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# Chemotherapy

FACT SHEET

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# Chemotherapy



## About this information sheet

This fact sheet will help you to help you understand what chemotherapy is and how it may be used to treat your brain tumour. Chemotherapy is the use of cytotoxic (anti-cancer) drugs to kill or slow the growth of tumour cells. Chemotherapy may be the only treatment you need or it may be used after surgery or possibly with or after radiotherapy.

## Treatment options

Making a decision about treatment can feel overwhelming. In a short time, you are called upon to make critical decisions about your future, many of which are confusing and frightening. When your doctor first tells you about your recommended treatment options you may not remember the details about what you are told. You may find it useful to take a friend or family member along who can listen with you; ask questions on your behalf and takes notes for you.

If you feel uncertain about your treatment plan, it may be beneficial to consider a second opinion. You may find it reassuring to discuss your thoughts about your treatment with family and friends. Your treatment options and recommendations will depend on many factors such as the size, type, and grade of your tumour, the potential benefits, risks and side-effects. You should consider all of these before making an informed decision. You have the right to refuse any treatment if you wish. Your involvement in the choices you make with your healthcare team can make a big difference in your experience and your quality of life.

## What is chemotherapy?

Body tissues are made of billions of individual cells. As adults most of the body's cells don't divide and multiply much. They only divide if they need to repair damage. Chemotherapy is the use of cytotoxic (anti-cancer) drugs to treat cancer. Chemotherapy circulates throughout your body in the bloodstream. Chemotherapy (often abbreviated to "chemo") refers to drugs that prevent cancer cells from growing and spreading by destroying the cells or stopping them from dividing while causing the least possible damage to healthy cells.

The blood-brain barrier is a protective network of blood vessels and cells that filters blood flowing to the brain. The chemotherapy drugs used to treat brain tumours must be able to cross the blood-brain barrier. Only certain types of chemotherapy drugs can get through this barrier. Temozolomide is the most commonly prescribed chemotherapy drug for the treatment of brain tumours, although other chemotherapy drugs are also used.

## Chemotherapy drugs to treat brain tumours

The most common drugs used to treat primary brain tumours are:

### Temozolomide

Temozolomide (Temodar) is a widely used treatment, and often the standard of care if you are diagnosed with a malignant brain tumour. Temozolomide is almost exclusively prescribed orally, and there are few (and sometime no) alternative therapies.

## Lomustine (CCNU), procarbazine and vincristine on their own or together (called PCV)

PCV is a combination treatment for brain tumours. It may be used if you are diagnosed with a recurrent high-grade glioma. Vincristine is given as a drip. Procarbazine and lomustine are given as capsules. You usually have it as an outpatient at the hospital.

## Carmustine

Carmustine is a chemotherapy drug used to treat lymphomas, myeloma and brain tumours. Carmustine is usually given into a vein. You usually have it as an outpatient or during a hospital stay.

If you are having carmustine as an implant (wafer) for a brain tumour, you have it during a hospital stay.

## Why give chemotherapy?

Chemotherapy drugs are may be used after surgery and sometimes during and after radiotherapy. Your healthcare team will carefully consider the best course of treatment for and discuss this with you. Your recommended treatment will depend on:

- The type of tumour you have and whether it has spread within the brain.
- Your general health and fitness.
- Your age.
- Your tolerance for specific medications, procedures, or therapies.

You should feel free to ask your health team as many questions as you wish.

Chemotherapy is given for different reasons. You may have chemotherapy:

- During or after surgery to control cells cancer cells left behind and reduce the risk that the cancer will come back (recur) (called adjuvant chemotherapy). This reduces the chance of, or delays, the tumour returning.
- With or after radiation therapy to reduce the risk of tumour regrowth.
- If your tumour has returned.
- To shrink or slow the growth of your tumour if it cannot be operated on.
- To ease the symptoms of your brain tumour.
- To prevent or slow further growth of a tumour.

## How chemotherapy is given

Chemotherapy is given in a series of treatments separated by rest periods. A treatment session and rest period together are called a 'cycle'. You may require more than one cycle of chemotherapy to treat your brain tumour.

Your chemotherapy can be given as:

- Tablets or capsules.
- An injection into the bloodstream (usually through a vein).
- A drip (intravenous infusion) into the bloodstream through a vein.

Chemotherapy drugs that you have in these ways circulate around the body in the bloodstream until they reach the tumour cells. This is known as systemic treatment.

### Tablets

You may be able to take your chemotherapy medication orally.

You can take these tablets at home but you must wash your hands immediately afterwards. If possible wear disposable gloves when handling the tablets and then place the gloves in a bin.

Do not crush or chew the tablets or capsules unless you have been advised to. The medication may leave an unpleasant aftertaste so you may want to chew gum afterwards to help disguise the taste.

### Injection or drip

Chemotherapy can be delivered directly into the



bloodstream as an injection or through a drip (intravenously), often using an infusion pump.

### **Wafers**

Wafers are inserted directly into a resection cavity (the area in the brain where the tumour was located) during surgery. These are called Gliadel® implants. They're may only be used if you have a high-grade glioma, or with glioblastoma (GBM) that has returned after treatment.

### **Ventricular access device or an Ommaya reservoir**

An Ommaya reservoir is a plastic device that's implanted under your scalp. It's used to deliver medication to your cerebrospinal fluid (CSF), a clear fluid in your brain and spinal cord.

Your brain and spinal cord have a group of blood vessels that form a protective screen called the blood-brain barrier. Chemotherapy that's delivered through your bloodstream can't cross this barrier to reach cancer cells. An Ommaya reservoir allows the medication to bypass the blood-brain barrier.

## **How long will I have to have chemotherapy?**

How many cycles of chemotherapy you have will be carefully planned specifically for you. A typical course of chemotherapy may last for 6–12 months and may consist of 6–12 cycles. Your response to chemotherapy will be carefully monitored throughout the course and may include Magnetic Resonance Imaging or MRI and Computerised Tomography or CT scans.

Rest periods between treatment sessions allow your body to recover from any side-effects and give healthy cells a chance to repair themselves. Having chemotherapy in cycles also enhances its effectiveness.

Tumour cells are not dividing all the time, so there will be times when they're resting.

The first time you have chemotherapy, it won't work on the cells that are resting. During the second treatment session, the cells that were resting the first time may now be dividing, increasing the chance that the chemotherapy will affect them.

The maximum number of times you can have

chemotherapy will depend on the drug, how well you tolerate treatment and how your tumour responds to chemotherapy.

## **Where will I have my chemotherapy?**

If you are given Temozolomide you can take this at home, or if you are in hospital. If you are receiving your chemotherapy intravenously or by injection this will take place at the hospital or on as an outpatient. A member of your healthcare team will speak to you about how to take your chemotherapy medication.

Ask as many questions as you need to until you feel confident about taking your chemotherapy.

## **Can I work while having chemotherapy?**

You will need to speak to your employer to arrange time off to attend hospital and specialist appointments. You may experience certain side-effects from chemotherapy such as fatigue and tiredness or nausea which may require time off work. Most employers will reduce your hours and change work duties to make things easier for you.



## What are the side-effects of chemotherapy?

Tumour cells grow quickly and chemotherapy kills fast-growing cells. Because these drugs travel throughout the body, they can affect normal, healthy cells that are fast-growing, too. The healthy cells most likely to be damaged by chemotherapy are those in the mouth, digestive tract, and reproductive system, blood-forming cells in the bone marrow and hair follicles.

Your healthcare team will give chemotherapy at doses high enough to treat your brain tumour while keeping side-effects at a minimum. You may be given your medications to help prevent certain side-effects before they happen.

The severity of side-effects (how bad they are) varies greatly from person to person. You may experience very few, if any. Be sure to speak to your healthcare team about which side-effects are most common when you should call your doctor about them.

## Common side-effects of chemotherapy

### Lowered immunity and infection

If white blood cell numbers drop during chemotherapy it can lower your immunity (ability to fight infection). This makes you more likely to get infections and less able to fight any infections that do occur. Your doctor may recommend antibiotics as a precaution against infection.

Before you start chemotherapy, your doctor should order a complete blood count (CBC) to check your baseline levels of different blood cells, including white blood cells. You'll continue to have this blood test done periodically throughout your treatment. Many types of white blood cells make up the total white cell count. A type of white blood cell known as a neutrophil protects you against infection by destroying harmful bacteria and yeasts that enter the body. During chemotherapy, some people get low levels of neutrophils. This is known as neutropenia. If you have neutropenia, you may be given an injection of a growth factor drug called granulocyte-colony stimulating factor (G-CSF) after chemotherapy to encourage the bone marrow to make more white blood cells.

During chemotherapy treatment, even a minor infection could become serious quickly. To reduce the risk of infection while on chemotherapy:

- Keep clean and always wash your hands thoroughly after using the toilet or before preparing food.
- Stay away from crowded places and from people who you know have an infection, such as a cold.
- Make sure your food is thoroughly cooked, and ask your nurse if there are any foods you should avoid.

Your health team will monitor you and give you antibiotics to help fight infection if necessary. If you have a temperature over 38 degrees or are feeling unwell, it is important that you contact your doctor

### Increased risk of bruising and bleeding

Some chemotherapy drugs can cause a reduction in the number of platelets in the blood. This is known as thrombocytopenia and is a common occurrence with the chemotherapy drugs temozolomide and PCV.

Signs of a low platelet count may include:

- Bleeding gums.
- Nosebleeds.
- Bruising.
- Heavy periods.



- Tiny blood spots in the skin (petechiae) that may cluster to form a rash.

You should contact your doctor if you experience any of these symptoms or for any serious wounds, or for a bruise or injury that seems to be healing very slowly.

It is a good idea to take precautions, such as wear gloves when gardening or cutting food. Also take proactive steps to reduce falls and the risk of injury. Use a soft toothbrush to protect your gums from bleeding and do not floss.

## Nausea and vomiting

You may feel nausea (feel sick) or vomit (be sick) during or after treatment. Nausea and vomiting may come on suddenly, appear after each chemotherapy, or happen seemingly at random. Not all chemotherapy drugs cause this and you may not experience any sickness at all.

Your doctor may prescribe you anti-sickness medication before you begin chemotherapy or if you experience nausea after starting your treatment.

Some tips to help with feeling sick include:

- Try eating dry food such as crackers in the morning.
- Ginger can help reduce feeling of sickness – try crystallised ginger, ginger tea or ginger biscuits.
- Avoid fried, fatty foods or foods with a strong smell. If possible ask someone else to prepare food for you.

## Hair loss

If you are also having radiotherapy it will likely be the main cause of your hair loss rather than the chemotherapy. The loss of hair in the areas affected by the radiotherapy beam may be more permanent.

Chemotherapy can damage hair follicles which may cause your hair to weaken, become brittle, and fall out. Not all chemotherapy causes hair loss; it will depend on which drug or combination of drugs you have.

Generally, any hair loss (thinning) will start within a few weeks of treatment beginning.

Once you have finished your treatment it will

grow back over the next few months but it may be a slightly different colour or texture than before.

Here are some tips for looking after your hair during treatment :

- Avoid using hairdryers, straighteners, tongs or curlers.
- Pat your hair carefully after washing and gently brush with a wide toothed comb.
- Do not perm or colour your hair if it is brittle or your scalp is dry.
- If you want to colour your hair, use a mild, vegetable-based colourant and ask your hairdresser for advice.

## Sore mouth

Your chemotherapy may cause changes in the lining of your mouth and make it very sore. This is called oral mucositis (inflammation of the inside of the mouth) and is more likely to occur at high doses of chemotherapy. You may also suffer from painful sores in your mouth or on your tongue and lips.

You may find some relief from rinsing your mouth with warm salt water or sucking on ice cubes. There are a number of medicines and numbing gels which can help relieve the symptoms.

If you notice a white coating or bumps on the inside of your mouth or tongue it may be oral thrush related to the treatment and to steroids. Thrush is treated with anti-fungal tablets. You may be prescribed these tablets to prevent thrush.

If you think you may have oral thrush or if mouth sores are very painful or weeping you should contact your doctor.



## Tiredness and fatigue

During your chemotherapy you may feel more fatigued and tired than usual. This can be frustrating if you're usually an active person. It is important you try to be patient and rest as much as you need to.

Balance plenty of rest with gentle exercise like short walks or more, if you feel up to it. You should try to cut down on things you do not really need to do. Ask family and friends to help out with shopping, household jobs or gardening.

Your tiredness should wear off a little while after your course of treatment has finished although it may take a few months for your energy levels to return to normal. If you have been given radiotherapy this may also make you feel tired.

## Changes in sexuality

A range of issues can cause you to lose interest in sex while you're having chemotherapy. Aside from feeling tired and unwell, you may feel less confident about who you are and what you can do. Changes in your appearance can also affect your feelings of self-esteem and, in turn, sexuality. Talk about how you're feeling with your partner or doctor.

It would be best to avoid getting pregnant if chemotherapy is needed. If appropriate, your doctor will talk to you about using contraception during and after chemotherapy.

## Anaemia

Anaemia is a relatively common side-effect of chemotherapy. This is because chemotherapy can temporarily lower the number of your red blood cells. You may become very tired and feel you have no energy. You may also become breathless and feel dizzy and light-headed. These symptoms happen because the red blood cells contain haemoglobin, which carries oxygen around the body.

If you have any of these symptoms, tell your healthcare team as soon as possible. If your haemoglobin is low, you may be offered a blood transfusion. After this, you will have more energy and feel less short of breath.

## Taste, appetite and digestion

Chemotherapy may cause changes to your taste and appetite. It can also cause diarrhoea or constipation. If you don't have much of an appetite, try to eat little amounts as often as possible. Keep snacks such as nuts, grated cheese or dried fruit handy to eat whenever you can. Try to maintain a healthy diet during your treatment. You can always ask to see a Dietitian.

You may get a bitter or metal taste in your mouth. Sucking sugar-free sweets or gum may help with this. These taste changes should improve after treatment finishes. Try to prepare food with spices and herbs to add flavour when cooking or eat sharp-tasting fresh fruit and juices or sugar-free sweets to leave a pleasant taste in your mouth.

## Constipation or diarrhoea

Some chemotherapy drugs, pain medicines and anti-nausea drugs can cause constipation or diarrhoea. Tell your doctor or nurse if your bowel habits have changed.

### Diarrhoea

If you experience diarrhoea during chemotherapy ensure that you drink plenty of liquid to replace the fluid you are losing. It may also help to avoid alcohol, caffeine, dairy, and high-fat and high-fibre foods. If your diarrhoea can be more severe or you have more than 4–6 episodes in a day it is important you contact the hospital.

### Constipation

Some chemotherapy drugs, anti-sickness drugs and painkillers may cause you to become constipated. Inform your doctor if this happens, so they can prescribe drugs to prevent or treat it.

Try to eat more fibre (cereals, raw vegetables and fruits) and drink plenty of liquid. Gentle exercise, such as short walks, can help to improve constipation.





## Skin and nail changes

It's possible that your skin may become dry and sore, particularly on your hands and feet. Your nails may also become dry and brittle. You may find your nails also change and become darker than usual, or develop ridges or white lines across them. Your skin may also be more sensitive to sunlight during and after treatment. You should contact your doctor if you develop any skin changes or rashes.

Your skin may become more sensitive to sunlight and chemicals like chlorine both during chemotherapy and for some time afterwards, so it's important to make sure that your skin is protected.

### Tips to care for your skin:

- Use a sunscreen that blocks both UVA and UVB rays, at least SPF (sun protection factor) 30–50.
- Keep covered up as much as possible outdoors.
- Avoid wet shaving – an electric razor is less likely to cause cuts.
- Wash your clothing in mild detergent for people with sensitive skin.
- Avoid chlorinated swimming pools as the water can make skin changes worse.
- Use moisturising cream if your skin is dry or itchy, but check with your doctor before using creams if you are also having radiotherapy.

If your skin becomes red or sore in the area if you have had an intravenous drip or injection let your doctor or nurse know immediately.

### Nail changes

Your nails may grow more slowly or break more easily. Keep your nails and hands moisturised. Wear gloves to protect your nails when you are doing things in the house or garden.

## Neuropathy (numbness or tingling hands or feet)

This is caused by the chemotherapy drug affecting the nerves and is called peripheral neuropathy. This can cause tingling or numbness, or a feeling like pins and needles.

You may also find it hard to fasten buttons or do other fiddly tasks.

Let your healthcare team know if you get these symptoms. The dose of the chemotherapy drug may need to be changed if it gets worse. Usually, peripheral neuropathy gradually gets better when chemotherapy is over, but sometimes it is permanent.

## Reaction with alcohol and foods

Some chemotherapy drugs, such as procarbazine, can react with alcohol (and non-alcoholic beers and wine), causing sickness, dizziness or breathlessness. Speak to your healthcare team if you need to avoid certain drinks or food with your during your chemotherapy.

## Less common side-effects

Less common side-effects can occur that affect other organs, such as the lungs, liver, kidneys or ears. Some of these cause symptoms, but others can only be detected by blood tests, which you'll have during your treatment.

Less common side-effects may include:

- Changes in hearing.
- Increased risk of blood clots.
- Changes in how your kidneys work.
- Changes in memory.

Speak to your healthcare team or doctor if you are concerned about these symptoms.

Side-effects tend to gradually disappear over time once the treatment is complete, but if you're concerned about any of your side-effects, please remember to speak to your healthcare team.





## After chemotherapy

You will be monitored throughout and following your treatment to check to assess changes to your tumour. This may involve the use of scans (Magnetic Resonance Imaging or MRI and Computerised Tomography or CT) to see if your tumour has stabilised or is shrinking. These appointments may continue for a number of years after your chemotherapy has finished.



## Resources

### Look Good Feel Better

[lgfb.co.nz](http://lgfb.co.nz)

If side-effects change your appearance and self-esteem, consider registering for a free workshop. Free Feel Better Classes are for anyone undergoing any treatment for any type of cancer at any stage. More information can be found on their website.

### Cancer Society NZ

[cancernz.org.nz](http://cancernz.org.nz)

### Support Friend

Brain Tumour Support NZ can organise a Support Friend to contact you so you can talk about any concerns you may have.





### Disclaimer

This guide reflects current recommendations from international clinical guidelines for the management of primary adult brain tumours. It is not intended to take the place of medical advice. A patient's GP or specialist may provide them with new or different information which is more appropriate to their needs.

New Zealand does not have its own set of clinical practice guidelines for the management of brain tumours. New Zealand doctors will typically refer to international guidelines, from organisations such as: the UK's National Institute for Health and Care Excellence (NICE); the European Society of Medical Oncology (ESMO); Cancer Council Australia; and the USA's National Comprehensive Care Network (NCCN). Links to these international guidelines can be found in our Online Resources directory.

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