



Understanding Acute Leukaemia

A guide for people with cancer,
their families and friends

Cancer
information

Cancer Council Helpline

13 11 20

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Understanding Acute Leukaemia

A guide for people with cancer, their families and friends

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Note to reader

Always consult your doctor about matters that affect your health. This booklet is intended as a general introduction to the topic and should not be seen as a substitute for medical, legal or financial advice. You should obtain appropriate independent professional advice relevant to your specific situation and you may wish to discuss issues raised in this book with them.

All care is taken to ensure that the information in this booklet is accurate at the time of publication. Please note that information on cancer, including the diagnosis, treatment and prevention of cancer, is constantly being updated and revised by medical professionals and the research community. Cancer Council Australia and its members exclude all liability for any injury, loss or damage incurred by use of or reliance on the information provided in this booklet.

Cancer Council NSW

Cancer Council is the leading cancer charity in NSW. It plays a unique and important role in the fight against cancer through undertaking high-quality research, advocating on cancer issues, providing information and services to the public and people with cancer, and raising funds for cancer programs. This booklet is funded through the generosity of the people of NSW. To make a donation to help defeat cancer, visit Cancer Council's website at www.cancerCouncil.com.au or phone 1300 780 113.



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Introduction

This booklet has been prepared to help you understand more about acute leukaemia. It was developed with help from a range of health professionals and people affected by acute leukaemia.

Many people feel shocked and upset when told they have acute leukaemia. We hope this booklet will help you, your family and friends understand how this disease is diagnosed and treated. We also include information about support services.

We cannot give advice about the best treatment for you. You need to discuss this with your doctors. However, we hope this information will answer some of your questions and help you think about other questions to ask your treatment team.

This booklet does not need to be read from cover to cover – just read the parts that are useful to you. Some medical terms that may be unfamiliar are explained in the glossary. You may also like to pass this booklet to your family and friends for their information.

If you're reading this book for someone who doesn't understand English, let them know that Cancer Council Helpline **13 11 20** can arrange telephone support in different languages. They can also call the Translating and Interpreting Service (TIS National) on **13 14 50**.



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What is cancer?

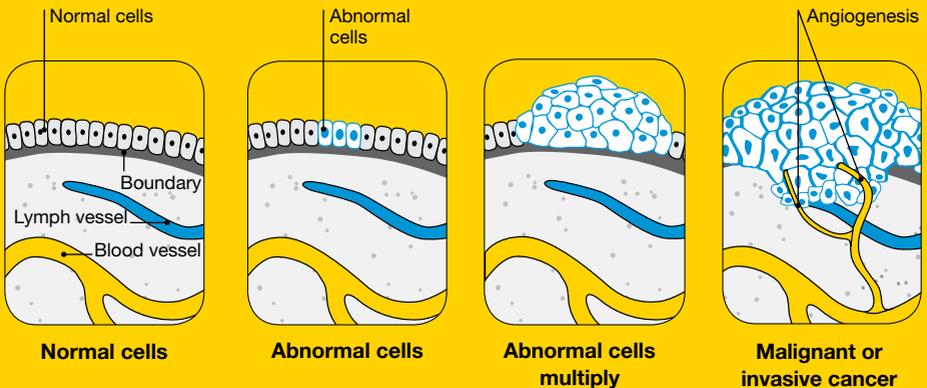
Cancer is a disease of the cells, which are the body's basic building blocks. The body constantly makes new cells to help us grow, replace worn-out tissue and heal injuries. Normally, cells multiply and die in an orderly way.

Sometimes cells don't grow, divide and die in the usual way. This may cause blood or lymph fluid in the body to become abnormal, or form a lump called a tumour. A tumour can be benign or malignant.

Benign tumour – Cells are confined to one area and are not able to spread to other parts of the body. This is not cancer.

Malignant tumour – This is made up of cancerous cells, which have the ability to spread by travelling through the bloodstream or lymphatic system (lymph fluid).

How cancer starts



A malignant tumour that has not spread to other parts of the body is called localised cancer. If cancerous cells grow and form another tumour at a new site, it is called secondary cancer or metastases.

Acute leukaemia doesn't follow the same process of spreading as other cancers because it is a blood cancer and starts in the bone marrow (the spongy part in the centre of the bone where blood cells are produced). It affects the growth of certain types of white blood cells.

With cancers that affect the blood and bone marrow, cells grow abnormally and multiply in such a way that they crowd the bone marrow. This reduces the bone marrow's ability to produce normal levels of other blood cells, which can impact on the way the rest of the body functions.

How cancer spreads

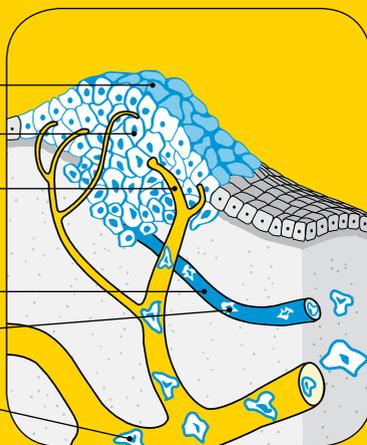
Primary cancer

Local invasion

Angiogenesis –
tumours grow their
own blood vessels

Lymph vessel

Metastasis –
cells invade other
parts of the body via
blood vessels and
lymph vessels





The blood

To understand acute leukaemia, it is useful to know what blood does in the body and where it is made.

Blood is pumped around your body to provide oxygen and nutrients to your tissues and to remove waste products. It is made up of three main types of blood cells, which are carried along in a clear fluid called plasma:



Red blood cells
carry oxygen
around the body



White blood cells
fight infection



Platelets
help the blood
to clot

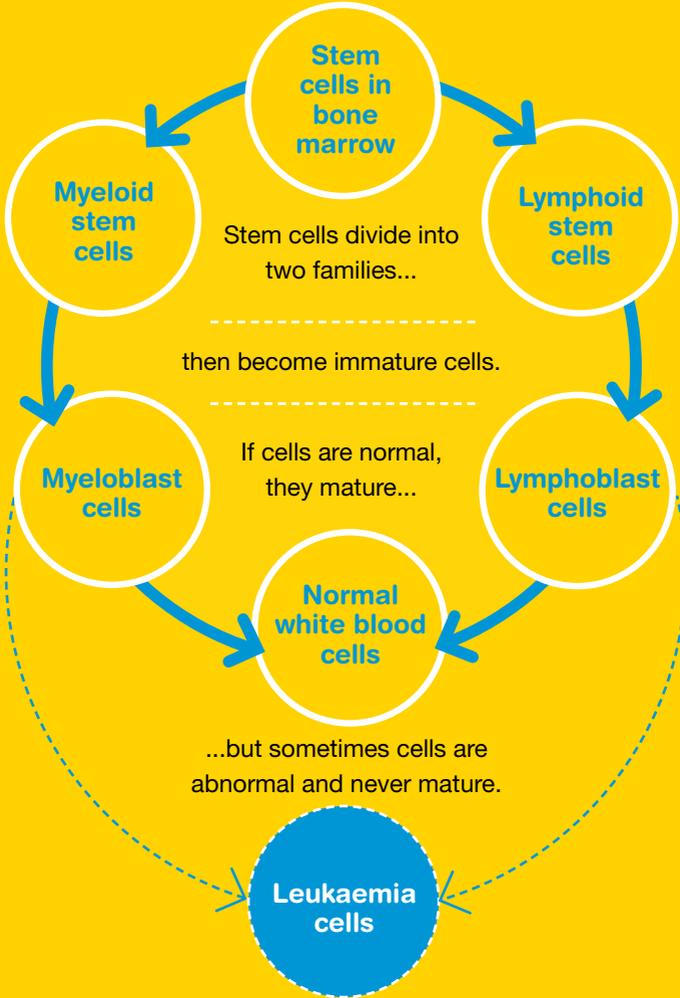
These different types of blood cells are made in the bone marrow. The bone marrow produces two types of immature blood cells:

- **myeloid stem cells** – develop into red blood cells, most white blood cells or platelets
- **lymphoid stem cells** – develop into other types of white blood cells called T-lymphocytes and B-lymphocytes.

Myeloid and lymphoid stem cells develop into blast cells (precursor cells). These immature cells continue to mature and are released into the bloodstream as mature blood cells. They carry out a range of functions depending on what type of blood cell they are. If blast cells do not mature normally, or if there are too many in the blood, it can cause health problems such as leukaemia.

Blood cell production

In acute leukaemia, blast cells never develop into mature white blood cells. These abnormal blast cells are also called leukaemia cells.





Key questions

Q: What is acute leukaemia?

A: Acute leukaemia occurs when immature white blood cells (blast cells) grow out of control and continue to divide but never mature into normal cells. It develops suddenly and progresses quickly.

The abnormal blast cells are known as leukaemia cells. Because they are immature and abnormal, the leukaemia cells do not carry out the usual function of white blood cells. They also crowd out the normal white blood cells, preventing them from working properly, which leads to an increased risk of infections.

When the bone marrow fills with leukaemia cells, there is little room for healthy red cells and platelets to be produced. This causes a variety of health problems.

Q: What types are there?

A: There are two main types of acute leukaemia, depending on what type of white blood cell is involved:

- **acute myeloid leukaemia (AML)** – a leukaemia involving myeloid blast cells, also called myeloblasts.
- **acute lymphoblastic leukaemia (ALL)** – a leukaemia involving lymphoid blast cells, which are known as lymphoblasts. ALL is also sometimes called acute lymphatic leukaemia.

Q: Are there other types of leukaemia?

A: There are several different types of leukaemia. All leukaemias start in the bone marrow and affect white blood cell production. They are grouped depending on how quickly the disease develops and which type of white blood cell is affected (lymphoid or myeloid).

All leukaemia types have their own subgroups and characteristics, and are treated differently.

Type	Description
Acute leukaemia	<ul style="list-style-type: none">• affects immature blood cells• occurs suddenly• develops quickly• includes acute myeloid leukaemia (AML) and acute lymphoblastic leukaemia (ALL)
Chronic leukaemia	<ul style="list-style-type: none">• usually affects more mature cells• appears gradually• develops slowly over months to years• includes chronic lymphocytic leukaemia (CLL) and chronic myeloid leukaemia (CML)

For information about chronic leukaemia, contact the Leukaemia Foundation on 1800 620 420 or www.leukaemia.org.au or call Cancer Council Helpline 13 11 20.

Q: What are the risk factors?

- A:** The definite causes of acute leukaemia are not known, but some factors may increase the chance of developing the illness, including:
- exposure to high levels of radiation (such as an atomic bomb explosion)
 - previous treatment with chemotherapy or radiotherapy
 - exposure to some chemicals, such as benzene, petroleum products, paints, certain pesticides and heavy metals, over a long period of time
 - having certain genetic disorders such as Down syndrome
 - viral infections
 - cigarette smoking.

Q: How common is it?

- A:** Each year in Australia about 3200 people are diagnosed with a form of leukaemia. Almost half of those cases are acute leukaemia. Acute leukaemia accounts for about 1.1% of all cancer cases in Australia.

Leukaemia is the most common type of cancer diagnosed in people under 15.

- **Acute myeloid leukaemia (AML)** – More common than ALL with about 900 people diagnosed annually, and it is more frequently diagnosed in men. It is more prevalent in adults than in children and becomes more common with age.

- **Acute lymphoblastic leukaemia (ALL)** – Over 300 people are diagnosed each year. It is the most common type of childhood cancer and usually occurs in children 1–4 years old.

Children with acute leukaemia

Children with acute leukaemia have the same types of tests and treatments as adults. Many of the side effects and emotional issues surrounding body image will be similar. This information booklet applies to children, but as no two cases of acute leukaemia are the same, you will need to discuss your child's case in detail with their doctors. For more information, see pages 42–45.

Q: What are the symptoms?

A: The main symptoms of acute leukaemia are caused by continually increasing numbers of blast cells in the bone marrow, which reduce the number of normal blood cells. These symptoms include:

- **Anaemia** – Lack of red blood cells can cause a pale complexion, weakness, tiredness and breathlessness. These are all signs of a condition called anaemia.
- **Repeated or persistent infections** – Lack of normal white blood cells can cause mouth sores, sore throats, fevers, sweats, coughing, boils, infected cuts or scratches, and frequent and painful passing of urine.

- **Increased bruising and bleeding** – Lack of platelets can cause bruising without a bump or fall (spontaneous bruising), nose bleeds, bleeding gums, heavy periods in women, and small red or purple spots on the skin or mouth (petechiae).

You may also have pain or discomfort in your abdominal or back area from an enlarged spleen (an organ that filters and stores blood cells).

Symptoms may appear quickly over a few weeks.

Occasionally, a person will have none of these symptoms or vague symptoms such as an ongoing cold, and the leukaemia is discovered during a routine blood test.

Less common symptoms

- bone or joint pain
- swollen, tender gums
- skin rashes
- headaches
- weight loss
- vision problems
- vomiting
- enlarged lymph glands
- chest pains

“ Within days of noticing odd bruising and cuts that wouldn’t heal, I was having three-hour afternoon sleeps. ”

Judy



Diagnosis

An initial blood test will show if leukaemia cells are present in the blood or if the levels of blood cells are different to what would be expected in a healthy person.

Other tests are needed to confirm the diagnosis and determine the type of leukaemia you have.

Bone marrow biopsy

This test is usually done to confirm the presence of leukaemia cells and to work out the type of leukaemia. The bone marrow sample may also be examined for chromosome and molecular changes, as leukaemia cells are different to normal cells. The results of this test may influence the type of treatment your doctor recommends.

When you have a bone marrow biopsy, a small amount of bone marrow is removed from your hip bone (pelvic bone) using a long needle. This can be uncomfortable and, at times, painful. A local anaesthetic will be used to numb the area. You may also be given some pain-killers and a drug to relax you. Children often have a general anaesthetic for this procedure.

Although it can take up to 30 minutes to prepare you for the bone marrow biopsy, the actual procedure only lasts a few minutes.

Pain relief medication may make you feel drowsy. Ask a family member or a friend to drive you home after the biopsy.



Chest x-ray and other imaging tests

A chest x-ray is taken to check the heart and lungs, and to see whether there are enlarged lymph nodes in the chest. This is sometimes seen in certain types of ALL.

The following imaging tests may also be done to check the health and function of your body before treatment:

- **Magnetic resonance imaging (MRI) scan** – Uses magnetism and radio waves to create a detailed cross-section of pictures.
- **Computerised tomography (CT) scan** – Uses x-rays to take multiple scans of the inside of your body.
- **Gated heart pool scan** – A small amount of your blood is taken, mixed with some radioactive material and reinjected into you to assess your heart's pumping ability.

Lumbar puncture

Once you have been diagnosed with leukaemia, you may have a lumbar puncture. This test shows if any leukaemia cells have travelled to the fluid around your spine. The fluid is called cerebrospinal fluid (CSF).



Everyone with ALL has a lumbar puncture, but only some people with AML have one.

Fluid is removed with a thin needle from a space between the bones in the lower back. This takes a few minutes, but as it can be uncomfortable, your doctor will use a local anaesthetic to numb the area. In some people, this test can cause the back of the legs to tingle when the needle goes in. This feeling is harmless and doesn't last long.

After the lumbar puncture, you will need to lie flat for a few hours to reduce the chance of developing a headache. If you do get a headache, let your doctor know so they can give you pain-killers.

If your doctor thinks the lumbar puncture may be difficult, or if the bones in your spine have degenerated, it can be performed under x-ray guidance.

Prognosis

Prognosis means the expected outcome of a disease. You will need to discuss your prognosis with your doctor, but it is not possible for any doctor to predict the exact course of your disease.

Test results, the rate and extent of leukaemia cell growth, how well you respond to treatment, and other factors such as age, fitness and medical history are all important factors in assessing your prognosis.

For many people, treatment can control leukaemia for years. This is known as remission. Most children and many adults who go into remission have a good chance of being cured with chemotherapy and a peripheral blood stem cell or bone marrow transplant.

Which health professionals will I see?

Often your general practitioner (GP) will arrange the first tests to assess your symptoms. If these tests do not rule out cancer, you will usually be referred to a haematologist who will arrange further tests and advise you about treatment options.

You will be cared for by a range of health professionals who specialise in different aspects of your treatment. This multidisciplinary team will probably include:

Health professional	Role
haematologist	specialises in diagnosing and treating diseases of the blood, the lymphatic system and bone marrow
radiation oncologist	prescribes and coordinates the course of radiotherapy
nurses	help administer chemotherapy and provide care, information and support throughout your treatment
cancer care coordinator	supports patients and families throughout treatment and liaises with other staff
dietitian	recommends an eating plan to follow while you are in treatment and recovery
social worker, physiotherapist, clinical psychologist and occupational therapist	link you to support services and help you with any emotional, physical or practical problems



Key points

- There are several different types of tests to diagnose acute leukaemia.
- Diagnostic tests will show what type of acute leukaemia you have - acute lymphoblastic leukaemia (ALL) or acute myeloid leukaemia (AML), and help your medical team recommend a treatment plan.
- You will have a blood test that will show if leukaemia cells are in your blood.
- Some people have a bone marrow biopsy. This means a small amount of bone marrow is removed from your hip bone with a needle.
- You may have further tests. X-rays, MRI and CT scans are painless scans that take pictures of the inside of your body. A gated heart pool scan means that some blood is taken, mixed with some radioactive material then reinjected into your body to test your heart function.
- If you have ALL, your doctor will remove some fluid from your lower spine (lumbar puncture). Only some people with AML have a lumbar puncture.
- Your doctor may talk to you about your prognosis. This is the expected outcome of what may happen to you. No one can predict the exact course of your disease.
- You will probably see many health professionals who will work together as a multidisciplinary team to diagnose and treat you. A haematologist, who specialises in treating people with blood diseases, will be part of the team.



Making treatment decisions

Sometimes it is difficult to decide on the type of treatment to have. You may feel that everything is happening too fast, because acute leukaemia treatments usually start as soon as you have been diagnosed. Check with your doctor when your treatment should start, and take as much time as you can before making a decision.

Understanding the disease, the available treatments and possible side effects can help you weigh up the pros and cons of different treatments and make a well-informed decision that's based on your personal values. You may also want to discuss the options with your doctor, friends and family.

You have the right to accept or refuse any treatment offered. Some people with more advanced cancer choose treatment even if it only offers a small benefit for a short period of time. Others want to make sure the benefits outweigh the side effects so that they have the best possible quality of life.

Talking with doctors

When your doctor first tells you that you have acute leukaemia, you may not remember the details about what you are told. Taking notes or recording the discussion may help. Many people like to have a family member or friend with them to take part in the discussion, take notes or simply listen.

If you are confused or want clarification, you can ask questions. See page 48 for a list of suggested questions. If you have several questions, ask the staff about a longer appointment.

A second opinion

You may want to get a second opinion from another specialist to confirm or clarify your doctor's recommendations or reassure you that you have explored all of your options. Specialists are used to people doing this.

Your doctor can refer you to another specialist and send your initial results to that person. You can get a second opinion even if you have started treatment or still want to be treated by your first doctor. You might decide you would prefer to be treated by the specialist who provided the second opinion.

Taking part in a clinical trial

Your doctor or nurse may suggest you take part in a clinical trial. Doctors run clinical trials to test new or modified treatments and ways of diagnosing disease to see if they are better than current methods. For example, if you join a randomised trial for a new treatment, you will be chosen at random to receive either the best existing treatment or the modified new treatment.

Over the years, trials have improved treatments and led to better outcomes for people diagnosed with cancer.

It may be helpful to talk to your specialist or clinical trials nurse, or get a second opinion. If you decide to take part, you can withdraw at any time. For more information, call the Helpline for a free copy of *Understanding Clinical Trials and Research* or visit www.australiancancertrials.gov.au.



Treatment

Treatment usually begins as soon as a diagnosis has been made and will depend on what type of acute leukaemia you have. You will probably have chemotherapy and you may have radiotherapy. Other treatments including steroid therapy, or a peripheral blood stem cell or bone marrow transplant, may be recommended depending on the type of leukaemia you have and your response to chemotherapy.

Chemotherapy

Chemotherapy treats cancer with anti-cancer drugs called cytotoxics. The aim of chemotherapy is to kill cancer cells while doing the least possible damage to healthy cells.

Chemotherapy is usually given intravenously (injected into your veins). It is often administered via a central venous catheter (see page 21) placed under the skin on your chest prior to treatment. Sometimes it is given in tablet form or as an injection into the spine during a lumbar puncture.

The drugs will mainly kill fast-growing cells, such as leukaemia cells. However, other fast-growing cells, such as hair, mouth and digestive tract cells, can also be affected. This can cause side effects such as hair loss, mouth ulcers, constipation or diarrhoea. See pages 23–24 for more information.

Treatment for acute leukaemia is given in 2–3 stages: induction, consolidation and maintenance. Maintenance treatment is used for ALL or a rare type of AML called acute promyelocytic leukaemia (APML). It is not given to everyone with acute leukaemia.

Induction chemotherapy

Induction treatment is an intensive course of chemotherapy that usually lasts about a week with a 4–6 week recovery break. It aims to kill as many leukaemia cells as possible to make the signs and symptoms of leukaemia disappear (remission). The chemotherapy is usually a combination of 3–4 drugs given intravenously.

A device called a central venous catheter can be inserted into a vein in your chest or arm to make having regular injections more comfortable. It can also be used to take blood samples for testing. The catheter is inserted under a general or local anaesthetic and usually remains in place throughout your treatment. Your nurses will care for the catheter to prevent infections or blockages.

The chemotherapy is given as several cycles of treatment in hospital, followed by a recovery period. Many patients stay in hospital for 2–4 weeks until their levels of blood cells (blood counts) recover.

You may also have a tablet called allopurinol and IV fluids to help protect the kidneys against damage caused by the increase in uric acid, a waste chemical produced as leukaemia cells are destroyed.

You will have a bone marrow biopsy to see if this treatment is working. If it is successful, no leukaemia cells will be visible. This means your leukaemia is in remission. However, there is a risk of it returning without further treatment, as a very small number of undetected leukaemia cells may survive in your body. To stop the leukaemia coming back you will usually have the next stage of treatment, consolidation chemotherapy.

Consolidation chemotherapy

If your leukaemia is in remission, you may be given several more courses of chemotherapy to kill any cells that may have survived the first treatment. This treatment is called consolidation chemotherapy. It will be milder than induction chemotherapy and will cause fewer side effects.

The chemotherapy can be a combination of intravenous drugs or tablets. Depending on the types of drugs used, you will either visit the hospital for treatment as an outpatient or stay in hospital for one or more nights.

Maintenance chemotherapy

If you have ALL or APML, you may have a final stage of less intensive maintenance chemotherapy. This is usually given to prolong remission. It is given over two years, as tablets or intravenously. You will need regular hospital visits so your doctor can check that the drugs are working properly.

Intrathecal chemotherapy

Some people with ALL, and less commonly AML, have leukaemia cells in their spine at the time of diagnosis. In other people, the leukaemia cells spread to the spine after remission. Chemotherapy drugs given intravenously or as

tablets cannot get into the fluid around the spine, so the drugs need to be injected directly into the spinal area using a lumbar puncture. This is called intrathecal chemotherapy. See page 14 for information about a lumbar puncture.

Side effects of chemotherapy

Chemotherapy drugs affect both cancerous cells and healthy fast-dividing cells in your body. This can cause side effects such as digestive problems, nausea, mouth ulcers, headaches, hair loss and fatigue. Side effects vary depending on the types of drugs given, but most are temporary and there are ways to prevent or reduce them.



Check with your doctor before using aspirin, ibuprofen, other pain-killers or any other medicines, including herbal medicines. These can potentially affect how chemotherapy works in your body and may sometimes make side effects worse.

Before treatment, discuss potential side effects and how to manage them with your haematologist. Tell your doctor or nurse about your side effects or anything unusual you experience. They may change or prescribe a break in your treatment, or give you medication to relieve these side effects. The following side effects are common in people who are having treatment for acute leukaemia:

Easy bruising or heavy bleeding from cuts or scrapes –

Chemotherapy can lower the number of platelets in your blood, which means you will bruise and bleed more easily from cuts and scrapes. Women who are menstruating will be given drugs to stop monthly periods and prevent any unnecessary blood loss while platelet counts are low. Your doctor may recommend you have a platelet transfusion during treatment to help elevate your platelet count.

Increased risk of infections – Chemotherapy drugs lower your normal white blood cell count. See opposite page.

Changed bowel habits – The passing of hard, dry bowel movements (constipation) can be caused by chemotherapy and other types of medications prescribed during treatment. Speak to your doctor if you are constipated, as it is important to act early to prevent any potential complications. They may suggest you eat more fibre or prescribe some laxatives.

Fatigue – The level of your red blood cells may drop, causing you to feel tired and breathless (anaemia). You may be given blood transfusions for this. Some people feel tired for weeks or months.

Dental problems – Lowered immunity can cause tooth or gum problems. Have regular dental check-ups, but talk to your haematologist before you have any major dental work.

Hair loss - Hair loss is a common side effect of chemotherapy and is usually temporary. Some people find it better to cut their hair short when it starts to fall out. Wear some form of head covering to avoid being cold and to protect your head from direct sunlight.



Look Good... Feel Better runs free programs for men and women on how to manage the appearance related side-effects of cancer treatments. Call **1800 650 960** or visit www.lgfb.org.au to book into a workshop.

Taking care with infections

When you have chemotherapy, colds and flu may be easier to catch and harder to shake off, and scratches and cuts may get infected easily.

During chemotherapy treatment, it is best to avoid contact with people who may have an infection. You may want to ask people close to you to have a flu shot, if they are able and willing to do so. You should also ask family and friends with a cold or the flu to wait until they are well before visiting. This is not practical for people you live with, so use your commonsense and try to avoid close contact.

You can reduce your risk of infections by washing your hands often, particularly before preparing food and after touching animals. Try to avoid injury, as even small cuts or tears in the skin could be a possible site for infection. Infections in people with

acute leukaemia need urgent attention. Contact your doctor or hospital immediately if you experience:

- a fever over 38°C (keep a thermometer handy to check your temperature)
- chills or constant shivering
- sweating, especially at night
- burning or stinging when urinating
- a new cough or sore throat
- vomiting that lasts more than a few hours
- constipation, diarrhoea or abdominal pain
- unusual bleeding or bruising, such as nosebleeds, blood in your urine or black bowel motions
- prolonged faintness and a rapid heartbeat
- breathlessness
- any sudden deterioration in your health.

Infertility – Some women’s periods become irregular during treatment but return to normal when it finishes. For other women, chemotherapy may cause periods to stop permanently (menopause). Menopausal women can no longer conceive a child naturally. Early menopause may also cause bones to become weaker and break more easily. This is called osteoporosis. In men, chemotherapy may lower the number of sperm produced and reduce their ability to move. This can cause infertility, which may be temporary or permanent. Talk to your doctor about these issues before treatment starts. For information on sexuality and intimacy, see page 36.



For more information on fertility and cancer call **13 11 20** for a copy of *Fertility and Cancer*, or download from www.cancercouncil.com.au.

For more detailed information about chemotherapy and managing other side effects such as nausea, mouth sores and hearing changes, see Cancer Council’s *Understanding Chemotherapy* and *Food and Cancer* booklets, at www.cancercouncil.com.au.

Radiotherapy

Radiotherapy uses x-rays to destroy cancer cells or injure them so they cannot multiply. Radiotherapy is part of treatment for people with ALL and, less commonly, AML. It is usually directed at the brain and also the spine, and may sometimes be given to the whole body in preparation for a transplant. See page 28.

Radiotherapy treatment is painless, but it may cause some side effects. Your radiation oncologist and haematologist will discuss this with you and talk to you about the type of radiotherapy and the number of treatments you will need.

Side effects

Most side effects of radiotherapy are temporary and there are ways to reduce discomfort. The most common side effects are tiredness, dry or itchy skin, and hair loss from your body and head.

For more information about radiotherapy, its side effects and how to manage them, call Cancer Council Helpline 13 11 20 for a free copy of *Understanding Radiotherapy*, or to access an online version visit www.cancercouncil.com.au.

Steroid therapy

Steroids are made naturally in the body and can also be produced artificially. Steroid therapy is often given with chemotherapy to help destroy leukaemia cells, particularly for the treatment of ALL. Steroid tablets are usually taken for a few weeks. However, sometimes steroids can be given for several months.

Side effects

Side effects will vary depending on how long you have to take steroids. Most are temporary and will gradually disappear when you stop taking the drugs. Your medical team will monitor your progress, but if you are concerned about particular side effects talk to your doctor or medical team.

Steroids prescribed for a short time cause few side effects. However, you might find your appetite increases, and you might feel more energetic or have trouble getting to sleep. Some people have mood swings.

Steroids taken for several months may cause fluid retention, weight gain and high blood pressure. This can make your eyelids, face, hands, fingers and feet puffy. The fluid retention may blur your vision and you will be more likely to get infections. Discuss any concerns with your medical team, so that they can help you.

Peripheral blood stem cell or bone marrow transplantation

Stem cells can be collected from the blood stream (peripheral blood stem cell transplant) or directly from the bone marrow (bone marrow transplant). A transplantation may be offered to some people with certain types of acute leukaemia to try to improve the outcome achieved with chemotherapy alone. Your doctor will tell you if a transplant may be helpful for your type of leukaemia.

Transplants are not done at every hospital, so you may have to travel for treatment.



For detailed information about transplants for acute leukaemia, call the Leukaemia Foundation on **1800 620 420** or visit the Australian Bone Marrow Donor Registry website, www.abmdr.org.au.

Transplant types

There are two types of transplants:

- **autologous** – cells are collected from your own body
- **allogeneic** – cells are collected from another person (donor)

The type of transplant recommended for you will depend on a number of factors including:

- the type of leukaemia you have
- your age and general health
- the condition of your bone marrow
- the availability of a suitable donor.

Autologous transplants are rarely used as a treatment for acute leukaemia. In 2012 only nine autologous transplants were performed for the treatment of acute leukaemia in Australia.

Allogeneic transplants are used more often for acute leukaemia, but are not suitable for many patients because of the risks involved and the difficulty finding a compatible donor.

Allogeneic transplant

The allogeneic transplant process is detailed here, but your health care team will explain the process for your individual transplant because it can vary from person to person. An allogeneic stem cell transplant will only be offered if the benefits outway the risks.

There are several stages of treatment and the entire procedure, including recovery, may take many months.

Collecting stem cells

Allogeneic transplants require blood-forming stem cells (immature cells) to be collected from another person's blood or bone marrow. This could be a matched family member or a suitably matched unrelated donor initiated via the Australian Bone Marrow Donor Registry (ABMDR).

If stem cells are collected from the blood, the donor may be given a drug called granulocyte-colony stimulating factor (G-CSF) to help the stem cells multiply quickly and move out of the bone marrow and into the circulating blood. When enough stem cells have been produced, they are collected from a vein. A drip is put into each of the donor's arms. The donor's blood is passed through a machine that separates the blood and collects the excess stem cells. This is a continuous process that can take 2–4 hours. Only about 250 mls of the donor's blood is outside their body at any one time.

Umbilical cord blood

In pregnant women, an umbilical cord connects the mother's body to her baby. The cord is attached to the mother's placenta, which is the structure in the womb (uterus) that links the blood supplies of the mother and baby. The cord and placenta are usually discarded after the birth,

however, this tissue is rich in stem cells. The stem cells can be collected, frozen and stored in tissue banks for later use.

Stem cells from umbilical cord blood are mostly used in children but may sometimes be used in small adults if a suitable donor cannot be found.

If bone marrow is collected, the donor is given a general anaesthetic and a needle is inserted into their pelvic bone to remove the marrow.

Storing the stem cells

Allogeneic stem cells are usually given to you on the day they are collected from the donor. If they are imported from another country or collected at another hospital, they are transported at a set temperature to keep them alive and in a good condition suitable for transplant (viable).

Having chemotherapy or radiotherapy

You will return to hospital when you're ready to begin chemotherapy or whole-body radiotherapy, which aims to destroy any remaining cancer cells in your body, in preparation for the transplant. These treatments will also kill off the blood-forming cells in your bone marrow, making room for new cells to grow.

You will probably experience side effects from the treatments, such as nausea, mouth sores or hair loss. Your blood counts will also be low, making you more at risk of infections.

Transplanting the stem cells

The stem cells are returned to you (infused) through an intravenous drip – similar to a blood transfusion, shortly after they are collected from the donor. This happens a day or so after completing your chemotherapy or whole-body radiotherapy, and depending on the amount of cells collected, can take about an hour to infuse.

Side effects

After the transplant your blood count will be low and you may continue to have side effects. Short-term side effects include an increased risk of infections, bruising and bleeding more easily, and tiredness. You may also develop mouth ulcers, feel like vomiting or have diarrhoea. These side effects are temporary and can be treated.

You'll be monitored carefully for any signs of graft-versus-host disease (GVHD). In GVHD, the donor's cells in the transplanted tissue (the graft) attack your own body tissue (the host), which can cause problems in many of your organs. After the transplant, your doctor will give you drugs to reduce the risk of GVHD and treat the problem if it occurs.



For more information about recovering from a transplant, call the Leukaemia Foundation on **1800 620 420** or Cancer Council Helpline **13 11 20**.

Recovery

The time it takes to recover varies depending on your situation. You can go home from hospital when your white blood count has risen and becomes stable and your general health has improved. If you have had an allogeneic transplant, your GVHD must be controlled.

Ongoing check-ups

After your treatment is over you will have regular outpatient follow-up appointments with your doctor. Your doctor will do blood tests to check your health.

Regular check-ups can help find a recurrence early and this gives you the best chance of getting the disease under control.

Check-ups will continue for several years, but will become less frequent if you have no further problems. Between check-ups, let your doctor know immediately of any health problems.

Palliative treatment

Palliative treatment aims to improve people's quality of life by alleviating symptoms of cancer without trying to cure the disease.

It is particularly important for people with advanced cancer.

However, it is not just for end-of-life care and it can be used at different stages of cancer.

Often treatment is concerned with symptom control and stopping the spread of cancer by using chemotherapy and/or radiotherapy, but it can also involve the management of other physical and emotional symptoms.

For more information, call the Helpline for free printed material on palliative care and advanced cancer, or view them online at www.cancercouncil.com.au.





Key points

- Treatment will depend on what type of acute leukaemia you have. The goal of treatment is to achieve complete remission – this means no detectable leukaemia in your blood or bone marrow.
- You will have treatment with chemotherapy, which is usually given intravenously. If the cancer is in your spine, drugs will be injected into this area.
- Chemotherapy can be given as an intensive treatment (induction chemotherapy), to kill any leftover cancer cells after treatment (consolidation chemotherapy) and in low doses to prolong remission (maintenance chemotherapy).
- Side effects of chemotherapy depend on the drugs you are given. They may include an increased risk of infections, fatigue and changed bowel habits.
- Steroid therapy is sometimes given with chemotherapy to help kill leukaemia cells. Side effects may include an increased appetite, mood swings or trouble sleeping.
- Radiotherapy treats cancer using x-ray beams to kill cancer cells. It is painless but it may cause tiredness, dry or itchy skin, and hair loss.
- Some people have a stem cell transplant. If the stem cells are collected from your own body, it is called an autologous transplant. If the cells are from a donor, it is an allogeneic transplant. Autologous transplants are rarely used to treat acute leukaemia.
- Not everyone is suitable for a stem cell transplant.
- Palliative care is treatment that helps improve a person's quality of life without trying to cure the cancer.



Looking after yourself

Cancer can cause physical and emotional strain. It's important to try to look after your wellbeing as much as possible.

Nutrition – Eating healthy food can help you cope with treatment and side effects. A dietitian can help you manage special dietary needs or eating problems, and choose the best foods for your situation. Call Cancer Council Helpline 13 11 20 for a free copy of the *Nutrition and Cancer* booklet.

Staying active – Physical activity may help to reduce tiredness, improve circulation and elevate mood. The amount and type of exercise you do depends on what you are used to, how you feel, and your doctor's advice. Cancer Council's *Exercise for People Living with Cancer* booklet provides more information about the benefits of exercise, and outlines simple exercises that you may want to try.

Complementary therapies – These therapies are used with conventional medical treatments. You may have therapies such as massage, relaxation and acupuncture to increase your sense of control, decrease stress and anxiety, and improve your mood. Let your doctor know about any therapies you are using or thinking about trying, as some may not be safe or evidence-based.

Alternative therapies are sometimes used instead of conventional medical treatments. These therapies, such as coffee enemas and magnet therapy, can be harmful. For more information, call 13 11 20 for a free copy of the *Understanding Complementary Therapies* booklet or visit your local Cancer Council website.

Relationships with others

Having cancer can affect your relationships with family, friends and colleagues. This may be because cancer is stressful, tiring and upsetting, or as a result of more positive changes to your values, priorities, or outlook on life.

Give yourself time to adjust to what's happening, and do the same for others. People may deal with the cancer in different ways, for example by being overly positive, playing down fears, or keeping a distance. It may be helpful to discuss your feelings with each other.

Sexuality, intimacy and fertility

Cancer can affect your sexuality in physical and emotional ways. The impact of these changes depends on many factors, such as treatment and side effects, your self-confidence, and if you have a partner. Although sexual intercourse may not always be possible, closeness and sharing can still be part of your relationship.

If you are able to have sex, you may be advised to use certain types of contraception to protect your partner or avoid pregnancy for a certain period of time. Your doctor will talk to you about the precautions to take. They will also tell you if treatment will affect your fertility permanently or temporarily. If having children is important to you, talk to your doctor before starting treatment.



Call **13 11 20** for free copies of *Sexuality, Intimacy and Cancer* and *Emotions and Cancer*, or download the booklets from the website.

Life after treatment

For most people, the cancer experience doesn't end on the last day of treatment. Life after cancer treatment can present its own challenges. You may have mixed feelings when treatment ends, and worry if every ache and pain means the cancer is coming back.

Some people say that they feel pressure to return to 'normal life', but they don't want life to return to how it was before cancer. Take some time to adjust to the physical and emotional changes, and re-establish a new daily routine at your own pace.

Cancer Council Helpline 13 11 20 can help you connect with other people who have had cancer, and provide you with information about the emotional and practical aspects of living well after cancer.

Dealing with feelings of sadness

If you have continued feelings of sadness, have trouble getting up in the morning or have lost motivation to do things that previously gave you pleasure, you may be experiencing depression.

This is quite common among people who have had cancer.

Talk to your GP, as counselling or medication – even for a short time – may help. Some

people are able to get a Medicare rebate for sessions with a psychologist. Ask your doctor if you are eligible. Your local Cancer Council may also run a counselling program.

The organisation [beyondblue](http://www.beyondblue.org.au) has information about coping with depression and anxiety.

Go to www.beyondblue.org.au or call **1300 224 636** to order a fact sheet.

Follow-up after treatment

After your treatment, you will need regular check-ups to confirm that the leukaemia hasn't come back. At first check-ups will be every few weeks. They will become less frequent if you have no further problems.

Between follow-up appointments, let your doctor know immediately if you are worried or notice any new symptoms.

At your check-ups the doctor will examine you and samples of blood will be taken to check your general health and blood cell count. Sometimes a bone marrow test will be done to check whether there are any cancer cells in your bone marrow.

Living Well After Cancer program

Living Well After Cancer is a free community education program run by Cancer Council NSW and trained cancer survivors. It is held throughout NSW.

The program includes practical information and open discussion for people who are cancer survivors, their carers, family, friends and work colleagues.

Participants can:

- discuss changes, challenges and opportunities they may face after completing treatment
- connect with others
- share tips and ideas.

Call **1300 200 558** or email **livingwellaftercancer@nswcc.org.au** for more information.

What if the leukaemia returns?

For some people, leukaemia does come back after treatment. This is known as a relapse.

Leukaemia may be found in the bone marrow again, or for those with acute lymphoblastic leukaemia (ALL), in the fluid around the brain and the spinal cord. For men, leukaemia cells may also be found in their testicles. It is important to have regular check-ups because tests done during a check-up may detect a relapse before there are symptoms. Early detection of a relapse offers the best chance for successful treatment.

If you have a relapse, further treatment can be given – usually using a different combination of chemotherapy drugs to those you were given before. This may lead to a second remission. If you did not have a bone marrow or stem cell transplant before, and you meet the criteria, your doctors may recommend a transplant.

“Everyone deals with the uncertainty of relapse in his or her own way. Some people find that keeping busy and setting goals for themselves helps. Fun and laughter can be a good way to lighten your spirits - even a good cry can help sometimes too. It is important however to find someone you feel you can honestly talk to.” *Jerome*



Seeking support

Cancer may cause you to experience a range of emotions, such as fear, sadness, anxiety, anger or frustration. It can also cause practical and financial problems.

Practical and financial help

There are many services that can help you deal with practical or financial problems caused by the cancer. Benefits, pensions and programs can help pay for prescription medicines, transport costs or utility bills. Home care services, aids and appliances can also be arranged to help make life easier.

Ask the hospital social worker which services are available in your local area and if you are eligible to receive them.

If you need legal or financial advice, you should talk to a qualified professional about your situation. Cancer Council offers free legal and financial services in some states and territories for people who can't afford to pay – call 13 11 20 to ask if you are eligible.

Talk to someone who's been there

Coming into contact with other people who have had similar experiences to you can be beneficial. You may feel supported and relieved to know that others understand what you are going through and that you are not alone.

People often feel they can speak openly and share tips with others who have gone through a similar experience.

You may find that you are comfortable talking about your diagnosis and treatment, relationships with friends and family, and hopes and fears for the future. Some people say they can be even more open and honest in these support settings because they aren't trying to protect their loved ones.

Types of support

There are many ways to connect with others for mutual support and to share information. These include:

- **face-to-face support groups** – often held in community centres or hospitals
- **telephone support groups** – facilitated by trained counsellors
- **peer support programs** – match you with someone who has had a similar cancer experience, e.g. Cancer Connect
- **online forums** – such as www.cancerconnections.com.au.

Talk to your nurse, social worker or Cancer Council Helpline about what is available in your area.

“ My family members don't really understand what it's like to have cancer thrown at you, but in my support group, I don't feel like I have to explain. ” *Sam*



Caring for someone with cancer

You may be reading this booklet because you are caring for an adult or a child with cancer. Being a carer can be stressful and cause you anxiety. Try to look after yourself – give yourself some time out and share your worries and concerns with somebody neutral such as a counsellor or your doctor.

Many cancer support groups and cancer education programs are open to carers, as well as people with cancer. Groups and programs can offer valuable opportunities to share experiences and ways of coping.

Support services such as Home Help, Meals on Wheels or visiting nurses can help you in your caring role. There are also many groups and organisations that can provide you with information and support, such as Carers Australia, the national body representing carers in Australia. Carers Australia works with the Carers Associations in each of the states and territories. Phone 1800 242 636 or visit www.carersaustralia.com.au.

You can also call Cancer Council Helpline 13 11 20 to find out more about carers' services and get a free copy of the *Caring for Someone with Cancer* booklet.

Children with acute leukaemia

If your child has been diagnosed with acute leukaemia, the following sections may help you, your child and other family members communicate with each other and cope during this difficult time.

Further information on issues surrounding a child's diagnosis of cancer can be found in the Leukaemia Foundation's booklet *Coping with Childhood Leukaemia* and Cancer Council's book *Cancer in the School Community*. Both available free of charge. Call the Leukaemia Foundation or the Cancer Council Helpline.

Should I tell my child?

It is natural to want to protect your child from the news of the diagnosis, but children often pick up that something is wrong. Your child may not be feeling well or may be seeing the doctor frequently. Talking openly and honestly about the leukaemia will help your child be less anxious and feel a little more in control of the situation. What you tell your child can depend on how old they are and how much they understand.

Newborns, infants and toddlers



Children this young do not understand illness but will react to being separated from you and to changes in routine. They may not be able to talk about it but they often pick up on physical and emotional changes. Toddlers like to have control over their environment.

- Create a familiar environment that can travel with the child, such as their travel cot and favourite blanket and toys.
- Be honest about hospital trips and explain tests that may hurt.
- Give your toddler choices where possible, e.g. "Would you like to wear the red or blue t-shirt to hospital?"



Preschool children, 3–5 years

Children in this age group are beginning to understand the difference between being well and being sick. They often believe their actions can make things happen.

- Assure your child they have not caused the illness by their behaviour or thoughts.
- Explain tests and treatments might hurt, but reassure them that you will be there.



School-age children, 6–12 years

By this age, some children know about cancer, but do not know its causes. They may fill in the gaps with their own theories. They can understand what cancer cells are.

- Be open and truthful so they don't fill in the gaps with their own interpretations.
- Tell the school about your child's cancer, and work with the school to maintain school work when possible.



Teenagers, 13–18 years

Many teenagers have an adult understanding of cancer and often want detailed information. They are starting to separate from the family. This is a vulnerable time, as they don't want to appear different from their peers.

- Encourage teenagers to talk about their feelings but realise they may find it easier to confide in friends, teachers or other trusted people.
- Provide some support and information resources.

Try to keep things normal

One of your child's main needs will be for as many things as possible to stay consistent. It is important to continue to show your love and support. It may help to keep rules and discipline as normal as possible. Although you may be tempted to spoil your child or relax your usual discipline, this can lead to confusion in the long run.

A cancer diagnosis can also be difficult for other children in the family. They may feel left out, as parents are constantly caring for the sick child. Their home routines are disturbed. Try to make time to talk to all your children about how they are feeling.

For more information, call Cancer Council Helpline **13 11 20** for a free copy of *Talking to Kids About Cancer*.



Who is available to help?

There are many resources that may be useful:

- Hospital staff may specialise in working with children (paediatrics) and can offer valuable advice and support.
- Some hospitals and treatment centres employ play therapists, music therapists or art therapists who work with children.
- Several organisations and parents' support groups, i.e. CanTeen, Camp Quality, Redkite and the Leukaemia Foundation offer practical and emotional support for families and children, camps for children and other services. See page 47 for website details.

Bone marrow and blood donations

One way people can offer indirect support to someone with acute leukaemia is by becoming a bone marrow donor or a blood donor.

Bone marrow and blood stem cell donations

Because of the difficulty of finding a match between donors and recipients, allogeneic bone marrow or blood stem cell transplants from unrelated people are rare. Each year only about one in 1500 potential donors in Australia is asked to donate their bone marrow or stem cells.

However, the more donors who are on the registry, the better the chance that a patient will have the opportunity to receive a bone marrow or blood stem cell transplant. As a donor, you cannot choose who your bone marrow is given to.

Siblings are the ideal bone marrow or stem cell donors, but only one patient in three will find a matched donor within their family. Two out of three will rely on a search of a bone marrow registry to find a suitable donor.

For more information see the Australian Bone Marrow Donor Registry website, www.abmdr.org.au.

Blood donations

Many people are able to donate blood throughout the year at the Australian Red Cross Blood Service. Donated blood helps people with cancer who need blood transfusions. To find out more call 13 14 95 or visit www.donateblood.com.au.



Useful websites

The internet has many useful resources, although not all websites are reliable. The websites below are good sources of support and relevant information.

Australian

Australian Bone Marrow Donor Registry	www.abmdr.org.au
Cancer Council NSW	www.cancercouncil.com.au
Cancer Australia	http://canceraustralia.gov.au
Department of Health	www.health.gov.au
healthdirect Australia.....	www.healthdirect.gov.au
beyondblue.....	www.beyondblue.org.au
Cancer Connections.....	www.cancerconnections.com.au
Carers Australia	www.carersaustralia.com.au
Leukaemia Foundation	www.leukaemia.org.au
CanTeen	www.canteen.org.au
Camp Quality.....	www.campquality.org.au
Redkite	www.redkite.org.au
Arrow Bone Marrow Transplant Foundation.....	www.arrow.org.au

International

Leukemia & Lymphoma Society (US)	www.lls.org
Macmillan Cancer Support.....	www.macmillan.org.uk
Cancer Research UK.....	www.cancerresearch.org.uk
American Cancer Society.....	www.cancer.org
National Cancer Institute (US).....	www.cancer.gov



Question checklist

You may find this checklist helpful when thinking about the questions you want to ask your doctor about your disease and treatment. If your doctor gives you answers that you don't understand, ask for clarification.

- What type of acute leukaemia do I have?
- What tests do I need?
- What treatment do you recommend and why?
- Are there other treatment choices for me? If not, why not?
- What are the risks and possible side effects of each treatment?
- How long will treatment take? Will I have to stay in hospital?
- Will I have a lot of pain with the treatment? What will be done about this?
- How long will treatment take? How much will it affect what I can do?
- What happens if I do nothing?
- Will the treatment affect my fertility?
- Will the treatment affect my sex life?
- What happens if the leukaemia comes back?
- How frequently will I need check-ups after treatment?
- Are there any clinical trials or research studies I could join?
- Are there any complementary therapies that might help me?
- How much will treatment cost? How can the cost be reduced?



Glossary

acute leukaemia

A fast-growing cancer that causes large numbers of white blood cells, known as blast cells, to be produced and enter the bloodstream.

acute lymphoblastic leukaemia (ALL)

A fast-growing leukaemia in which too many immature white blood cells from the lymphoid family (called lymphoblasts) are in the blood and bone marrow. Also called acute lymphatic leukaemia.

acute myeloid leukaemia (AML)

A fast-growing leukaemia in which too many immature white blood cells from the myeloid family (called myeloblasts) are in the blood and bone marrow.

acute promyelocytic leukaemia (APML)

A type of AML accounting for about 10% of all acute myeloid leukaemias. APML is treated differently to other types of AML and generally has the best prognosis.

allogeneic transplant

A transplant where stem cells or bone marrow are taken from one person and given to another.

anaemia

Deficiency in the number or quality of red blood cells in the body.

autologous transplant

A transplant where healthy stem cells are taken from a person's body and reimplanted into their body.

biopsy

The removal of a small sample of

tissue from the body, for examination under a microscope, to help diagnose a disease.

blast cells

Immature white blood cells belonging to two families: myeloid and lymphoid. Blast cells are called myeloblasts in the myeloid family and lymphoblasts in the lymphoid family.

bone marrow

The soft, spongy material inside bones. Bone marrow contains stem cells that produce red blood cells, white blood cells and platelets.

bone marrow biopsy

The removal of a small amount of bone marrow with a needle for examination under a microscope.

bone marrow transplantation

A procedure to replace bone marrow destroyed by high doses of chemotherapy treatment with healthy bone marrow.

cells

The basic building blocks of the body. A human is made of billions of cells that are adapted for different functions.

central venous access device (CVAD)

A thin plastic device inserted into a vein. The CVAD gives access to a vein so blood or chemotherapy can be given and blood can be taken.

chemotherapy

The use of cytotoxic drugs to treat cancer by killing cancer cells or slowing the rate of their growth.

graft-versus-host disease (GVHD)

A possible complication of allogeneic bone marrow transplant. The immune system in the person receiving the tissue (the graft) attacks the cells in the recipient's body (the host).

granulocyte-colony stimulating factor (G-CSF)

A protein that helps increase the number and function of certain white blood cells called neutrophils, which help fight infection in the bone marrow.

haematologist

A doctor who specialises in studying and treating diseases of the blood, bone marrow and lymphatic system.

intrathecal chemotherapy

Chemotherapy drugs that are injected into the fluid-filled space around the spinal cord.

intravenous (IV)

Within a vein. Intravenous medications are administered directly into the vein using a central venous access device.

leukaemia

A cancer of blood-forming cells, usually causing large numbers of white blood cells to be made.

lumbar puncture

A test in which a needle is inserted into the base of the spine to collect fluid for testing or to inject drugs for treatment.

lymph nodes

Small, bean-shaped structures that form part of the lymphatic system. Also called lymph glands.

lymphatic system

A network of tissues, capillaries, vessels, ducts and nodes that removes excess fluid from tissues, absorbs fatty acids and transports fat, and produces immune cells.

lymphocyte

A type of white blood cell that helps fight infection.

lymphoid

One of the two groups of white blood cells. The lymphoid family only produces white blood cells.

myeloid

One of the two groups of white blood cells. The myeloid family produces some white blood cells, red blood cells and platelets.

palliative treatment

Symptom management for people with advanced cancer to help them manage physical and emotional aspects of cancer.

petechiae

Small red or purple spots on the skin or mouth, a symptom of leukaemia.

plasma

The clear fluid part of the blood that carries blood cells.

platelets

One of three types of cells found in the blood. These help the blood to clot and stop bleeding. Also called thrombocytes.

prognosis

The likely outcome of a person's disease.

radiation oncologist

A doctor who specialises in treating cancer with radiotherapy.

radiotherapy

The use of radiation, usually x-rays or gamma rays, to kill cancer cells or injure them so they cannot grow and multiply.

recurrent cancer

A cancer that grows from cells of the primary cancer that have resisted treatment, or cancer that has spread to another part of the body.

red blood cells

One of three types of cells found in the blood. They carry oxygen around the body. Also called erythrocytes.

relapse

The return of a disease after a period of remission.

remission

When the symptoms and signs of the cancer reduce or disappear. A partial remission is when there has been a significant improvement in the cancer. A complete remission is when there is no evidence of active disease. This does not necessarily mean that the cancer is cured.

side effect

Unintended effect of a drug or treatment.

spleen

An organ in the lymphatic system located on the left side of the abdomen under the ribs. The spleen produces lymphocytes, filters the blood, stores blood cells, and destroys old blood cells.

stem cells

Early-stage cells from which mature cells develop. Stem cells are found in the bone marrow.

tissue

A collection of cells that make up a part of the body.

white blood cells

One of three types of cells found in the blood. They help fight infection. Types of white blood cells include neutrophils, lymphocytes and monocytes. Also called leucocytes.

Can't find what you're looking for?

For more cancer-related words, visit www.cancercouncil.com.au/words or www.cancervic.org.au/glossary.



How you can help

At Cancer Council we're dedicated to improving cancer control. As well as funding millions of dollars in cancer research every year, we advocate for the highest quality care for cancer patients and their families. We create cancer-smart communities by educating people about cancer, its prevention and early detection. We offer a range of practical and support services for people and families affected by cancer. All these programs would not be possible without community support, great and small.

Join a Cancer Council event: Join one of our community fundraising events such as Daffodil Day, Australia's Biggest Morning Tea, Relay For Life, Girls Night In and Pink Ribbon Day, or hold your own fundraiser or become a volunteer.

Make a donation: Any gift, large or small, makes a meaningful contribution to our work in supporting people with cancer and their families now and in the future.

Buy Cancer Council sun protection products: Every purchase helps you prevent cancer and contribute financially to our goals.

Help us speak out for a cancer-smart community: We are a leading advocate for cancer prevention and improved patient services. You can help us speak out on important cancer issues and help us improve cancer awareness by living and promoting a cancer-smart lifestyle.

Join a research study: Cancer Council funds and carries out research investigating the causes, management, outcomes and impacts of different cancers. You may be able to join a study.

To find out more about how you, your family and friends can help, please call your local Cancer Council.



Cancer Council Helpline 13 11 20

Cancer Council Helpline is a telephone information service provided by Cancer Council NSW for people affected by cancer.

For the cost of a local call (except from mobiles), you can talk confidentially with oncology health professionals about any concerns. Helpline consultants can send you information and put you in touch with services in your area. If you need information in a language other than English, an interpreting service is available.

You can call the Helpline, Monday to Friday, 9am to 5pm.

If you have difficulty communicating over the phone, contact the National Relay Service (www.relayservice.com.au) to help you communicate with a Cancer Council Helpline consultant.

For more information, go to www.cancercouncil.com.au.

Regional offices

Metro Sydney

Woolloomooloo
02 9334 1600

Crows Nest
02 9334 1600

Greater Western Sydney

Parramatta
02 9354 2000

Casula
02 9354 2000

Penrith
9354 2000

Hunter Central Coast

Charlestown
02 4923 0700

Erina
02 4336 4500

Singleton
02 6571 2899

Northern

Byron Bay
02 6639 1300

Tamworth
02 6763 0900

Coffs Harbour
02 6659 8400

Lismore
02 6629 4396

Southern

North Wollongong
02 4223 0200

Bega
02 6492 1805

Western

Wagga Wagga
02 6937 2600

Orange
02 6392 0800



Cancer Council
Helpline

13 11 20

For support and information on cancer and cancer-related issues, call Cancer Council Helpline. This is a confidential service.

For further information and details please visit our website: www.cancerCouncil.com.au