

Late effects of lymphoma treatment

Late effects are health problems that may develop months or years after treatment for lymphoma. This page explains some of the potential late effects of lymphoma treatment. Detecting these late effects early can limit the problems they cause.

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What are late effects?

Treatment for lymphoma is generally successful. Most people who have lymphoma live for many years after their treatment has finished and recover well. However, people who have been treated for lymphoma are more at risk of developing certain health problems in later life than people who have not been treated for cancer. These problems can develop months, years or even decades after treatment has finished. They are called 'late effects'.

Lymphoma treatment aims to balance the need to treat the lymphoma effectively with the risk of causing late effects. Modern lymphoma treatments have a lower risk of late effects than older treatments but late effects may still develop.

Potential late effects of lymphoma treatment may include:

- second cancers
- heart disease
- lung problems
- hormone problems
- other late effects.

The risk of late effects might seem worrying, but knowing what conditions you might be at risk of, and how to lower your risk, gives you the best chance of preventing late effects or getting treatment early if they develop.

Who might get late effects?

Your chance of developing late effects depends on a number of different factors, known as 'risk factors'. These include:

- the type of lymphoma you had
- the treatment you had
- individual factors.

Having risk factors doesn't mean you will develop late effects. Many people who have a higher-than-average-risk still do not develop late effects from lymphoma treatment.

Your medical team should talk to you about the possible short-term and long-term effects of your treatment before it starts. When your treatment finishes, your medical team should give you and your GP a **treatment summary**. This outlines what treatment you had and also explains any late effects it might have.

Lymphoma-related risk factors

These include the **type of lymphoma** you had and where in your body it was growing. In general, people treated for **Hodgkin lymphoma** have a slightly higher chance of developing late effects than people treated for **non-Hodgkin lymphoma**.

Treatment-related risk factors

These depend on:

- the type of **treatment** you had (for example, **chemotherapy** or **radiotherapy**)
- the specific drugs you had
- your treatment dose
- how long ago you were treated
- how old you were when you were treated.

The potential late effects of **radiotherapy** depend on what area of your body was treated and what dose of radiation you had. Your doctor should give you more information on the risks associated with your specific treatment plan.

Different **chemotherapy** drugs have different potential late effects. In general, high-dose chemotherapy has a greater chance of causing late effects than lower-dose treatment. Your doctor should give you more information about the exact drugs used in your treatment. Macmillan also have detailed information on the **side effects of particular drugs and combination regimens** used in cancer treatment.

The treatments used nowadays tend to have a lower risk of causing late effects than treatments that were used in the past. This is because modern treatments are more precisely targeted to the cancer, reducing effects on healthy tissues as much as possible.

Targeted treatments are becoming more commonly used to treat lymphoma. Examples include **antibody treatments, checkpoint inhibitors, cell signal blockers, proteasome inhibitors** and **immunomodulators**. Scientists can only know for certain whether these treatments cause late effects many years after they have been in widespread use. However, they are generally expected to cause fewer late effects than chemotherapy and radiotherapy. Research is ongoing to find out if this is the case.

Individual risk factors

Your chance of developing late effects is affected by how old you were when you were treated. People who were treated for **lymphoma as children or young adults** have a higher chance of developing late effects than people who were treated as adults. This is partly because of the effect of treatment on developing organs, and partly because they have a longer lifespan after treatment when late effects might develop.

Any other health problems you have, your family history and your lifestyle also affect your chances of getting late effects.

Your specialist is best placed to advise you on your risk of developing late effects based on your individual circumstances.

Second cancers

People who have had treatment for **Hodgkin lymphoma** are about twice as likely as the general population to develop a second, different cancer. People who have been treated for **non-Hodgkin lymphoma** are about 1.5 times more likely than the general population to develop a second cancer.

Although you have a higher risk than other people, this does not mean you will develop another cancer. Most people who have been treated for lymphoma never develop a second cancer.

The most common cancers that have been linked to previous treatment for lymphoma include:

- leukaemia – particularly acute myeloid leukaemia (AML)
- breast cancer
- thyroid cancer
- lung cancer
- non-Hodgkin lymphoma (if you have previously been treated for Hodgkin lymphoma)
- skin cancer.

I didn't know I had Hodgkin lymphoma when I was treated in the 1980s – I was just told that it was the 'common cold' of cancers. It was only when I was diagnosed with diffuse large B-cell lymphoma (a type of non-Hodgkin lymphoma) nearly 30 years later that I found out my first cancer had been Hodgkin lymphoma.

Leo, who was treated for Hodgkin lymphoma and developed non-Hodgkin lymphoma later in life

The type of second cancer you might be at risk of depends on the area of your body that has been treated with **radiotherapy** or the particular **chemotherapy** you have had.

Radiotherapy is linked to an increased risk of developing solid tumours (in other words, not blood cancers) in parts of your body that were exposed to radiation during your treatment.

- If you've had radiotherapy to the chest, you are at increased risk of developing breast cancer, lung cancer or cancer of the gullet (or 'oesophagus' – the tube leading from your mouth to your stomach).
- Radiotherapy to the head or neck increases your risk of head and neck cancers, including thyroid cancer.
- Radiotherapy to the tummy (abdomen) increases your risk of bowel cancer and other cancers of the digestive system (for example, pancreatic cancer or stomach cancer).
- You also have a higher risk of skin cancer in the area treated by radiotherapy.

In general, chemotherapy is linked with an increased risk of developing leukaemias (blood cancers), although some chemotherapy may also increase your risk of certain solid tumours (for example, lung cancer).

Chemotherapy drugs that are linked to second cancers include a class of drugs called 'alkylating agents'. They are part of many **chemotherapy regimens** (combinations of drugs) used to treat lymphoma. Examples of alkylating agents that may be used to treat lymphoma include:

- cyclophosphamide (a component of **CHOP**, **BEACOPP**, **DA-EPOCH** and other regimens)
- dacarbazine (a component of **ABVD**)
- bendamustine (often used on its own or in combination with **rituximab**)
- melphalan and carmustine (components of **BEAM**)
- ifosfamide (a component of **ICE** and **IVAC**)
- chlorambucil (a component of **ChIVPP** and **MCP**)
- procarbazine (a component of a chemotherapy regimen called MOPP [**mechlorethamine**, vincristine (also known as **Oncovin**®), **procarbazine** and **prednisone**], which was used to treat Hodgkin lymphoma in the past).

A class of chemotherapy drugs called 'anthracyclines' is also linked to the development of second cancers. An anthracycline called doxorubicin is used in many chemotherapy regimens for lymphoma, including CHOP, ABVD, BEACOPP and DA-EPOCH.

You usually remain at an increased risk of developing a second cancer for several decades after your lymphoma treatment. Your risk is higher as you get older and if you also have other factors linked with developing cancer, such as obesity, smoking or a family history of cancer.

If you've had chemotherapy or radiotherapy, ask your specialist what cancers you may be at higher risk of developing. Make sure you know the symptoms of these cancers. Cancer is usually more treatable if diagnosed early.

Heart disease

People who have been treated for **Hodgkin lymphoma** are about seven times more likely to develop heart disease than the general population. People who have been treated for **non-Hodgkin lymphoma** are about five times more likely to develop heart disease than the general population.

Heart disease can develop as a result of **radiotherapy** or certain types of **chemotherapy**.

Radiotherapy to the chest can directly damage the heart and its blood vessels. This can increase your risk of developing a number of different heart problems, including hardening of the arteries (known as 'atherosclerosis'), coronary heart disease (angina or heart attack), heart valve problems or heart rhythm abnormalities.

People who had radiotherapy when they were under 50 are more likely to develop heart disease than older people. Your risk increases with a higher dose of radiotherapy. Modern radiotherapy uses lower doses of radiation targeted more precisely to the lymphoma so the risk of developing heart disease nowadays is lower than in the past.

Chemotherapy drugs called 'anthracyclines' can damage heart muscle so that it can't pump strongly enough. However, they are very effective at treating lymphoma. Doxorubicin is an anthracycline that is used in many **chemotherapy regimens** (combinations of drugs) for lymphoma, including:

- **CHOP**
- **ABVD**
- **BEACOPP**
- **DA-EPOCH.**

Your risk of heart problems increases with higher doses or more courses of treatment with anthracyclines.

People who have had **stem cell transplants** also have an increased risk of developing heart disease. Scientists aren't sure if this is due to the stem cell transplant itself or to the lymphoma treatments that people have before the stem cell transplant.

Your doctors have to balance the possible risk of heart problems with giving you the most effective treatment for your lymphoma. You may have tests to check that your heart is working effectively before you start treatment.

I developed an arrhythmia (an abnormal heart rhythm) after my chemotherapy. Talking to the doctors helped me to understand the effects of the treatment, which took away some of the fear. Now, I have learnt to accept my limitations and manage the condition, living life to the full.

Andrea, who had Hodgkin lymphoma

People who have been treated for lymphoma also have a higher than usual chance of developing 'metabolic syndrome' – a combination of diabetes, high blood pressure and obesity. Metabolic syndrome also increases your risk of developing heart disease.

Heart problems become more common 10 years or more after your treatment but they can occur sooner. Your risk of developing heart problems stays higher than usual for several decades after your lymphoma treatment. Your risk is higher if you also have other factors linked with developing heart disease – for example, if:

- you are over 65
- you are obese (body mass index [BMI] more than 30)
- you don't exercise
- you smoke
- you have high blood pressure
- you have high cholesterol
- you have diabetes
- you have a family history of heart disease.

It is important that you are aware of this continuing risk and follow lifestyle advice to keep your heart as healthy as possible.

The **British Heart Foundation** has more information about heart problems. They also offer advice on keeping your heart healthy.

Lung problems

Radiotherapy to the chest or treatment with a **chemotherapy** drug called bleomycin can cause scarring (fibrosis) of your lungs. Bleomycin is part of the **ABVD** and **BEACOPP** regimens commonly used to treat **Hodgkin lymphoma**. The targeted drug **brentuximab vedotin** contributes to lung damage if it is given with bleomycin. This combination is usually avoided.

Once it develops, lung fibrosis is usually permanent. If the damage is mild, it can be seen on **X-rays or scans**, but does not cause you any symptoms. More damage can cause symptoms such as shortness of breath. If you are affected, you might not be able to do as much **exercise** as you used to.

After my allogeneic stem cell transplant I developed heart and lung problems. The heart problems resolved reasonably quickly, but my lung capacity was reduced by 20%. As a professional trombone player, my lungs have to do a lot of hard work, similar to sports people. My medical team have told me that working my lungs so hard has actually helped. I can tell the difference in my playing, but I am doing my best to overcome it.

Carol, who had Hodgkin lymphoma

Doctors are looking at ways to reduce the risk of lung problems after treatment for lymphoma. For example, if a **PET/CT scan** shows you have responded well to your first two cycles of ABVD, you might not have the bleomycin component of the treatment for your remaining cycles of chemotherapy.

If you have been treated with bleomycin, you might be advised to avoid scuba diving because high-flow oxygen could potentially increase your risk of developing lung problems. Please check with your doctor.

If you have been treated with bleomycin and you need surgery, tell the anaesthetist about your treatment so they can take any necessary precautions.

Hormone problems

Treatment for lymphoma can affect the glands that make hormones in your body. This may lead to problems with thyroid function, growth issues in children, diabetes, or reduced fertility.

Thyroid function

The thyroid is a gland at the front of your neck that produces a hormone called thyroxine. Thyroxine controls how fast the cells in your body work.

The thyroid gland often becomes underactive after **radiotherapy** to the neck, particularly if it is given at higher doses or to both sides of the neck. This is called 'hypothyroidism'. It makes the cells in your body slow down. People who have been treated for **Hodgkin lymphoma** or **non-Hodgkin lymphoma** have a much higher chance of developing hypothyroidism than people who have not been treated for cancer. It can develop up to 30 years after your initial treatment. Some people also develop an enlarged thyroid gland (known as a 'goitre').

Hypothyroidism can make you feel tired a lot of the time and be more sensitive to cold. You may also put on weight. These symptoms are often caused by other things but it is important to know that they could be a sign of thyroid problems. If you think you might have an underactive thyroid gland, talk to your consultant or GP.

Hypothyroidism can be diagnosed by a **blood test**. It is easily treated with tablets to increase your thyroxine levels. If you have hypothyroidism, you need to take these for the rest of your life.

The British Thyroid Foundation has **more information on hypothyroidism**.

Effects on growth

Radiotherapy in children and adolescents can affect the growth of bones and soft tissue in the area that has been treated. We have more detailed information on **lymphoma in children and young people** that you might find helpful.

Diabetes

People who have had **radiotherapy** to the tummy (abdomen) have a slightly higher risk of developing diabetes than people who have not had radiotherapy. This is because radiotherapy can cause your pancreas (a large gland that sits just behind your stomach) to produce less insulin than it should. Insulin is the hormone that controls your blood sugar levels.

Diabetes UK has more information about diabetes, including **things you can do to reduce your risk** of developing it.

Reduced fertility

Chemotherapy or **radiotherapy** to the tummy (abdomen) and the area below your belly button (your pelvis), can damage your ovaries or testicles. This can lead to early menopause in women, and reduced fertility in both men and women. We have more detailed information on **early menopause** and **fertility after lymphoma treatment**, including options to help preserve your fertility.

Other late effects

There are some other, less common late effects of lymphoma treatment. We cover some here but your specialist can advise you of other risks you should be aware of. You may also find our information on longer-lasting side effects of treatment, such as **fatigue** and **peripheral neuropathy**, helpful.

Radiotherapy to the head and neck, and some types of **chemotherapy**, especially at high doses, can lead to tooth decay if you don't look after your teeth properly. Follow your dentist's advice to keep your teeth healthy.

Eye problems, such as dry eyes or cloudy patches in the lens of your eye that reduce your vision (cataracts), are also more likely to occur in people who have been treated with radiotherapy to the head or neck, or high doses of steroids. **Steroids** such as prednisolone are part of some **chemotherapy regimens** (combinations of drugs) used to treat lymphomas. In some people, steroids can also cause high pressure inside your eye (glaucoma). This can affect your vision.

It is important to visit your dentist and optician regularly. Tell them what lymphoma treatment you've had.

Reducing your risk of late effects

Monitoring your health and how well you are recovering from treatment is an important part of your **follow-up after treatment**. Your medical team should tell you what late effects to look out for and what you can do to reduce your risk of developing them. You can't always prevent late effects but catching problems early gives you the best chance of being treated successfully.

You know your own body best. If you are worried about any symptoms you are having, talk to your medical team. If you have been discharged from lymphoma **follow-up**, see your GP. **Tell any doctors treating you that you've had treatment for lymphoma, so they are aware that you are at risk of certain health problems.**

Be aware of your risks

- Find out what your risks are – ask your medical team exactly what treatment you've had and what your individual risks are. Keep this information in case you need it. Late effects can occur many years after treatment, when you might have been discharged from follow-up.
- Find out what symptoms you should be aware of.
- Ask what cancers you are at higher risk of developing and when the risk is highest – cancers are usually more treatable if diagnosed early. Make sure you know the symptoms of these cancers.
- See your doctor promptly if you have any concerns.

Follow a healthy lifestyle

You can reduce your risk of developing many late effects by following a healthy lifestyle.

- If you're a smoker, **try to give up** – smoking makes your risk of developing late effects such as second cancers, heart disease and lung problems much higher. **The NHS** provides free support to help you quit.
- **Eat a healthy diet** and maintain a healthy weight.
- **Exercise regularly.**
- Drink alcohol within **recommended limits**.
- Protect your skin from the sun.

Read our section on **living with lymphoma** for more information on how to live well with and beyond lymphoma.

Monitor your health to find problems early

- Attend your **follow-up appointments** – monitoring and treatment of long-term effects (**side effects** that don't go away after treatment finishes) and late effects is an important part of your follow-up after treatment. Make a note of any concerns to discuss at your appointments. Ask for your appointment to be brought forward if you are worried.
- Get to know what is normal for you – be aware of your body and how you usually feel. If you think something is not right, visit your GP or contact your lymphoma specialist.
- If you are at increased risk of developing breast cancer, be aware of any changes in your breasts. **Breast Cancer Now** has information on what changes to look for and how to examine your breasts.
- If you have had radiotherapy, check your skin in the treated area for changes. The British Association of Dermatologists has information on **how to reduce the risk of a second skin cancer**.
- Have regular check-ups with your dentist and optician.

Most people know when they are not well. I was experiencing night sweats, and although I was convincing myself they were nightmares, I knew something wasn't right. I would urge anyone to go to their doctors as soon as possible with any concerns.

Leo, who had Hodgkin lymphoma and developed second cancers

Attend screening programmes or health checks

Depending on what treatment you had, you may be screened for some cancers or other health conditions in a different way or earlier than people who have not had lymphoma treatment. Screening can detect health issues at an early stage, allowing the best chance of successful treatment. If you are offered screening or a health check, it is important to attend.

- If you are female and you had **radiotherapy** to your chest before you were 30, you should be called for breast cancer screening from the age of 30 onwards. Depending on how old you are, this might involve an annual **MRI scan** or an annual breast **X-ray** (mammogram). The NHS has more information on **breast cancer screening**.

- Routine NHS screening programmes are also available for **bowel cancer** and **cervical cancer** as well as **general health checks** for heart disease, diabetes or stroke.
- If you had radiotherapy to your neck, you might have regular **blood tests** to monitor your thyroid function.
- Ask your lymphoma specialist or GP if you are eligible for any screening programmes.

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.

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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