

# Chemotherapy

Chemotherapy is a treatment that uses drugs to kill cancer cells. Chemotherapy can be used alone or in combination with other treatments such as targeted treatments and radiotherapy.

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## Quick overview

Chemotherapy is treatment that uses drugs to kill cancer cells.

## What is the aim of chemotherapy?

Many people with lymphoma have chemotherapy, but not everyone does.

The aim of chemotherapy depends on the exact type of lymphoma you have. Some types of lymphoma can be cured with chemotherapy while others can be effectively controlled with chemotherapy.

## How often do I have treatment and how long does a course last?

A course of chemotherapy usually involves several treatments ('cycles'). A rest period follows each cycle. Your doctor decides how many cycles you should have. A whole course of treatment can vary from several weeks to a number of months.

## How is chemotherapy given?

Different chemotherapy drugs for lymphoma are given in different ways:

- orally – by mouth
- intravenously (IV) – into a vein
- intrathecally – into the cerebrospinal fluid (CSF), which surrounds the brain and spine.

## Is chemotherapy painful?

Having chemotherapy is not painful. There might be times when you feel some discomfort, for example, in your arm if you have intravenous chemotherapy given into a vein in your arm.

## What are the side effects of chemotherapy?

Side effects can vary a lot from person-to-person and depend on the exact chemotherapy drugs you are given.

Your medical team should talk to you about the side effects you might have.

The following side effects are quite common after chemotherapy; however you are unlikely to have all of them:

- increased risk of infection
- nausea
- hair loss or thinning
- sore mouth and mouth ulcers
- change in taste – foods can taste different, unpleasant or metallic
- fatigue – extreme tiredness
- nail changes – your nails can become brittle and ridged.

Less common side effects depend on the particular type of chemotherapy drug you have.

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## What is chemotherapy?

Chemotherapy means treatment with drugs that kill cancer cells. These drugs are known as 'cytotoxic' drugs. 'Cyto' means 'cell' and 'toxic' means 'poison'. Chemotherapy works by 'poisoning' cancerous lymphoma cells.

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## How does chemotherapy work?

**Lymphoma** is a type of cancer. It develops when **lymphocytes** (specialised white blood cells) grow out of control. They can then build up in the **lymph nodes** and/or other organs. This can happen when lymphocytes divide more often than normal. It can also happen when they do not die when they should.

Chemotherapy for lymphoma works in one or both of the following ways:

- stopping lymphoma cells from dividing
- triggering lymphoma cells to die.

The drugs work on cells that are in the **process of dividing** but they have little effect on cells that are not dividing.

Most of our cells have a limited lifespan. They die naturally and new cells replace them. Lymphomas occur when this process goes wrong.

Chemotherapy drugs often work by preventing this process of cell division in the abnormal cells, which leads to the cells dying off.

## Chemotherapy regimens (combinations of drugs)

Usually, more than one chemotherapy drug is given at once. This is known as a **combination regimen**.

Different drugs work on different phases of the cell cycle. Having them together helps to kill as many lymphoma cells as possible.

For some **types of lymphoma**, chemotherapy drugs are often combined with **targeted treatments**, such as **rituximab**. Similarly, **steroids** are often combined with chemotherapy.

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## Why is chemotherapy used to treat lymphoma?

Chemotherapy is often used in the treatment of lymphoma because most lymphoma cells are easily killed by it. Chemotherapy can be used on its own or in combination with other treatments, for example **targeted therapy** or **radiotherapy**.

The exact chemotherapy treatment your doctors recommend for you depends on factors including the **type** and **stage** of your lymphoma.

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## How is chemotherapy given?

You are most likely to have chemotherapy in one or more of the following ways:

- **orally** (by mouth)
- **intravenously** (into a vein)
- **intrathecally** (into the fluid surrounding the brain and spinal cord).

## Oral chemotherapy

Oral chemotherapy is taken by mouth, in the form of tablets or capsules. You might have all of your chemotherapy orally.

Oral chemotherapy can be taken safely at home and does not require an overnight hospital stay. You will be given instructions about how to take the tablets at home.

**Important:** Chemotherapy drugs should not be handled by anyone else other than the person who is taking them.

## Intravenous (IV) chemotherapy

Intravenous (IV) chemotherapy means that drugs are given into a vein. This is the most common way to have chemotherapy for lymphoma.

IV chemotherapy can be given:

- through a **cannula**
- through a **central venous catheter** ('line').

### IV chemotherapy through a cannula

IV chemotherapy for lymphoma is usually given through a cannula, a soft plastic tube with a needle inside it. A nurse or doctor puts the needle into a vein, usually on the back of your hand or in your lower arm. The needle is then removed, leaving only the plastic tube in the vein. You have a dressing put on to keep the cannula clean and in the correct position.

Some IV drugs are given as a 'bolus' or a 'push' dose. The nurse injects the drug through the cannula over a short period of time, usually over a few minutes.

Other drugs are given through an intravenous infusion (drip). IV chemotherapy drugs are mixed with fluid in a bag. The fluid drips slowly from the bag, down some tubing and through a cannula into a vein in your arm over a set amount of time. This could be anywhere from 30 minutes to a number of hours, depending on the drug you are given. Your medical team can advise you how long you will need to be in the chemotherapy unit for this procedure.

The bag must be kept higher than your arm, so it is often hung from a metal drip stand. The stand usually has wheels, which means that it is mobile and you can walk around while the drip is connected to you.

A drip is usually controlled with a pump to keep the fluid flowing into your vein at the right speed. The pump might make a beeping sound from time to time to let the nurses know if something is not right. Don't worry if this happens – the drip stops until the problem is corrected.

**Important:** Tell the nurses if you feel any discomfort while you are having IV chemotherapy. Occasionally the drug goes into the tissues around the vein instead of into the vein itself. This is called 'extravasation' and can cause damage to the tissues if it isn't stopped quickly. All nurses who give chemotherapy are trained in how to deal with this complication.

## IV given through a central venous catheter ('line')

You might have your IV chemotherapy through a central venous catheter ('central line' or 'line'). This is a tube that goes into a bigger vein than a cannula and stays there for a longer amount of time. It can be left in for several months, sometimes even for the whole of your treatment. Lines usually do not cause any pain.

Not everybody needs a line. Sometimes, having a line can make it easier to give you drugs and other fluids and to take **blood samples** without the discomfort of repeated needle pricks.

Lines are put in during a small operation done under local or general anaesthetic. Once the line is in, you will have a chest **X-ray** to check that it is in the right position.

There are two types of line:

- **PICC line** (peripherally inserted central catheter), which goes in through a vein in your arm at the level of your elbow. It is held in place by a very secure dressing.
- **Tunnelled central line**, which is usually positioned on your upper chest. Part of it runs in a 'tunnel' under your skin, which lowers the risk of infection. You might also hear this type of line called a Hickman® line, a Groshong® line or apheresis line.

I had to change to a more intensive treatment so I had a PICC line inserted. Through this, I had 3 hours of drips each day, before returning a week later for a final 30 minute drip, with chemotherapy tablets in between and injections to promote bone marrow production. It was overwhelming, but I managed the treatment well.

– Natalia, diagnosed with Hodgkin lymphoma

The line is covered to protect it when you go home. You will be given instructions on how to care for it, including on how to manage baths and showers.

Lines can sometimes become infected or can occasionally cause a blood clot to form around them. Contact your hospital immediately if you develop any symptoms of infection, including:

- redness or heat around the line site
- a high temperature (above 38°C)
- arm swelling.

## **Intrathecal chemotherapy**

Intrathecal chemotherapy is given into the fluid that surrounds the central nervous system (CNS; brain and spinal cord). This fluid is called 'cerebrospinal fluid'.

The CNS is surrounded by a blood-brain barrier that protects against infections; however, it also prevents many drugs getting into the CNS through the bloodstream. Only certain drugs can pass through the blood-brain barrier when they are given intravenously. Intrathecal chemotherapy is a way to bypass the blood-brain barrier and give drugs directly into the CNS.

You might have intrathecal chemotherapy if you have:

- **Lymphoma in your brain and spinal cord**; central nervous system (CNS).
- A type of **high-grade lymphoma** that can sometimes spread to the CNS (such as **Burkitt lymphoma**, **diffuse large B-cell lymphoma** with particular risk features) or **lymphoblastic lymphoma**. In these cases, you may have intrathecal chemotherapy to prevent the lymphoma from spreading there; this is called '**CNS prophylaxis**'.

Intrathecal chemotherapy is usually given by a **lumbar puncture**. This is an injection into cerebrospinal fluid in the lower part of your back under a local anaesthetic.

## Subcutaneous chemotherapy

A small number of chemotherapy drugs are given by injection into the layer of fat that lies just under your skin (subcutaneous chemotherapy). You might have subcutaneous chemotherapy if you are being treated for **hairy cell leukaemia** (HCL).

Some other types of treatment can be given by subcutaneous injection, for example **maintenance rituximab**, **growth factors** and **immunoglobulin replacement therapy**.

The nurse injects the drug through a tiny needle into the skin on your tummy, upper arm or thigh. The injection is not usually painful but it may sting for a few moments. The time it takes to give the drug depends on what drug you are having.

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## What side effects might I have?

Although the aim is to kill lymphoma cells, many types of chemotherapy also temporarily affect healthy cells. This is the reason for many of the **side effects of chemotherapy**.

Your medical team should advise you on whether they expect you to have side effects during or soon after your treatment. They should also talk to you about any possible **late effects** you might have. Late effects are health problems that first appear months or years after treatment has finished.

The side effects you have depend on which type of chemotherapy drug you are given and any pre-existing conditions you have. They can also vary a lot between different people having the same treatments.

I was treated with chemotherapy, which I tolerated pretty well. At least I thought I had, although others told me I was a bit more snappy and bad tempered, and looked very ill. I experienced side effects, with my hair dropping out. I was also really aware of how fatigued I became.

– Ron, diagnosed with diffuse large B-cell lymphoma

The side effects listed here are intended as a general guide. You are unlikely to have all of them and you may have only a few. Your medical team should talk through the details and possible side effects of your treatment and give you some written information to take away.

Shorter term common side effects can include:

- Low **blood counts** – **neutropenia** (low white blood cells, which can increase your risk of infection), **anaemia** (low red blood cells, which can make you tired, light-headed, dizzy or breathless) and **thrombocytopenia** (low platelets, which can increase your risk of infection, bruising or bleeding).
- **Fatigue** (extreme tiredness), which may come and go in peaks and troughs and worsen after each cycle of treatment.
- **Nausea** (feeling and being sick) – if your drugs are likely to cause sickness, your medical team may be able to prescribe antiemetics (anti-sickness medication) to help manage it.
- **Hair loss** or thinning and changes to your nails – many people worry about this; however, not all chemotherapy drugs have this effect and any effects are usually temporary.

- **Sore mouth** and ulcers – your mouth may become swollen and red a week or two after you start chemotherapy.
- Changes in taste – many people say food tastes bland. Others describe a metallic taste, or find that food tastes more salty or bitter than usual.
- **Skin changes** including rashes – some drugs make your skin photosensitive (more sensitive to sunlight). The drugs that are more likely to cause this are dacarbazine and methotrexate. Allergic skin reactions and ‘papular rash’ (small, red rashes) are also common.
- **Peripheral neuropathy** (effects on some of your nerve endings) and can cause symptoms such as pins and needles, numbness and tingling.
- **Changes in bowel habits** (such as diarrhoea and constipation).
- Bladder symptoms – cyclophosphamide (particularly in a high dose) and ifosfamide (Mitoxana®) can cause irritation to, and bleeding from the lining of the bladder and the kidneys. You may be given a drug called mesna (Uromitexan®) to prevent bladder and kidney complications.
- Cancer-related cognitive impairment (**‘chemo brain’**) – after treatment for lymphoma, some people experience a change in thinking processes, such as difficulty with concentrating or with remembering things.

## Other possible side effects

Other possible side effects only occur with particular chemotherapy drugs.

These can include:

- hearing changes, for example temporary loss or tinnitus (ringing in your ears)
- flu-like symptoms
- **heart problems**
- **lung problems.**

Your medical team should speak to you before you begin treatment about any side effects you should expect.

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# What late effects might I have?

**Late effects** are health problems that first appear weeks, months or years after treatment has finished. Examples of possible late effects after chemotherapy include heart or lung problems.

Not everyone gets late effects. The late effects you have depend on which chemotherapy drug you have, the strength of the dose and the duration of treatment.

Your doctor should talk to you about possible late effects before you begin treatment.

## Effects on fertility

**Your fertility** (ability to have children) may be affected by treatment. This can range from reduced fertility to loss of fertility, for example through **early menopause**.

Effects on fertility are more likely with certain chemotherapy drugs and at higher doses, such as those used in **stem cell transplants**.

You may wish to find out from your medical team about fertility preservation – talk to them before you begin your treatment.

## Second cancers

People who have had chemotherapy have a slightly higher risk of developing another form of cancer, including leukaemia, some years later.

Ask your medical team which cancers you are at a higher risk of developing. Make sure you know the symptoms of these cancers – cancer is usually more treatable when it is diagnosed early.

**Cancer Research UK** has information about different types of cancers. It is important to avoid **smoking** to reduce the risk of developing other cancers.

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# How will I be followed-up after treatment?

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

One of the tests you are likely to have in the first few months after chemotherapy is the **full blood count** (FBC). This measures the numbers and sizes of your blood cells and tells doctors how well your bone marrow is working.

The aim of follow-up is to:

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

How often you are followed-up depends on several factors. These include the **type of lymphoma** you had, how long it's been since you had treatment and whether you were treated as part of a **clinical trial**.

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## Frequently asked questions

Below are some frequently asked questions about chemotherapy for lymphoma. Do not hesitate to ask questions – your medical team are used to going over things and want to help you.

## Will I have other treatments together with my chemotherapy?

As well as your chemotherapy drugs you will probably have other drugs to take as part of a chemotherapy regimen, for example:

- **steroids**, often in the form of prednisolone tablets
- **targeted therapies** such as **antibody therapies** (for example **rituximab**); some of these are in tablet form and others are given by **intravenous injection** or by subcutaneous injection.

Other treatments may be given to help you with the side effects of chemotherapy.

- G-CSF (granulocyte colony-stimulating factor) is a '**growth factor**' given by subcutaneous injection. It helps the **bone marrow** to make healthy new white blood cells.
- **Anti-emetic** (anti-sickness) medicines stop you feeling sick. There are several different kinds of anti-emetic drug – tell your nurses or doctors if the drug they give you isn't working so that they can try another one.

## Why can't surgery cure my lymphoma?

Surgery can't remove all the cancerous cells in lymphoma. Even for lymphomas that appear to be in one area only, surgery usually leaves some cells behind. For this reason, chemotherapy and/or **radiotherapy** are the standard treatments.

## How can I reduce my risk of infection while I'm having treatment?

You are more prone to infections and may be less able to shake them off while you are on chemotherapy. It is important that you know:

- how to spot the **signs of infection**
- what to do **if you think you might have an infection**
- how to **lower the risk of infection**.

## How long do chemotherapy drugs stay in your body?

In most cases, drugs last from a few hours to a few days in the body. It can, however, take longer for them to be completely eliminated.

The length of time a drug stays in your body depends on factors such as the **type of drug** you are given and how your body processes it. It also depends how well your organs are working, for example your kidneys and liver, as most drugs are excreted through your urine or stools (poo).

## Can I drink alcohol?

Check with your consultant whether it is safe for you to drink alcohol. Alcohol can interact with some drugs and may affect how well they work.

Generally, it should be OK to have the occasional drink between chemotherapy cycles when you feel well enough, but seek medical advice first. Remember, too, that you may feel the effects of alcohol more quickly now than you did before you had treatment.

## Can I smoke?

Smoking increases your risk of developing infections, especially in the lungs. If you are currently having treatment for lymphoma, the risk increases further.

Some chemotherapy drugs, including bleomycin, increase the risk of pulmonary fibrosis (scarring in the lungs), which can lead to breathing problems. If you **smoke**, stopping can help to lower these risks. **NHS Choices** has information and advice to help you quit smoking.

## Is it safe to exercise?

**Exercise** can have a positive impact on physical and mental health. It may also shorten your recovery time after treatment.

Speak to your doctor about the type and intensity of exercise that's safe for you. They may advise you to avoid certain types of exercise at times. For

example, you'll probably be advised to avoid contact sports like rugby if you have **thrombocytopenia** (low platelets), due to the risk of bruising and bleeding. Swimming may also not be advised for a while because of the increased risk of infection from public pools and changing rooms. It could also dislodge a **central line** or **PICC line**.

## Am I likely to lose my hair?

Full **hair loss** is common only with some, not all, types of chemotherapy. Speak to your medical team about what to expect. You may also be interested in suggestions for how to cope with hair loss and in exploring headwear options.

## Is it safe to have a massage?

Some people with lymphoma worry that having a **massage** could spread the lymphoma throughout their body. Little research has been done into massage specifically for people with lymphoma but at the time of writing, there is nothing to say that gentle massage is unsafe. Speak to your medical team for advice if you would like to have a massage.

## Could complementary therapies help me?

There is some evidence that **acupuncture** can help with nausea and vomiting as side effects of chemotherapy. It may also provide some pain relief. As with all **complementary therapies**, speak to a member of your medical team before you decide whether to have acupuncture – if you have **thrombocytopenia** or **neutropenia**, you could be at greater risk of bleeding or infection.

## Can I carry on working?

You are likely to need to take some time out of work while you're having treatment for lymphoma and probably for a little while after finishing treatment. You might choose to carry on working through your treatment. Your employer must, by law, make any 'reasonable adjustments' that allow you to continue working during and after treatment (under the Equality Act 2010).

Speak to your HR department or your line-manager and ask how they can support you. You may also be interested in finding out about any sources of **financial support** available to you if your income is lowered.

Your keyworker (often your Clinical Nurse Specialist; CNS) is often a good person to speak to. He or she may be able to signpost you to further sources of advice and support.

## Can I see friends and family?

The support of **friends and family** can greatly improve your mental wellbeing and might encourage you to take good care of your general health. Be realistic, though, and try not to let people put you under pressure to do more than you want to do socially.

If you have a particular event that you want to attend, such as a family wedding, talk to your medical team. It may be possible to plan your schedule of treatment so that you are likely to feel as well as possible on the day.

## Can I have a flu vaccination?

Ask your medical team whether they advise that you have the flu vaccination. The vaccine may not work effectively while you are having chemotherapy and may only be advisable before or after a course of chemotherapy.

It is sensible to have the flu vaccination every year once you have completed your chemotherapy.

## Are there any restrictions in what I can eat?

Aim to eat a **healthy, balanced diet**. Make sure that all fruit and vegetables are well washed, meat and eggs are thoroughly cooked, avoid shellfish, pate, unpasteurised soft cheeses and live yogurts.

If you are having a more intensive **chemotherapy regimen**, your medical team may give you some additional advice on foods to avoid.

DiETING when you are having chemotherapy is not advised – far better to opt for a healthy and balanced diet – and do remember to have some treats from time-to-time!

– Gill Stewart, Lymphoma Clinical Nurse Specialist

## Can I go out in public?

It is fine to go out in public, though you should take care to minimise the risk of infection if you are **neutropenic**.

## Can I have sex?

Generally, sex during treatment is considered to be safe and can enhance your wellbeing. Check with your medical team about any precautions you should take, though, especially if you have **thrombocytopenia** (low platelets).

During chemotherapy, you should use a condom to avoid passing chemotherapy to your partner and to protect against infection. Note that pregnancy is not recommended during treatment.

Oral contraceptive tablets ('the pill') may be less effective while you are on treatment, so discuss this with your doctor or nurse – you may need to use a different form of contraception for a while.

## When can I get pregnant after my treatment?

**Your fertility** may be reduced by the chemotherapy. Your medical team should discuss this possibility with you before you start treatment.

Whether your fertility is likely to be reduced by your treatment or not, it is not a good idea to start a **pregnancy while you are on chemotherapy** or soon

afterwards. Women are strongly advised to wait for two years after their treatment for lymphoma has finished before trying to start a family. Men with lymphoma are usually advised that they should avoid making their partner pregnant during their chemotherapy and for at least six months afterwards.

Talk to your hospital team for fertility advice specific to your individual circumstances.

## Can I breastfeed while I am having treatment?

Chemotherapy drugs may be present in your breast milk so you should avoid breastfeeding your baby during treatment. Ask your doctor for further information.

## Can I go on holiday when I am having chemotherapy?

Most doctors would not recommend **travelling abroad** outside of the UK during chemotherapy and for three months afterwards.

Short breaks in the UK are usually fine so long as you feel well enough and have access to a hospital if needed.

Discuss the safety of your travel plans with your medical team before you travel and ensure that you have appropriate **travel insurance**.

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### References

These are some of the sources we used to prepare this information. The full list of sources is available on request. Please contact us by email at [publications@lymphoma-action.org.uk](mailto:publications@lymphoma-action.org.uk) or phone on 01296 619409 if you would like a copy.

- Brown MB and Cutler TJ (eds). Haematology Nursing. 2012. Wiley-Blackwell, Chichester

- Skeel RT, Khleif SN (eds). Handbook of Cancer Chemotherapy. 8th edition. 2011. Lippincott, Williams & Wilkins, Philadelphia
- Perry MC. The Chemotherapy Source Book. 4th edition. 2008. Lippincott Williams & Wilkins, Philadelphia
- Koren, G et al. Cancer chemotherapy and pregnancy. *Journal of Obstetrics and Gynaecology of Canada*, 2013. 288: 263-278. Available at: [bit.ly/2ltVIGF](http://bit.ly/2ltVIGF) (Accessed October 2017)
- Cancer Research UK, 2015. Acupuncture. Available at: [bit.ly/2xcjUh6](http://bit.ly/2xcjUh6) (Accessed October 2017)

## Further reading

- Chemotherapy regimens
- CNS prophylaxis
- Glossary
- Late effects of lymphoma treatment
- Side effects of lymphoma treatment
- Types of lymphoma

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