

Radiotherapy

This information is about radiotherapy, a type of treatment that is sometimes used in the treatment of lymphoma.

What is radiotherapy?

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Frequently asked questions about radiotherapy

We have separate information about the topics in **bold font**. Please get in touch if you'd like to request copies or if you would like further information about any aspect of lymphoma. Phone 0808 808 5555 or email information@lymphoma-action.org.uk.

What is radiotherapy?

Lymphoma is a type of cancer. Radiotherapy uses radiation to destroy cancer cells. You might have radiotherapy with the aim of:

- getting rid of your lymphoma entirely ('**curative treatment**')
- controlling your symptoms ('**palliative treatment**').

Radiotherapy is a 'local' treatment, which means that it affects only the parts of your body being treated. It damages lymphoma cells in the area of the body treated so that they die off in time. Although healthy cells in the areas surrounding the treatment area can also be affected by radiotherapy, they are much more easily able to repair themselves.

Why is radiotherapy used to treat lymphoma?

Lymphoma cells are usually more sensitive to radiotherapy than many other types of cancer cell. This means that the dose of radiation needed to treat lymphoma is often less than the dose that's needed for other types of cancers. This can help to limit **side effects**

Radiotherapy might be given to try to get rid of the lymphoma ('**curative radiotherapy**') or to control symptoms ('**palliative radiotherapy**').

Curative radiotherapy (given to try to get rid of your lymphoma)

Many people have radiotherapy with the aim of destroying all of the lymphoma; this is known as curative treatment.

Depending on which **type and stage of lymphoma** you have, your treatment might involve radiotherapy alone, or a combination of **chemotherapy** and radiotherapy.

- Some types of lymphoma that are **low grade** or 'indolent' (slow-growing) and at an **early stage** can be cured with just radiotherapy.
- **High-grade** lymphomas that are at an early stage are often treated with chemotherapy and then radiotherapy.
- High-grade lymphomas that are at a more **advanced stage** are usually treated with chemotherapy. You might also have some radiotherapy after finishing your chemotherapy.

The aim of having both chemotherapy and radiotherapy is that:

- Chemotherapy treats all areas of the lymphoma, including small clusters of lymphoma cells that are some way away from the main area (site) of the disease.
- Radiotherapy then targets the main site of the lymphoma. With **curative radiotherapy**, this increases the likelihood of completely destroying the lymphoma.

Usually, lymphoma doesn't come back (**relapse**) in a part of the body that has already been treated with curative radiotherapy.

Palliative radiotherapy (given to control symptoms of lymphoma)

Sometimes, radiotherapy is given with the aim of reducing the size of the lymphoma to help control symptoms such as pain and discomfort. This is known as 'palliative radiotherapy'.

Which types of lymphoma can radiotherapy treat?

Hodgkin lymphoma

You might be treated with radiotherapy if you have:

- **Classical Hodgkin lymphoma** that is at an early stage, after a course of chemotherapy.
- Classical Hodgkin lymphoma that is at an advanced stage, sometimes if there are areas that seem not to have completely responded to chemotherapy.
- **Nodular lymphocyte-predominant Hodgkin lymphoma (NLPHL)** that is at an early stage. Radiotherapy alone is often recommended.

Non-Hodgkin lymphoma

Radiotherapy is used to treat many types of **non-Hodgkin lymphoma**. You might be treated with radiotherapy if you are affected by one of the following types of lymphoma:

Low-grade or 'indolent' (slow-growing) non-Hodgkin lymphoma

- If the lymphoma is in just one area of your body, you might have **curative radiotherapy**.
- If the lymphoma is more widespread, you might have **palliative radiotherapy**.

High-grade or 'aggressive' (fast-growing) lymphoma

- If the lymphoma is at an early stage, treatment often involves a course of chemotherapy followed by radiotherapy.
 - If the lymphoma is more advanced, chemotherapy is usually given as a first treatment. You might have radiotherapy afterwards to treat areas of lymphoma that were large before chemotherapy. Radiotherapy might also be used to treat areas that have not responded completely to chemotherapy.
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Types of radiotherapy

The type of radiotherapy and length of treatment depends on where in your body the lymphoma is and the **aim of the radiotherapy**. Your clinical oncologist (a doctor who specialises in the treatment of cancer) chooses the most appropriate method for you. They should talk you through your treatment plan and give you an opportunity to ask any questions.

Most radiotherapy is given by high energy X-rays (photons). These are produced by a machine (often a linear accelerator machine, known as a 'LINAC') and can be given in different ways, including as:

- single beams
- multiple beams
- intensity modulated radiotherapy (IMRT), which shapes the dose delivered using lots of beams.

Electron beam therapy

If the lymphoma is on or near the surface of the skin, a type of radiotherapy called electron beam therapy might be recommended. Electrons are tiny particles of radiation that can't travel far in the body. This keeps them to within a short distance under the skin, which means that they cannot affect deeper tissues.

Electrons are produced by a linear accelerator machine that has an 'applicator' connected to the head of the machine. The applicator directs electrons to the area of your body to be treated. When the machine is set up, the applicator is brought very close to you and might touch you. However, you won't feel anything during the treatment.

Three types of radiotherapy are occasionally used in particular circumstances:

- **total body irradiation** (TBI)
- **total skin electron therapy** (TSET)
- **proton beam therapy** (PBT).

Total body irradiation (TBI)

Total body irradiation (TBI) is a type of high energy X-ray radiotherapy given to the whole body.

If you need an **allogeneic (donor) stem cell transplant**, you might have TBI as part of your **conditioning treatment**, before the procedure.

You might have TBI as a single dose, or twice a day over a number of days.

Total skin electron radiotherapy (TSET)

Total skin electron radiotherapy (TSET) uses electrons to treat the whole surface of your skin. It is used to treat a type of **cutaneous T-cell Lymphoma** (CTCL) called **mycosis fungoides**.

Proton beam therapy (PBT)

Proton beam therapy (PBT) is a type of radiation therapy that uses charged particles (protons). The protons are delivered directly to the cancer cells. Both conventional X-ray (or photon) radiotherapy and PBT can accurately target cancer cells. PBT can deliver less radiation to surrounding healthy tissues. In some circumstances, this can reduce some of the long-term side effects (**late effects**) of radiotherapy.

PBT is most useful for treating cancer in children, teenagers and young adults who have a higher risk of developing late effects. Its potential benefits are considered on a case-by-case basis by a national panel of clinical experts.

PBT is not currently available on the NHS for adults (aged 25 years old or older) with lymphoma. This is because the current evidence does not suggest that PBT is a better treatment compared with current standard treatment. Scientists continue their research to find out more.

PBT is available privately at some centres in the UK and in other countries. The exact techniques and treatments vary from centre to centre.

You can find out more about **PBT on the NHS website**.

Where and when will I have radiotherapy?

You need to go to hospital for your **treatment to be planned** and each time you have radiotherapy.

Not all hospitals have a radiotherapy department, so you might need to travel a bit further to one that does. It's quite common to feel tired after radiotherapy, so it is a good idea to arrange for someone to drive you home. If you don't have anyone who could help with this, speak to a member of your medical team beforehand, to ask if there are any community transport systems available to you.

I only had about 10 minutes of radiotherapy a day for 17 days but I found the process of driving to and from the hospital quite tiring after a few days. Although I am grateful for the excellent treatment and care I received, I did find the 'daily grind' of it exhausting. It might be helpful to arrange to take some time off work and other commitments while you're having treatment.

David, treated with radiotherapy for skin lymphoma

Most people who have radiotherapy have treatment Monday to Friday. The length of treatment can vary from a one day to around 5 weeks. Don't worry if your schedule differs from this as your treatment plan is designed specifically for you.

How is radiotherapy planned?

Once you and your medical team have agreed on radiotherapy, you are under the care of a clinical oncologist.

Radiotherapy needs to be carefully planned to make it as effective as possible and to minimise **side effects**.

How much radiotherapy (what dose) will I have?

The total dose of radiotherapy, measured in Gray (Gy), is split into separate treatments, known as 'fractions'. Highly trained specialists calculate the right dose of radiation for you. They work within limits of radiation that are known to be safe.

How much radiotherapy you have depends on the aim of it.

- **Curative radiotherapy** is usually given over a few weeks. Treatment is spread out so that healthy cells have a chance to repair between fractions. Giving treatment in fractions also increases the likelihood of the treatment reaching the lymphoma cells at a time when they are most sensitive to radiotherapy.
- Just one fraction of **palliative radiotherapy** can be effective, although sometimes, a longer course might be recommended.

With modern techniques, it's often possible to use a lower total dose of radiotherapy and to target lymphoma cells more accurately than in the past. This reduces the **side effects** caused by radiation to healthy cells while also successfully treating the lymphoma.

During **planning**, the radiotherapy team make sure that the right amount of radiotherapy is delivered to precisely the right place. They look at:

- exactly where the lymphoma is. This area will receive most of your total dose of radiotherapy
- organs at risk. These are critical structures in the body such as the brain, heart, and salivary glands. Your treatment is planned to protect these organs from radiation, to prevent damage to them.

You won't receive radiotherapy to the rest of your body unless you are having **total body irradiation** (TBI).

The radiotherapy planning process

Most radiotherapy treatment is planned using a **computed tomography** (CT) simulator scan. You might hear this called a 'CT planning scan'. Images from the scan are transferred to a radiotherapy planning system to help plan your treatment.

Unless you are having radiotherapy to your head or neck, you might have some permanent dot-like marks made to your skin. Usually, these are two or three tiny dots of ink, just under the surface of your skin. The dots are lined-up with the X-ray beams on the radiotherapy treatment machine to help make sure that the radiotherapy goes to exactly the right place. You might also have a 'contrast agent', which is a type of dye. Usually, this is injected into one of your veins or you might have it as a drink. This makes the CT image clearer, helping doctors to plan your treatment.

If you're having radiotherapy to your head, neck, armpit or chest, you might have a plastic **radiotherapy mask** (sometimes called a 'shell') made. This helps keep you in the same position for each treatment so that the treatment goes to exactly the right place. Your doctor might use a felt-tip-liked pen to mark the area to be treated.

If you're having radiotherapy to particular areas of your chest, you might be asked to take a deep breath in during your CT planning scan and treatment sessions. This technique is called 'deep inspiratory breath hold'. It is used only in certain circumstances to help reduce the impact of movement due to breathing on the area to be treated.

The CT simulator scan gives an image that can be thought of as a detailed 3D map. This shows:

- where the lymphoma is
- the exact positions of nearby tissues and organs in your body

Your radiotherapy team and your clinical oncologist use this information and computer software to work out how to best direct the X-ray beams. Their goal is to treat the lymphoma while keeping radiation to the nearby parts of the body low.

Treatment mask or shell

If you have radiotherapy treatment for lymphoma in the head and neck area, you will probably have a thin plastic shell or mask made. The mask helps to get you into the same position each time you have treatment. It also helps to keep you still during each treatment.



I had to have a head and neck ‘shell’ or ‘mask’ made to ensure I received radiotherapy to exactly the same position each time. I found it very odd that I could only see from one angle. I was able to breathe easily, though I found that the best way to cope was to think about totally different things.

Julian, diagnosed with marginal zone lymphoma

The shell is usually made from thermoplastic sheet. The thermoplastic is softened in warm water for a couple of minutes to make it mouldable. The sheet is then gently laid over your face. You need to stay still while it cools and sets into the shape of your face. This takes a few minutes and most people say it doesn't feel unpleasant.

After your shell is made, the radiographers make marks on it to line the radiotherapy beams up with. This ensures that the radiotherapy goes to exactly the right place.

The thought of wearing a shell might seem daunting but most people find it OK, even if they feel nervous beforehand. Holes in the shell over your mouth let you breathe easily. Often, extra holes can be cut out over your eyes and nose.

If you are worried about wearing a mask, let your medical team know. They'll be used to talking through worries and concerns, and can give you suggestions to help you feel more relaxed.

What happens during a radiotherapy session?

When you go to the hospital for treatment, you'll be in a room that has a radiotherapy (linear accelerator) machine in it. Usually, you'll lie down on a couch.

- The radiotherapy team spend some time getting you into the correct position to receive the radiotherapy. They will check that you're comfortable and that you know what to expect.
- The lights are dimmed. You'll probably notice a beam of light coming from the head of the machine. There'll also be some coloured laser beams coming from different points around the room. These laser beams are not harmful; they guide the radiographer in getting you and the machine into the correct position.
- The radiographers turn on the lights fully and then leave the room. They switch on the linear accelerator machine, which delivers an accurate dose of radiation inside the body.
- The radiographers watch you on closed-circuit television (CCTV) while you are having your treatment. They can see and hear you the whole time, and you can hear them too. If you need to call for attention, you can ask for it, or raise your hand.

- Sometimes, the radiographers take **X-ray** or **CT** images during the treatment session. These help to check that you're in the correct position.

The total time for each treatment session is typically around 10 to 20 minutes. Most of this time spent getting you into position, while the radiotherapy treatment itself takes only a few minutes. After the treatment session, the radiographers will come back into the room and help you get up.

What side effects might I have?

All treatments have the potential to cause side effects. Your clinical oncologist and radiotherapy team will talk to you about side effects you might experience, and how long after treatment you could expect them to start and go on for. They will also talk to you about any possible **late effects** you might have.

The side effects we cover in this information are intended as a general guide. The exact side effects you experience depend on a number of factors, including:

- which area of your body is treated
- the **type of radiotherapy** you have
- the **dose of radiotherapy** you have.

Generally, other than tiredness, radiotherapy only causes side effects in the area of the body that is treated.

Shorter term side effects of radiotherapy can include:

- **fatigue** (extreme tiredness)
 - **sore skin**
 - **sore mouth** (oral mucositis)
 - (feeling and being sick) **nausea**
 - **diarrhoea**
 - **hair loss**.
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What late effects might I have?

Late effects are health problems that first appear months or years after treatment has finished.

Many people do not get late effects. The late effects you might experience depend on the dose of the radiotherapy and which area of the body was treated. Your doctor should talk to you about possible late effects before you begin treatment.

For some people, possible late effects can include:

- dental problems from an increased risk in tooth decay if you had radiotherapy to your head or neck
- eye problems, such as dry eyes and cataracts (cloudy patches in the lens of your eye that reduce your vision) if you've had radiotherapy to an area that includes one or both of your eyes
- heart problems, if your heart was in or near the area treated with radiotherapy
- dryness of the mouth, if your salivary glands received radiotherapy
- reduced fertility, if you had radiotherapy to your tummy (abdomen) and the areas below your belly button (your pelvis)
- lung problems, leading to coughing and shortness of breath, if you had radiotherapy to your chest
- thyroid problems, leading to hypothyroidism. This can make you feel cold and tired, and make you gain weight easily. The risk of developing hypothyroidism is higher in the first five years after treatment but remains increased after this time
- a small risk of developing a cancer many years later.

Frequently asked questions about radiotherapy

A highly skilled team of radiographers closely supervise radiotherapy treatment. Your team should explain everything as you go through the process. Don't hesitate to ask questions or for information to be repeated if this would help you.

Below, we give brief answers to some frequently asked questions about radiotherapy.

Will radiotherapy make me radioactive?

Radiotherapy will not make you radioactive. People around you, including children, are not at any risk from being near to you after you've had treatment.

Can I take someone into the room with me when I have radiotherapy?

It can be helpful to take someone with you to the hospital for emotional support. However, friends or family members will need to wait outside the treatment room.

Is it safe to have radiotherapy if I have a pacemaker (cardiac rhythm device) or implantable cardioverter defibrillator (ICD)?

Generally, people who have a pacemaker or an implantable cardioverter defibrillator can have radiotherapy. However, the radiation can affect how the pacemaker or defibrillator works.

Depending upon the type of device and the dose of radiotherapy it will receive, you might need extra checks. Sometimes, some devices might need to be switched off temporarily for each dose of treatment. Your radiotherapy team will work with pacemaker technicians for all of this to take place safely.

How will I be followed-up after treatment?

After finishing your treatment for lymphoma, you will have **follow-up appointments** at the hospital. These involve conversations and physical tests with a member of your medical team.

The aim of follow-up is to:

- check your **recovery from treatment**
- check for signs of the lymphoma coming back (**relapse**)
- manage any **late effects** of treatment.

Your schedule of follow-up appointments depends on several factors. These include the type of lymphoma you were treated for, how long it's been since you had treatment and whether you were treated as part of a **clinical trial**.

I'm pregnant. Is it safe to have radiotherapy?

Doctors might advise waiting until after you have given birth before you have radiotherapy. If you need treatment urgently, they might advise you to go ahead with treatment while taking suitable precautions.

Can I breastfeed if I am having radiotherapy?

Speak to your doctor if you are breastfeeding or plan to breastfeed. The safety of breastfeeding depends on which areas of your body receive treatment and the **type of radiotherapy** you have.

If you are also having treatment with **chemotherapy** or other drugs, your doctors might advise you **not** to breastfeed during, and for a while after, treatment.

We have more information about **lymphoma during pregnancy**.

References

The full list of references for this page is available on our website. Alternatively, email **publications@lymphoma-action.org.uk** or call 01296 619409 if you would like a copy.

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