

Most of the drugs are given into a vein (intravenously). Some chemotherapy drugs, such as topotecan, are given as tablets.

A nurse gives you chemotherapy through a small tube (cannula) placed into a vein in your hand or arm. The drugs are given through a drip (infusion), or as an injection into the vein.

Some people have chemotherapy through a soft, plastic tube into a vein in their chest (called a central line). Or they may have it through a PICC line into a vein in their arm.

You have chemotherapy into the vein as 1 to 2 sessions of treatment, usually over 3 weeks. This makes up a cycle of chemotherapy. Each session will take a few hours.

Your doctor or nurse will explain more about this. You usually have 4 to 6 cycles of chemotherapy.

Possible side effects

Chemotherapy drugs cause different side effects. These can usually be well controlled with medicines. Your doctor or nurse will tell you about the most likely side effects and how they can be controlled or managed. Most side effects usually go away once treatment has finished.

Risk of infection

This treatment can reduce the number of white blood cells in your blood. These cells fight infection. If the number of white blood cells is low, you are more likely to get an infection. A low white blood cell count is called neutropenia.

If you have an infection, it is important to treat it as soon as possible. Contact the hospital straight away on the 24-hour contact number you have if:

- your temperature goes over 37.5°C (99.5°F)
- you suddenly feel unwell, even with a normal temperature
- you have symptoms of an infection.

Symptoms of an infection include:

- feeling shivery
- a sore throat
- a cough
- diarrhoea
- needing to pass urine often.

It is important to follow any specific advice your cancer treatment team gives you.

The number of white blood cells will usually return to normal before your next treatment. You will have a blood test before having more treatment. If your white blood cell count is low, your doctor may delay your treatment for a short time.



Bruising and bleeding

This treatment can reduce the number of platelets in your blood. Platelets are cells that help the blood to clot. Tell your doctor if you have any bruising or bleeding that you cannot explain. This includes:

- nosebleeds
- bleeding gums
- tiny red or purple spots on the skin that may look like a rash.

Some people may need a drip to give them extra platelets. This is called a platelet transfusion.

Blood clot risk

Cancer and some cancer treatments can increase the risk of a blood clot. Symptoms of a blood clot include:

- pain, redness or swelling in a leg or arm
- breathlessness
- chest pain.

If you have any of these symptoms, contact a doctor straight away.

A blood clot is serious, but can be treated with drugs that thin the blood. Your doctor or nurse can give you more information.

Anaemia (low number of red blood cells)

This treatment can reduce the number of red blood cells in your blood. These cells carry oxygen around the body. If the number of red blood cells is low, you may be tired and breathless. Tell your doctor or nurse if you feel like this. If you are very anaemic, you may need a drip to give you extra red blood cells. This is called a blood transfusion.

Feeling tired

Feeling tired is a common side effect. It is often worse towards the end of treatment and for some weeks after it has finished. Try to pace yourself and plan your day so you have time to rest. Gentle exercise, like short walks, can give you more energy. If you feel sleepy, do not drive or operate machinery.

Feeling sick

You may feel sick in the first few days after this treatment. Your doctor will give you anti-sickness drugs to help prevent or control sickness. Take the drugs exactly as your nurse or pharmacist tells you. It is easier to prevent sickness than to treat it after it has started.

If you feel sick, take small sips of fluids and eat small amounts often. If you continue to feel sick, or if you vomit more than once in 24 hours, contact the hospital as soon as possible. They will give you advice and may change the anti-sickness drug to one that works better for you.

Constipation

Some drugs may cause constipation. Here are some tips that may help:

- drink at least 2 litres (3½ pints) of fluids each day
- eat high-fibre foods, such as fruit, vegetables and wholemeal bread
- do regular gentle exercise, like going for short walks.

If you have constipation, contact the hospital for advice. Your doctor can give you drugs called laxatives to help.

Sore mouth

You may get a sore mouth or mouth ulcers. This can make you more likely to get a mouth infection. Use a soft toothbrush to clean your teeth or dentures in the morning, at night and after meals.

If your mouth is sore:

- tell your nurse or doctor – they can give you a mouthwash or medicines to help
- try to drink plenty of fluids
- avoid alcohol, tobacco, and foods that irritate your mouth.

Numb or tingling hands or feet (peripheral neuropathy)

Some of the drugs affects the nerves, which can cause numb, tingling or painful hands or feet. You may find it hard to fasten buttons or do other fiddly tasks.

Tell your doctor if you have these symptoms. They sometimes need to lower the dose of the drug. The symptoms usually improve slowly after treatment finishes, but for some people they may never go away. Talk to your doctor if you are worried about this.

Hair loss

Your doctor or nurse will tell you if the drugs you are going to have cause hair loss. If they do, you may lose all the hair from your head. Your eyelashes, eyebrows and other body hair may also thin or fall out.

We have more information in our booklet **Coping with hair loss** (see page 110).

Hair loss usually starts after your first or second treatment. It is almost always temporary and your hair will usually grow back after treatment ends. Your nurse can talk to you about ways to cope with hair loss. This includes wearing a wig, which they can order for you, and different types of headwear.

Changes in hearing

Cisplatin can affect your hearing. You may have a hearing test before you start treatment. During treatment, you may get ringing in your ears (tinnitus) and not be able to hear some high-pitched sounds. Tinnitus usually gets better after your course of chemotherapy ends. Some hearing changes can be permanent. Tell your doctor if you notice any changes in your hearing.

Contraception

Your doctor will advise you not to get pregnant or make someone pregnant while having this treatment. The drugs may harm a developing baby. It is important to use contraception during your treatment and for a while after treatment finishes. Your doctor, nurse or pharmacist can tell you more about this.

Sex

If you have sex in the first few days after chemotherapy, you need to use a condom. This is to protect your partner in case there is any chemotherapy in semen or vaginal fluid.

Fertility

Some cancer drugs can affect whether you can get pregnant or make someone pregnant. If you are worried about this, it is important to talk with your doctor before you start treatment.

Radiotherapy

Radiotherapy uses high-energy x-rays to destroy cancer cells, while doing as little harm as possible to normal cells. It can be used in different situations, depending on the type and stage of lung cancer you have.

Non-small cell lung cancer (NSCLC)

Radiotherapy for non-small cell lung cancer (NSCLC) may be given:

- on its own instead of surgery, to try to cure early-stage NSCLC
- after surgery, to reduce the risk of cancer coming back (adjuvant radiotherapy)
- at the same time as chemotherapy, if the cancer is locally advanced (concurrent chemoradiotherapy)
- before or after chemotherapy, if the cancer is locally advanced (sequential chemoradiation)
- to control symptoms, if lung cancer has spread to other parts of the body (palliative radiotherapy).

Small cell lung cancer (SCLC)

Radiotherapy for small cell lung cancer (SCLC) may be given:

- before or after chemotherapy, if the cancer is locally advanced (sequential chemoradiation)
- at the same time as chemotherapy, if the cancer is locally advanced (concurrent chemoradiotherapy)
- after chemotherapy, if the cancer has responded to treatment
- to control symptoms, if the cancer is more advanced or has spread to other parts of the body (palliative radiotherapy)
- to the head to stop any lung cancer cells that may have spread, forming a secondary cancer in the brain (prophylactic cranial radiotherapy).

Having external beam radiotherapy

You have the treatment in the hospital radiotherapy department.

Usually radiotherapy is directly aimed at the lung from a radiotherapy machine. This is called external-beam radiotherapy.

You usually have a course of radiotherapy planned.

Each treatment lasts for a few minutes. Your doctor or nurse will tell you how many treatments you will have.

You may have radiotherapy over different times and in different ways. Some people have it once a day Monday to Friday, with a break at the weekend. This may be done over 4 to 7 weeks.

You may have it more than once a day and over the weekend (hyper-fractionated). Sometimes specialist radiotherapy techniques are used.

To control symptoms, radiotherapy may be given over a shorter time, often 5 to 10 days.

Stereotactic ablative radiotherapy (SABR) for NSCLC

(SABR) is a specialised type of radiotherapy. It may be used to try to cure a small tumour that has not spread to the lymph nodes in the chest. This is usually when you cannot have, or do not want, surgery. SABR is not available at every hospital, so you may have to travel to have it.

Your cancer team use scans, specialist machinery and complex planning to target the radiotherapy beams very precisely. This gives a very high dose of radiotherapy to small cancers, and only a low dose to healthy tissue surrounding it. This helps to reduce side effects.

People usually have SABR as 3, 5 or 8 treatments on every other day. We have more information about SABR on our website (see page 110).

CHART for non-small cell lung cancer

CHART stands for continuous hyper-fractionated accelerated radiotherapy. You have radiotherapy 3 times a day including weekends, for 12 days. Each treatment must be at least 6 hours apart. You usually have to stay in the hospital or somewhere nearby during treatment.

Your doctor can tell you if CHART is suitable for you. It is not available at every hospital, so you may have to travel to have it.

Preventive radiotherapy to the brain for SCLC

If chemotherapy has been helpful, your cancer doctor may talk to you about having radiotherapy to the brain. This is called prophylactic cranial radiotherapy (PCR).

With SCLC, there is a risk that tiny numbers of cancer cells too small to see on a scan may have spread to the brain. Over time this could develop into a secondary cancer in the brain. PCR can reduce this risk and help people with SCLC to live longer. Your doctor and nurse will explain what is involved and what the side effects are before you decide.

Palliative radiotherapy

Sometimes people have external radiotherapy to shrink the cancer and improve their symptoms. This is called palliative radiotherapy.

It may be given to improve:

- breathlessness
- chest pain
- a cough
- coughing up blood
- pain in a bone, if the cancer has spread to the bones.

Some people have just one session of treatment. Other people have it over a few days. Or they might have a higher dose over 1 or 2 weeks. Your cancer doctor or nurse will explain more about this.

Superior vena cava obstruction

Doctors may use radiotherapy to treat a condition called superior vena cava obstruction. This is when the cancer is pressing on a large vein in the chest causing a blockage to the blood-flow (see page 97).

Spinal cord compression

Radiotherapy may also be used if lung cancer that has spread to the spine or near it and is causing pressure on the spinal cord. This is called spinal cord compression (SCC).

Internal radiotherapy

If the cancer is blocking one of the airways, you may have a type of internal radiotherapy (brachytherapy).

Most people have only one session of treatment. It is usually done in an operating theatre. The doctor passes a thin tube (catheter) down the nose or throat into the lung, using a bronchoscope. They put a small piece of radioactive material inside the catheter, next to the cancer. They leave it in place for a few minutes to give a dose of radiation to the cancer. Then they remove it together with the catheter.

Planning your radiotherapy treatment

You will have a hospital appointment to plan your treatment. You will usually have a CT planning scan of the area to be treated. During the scan, you need to lie in the position that you will be in for your radiotherapy treatment.

You may need to have some small, permanent markings made on your skin. The marks are about the size of a pinpoint. They help the radiographer make sure you are in the correct position for each session of radiotherapy.

These marks will only be made with your permission. If you are worried about them, talk to your radiographer.

Treatment sessions

At the beginning of each session of radiotherapy, the radiographer positions you carefully on the couch and makes sure you are comfortable. Radiotherapy is not painful, but you have to lie still for a few minutes during the treatment. You are alone in the room during treatment. But you can talk to the radiographer, who is watching from the next room.

Side effects of radiotherapy

You may get some side effects over the course of your treatment. Your doctor, nurse or radiographer will explain the side effects so you know what to expect. Tell them about any side effects you have. There are often things they can do to help. They will also give you advice on how you can manage side effects.

It can take 1 or 2 weeks after treatment before side effects start getting better. After this, most side effect usually slowly go away.

Difficulty swallowing

You may have:

- difficulty swallowing
- pain or discomfort when you swallow
- heartburn
- indigestion.

This is because radiotherapy can cause inflammation in the gullet (oesophagus).

These side effects usually happen towards the end of treatment and continue for a few weeks after it finishes. Your doctor can prescribe medicines to help reduce the symptoms.

If you have difficulty eating, you can replace meals with nutritious, high-calorie drinks. You can get these from most chemists, or your GP can prescribe them.

Tiredness

Radiotherapy often makes people feel tired. This can build up over your treatment. If you are having other treatments, such as surgery or chemotherapy, you may feel more tired.

It can help to:

- pace yourself and get plenty of rest
- do some light exercise, such as short walks – this will give you more energy.

Sometimes tiredness can continue for weeks or months after treatment finishes. If it does not get better, tell your doctor or nurse. Our booklet **Coping with fatigue** has more information. Or you can listen to our audiobook at macmillan.org.uk/fatigueaudio

Skin changes

The skin in the treated area may get dry and irritated. Do not use perfumed soap or body wash in that area during treatment, as it could irritate the skin. The hospital staff will advise you on how to look after your skin. If it becomes sore, your doctor can prescribe cream to help.

Breathlessness and a cough

You may find your breathing gets worse during radiotherapy and for a few weeks or months after it finishes. This is because radiotherapy can cause inflammation in the area of the lung being treated. It may also give you a dry cough. Always tell your doctor or nurse if:

- you have these symptoms
- these symptoms get worse.

They may prescribe steroids to help improve your symptoms. Our booklet **Managing breathlessness** has tips that might help (see page 110).

Hair loss

This only happens in the treatment area. Men may lose hair on their chest, but it usually grows back. Occasionally hair loss is permanent.

Late effects of radiotherapy

Late effects are side effects that do not go away or side effects that develop months or years after treatment.

Some possible late effects are:

- inflammation or scarring (fibrosis) in the treated area of the lung, which can cause breathlessness or a cough
- narrowing of the gullet (oesophagus), which makes it difficult to swallow
- a slight increase in the risk of heart problems, which might cause pain or tightness in the chest
- thinning of the bones in the chest area, which may cause pain in that area.

If you get any of these side effects or any others, tell your cancer doctor or nurse straight away. There are different things that can be done to manage late effects. Also let them know if any side effects do not improve.

Chemoradiation

This is when chemotherapy and radiotherapy are given at the same time. Chemoradiation can make treatment more effective. But you usually have more side effects, so you need to be well enough to cope with these.

NSCLC

If the cancer is locally advanced and surgery is not suitable you may have chemoradiation. You usually start chemotherapy during the first week of radiotherapy.

Occasionally, people may go on to have surgery 3 to 5 weeks after chemoradiation. But usually you will just have chemoradiation.

SCLC

People with SCLC stage 1 to 3 sometimes have chemoradiation. How you have this may depend on the cancer centre where you are having treatment.

For example, you may have radiotherapy twice a day over 3 weeks, along with chemotherapy. The radiotherapy starts during the first or second cycle of chemotherapy. If this is too much to cope with, you can have radiotherapy once a day over 4 to 6 weeks.

Targeted therapies and immunotherapies

Targeted therapy and immunotherapy drugs are usually used to treat non-small cell lung cancer (NSCLC) that has spread outside the lung or to other parts of the body. They are not commonly used for small-cell lung cancer (SCLC). But in some situations, a combination of immunotherapy and chemotherapy for SCLC may be given.

To find out the right treatment for you, the cancer cells taken during a biopsy or surgery are tested. Tests can also be done on blood taken with a blood test, but this is rare. The tests look for gene mutations (changes) and whether the cancer cell is making certain proteins. This is called molecular testing.

The results help your doctor to decide which treatment is the most suitable for you. The drug you have may also depend on whether you have squamous or adenocarcinoma NSCLC.

Not all the drugs we mention here are widely available in the UK. Your cancer doctor or specialist nurse will tell you which drugs are suitable for you. You may have some of these drugs as part of a clinical trial. You can find more information about most of these drugs and their side effects on our website (see page 110).

Targeted therapy drugs for NSCLC

These drugs interfere with the way cancer cells signal or interact with each other. This stops them growing and dividing. Targeted therapies do not always work for everyone with NSCLC. The drug you have will depend on the gene change found in testing. If a drug is likely to work well for you, it may be given as your first treatment.



EGFR inhibitors

You may have one of these drugs if tests find an abnormal change in the epidermal growth factor receptor (EGFR) gene. It makes an abnormal form of EGFR protein, which can make the cancer cells grow. This is sometimes called EGFR-positive lung cancer.

The following drugs block signals from EGFR to the cancer cells which stops them growing:

- gefitinib (Iressa®)
- afatanib (Giotrif®)
- erlotinib (Tarceva®)
- dacomitinib (Vizimpro®)
- osimertinib (Tagrisso®).

You take them as tablets.

Side effects

Common side effects of EGFR inhibitors include:

- a skin rash and nail changes
- diarrhoea
- feeling sick
- tiredness (fatigue).

ALK inhibitors

A small number of people (1 in 25) with NSCLC have a change in a gene called anaplastic lymphoma kinase (ALK). It makes an abnormal protein that can make the cancer cells grow. This is sometimes called ALK-positive NSCLC. If you have this, your doctor may give you one of these drugs:

- alectinib (Alecensa®)
- crizotinib (Xalkori®)
- ceritinib (Zydakia®).

You take these drugs as capsules.

If your treatment stops working your doctor may advise another ALK drug, such as:

- ceritinib (Zykadia®)
- brigatinib (Alunbrig®).

ROS1 gene change

About 1 in 50 people with NSCLC cancer have a change in a gene called ROS1. If you have this, you may be given crizotinib (Xalkori®).

Side effects

Common side effects of ALK inhibitors include:

- feeling sick
- tiredness
- diarrhoea
- constipation
- changes to eyesight
- fluid retention (for example ankle swelling).

Nintedanib (Vargatef®) for adenocarcinoma NSCLC

Nintedanib (Vargatef®) is a targeted therapy drug used to treat adenocarcinoma type NSCLC. It may be given if the cancer comes back, or has spread after you have already had chemotherapy. Nintedanib is given with the chemotherapy drug docetaxel.

You take it as a capsule.

Side effects

Common side effects include:

- diarrhoea
- feeling sick (nausea)
- tummy pain
- an increased risk of infection.

Immunotherapy drugs

Immunotherapy drugs use the immune system to find and attack cancer cells. They are mainly used to treat non-small cell lung cancer and include:

- pembrolizumab (Keytruda®)
- atezolizumab (Tecentriq®)
- durvalumab (Imfinzi®)
- ipilimumab (Yeryov®)
- nivolumab (Opdivo®).

Atezolizumab (Tecentriq®) may also be used to treat people with small-cell lung cancer.

You have these drugs as a drip (infusion) into a vein. A nurse will give them to you in the chemotherapy day unit.

These drugs target and block a protein (receptor) called PD-1 on the surface of T cells, which are part of the immune system. They also block another protein called PD-L1. By blocking PD-1 or PD-L1, these drugs help the immune system to find and attack the cancer cells.

Some people have tests on the cancer cells to check the levels of PD-L1. The results can tell your doctor how likely these drugs are to be helpful. But these drugs can still work for you even if results don't show high levels of PD-L1.

When immunotherapy drugs are given

You may have an immunotherapy drug after you have had chemotherapy or targeted therapy drugs. They may also be given as a first treatment for lung cancer.

Immunotherapy drugs can be given:

- on their own
- together with chemotherapy drugs
- with a targeted therapy drug or another immunotherapy drug.

You can have these drugs for up to 2 years if they are controlling the cancer. But if you develop certain side effects, treatment may need to be stopped.

New immunotherapy drugs are also being developed. We have more information about immunotherapy drugs on our website (see page 110).

Pembrolizumab

This drug may be your first treatment if tests show it is likely to work well for you. You may have it alone or with chemotherapy.

Atezolizumab

This drug may be given:

- on its own, after treatment with chemotherapy
- with a targeted therapy drug called bevacizumab (Avastin®) and chemotherapy
- as the first treatment for non-squamous NSCLC
- after you have already had treatment with an EGFR or ALK targeted therapy drug
- alongside chemotherapy for extensive stage small-cell lung cancer, alongside chemotherapy.

Durvalumab

This drug may be given for up to a year after chemoradiation to reduce the risk of the cancer coming back. Tests have to show that the cancer cells show some level of PD-L1.

Nivolumab

This drug can be given on its own after you have already had treatment with chemotherapy.

Ipilimumab and nivolumab

These drugs may be given together, but this is usually in a clinical trial.

We have more information about clinical trials on our website and in our booklet **Understanding cancer research trials (clinical trials)** – see page 110.

Side effects

Some of the common side effects of immunotherapy drugs are:

- diarrhoea
- tiredness
- a skin rash
- thyroid problems.

Immunotherapy drugs can sometimes make the immune system attack other parts of the body. This is not common, but it can cause serious side effects in:

- the lungs
- other organs, such as the liver or bowel
- glands that make certain hormones.

Sometimes the treatment may need to be stopped. You may need to take steroids for a short while to suppress your immune system.

Rarely, these side effects can happen up to 2 years after the treatment has stopped. These are called late effects. If you think you have any of these side effects, contact your cancer doctor or nurse straight away.

Your doctor or nurse will explain all these side effects to you. Always tell them about any side effects you have.

Controlling blocked airways

When the cancer is causing a blockage or narrowing in the airways, doctors may use the following treatments to relieve symptoms. Sometimes more than one treatment can be used, and treatments may be repeated.

You usually have them under a general anaesthetic using a bronchoscopy. The choice of treatment will depend on the size of the tumour and where it is in the airway. The doctor will explain the possible advantages and risks of these treatments to you.

Cryosurgery

Cryosurgery (cryotherapy) uses extreme cold to freeze and destroy cancer cells. It is usually used if the tumour grows into the main lung airways and makes them narrow. This is not common, but if it happens you may become breathless. The doctor uses a thin, flexible tube with a rounded end called a probe facing towards the tumour. They use liquid nitrogen to freeze the end of the probe. This freezes and destroys the cancer cells. The liquid nitrogen reduces the size of the tumour in the airway and makes breathing easier.

You can have this treatment again if the tumour grows back.

Diathermy or electrocautery

These treatments use an electrical current to destroy cancer cells. You might need a general anaesthetic for this treatment.

Your doctor uses a bronchoscope to guide a wire to probe into your windpipe. They pass an electrical current through the probe into the tumour to remove pieces of the tumour. This will make your breathing easier.

Laser therapy

Doctors can use laser therapy to shrink the cancer and prevent it from blocking the airways. You usually have laser therapy under a general anaesthetic. The doctor uses a flexible tube (bronchoscope) to aim the laser beam at the tumour. The laser beam uses heat to destroy as much of the tumour as possible.

Another laser treatment called photodynamic therapy (PDT) is sometimes used to treat blocked airways.

Stents to open the airway

If the cancer presses on the airway, the airway can become narrow. A small tube called a stent can be used to open the airway to help you breathe more easily. You may need a general anaesthetic to have a stent put in.

The doctor puts the stent inside the airway using a bronchoscope. The stent is folded flat when it is first inserted. As it comes out of the bronchoscope, the stent opens up like an umbrella. This pushes the walls of the narrowed airway open and makes your breathing easier. It can stay in your lung permanently.

Controlling symptoms of lung cancer

You may have symptoms of the cancer, such as breathlessness or a cough. Some people may develop new symptoms during their illness. Chemotherapy and radiotherapy help reduce symptoms (see pages 62 to 81), but there are also other ways to manage and control symptoms.

You may be referred to a doctor or nurse who is an expert in symptom control. They are sometimes called palliative care specialists.

Breathlessness

Breathlessness is a common symptom in people with lung cancer. It can be distressing to deal with. It may take a while for treatments to improve your breathing.

Your doctor or nurse will explain if there are suitable treatments to help treat blocked airways. Or if oxygen therapy would be useful.

There are different drugs that can help ease breathlessness. These include:

- bronchodilator drugs to widen your airways – you have these through an inhaler or a mask called a nebuliser
- steroids to reduce inflammation in your lung
- diuretics to help you pass more urine
- small doses of morphine
- drugs that reduce anxiety.

There are things you can do to help manage breathlessness. It is important to pace yourself. Save your energy for the things you need to do or that are important to you.

You may find these tips helpful:

- Sit by an open window or use a fan to create cool air blowing on or across your face.
- Wear loose-fitting clothes.
- Sit down to do things like washing, dressing or preparing food.
- Make it easier to move around your home. For example, you could put a chair in a hallway so you can rest between rooms.
- Ask an occupational therapist about aids that can help, such as grab rails or a raised toilet seat.
- Ask your nurse or physiotherapist about controlled breathing exercises or relaxation exercises.

Our booklet **Managing breathlessness** has tips that might help (see page 110).

Coughing

If you have a cough, there are different treatments that can help. Some types of painkiller tablets, such as codeine or morphine can help suppress a cough. You can also have other drugs as a vapour that you inhale. A saline mixture through a nebuliser may help loosen phlegm.

Sometimes a short course of radiotherapy may help improve a cough (see pages 73 to 77).

Pain

Tell your doctor or nurse if you have pain. There are different ways to control it. Treating the cancer can often improve pain. Your doctor will prescribe painkillers to take regularly.

You can take most painkillers by mouth, but they can also be given as a patch on the skin or as an injection. There are different types of painkiller and they can be given in different ways.

You can find more information about painkillers in our **Managing cancer pain** booklet (see page 110).

Bone problems

If the cancer has spread to your bones it may cause different problems, including pain. To reduce the risk of bone problems, your doctor may prescribe a drug called denosumab. You have it as an injection under the skin. Another possible drug your doctor may prescribe is zoledronic acid. It is given as a drip. We have more information about these drugs on our website (see page 110).

You may be given 1 or 2 sessions of radiotherapy to treat bone pain. Sometimes surgery may be used to strengthen a weakened bone.

Our booklet **Understanding secondary cancer in the bone** has more information (see page 110).

Treating other lung conditions

Lung cancer may cause other conditions that cause breathlessness and other symptoms. Cancer treatments can help improve these, but there are other ways they can be treated. Your doctor or nurse will give you more information about them.

Pleural effusion

Cancer in the lung can cause fluid to build up between the layers that cover the lung (the pleura). This is called a pleural effusion.

To treat a pleural effusion, the fluid is slowly drained. You may have this treatment as an outpatient, or you may need to stay in hospital for a couple of days.

Your doctor gives you an injection of local anaesthetic into the skin of the chest to numb it. You then have an ultrasound scan to find where the fluid is collecting.

The doctor makes a small cut in your skin and places a drain through this into your chest. The drain is attached to a bag or bottle. When your doctor thinks most of the fluid has drained, you have a chest x-ray to see how well your lung has re-expanded. If it has re-expanded, the chest drain is removed.

Sometimes a pleural effusion comes back, and you may need to have the fluid drained again. Some people may have a pleural catheter (tube) inserted so they can drain off more fluid at home.

Pleurodesis

It may be possible for your doctor to seal the layers of the pleura together. This is called pleurodesis. They inject sterile talcum powder through the drain to seal the layers together. They leave the drain clamped for some time and ask you to lie in different positions. This helps the two linings stick together.

The drain may then be attached to a suction machine to help the pleura to seal together. After a pleurodesis, you usually have the drain in place for a further 24 hours.

Superior vena cava obstruction (SVCO)

The superior vena cava (SVC) is a big vein in the middle of the chest. It carries blood from the upper body to the heart. If lung cancer presses on the SVC, it may block the flow of blood along this vein. This is called superior vena cava obstruction (SVCO).

Symptoms can develop quickly. They include:

- a feeling of fullness in the face when you bend over
- breathlessness
- headaches
- swelling in the face, neck, arms, hands, and veins in the chest
- feeling dizzy
- changes in your eyesight.

SVCO needs to be treated quickly. The symptoms can be distressing, but they can usually be controlled quickly.

You may be given:

- oxygen
- steroids to reduce swelling
- painkillers.

Treating SVCO

The treatment will depend on your situation. You may have radiotherapy or chemotherapy to shrink the cancer. Or the doctor may put a small tube (stent) into the vein to keep it open.

AFTER TREATMENT

Follow up

100



Follow up

After treatment, you will have regular check-ups with either CT scans or chest x-rays. Your appointments will be every few months at first, but eventually they may be once a year. They might be in person, or by phone or video. Appointments are a good way for you to talk to your doctor or nurse about any concerns you have. But if you notice any new symptoms between appointments, contact your doctor or lung specialist nurse for advice.

Many people find they get anxious before their appointments. This is normal. It can help to get support from family, friends, a support group or an organisation.

Driving after lung cancer

Lung cancer may affect your ability to drive safely. You need to tell the DVLA (England, Scotland or Wales) or the DVA (Northern Ireland) if:

- you get any problems with your brain or nervous system
- your doctor says you might not be fit to drive
- the medicines you are taking cause side effects that could affect your driving
- you have a bus, coach or lorry licence
- you are restricted to certain vehicles or to vehicles that have been adapted for you.

Talk to your doctor or nurse if you are worried that cancer treatments or symptoms may affect your driving.

Taking care of yourself

After treatment, you are likely to feel very tired. You may also have some other side effects or symptoms to cope with.

Recovering from treatment takes time. It is important to take care of yourself and to give your body time to recover. Build things up gradually rather than trying to do too much too quickly.

Stopping smoking

It is important to follow your doctor's advice on stopping smoking. There is a lot of advice and support to help people who have been advised to stop. Your hospital may provide advice to help you. Or you can get help from your GP, pharmacist or national services (see pages 114 to 115).

Stopping smoking will help reduce your risk of other health conditions, such as heart disease. It will improve your lung health and it also reduces the risk of other smoking-related cancers.

Don't close yourself off from everyone. Try your best to be yourself. The worst thing I found you could do is completely isolate yourself. If you're alone it just plays on your mind constantly. Try to do things that help you relax if you can.

Adam

Managing tiredness

It may take weeks or months for tiredness to improve after treatment. If you are very tired, it may make problems like breathlessness worse.

Ask family or friends for help with day-to-day things that use more energy. An occupational therapist may be able to help you manage your tasks.

Our booklet **Coping with fatigue** has more information. Or you can access our audiobook at macmillan.org.uk/fatigueaudio

Trying to eat well

Eating healthily can help you feel better and give you more energy. Try to eat:

- plenty of fruit and vegetables
- more chicken and fish
- less red or processed meats.

Even if you do not have much of an appetite, make sure you have regular snacks. There are also supplement drinks you can take to make sure you are getting enough energy and nutrients. You can get some supplement drinks on prescription. Your GP or dietitian can tell you more.

Ask your doctor or nurse to refer you to a dietitian if you want more advice on eating problems. Our booklet **Healthy eating and cancer** has more information (see page 110).

Being active

Going for regular short walks can help build up your energy levels after treatment. You can slowly build up the amount of exercise you do to improve your lung and heart health. Being more physically active can help reduce stress. It can also help keep your weight at a healthy level.

Our **Move more pack** has more information about keeping active and includes tips to help you get started (see page 110).



Drink sensibly

NHS guidelines suggest that both men and women should:

- not regularly drink more than 14 units of alcohol in a week
- spread the alcohol units they drink in a week over three or more days
- try to have several alcohol-free days every week.

A unit of alcohol is

- half a pint of ordinary strength beer, lager or cider
- one small glass (125ml) of wine
- a single measure (25ml) of spirits.

There is more information about alcohol and drinking guidelines at drinkaware.co.uk

Emotional help

Talk to your cancer specialist or nurse if you:

- think you may be depressed
- feel helpless or anxious a lot of the time.

They can refer you to a psychologist or counsellor who specialises helping people with cancer talk through confusing or upsetting emotions. Our cancer support specialists can tell you more about counselling and let you know about services in your area.

Cancer has been a huge challenge to get my head around, and I decided that my approach should be to try not to worry too much about the future. I am going to try and do my best to live well now, whatever that means.

Paul, diagnosed with lung cancer

Complementary therapies

Some people find that using some complementary therapies helps them relax or cope with treatment side effects. Some hospitals or support groups may offer therapies such as relaxation or aromatherapy.

Our booklet **Cancer and complementary therapies** has more useful information (see page 110).

Support groups

Self-help or support groups offer a chance to talk to other people who understand what you are going through. Ask your cancer team what support is available for you in your area. You can call us on **0808 808 00 00** or read our information about support groups in the UK (see pages 111 to 113).

Online support

Many people get support on the internet. There are online support groups, social networking sites, forums, chat rooms and blogs for people affected by cancer. You can use these to:

- share your experience
- ask questions
- get and give advice based on your experience.

Our Online Community is a social networking site where you can talk to people in our chat rooms, write blogs, make friends and join support groups. Visit **macmillan.org.uk/community**

I was lucky that I have such good friends. Obviously, some cope with it better than others. I had some friends ask me all the wrong questions, and I also have friends who can't find a way to talk about it. I don't want people to treat me differently. I am still the same guy. That is what people need to remember.

Neville, diagnosed with lung cancer



FURTHER INFORMATION

About our information	110
Other ways we can help you	111
Other useful organisations	114
Your notes and questions	123

About our information

We provide expert, up-to-date information about cancer.
And all our information is free for everyone.

Order what you need

You may want to order more booklets or leaflets like this one.
Visit be.macmillan.org.uk or call us on **0808 808 00 00**.

We have booklets about different cancer types, treatments and side effects. We also have information about work, financial issues, diet, life after cancer treatment and information for carers, family and friends.

Online information

All our information is also available online at macmillan.org.uk/information-and-support You can also find videos featuring stories from people affected by cancer, and information from health and social care professionals.

Other formats

We also provide information in different languages and formats, including:

- audiobooks
- Braille
- British Sign Language
- easy read booklets
- eBooks
- large print
- translations.

Find out more at macmillan.org.uk/otherformats

If you would like us to produce information in a different format for you, email us at cancerinformationteam@macmillan.org.uk or call us on **0808 808 00 00**.

Other ways we can help you

At Macmillan, we know how a cancer diagnosis can affect everything, and we are here to support you.

Talk to us

If you or someone you know is affected by cancer, talking about how you feel and sharing your concerns can really help.

Macmillan Support Line

Our free, confidential phone line is open 7 days a week, 8am to 8pm. Our cancer support specialists can:

- help with any medical questions you have about cancer or your treatment
- help you access benefits and give you financial guidance
- be there to listen if you need someone to talk to
- tell you about services that can help you in your area.

Call us on **0808 808 00 00** or email us via our website, **macmillan.org.uk/talktous**

Information centres

Our information and support centres are based in hospitals, libraries and mobile centres. There, you can speak with someone face to face. Visit one to get the information you need, or if you would like a private chat, most centres have a room where you can speak with someone alone and in confidence.

Find your nearest centre at **macmillan.org.uk/informationcentres** or call us on **0808 808 00 00**.

Talk to others

No one knows more about the impact cancer can have on your life than those who have been through it themselves. That is why we help to bring people together in their communities and online.

Support groups

Whether you are someone living with cancer or a carer, we can help you find support in your local area, so you can speak face to face with people who understand. Find out about support groups in your area by calling us or by visiting [macmillan.org.uk/selfhelpandsupport](https://www.macmillan.org.uk/selfhelpandsupport)

Online Community

Thousands of people use our Online Community to make friends, blog about their experiences and join groups to meet other people going through the same things. You can access it any time of day or night. Share your experiences, ask questions, or just read through people's posts at [macmillan.org.uk/community](https://www.macmillan.org.uk/community)

The Macmillan healthcare team

Our nurses, doctors and other health and social care professionals give expert care and support to individuals and their families. Call us or ask your GP, consultant, district nurse or hospital ward sister if there are any Macmillan professionals near you.

Help with money worries

Having cancer can bring extra costs such as hospital parking, travel fares and higher heating bills. If you have been affected in this way, we can help.

Financial guidance

Our financial team can give you guidance on mortgages, pensions, insurance, borrowing and savings.

Help accessing benefits

Our benefits advisers can offer advice and information on benefits, tax credits, grants and loans. They can help you work out what financial help you could be entitled to. They can also help you complete your forms and apply for benefits.

Macmillan Grants

Macmillan offers one-off payments to people with cancer. A grant can be for anything from heating bills or extra clothing to a much-needed break.

Call us on **0808 808 00 00** to speak to a financial guide or benefits adviser, or to find out more about Macmillan Grants.

We can also tell you about benefits advisers in your area. Visit **[macmillan.org.uk/financialsupport](https://www.macmillan.org.uk/financialsupport)** to find out more about how we can help you with your finances.

Help with work and cancer

Whether you are an employee, a carer, an employer or are self-employed, we can provide support and information to help you manage cancer at work. Visit **[macmillan.org.uk/work](https://www.macmillan.org.uk/work)**

Work support

Our dedicated team of work support advisers can help you understand your rights at work. Call us on **0808 808 00 00** to speak to a work support adviser (Monday to Friday, 8am to 6pm).

Other useful organisations

There are lots of other organisations that can give you information or support.

Lung cancer support organisations

ALK Positive UK

Email hello@alkpositive.wco.uk

www.alkpositive.org.uk

Provides support and advocacy and aims to improve the overall survival and quality of life of ALK positive lung cancer patients across the United Kingdom.

British Lung Foundation

Helpline **0300 003 0555** (Mon to Fri, 9am to 5pm)

www.blf.org.uk

Supports people affected by any type of lung disease.

NHS Direct – Stop Smoking Wales

Tel **0808 278 2522**

Text 'HMQ' to **80818**

www.helpmequit.wales

Offers information, advice and support in English and Welsh.

NHS Inform – Quit your Way Scotland

Tel **0800 84 84 84**

www.nhsinform.scot/care-support-and-rights/nhs-services/helplines/quit-your-way-scotland

Scotland's national stop smoking support service. Offers advice and information about how to stop smoking. You can also chat online to an adviser.

NHS Northern Ireland

www.nidirect.gov.uk/smoking

Has information, advice, and links to support organisations for people in Northern Ireland who want to give up smoking.

NHS Smokefree

Helpline **0300 123 1044** (Mon to Fri, 9am to 8pm, Sat to Sun, 11am to 4pm)

www.nhs.uk/smokefree

Offers information, advice and support to people who want to stop smoking or have already stopped and do not want to start again.

Quit

Helpline **0800 00 22 00**

www.quit.org.uk

Offers practical help and advice to people who want to stop smoking.

Roy Castle Lung Cancer Foundation

Helpline **0333 323 7200** (Mon to Fri, 9am to 5pm)

www.roycastle.org

Provides information and practical and emotional support for anyone affected by lung cancer.

General cancer support organisations

Cancer Black Care

Tel **0208 961 4151**

www.cancerblackcare.org.uk

Offers UK-wide information and support for people from Black and ethnic minority communities who have cancer. Also supports their friends, carers and families.

Cancer Focus Northern Ireland

Helpline **0800 783 3339** (Mon to Fri, 9am to 1pm)

Email **nurseline@cancerfocusni.org**

www.cancerfocusni.org

Offers a variety of services to people affected by cancer in Northern Ireland.

Cancer Research UK

Helpline **0808 800 4040** (Mon to Fri, 9am to 5pm)

www.cancerresearchuk.org

A UK-wide organisation that has patient information on all types of cancer. Also has a clinical trials database.

Cancer Support Scotland

Tel **0800 652 4531** (Mon to Fri, 9am to 5pm)

Email **info@cancersupportscotland.org**

www.cancersupportscotland.org

Runs cancer support groups throughout Scotland. Also offers free complementary therapies and counselling to anyone affected by cancer.

Maggie's

Tel **0300 123 1801**

Email **enquiries@maggies.org**

www.maggies.org

Has a network of centres in many locations throughout the UK. Provides free information about cancer and financial benefits. Also offers emotional and social support to people with cancer, their family, and friends.

Penny Brohn UK

Helpline **0303 300 0118** (Mon to Fri, 9.30am to 5pm)

Email helpline@pennybrohn.org.uk

www.pennybrohn.org.uk

Offers physical, emotional and spiritual support across the UK, using complementary therapies and self-help techniques.

Riprap

www.riprap.org.uk

Developed especially for teenagers in the UK who have a parent with cancer. Has an online forum where teenagers going through similar experiences can talk to each other for support.

Tenovus

Helpline **0808 808 1010** (Daily, 8am to 8pm)

Email info@tenovuscancercare.org.uk

www.tenovuscancercare.org.uk

Aims to help everyone in the UK get equal access to cancer treatment and support. Funds research and provides support such as mobile cancer support units, a free helpline, benefits advice and an online 'Ask the nurse' service.

Counselling and emotional support

British Association for Counselling and Psychotherapy (BACP)

Tel **0145 588 3300** (Mon to Fri, 9am to 5pm)

Email bacp@bacp.co.uk

www.bacp.co.uk

Promotes awareness of counselling and signposts people to appropriate services across the UK. You can also search for a qualified counsellor on their 'How to find a therapist' page.

Mind

Helpline **0300 123 3393** (Mon to Fri, 9am to 6pm)

Text **86463**

Email **info@mind.org.uk**

www.mind.org.uk

Provides information, advice and support to anyone with a mental health problem through its helpline and website.

UK Council for Psychotherapy (UKCP)

Tel **0207 014 9955**

Email **info@ukcp.org.uk**

www.psychotherapy.org.uk

Holds the national register of psychotherapists and psychotherapeutic counsellors, listing practitioners who meet exacting standards and training requirements.

Financial support or legal advice and information

Advice NI

Helpline **0800 915 4604**

Provides advice on a variety of issues including financial, legal, housing and employment issues.

Benefit Enquiry Line Northern Ireland

Helpline **0800 220 674** (Mon, Tue, Wed and Fri, 9am to 5pm, Thu, 10am to 5pm)

Textphone **0289 031 1092**

www.nidirect.gov.uk/money-tax-and-benefits

Provides information and advice about disability benefits and carers' benefits in Northern Ireland.

Citizens Advice

Provides advice on a variety of issues including financial, legal, housing and employment issues. Use their online webchat or find details for your local office by contacting:

England

Helpline **03444 111 444**

www.citizensadvice.org.uk

Wales

Helpline **03444 77 2020**

www.citizensadvice.org.uk/wales

Scotland

Helpline **0808 800 9060**

www.cas.org.uk

Civil Legal Advice

Helpline **0345 345 4345** (Mon to Fri, 9am to 8pm, Sat, 9am to 12.30pm)

Textphone **0345 609 6677**

www.gov.uk/civil-legal-advice

Has a list of legal advice centres in England and Wales and solicitors that take legal aid cases. Offers a free translation service if English is not your first language.

GOV.UK

www.gov.uk

Has information about social security benefits and public services in England, Scotland and Wales.

Jobs and Benefits Office Enquiry Line Northern Ireland

Helpline **0800 232 1271** (Mon, Tue, Wed and Fri, 9am to 5pm, Thu, 10am to 5pm)

Textphone **0289 031 1092**

www.nidirect.gov.uk/money-tax-and-benefits

Provides information and advice about disability benefits and carers' benefits in Northern Ireland.

Money Advice Scotland

Tel **0141 572 0237**

Email info@moneyadvicescotland.org.uk

www.moneyadvicescotland.org.uk

Use the website to find qualified financial advisers in Scotland.

NiDirect

www.nidirect.gov.uk

Has information about benefits and public services in Northern Ireland.

StepChange Debt Charity

Tel **0800 138 1111**

www.stepchange.org

Provides free debt advice through phone, email and the website, and online through live chats with advisers.

Unbiased.co.uk

Helpline **0800 023 6868**

Email contact@unbiased.co.uk

www.unbiased.co.uk

You can search the website for qualified advisers in the UK who can give expert advice about finances, mortgages, accounting or legal issues.

young people with cancer, their friends and families.

Support for older people

Age UK

Helpline **0800 055 6112** (Daily, 8am to 7pm)

www.ageuk.org.uk

Provides information and advice for older people across the UK via the website and advice line. Also publishes impartial and informative fact sheets and advice guides.

LGBT-specific support

LGBT Foundation

Tel **0345 330 3030** (Mon to Fri, 9am to 9pm, and Sat and Sun, 10am to 6pm)

Email **helpline@lgbt.foundation**

www.lgbt.foundation

Provides a range of services to the LGBT community, including a helpline, email advice and counselling. The website has information on various topics including sexual health, relationships, mental health, community groups and events.

Support for carers

Carers Trust

Tel **0300 772 9600** (Mon to Fri, 9am to 5pm)

Email **info@carers.org**

www.carers.org

Provides support, information, advice and services for people caring at home for a family member or friend. You can find details for UK offices and search for local support on the website.

Carers UK

Helpline (England, Scotland, Wales) **0808 808 7777** (Mon and Tue, 10am to 4pm)

Helpline (Northern Ireland) **0289 043 9843**

www.carersuk.org

Offers information and support to carers across the UK. Has an online forum and can put people in contact with local support groups for carers.

Cancer registries

The Cancer Registry

A national database that collects information on cancer diagnoses and treatment. This information helps the NHS and other organisations plan and improve health and care services. There is one in each country in the UK:

National Cancer Registration and Analysis Service

Tel (England) **0207 654 8000**

Tel (Ireland) **0214 318 014**

Email **enquiries@phe.gov.uk**

www.ncras.nhs.uk

www.ncri.ie

Scottish Cancer Registry

Tel **0131 275 7050**

Email **nss.csd@nhs.net**

www.isdscotland.org/health-topics/cancer/scottish-cancer-registry

Welsh Cancer Intelligence and Surveillance Unit (WCISU)

Tel **0292 037 3500**

Email **general.enquiries@wales.nhs.uk**

www.wcisu.wales.nhs.uk

Northern Ireland Cancer Registry

Tel **0289 097 6028**

Email **nicr@qub.ac.uk**

www.qub.ac.uk/nicr

Disclaimer

We make every effort to ensure that the information we provide is accurate and up to date but it should not be relied upon as a substitute for specialist professional advice tailored to your situation. So far as is permitted by law, Macmillan does not accept liability in relation to the use of any information contained in this publication, or third-party information or websites included or referred to in it. Some photos are of models.

Thanks

This booklet has been written, revised and edited by Macmillan Cancer Support's Cancer Information Development team. It has been approved by our Senior Medical Editor, Dr David Gilligan, Consultant Oncologist.

With thanks to: Carol Davies, Macmillan Lung Cancer Nurse; Dr Emrys Evans, Lung Cancer Consultant Respiratory Physician; Tracey Everitt, Clinical Nurse Specialist, Lung Cancer; Claire Haslop, Clinical Nurse Specialist, Lung Cancer; Professor Sam Janes, Professor of Respiratory Medicine; Mr David Lawrence, Cardiothoracic Surgeon; Dr Anthony Pope, Lung Radiation Oncologist; and Dr Ceri Powell, Lung Radiation Oncologist.

Thanks also to the people affected by cancer who reviewed this edition, and those who shared their stories.

We welcome feedback on our information. If you have any, please contact **cancerinformationteam@macmillan.org.uk**

Sources

Below is a sample of the sources used in our lung cancer information. If you would like more information about the sources we use, please contact us at **cancerinformationteam@macmillan.org.uk**

European Society for Medical Oncology (ESMO). Early and locally advanced non-small-cell lung cancer (NSCLC): ESMO clinical practice guidelines for diagnosis, treatment and follow-up. 2017.

European Society for Medical Oncology (ESMO). Metastatic non-small cell lung cancer: ESMO clinical practice guidelines for diagnosis, treatment and follow-up. 2018.

National Institute for Health and Care Excellence (NICE). Lung cancer – Diagnosis and management. Clinical guideline 2019.

Neal et al. Lung cancer – clinical update. *BMJ* 365:11725. 2019.

C Zappa & SA Mousa, Non-small cell lung cancer: current treatment and future advances, *Translational lung cancer research*, 2016;5(3):288-300.

Can you do something to help?

We hope this booklet has been useful to you. It is just one of our many publications that are available free to anyone affected by cancer. They are produced by our cancer information specialists who, along with our nurses, benefits advisers, campaigners and volunteers, are part of the Macmillan team. When people are facing the toughest fight of their lives, we are here to support them every step of the way.

We want to make sure no one has to go through cancer alone, so we need more people to help us. When the time is right for you, here are some ways in which you can become a part of our team.

5 ways you can help someone with cancer

Share your cancer experience

Support people living with cancer by telling your story, online, in the media or face to face.

Campaign for change

We need your help to make sure everyone gets the right support. Take an action, big or small, for better cancer care.

Help someone in your community

A lift to an appointment. Help with the shopping. Or just a cup of tea and a chat. Could you lend a hand?

Raise money

Whatever you like doing you can raise money to help. Take part in one of our events or create your own.

Give money

Big or small, every penny helps. To make a one-off donation see over.

Call us to find out more 0300 1000 200
macmillan.org.uk/getinvolved

Please fill in your personal details

Mr/Mrs/Miss/Other

Name

Surname

Address

Postcode

Phone

Email

Please accept my gift of £
(Please delete as appropriate)

I enclose a cheque / postal order /
Charity Voucher made payable to
Macmillan Cancer Support
OR debit my:
Visa / MasterCard / CAF Charity
Card / Switch / Maestro

Card number

Valid from

Expiry date

Issue no

Security number

Signature

Date / /

Do not let the taxman keep your money

Do you pay tax? If so, your gift will be worth 25% more to us – at no extra cost to you. All you have to do is tick the box below, and the tax office will give 25p for every pound you give.

I am a UK tax payer and I would like Macmillan Cancer Support to treat all donations I make or have made to Macmillan Cancer Support in the last 4 years as Gift Aid donations, until I notify you otherwise.

I understand that if I pay less Income Tax and/or Capital Gains Tax than the amount of Gift Aid claimed on all my donations in that tax year it is my responsibility to pay any difference. I understand Macmillan Cancer Support will reclaim 25p of tax on every £1 that I give.

Macmillan Cancer Support and our trading companies would like to hold your details in order to contact you about our fundraising, campaigning and services for people affected by cancer. If you would prefer us not to use your details in this way please tick this box.

In order to carry out our work we may need to pass your details to agents or partners who act on our behalf.

If you would rather donate online
go to macmillan.org.uk/donate



Registered with
**FUNDRAISING
REGULATOR**



Please cut out this form and return it in an envelope (no stamp required) to: Supporter Donations, Macmillan Cancer Support, FREEPOST LON15851, 89 Albert Embankment, London SE1 7UQ

This booklet is about lung cancer. It is for anyone who has been diagnosed with primary lung cancer. There is also information for carers, family members and friends.

The booklet explains the signs and symptoms of lung cancer, and how it is diagnosed and treated. It also has information about emotional, practical and financial issues.

We're here to help everyone with cancer live life as fully as they can, providing physical, financial and emotional support. So whatever cancer throws your way, we're right there with you. For information, support or just someone to talk to, call **0808 808 00 00** (7 days a week, 8am to 8pm) or visit **macmillan.org.uk**

Would you prefer to speak to us in another language? Interpreters are available. Please tell us in English the language you would like to use. Are you deaf or hard of hearing? Call us using NGT (Text Relay) on **18001 0808 808 00 00**, or use the NGT Lite app.

Need information in different languages or formats? We produce information in audio, eBooks, easy read, Braille, large print and translations. To order these, visit **macmillan.org.uk/otherformats** or call our support line.

**MACMILLAN
CANCER SUPPORT**

© Macmillan Cancer Support, November 2020. 17th edition. MAC11632_E17.
Next planned review November 2023. Macmillan Cancer Support, registered charity in England and Wales (261017), Scotland (SC039907) and the Isle of Man (604). Also operating in Northern Ireland. Printed on sustainable material. Please recycle.



Patient Information Forum