

Dictionary of Terms



our mission is to care, our vision is to cure

Introduction

This booklet has been written to help you and your family or whanāu understand many of the medical terms you may encounter.

If you or someone you care for has been diagnosed with a blood cancer or condition, you may be feeling anxious or a little overwhelmed. This is normal. Perhaps you have already started treatment or you are discussing different treatment options with your doctor and your family. Whatever point you are at, we hope that the information contained in this booklet is useful in answering some of your questions. It may raise other questions, which you should discuss with your doctor or specialist nurse.

Some people may require more information than is contained in this booklet. We have included some internet addresses that you might find useful. In addition, many of you will receive written information from the doctors and nurses at your treatment centre.

There is a range of disease-specific information booklets available from Leukaemia & Blood Cancer New Zealand (LBC). These are available from your treatment centre or by contacting (LBC) using the contact details on the back of this booklet.

It is not LBC's intention to recommend any particular form of treatment to you. You need to discuss your circumstances at all times with your doctor and treatment team.

We hope that you find this booklet useful. There is a feedback form in the back of this booklet, please feel free to fill this in and return it to us to assist in the production of future editions.

Acknowledgements

Leukaemia & Blood Cancer New Zealand of New Zealand acknowledges the support of the Leukaemia Foundation of Australia for granting us permission to use material within this booklet.

Leukaemia & Blood Cancer New Zealand also gratefully acknowledges Dr Annette Neylon (Dunedin Hospital) for her assistance with the development of this booklet.



Leukaemia & Blood Cancer New Zealand is grateful to Farmers Trading Company for supporting the production of this booklet

Leukaemia & Blood Cancer New Zealand

Leukaemia & Blood Cancer New Zealand (LBC) is the only organisation in New Zealand dedicated to supporting patients and their families living with leukaemia, lymphoma, myeloma and related blood conditions.

Since 1977, our work has been made possible through our fundraising events and the generous support we receive from individuals, companies, trusts and grants. We do not receive government funding.

LBC manages the New Zealand Bone Marrow Donor Registry (NZBMDR), which works towards finding matched volunteer donors from New Zealand or overseas for New Zealand patients who need a bone marrow or stem cell transplant and who do not have a family donor. The registry maintains information on New Zealand donors and has access to a worldwide database of over 20 million donors.

Patient Support

Leukaemia & Blood Cancer New Zealand's Support Services provide personalised support programmes for patients and their families. This can include regular visits, phone or email contact, as well as face to face education and support programmes, and an online information forum. We also provide a toll free number for advice and support.

Research

Research plays a critical role in building a greater understanding of blood cancers and conditions. LBC supports and funds investigation into these conditions. Improved treatments for patients can lead to less side effects and increased survival rates.

Information

We provide vital information to patients, families, health professionals and the community to improve understanding about blood cancers and conditions.



Awareness

We work to increase public knowledge of blood cancers and conditions. This is achieved through specifically focused campaigns for the public, health professionals and health agencies.

Advocacy

We represent the needs of patients and their families to the government, related agencies and other relevant organisations.

Contacting us

Leukaemia & Blood Cancer New Zealand provides services and support throughout New Zealand. Each person's experience of living with a blood cancer or condition is different. Living with leukaemia, lymphoma, myeloma or a related blood condition is not easy, but you do not have to do it alone.

Call **0800 15 10 15** to speak to a local Support Services Coordinator or to find out more about the services offered by Leukaemia & Blood Cancer New Zealand. Alternatively, contact us via email by sending a message to info@leukaemia.org.nz or by visiting www.leukaemia.org.nz.

We welcome visitors to our offices in Auckland, Wellington and Christchurch. Please phone for an appointment.



List of abbreviations

ALL	Acute lymphoblastic leukaemia	EEG	Electroencephalogram
AML	Acute myeloid leukaemia	ESR	Erythrocyte sedimentation rate
APML	Acute promyelocytic leukaemia	ET	Essential thrombocythaemia
ATG	Anti-thymocyte globulin	FNA	Fine needle aspiration
BJP	Bence-Jones protein	GCSF	Granulocyte-colony stimulating factor
BMT	Bone marrow transplant	GvHD	Graft versus host disease
CNS	Central nervous system	GvL	Graft versus leukaemia
CSF	Cerebrospinal fluid	HL	Hodgkin lymphoma
CLL	Chronic lymphocytic leukaemia	HLA	Human leukocyte antigen
CML	Chronic myeloid leukaemia	HTLV	Human T-cell lymphotropic virus
CMML	Chronic myelomonocytic leukaemia	INR	International normalised ratio
CMV	Cytomegalovirus	IM	Intramuscular injection
CSA	Cyclosporin acid	IT	Intrathecal injection
CT/CAT scan	Computer assisted tomography	ITP	Immune-mediated thrombocytopaenia purpura
CVC/CVAD	Central venous catheter/central venous access device	IV	Intravenous injection/infusion
DNA	Deoxyribonucleic acid	MDS	Myelodysplastic syndromes
DVT	Deep vein thrombosis	MGUS	Monoclonal gammopathy of uncertain significance
ECG	Electrocardiogram	MLC	Mixed lymphocyte culture
		MPD	Myeloproliferative disorders

MRI	Magnetic resonance imaging
MUD	Matched unrelated donor
NHL	Non-Hodgkin lymphoma
NMAT	Non-myeloablative transplant
PCR	Polymerase chain reaction
PCV	Packed cell volume
PET scan	Positron emission tomography
PICC line	Peripherally inserted central catheter
PNH	Paroxysmal nocturnal haemoglobinuria
PV	Polycythaemia vera
RIC	Reduced intensity chemotherapy
RNA	Ribonucleic acid
SLE	Systemic lupus erythmatosus
TBI	Total body irradiation
VWD	Von Willebrand disease
ZIG	Zoster immune globulin

Ablative therapy

High dose chemotherapy or radiotherapy aimed at destroying any residual cancer cells but which at the same time destroys the patient's own bone marrow, and therefore requires a stem cell transplant to restore normal blood production.

Acute

Often means that an illness is of short duration, possibly rapidly progressive, and in need of urgent treatment.

Acute leukaemia

A rapidly progressing cancer of the blood. Usually of sudden onset and characterised by the uncontrolled growth of immature blood cells which take over the bone marrow and spill into the bloodstream. If left untreated, acute leukaemia may be fatal within a few weeks or months.

Acute lymphoblastic leukaemia (ALL)

A rapidly progressing cancer of the blood affecting the type of white blood cells that produce lymphocytes. This, the most common form of childhood leukaemia, also occurs in adults.

Acute myeloid leukaemia (AML)

A rapidly progressing cancer of the blood affecting immature cells of the bone marrow, which normally produce neutrophils, red cells and platelets. AML is more common in adults than in children.

Acute promyelocytic leukaemia (APML)

A variant of acute myeloid leukaemia in which promyelocytes (cells of intermediate maturity) are increased in the marrow. This subtype is often associated with increased bleeding problems. Treatment includes retinoic acid (related to vitamin A) in addition to conventional chemotherapy. Also known as promyelocytic leukaemia (PML).

Adjuvant therapy

A treatment that is added to the primary treatment to increase its effectiveness. This may be chemotherapy or radiation therapy. Adjuvant usually means 'in addition to' initial treatment.

Adenosine deaminase inhibitors

Drugs used in the treatment of chronic lymphocytic leukaemia and lymphoma that act mainly by inhibiting the production of DNA in the lymphoid cells. Drugs of this type include cladribine, fludarabine and pentostatin.

Aetiology

The factors that contribute to a disease developing, for example, environmental factors such as infections and radiation. An example is "the aetiology of some leukaemias is benzene exposure" (Spelled 'etiology' in the USA).

Alkylating agent

A type of chemotherapy drug that interact with genetic material (DNA) to prevent division of the cells. Drugs of this type include busulphan, chlorambucil, cyclophosphamide, and melphalan.

Allogeneic stem cell or bone marrow transplant

Transplant using stem cells or bone marrow collected from a matched healthy donor, usually a brother or sister.

Allopurinol

A drug used to prevent high levels of uric acid in the body, including the increase caused by certain cancer medications. High levels of uric acid may cause gout attacks, kidney stones or renal failure. It is taken by mouth.

Alopecia

Loss of hair. Usually temporary when due to chemotherapy or radiotherapy treatment.

Amyloidosis

A disorder that results from the abnormal deposition of a particular protein (called amyloid) in various tissues of the body. Amyloid protein can be deposited in a localised area, and not be harmful, or can cause serious changes in several organs of the body (such as the heart, kidney etc.). Amyloidosis can be secondary to myeloma or can occur on its own (primary amyloidosis).

Anaemia

Deficiency of red blood cells which results in a reduced level of the oxygen carrying pigment haemoglobin in the blood. Causes pale skin, tiredness and other symptoms such as shortness of breath.

Anorexia

Loss of appetite.

Anthracyclines

A group of chemotherapy drugs used in leukaemia therapy to prevent cell division by disrupting the structure of DNA. Drugs of this type include daunorubicin, doxorubicin (adriamycin), epirubicin, and idarubicin.

Antibiotics

Drugs that kill or stop the growth of bacteria, for example, penicillin.

Antibodies

Naturally produced proteins in the blood that destroy or neutralise specific toxins or infections such as viruses. They are produced by white blood cells known as lymphocytes when the body is exposed to these agents. They form an important part of the body's defence system against infection. Auto-antibodies or antibodies that attack the patient's own tissues are produced in auto-immune disorders such as ITP.

Antiemetic

A drug to prevent or alleviate nausea and vomiting that can sometimes be a side effect of chemotherapy. Drugs of this type include metoclopramide (Maxolon) and ondansetron (Zofran).

Anti-thymocyte globulin (ATG)

A protein obtained by immunising horses or rabbits with human white cells called lymphocytes, to make antibodies. These are collected from the animals and purified into ATG which is most commonly used to treat aplastic anaemia. ATG temporarily suppresses the immune system thus allowing the bone marrow to recover.

Antigen

Any substance (usually a protein), including those on the surface of a foreign body such as a virus or bacteria, that stimulates an immune response, such as the formation of an antibody or the activation of specific cells.

Antihistamines

Drugs given to reduce histamine levels which are produced in some allergic reactions. Drugs of this type include phenegan.

Antimetabolites

A group of chemotherapy drugs that prevents cells growing and dividing by blocking the chemical reactions required to produce DNA. Drugs of this type include mercaptopurine, azathioprine, thioguanine, and methotrexate.

Apheresis

Method of collecting blood via an intravenous catheter into an apheresis machine. The blood is then separated into its liquid and cellular components. The cells required are collected and unneeded blood components are infused back into the donor. Used for collecting platelets, plasma and stem cells, can also be used therapeutically to remove leucocytes.

Aplasia

The lack of development of the products of an organ or tissue e.g. bone marrow aplasia (known as aplastic anaemia), red cell aplasia.

Aplastic anaemia

A rare disorder characterised by the failure of the bone marrow to produce blood cells (as opposed to leukaemia where cells are produced but do not mature). Although this may occur as an inherited condition (see 'Fanconi anaemia'), more often the exact cause is not known, but can be due to immune damage to the marrow. It can lead to a severe shortage of all types of blood cells, causing tiredness, susceptibility to infection and serious problems with bleeding. It may be treated by anti-thymocyte globulin (ATG) infusions or a stem cell transplant.

Apoptosis

A form of cell death in which a programmed sequence of events leads to the death of cells. Apoptosis plays a crucial role in developing and maintaining health by eliminating old, unnecessary and unhealthy cells.

Audiogram

A hearing test charted for different frequencies. Is useful for the early detection of deafness from various causes including drug toxicity to the eardrum.

Auto-immune disease

A disease caused by an individual's immune system producing antibodies against their own tissues (known as auto-antibodies). Examples include some haemolytic anaemias, rheumatoid arthritis and systemic lupus erythematosus (SLE or Lupus). To cause disease, the type of produced antibody must have an adverse effect in the body (in contrast to some antibodies which are normal or which do not cause disease).

Autologous stem cell or bone marrow transplant

Transplant using stem cells or bone marrow collected from the patient's own blood or bone marrow that has been collected and stored after remission-inducing treatment. Because there are no problems with tissue matching this type of procedure has less risk than an allogeneic transplant and may be offered to all ages, including patients in their sixties and sometimes seventies.

B-cell (B-lymphocyte)

A type of normal white blood cell involved in the production of antibodies to combat infection. The mature B-cell is often called a plasma cell. Tumours of mature B-cells can occur – these include B-cell lymphomas and myeloma.

Bacteria

Microscopic organisms which cause many infections, for example pneumonia. The reduced ability of patients to fight infections following chemotherapy or a stem cell transplant. Sometimes results in serious illness caused by normally harmless bacteria on the skin or in the mouth.

Basophil

A type of white blood cell involved in allergic and inflammatory reactions, normally present in low numbers in the blood. They are called basophils because the granules in the cell can be stained by a basic dye which allows them to be easily recognised under the microscope.

Basophilia

An increase in the number of basophils in the blood.

BCR-ABL gene

See 'Philadelphia (Ph) chromosome'.

Bence-Jones protein (BJP)

A protein found in the urine of many patients with myeloma. BJP is the light chain part of the antibody produced by the myeloma cells. It can be used to help in the diagnosis of the disease and is measured in the urine to monitor treatment. BJP is a small molecule that can potentially damage the kidneys. See 'serum free light chain assay'.

Benign

Non-cancerous. Such a growth may or may not need to be surgically removed. This depends on its size and position.

Benzene

Liquid hydrocarbon which is widely used as a solvent, also a natural part of crude oil, gasoline and cigarette smoke. Benzene exposure is a known risk factor for leukaemia.

Biopsy

A small sample of fresh tissue, for example lymph node or bone marrow, removed for laboratory analysis to establish the exact diagnosis, or to monitor treatment response.

Bisphosphonates

Drugs used to prevent or treat high calcium levels in cancer. They are also very useful in strengthening bones in breast cancer and myeloma to prevent fractures and pain. Drugs of this type include pamidronate and zoledronate.

Blast cells

Immature marrow cells that normally represent up to five per cent of cells in the bone marrow. They mature to replenish and produce the normal cells in the bone marrow and eventually the blood. Blast cells are not normally found in healthy peripheral blood. In acute leukaemia, there is an accumulation of abnormal blast cells that can take over the bone marrow and often spill out into the bloodstream.

Blast crisis

The phase of a chronic condition which has transformed into an acute condition. For example, when chronic myeloid leukaemia progresses to acute leukaemia. This can result in a very high number of immature, abnormal white blood cells (blasts) in the bone marrow and blood.

Blinded trial

A study in which participants do not know which treatment they are getting. In a double blinded trial, neither the participant nor the treating doctor knows which treatment the participant is receiving.

Blood cells

There are three main types of cells in the bloodstream – the red blood cell which carries oxygen, the white blood cell which fights infection, and the platelet which helps prevent bleeding.

Blood count

A routine blood test that measures the number and type of cells circulating in the blood. Also known as a full blood count (FBC) or a complete blood count (CBC).

Blood disease

This is a misleading term, because although diseases are often found in the blood, they usually originate from the bone marrow, where the blood cells are produced. Diseases are classified by their cell of origin. For example, lymphoma, from the lymphatic system.

Bone marrow

The tissue that is found within the hollow cavities of most of the bones of the body. In children these include the arms and the legs, but the red marrow regresses centrally from the limbs in adult life and is replaced by non-functional fatty marrow. Red bone marrow contains stem cells from which all blood cells originate.

Bone marrow biopsy

A procedure to collect a sample of the bone marrow. This is usually from the back of the hip bone, or occasionally from the breastbone (sternum). This procedure is often done under local anaesthetic with or without light sedation and incorporates either or both of the following:

Aspirate - A procedure that involves removing (or aspirating) a small sample of bone marrow fluid for examination in the laboratory.

Trephine - A procedure that involves removing a small core of bone and bone marrow for examination in the laboratory.

Bone marrow transplant (BMT)

Also called a stem cell transplant, this is used in the treatment of a variety of bone marrow disorders including leukaemia, lymphoma and myeloma. The patient receives very high doses of chemotherapy and/or radiotherapy to treat the disease. This destroys the bone marrow and makes the blood counts fall. Replacement stem cells are taken from the bone marrow of a matched donor (allogeneic stem cell transplant) and returned to the patient through a vein (or central venous line) in a similar way to a blood transfusion. See also 'stem cell transplant'.

Brachytherapy

A means of delivering radiotherapy directly to a tumour by an implanted tube. It avoids the use of external beams of radiation and often allows stronger local treatment without an increase in toxicity to surrounding organs.

Burkitt lymphoma

A rapidly growing type of non-Hodgkin lymphoma, first described in Africa where it may present as a cancer of the facial bones. However, it primarily affects lymph nodes in the abdomen and the bone marrow. Burkitt lymphoma requires immediate treatment and may present as a type of leukaemia (Burkitt leukaemia).

Cancer

Disease caused by abnormal cells growing in an uncontrolled fashion, creating a tumour, invading nearby tissues and/or spreading through the blood and lymph systems. Also called malignant disease or neoplasia. Cancer causes problems such as the release of chemicals from the cells, direct pressure or infiltration of organs such as the lungs, or loss of normal cellular functions such as the production of blood cells.

Candida

A type of yeast infection or fungus that grows out of control in moist skin areas of the body, such as the mouth or vagina. It is usually the result of a weakened immune system but can be a side effect of chemotherapy, treatment with antibiotics or diabetes. Also called 'thrush'.

Cannula

A plastic tube inserted into a vein, usually in the hand or arm, to allow fluid to enter the blood circulation, such as an intravenous (IV) infusion.

Carcinogen

A substance that may have the ability to cause developing cells to become cancerous. For example, the relationship between tobacco and lung cancer. In many cancers, and in many patients, a specific carcinogen is not known.

Carcinogenesis

The development of cancer.

Cardiac

Related to the heart.

Catheter

A hollow tube inserted into organs of the body for instilling or removing gases or liquids. For example, a urinary catheter is used to remove urine from the bladder.

CD34 cells

Number allocated to a protein cell marker found on the outside of stem cells used in transplants. A 'CD34 count' is used to measure the number of this type of stem cell available for collection from a patient or donor prior to collection.

Cell biology

The study of the structure, composition and function of cells.

Cell markers

Usually proteins or antigens on the cell surface that distinguish and discriminate between different cell types. Cell markers are like flags stuck to the outside of a cell which can be analysed in the laboratory using special stains or fluorescent tagged antibodies. Such tests are critical in diagnosing leukaemia and lymphoma.

Cells

The individual units from which tissues of the body are formed, not visible to the naked eye, but can be seen under microscope.

Central nervous system (CNS)

The brain and spinal cord.

Central nervous system (CNS) leukaemia

Invasion of the brain, central nervous system, or spinal cord by leukaemic cells. This can often be diagnosed by examination of cerebrospinal fluid obtained by a lumbar puncture.

Central venous line/catheter (CVC)

Also known as a central venous access device (CVAD). A plastic tube inserted through the skin into a major blood vessel in the chest or neck. It is used for patients undergoing intensive therapy and provides a route for taking blood samples and administering drugs and other treatments without repeated needle punctures into the patient's arm. It may have one or multiple tubes (called lumens). Different manufacturing companies produce these devices - examples include the Groshong catheter, Hickman catheter, Apheresis catheter and the Portacath.

Cerebrospinal fluid (CSF)

Fluid that surrounds and protects the brain and spinal cord. Samples can be obtained by lumbar puncture, and chemotherapy also can be injected by the same route to prevent or treat some blood diseases that can invade the central nervous system, such as acute lymphoblastic leukaemia.

Cerebrum

The thinking part of the brain.

Chemotherapy

Treatment using anti-cancer drugs. These may be used on their own or in combination to kill or prevent the growth and division of cells. Although aimed at the cancer cells, chemotherapy often affects rapidly dividing normal cells such as those in the scalp and gut, causing hair loss and nausea in some instances. These side effects are usually temporary, reversible and can be minimised by other means such as using anti-nausea drugs. Some newer drugs are more specific to cancer cells and therefore less toxic to other cells in the body. An example is imatinib (Glivec), which is used to treat chronic myeloid leukaemia (CML) and rituximab (Mabthera) used to treat diseases including non-Hodgkin lymphoma.

Chemotherapy cycle

Chemotherapy is usually given in cycles, with chemotherapy drugs given for a predetermined number of days, followed by a recovery period. The purpose of the recovery period between cycles of chemotherapy drugs is to allow the recovery of the normal cells in the bone marrow, i.e. the red blood cells, white blood cells and platelets before giving further chemotherapy to eradicate remaining cancer cells.

Chromosomes

Chromosomes contain the genetic code compactly packaged, and are visible under the microscope when a cell divides. Chromosomes carry the 100,000 genes that provide the inherited blueprint of each individual. In humans there are normally 23 pairs contained in the nucleus of each cell. Alterations in the number or organisation of the chromosomes may play a key role in the development of cancer.

Chronic

Comes from the Greek word *chronos*, and means lasting a long time.

Chronic leukaemia

A persistent cancer of the blood, usually of gradual onset and generally of slow progression. May be diagnosed by chance following a routine blood test and before clinical symptoms appear. In chronic leukaemia, the cells are more mature than acute leukaemia cells.

Chronic lymphocytic leukaemia (CLL)

A slowly progressive form of cancer of the blood in which too many lymphocytes (a type of white blood cell) are produced by the bone marrow and by the lymphatic system. People may live with this condition for many years before needing treatment, or between treatment cycles.

Chronic myeloid leukaemia (CML)

A leukaemia that is initially slow progressing, in which a large number of abnormal mature granular white cells (mainly neutrophils) circulate in the blood. May transform into acute leukaemia. With the advent of targeted therapies such as Glivec, many patients remain in the chronic phase for many years. Also called chronic granulocytic leukaemia (CGL).

Chronic myelomonocytic leukaemia (CMML)

Classified as a myelodysplastic/myeloproliferative bone marrow disease, CMML is characterised by an increase in the number of circulating white blood cells known as monocytes. Patients may develop problems with infection or bleeding and in some cases CMML transforms or progresses to acute leukaemia. More common in older people.

Clinical trial

A controlled and carefully monitored assessment of new forms of treatment subject to ethical approval. Trials can vary in design and size from small-scale trials of experimental treatments to large international trials that compare subtle variations in current therapies. Patients will be informed and will always be given the option to join or not, without detriment to their usual treatment if they decline to participate. Likewise, patients can opt out of a clinical trial at any time.

Clone

A population of genetically identical cells arising from a single parent cell. Leukaemia is believed to be a clonal disease, that is, all the leukaemia cells in a patient may have originated from one abnormal cell.

Clotting factors

A group of biochemical components (factors I to XIII), which are made in the blood and interact to make blood clot when needed.

Coagulation

Clotting of the blood. A complex reaction depending on a series of clotting factors and platelets in the blood resulting in a fibrin plug or clot.

Combination chemotherapy

Combination therapy utilises two or more chemotherapy drugs that target the cancer cells by different actions. This approach produces a greater cell kill, possibly more tolerable side effects and decreases the possibility of tumour drug resistance.

Complete remission

Anti-cancer treatment has been successful in that so much of the disease has been destroyed that it can no longer be detected. In people with leukaemia this means that the proportion of blast cells present in the circulating blood has vastly decreased and the blood count has returned to normal.

Computer assisted tomography (CT scan/CAT scan)

A body scanning or imaging technique using x-rays that produces a series of detailed three dimensional (3D) images of cross sections of the body.

Congenital

A term used to describe deformities or diseases that are present at the time of birth.

Consolidation treatment

A course of treatment with anti-cancer drugs given to the patient while in remission with the aim of killing any remaining cancerous cells.

Cord blood

Cord blood is found in the umbilical cord and the placenta. This is a valuable source of stem cells for patients undergoing allogeneic stem cell transplants. These can be frozen and stored for future use by the donor or a matched recipient.

Corticosteroids (steroids)

A group of synthetic hormones including prednisone, prednisolone, methylprednisolone and dexamethasone used in the treatment of some leukaemias, lymphomas, auto-immune conditions and other marrow diseases, and also to suppress graft rejection and graft versus host disease following bone marrow or stem cell transplant. Side effects may include an increased risk of infection, hypertension, high blood glucose levels, weight gain, and sometimes thinning of the bones (osteoporosis) with longer term use.

Cure

This means that there is no evidence of disease and no sign of the disease reappearing. In practical terms the absence of symptoms (being cancer free) for five years after treatment is considered a cure for many different types of blood cancers.

Cyclosporin acid (CSA)

A drug used to prevent and treat rejection and graft versus host disease in bone marrow or stem cell transplant patients by suppressing the normal immune system. Also used in aplastic anaemia and other auto-immune conditions.

Cyto

Referring to cells.

Cytogenetics

The study of the structure of chromosomes. Cytogenetic tests are carried out on samples of blood and bone marrow taken from leukaemia patients to detect chromosomal abnormalities associated with the disease. These tests help in the diagnosis and selection of optimal treatment.

Cytokines

Chemicals excreted by the cells in the immune system to communicate with other cells during the coordination of the body's immune response.

Cytomegalovirus (CMV)

A virus, usually harmless in healthy people, which may cause serious infection in immuno-suppressed patients. This can be particularly dangerous following a bone marrow transplant.

Cytopenia

A reduction in the number of cells circulating in the blood.

Cytoplasm

The cellular substance outside the nucleus of each cell.

Cytotoxic drugs

Anti-cancer drugs that act by killing or preventing the division of cells.

Deep vein thrombosis (DVT)

A blood clot in a deep vein, usually in the thigh or calf.

Deletion

A chromosome abnormality in which a part of the chromosome has been lost.

Dendritic cells

Cells of bone marrow origin which present antigens from foreign agents to the immune cells to allow the development of immunity. These cells may one day be used in therapy to enhance the immune system against cancers.

Deoxyribonucleic acid (DNA)

Molecules found in the nucleus of the cell that carry all the genetic information for the body. There are four different chemical compounds of DNA (bases) arranged in coded sequences called genes, which determine an individual's inherited characteristics.

Depletion

A laboratory procedure for reducing the number of specific cell types within bone marrow donated for transplantation; for example, the removal of some types of lymphocytes to avoid rejection or graft versus host disease (particularly in unrelated donor transplants).

Desferrioxamine

A drug which chelates or binds body iron, used to help rid the body of excess iron as a consequence of repeated red blood cell transfusions or in conditions such as thalassemia.

Diagnosis

The identification and naming of a person's disease.

Diaphragm

The layer of muscle under the ribs that divides the stomach and the abdomen from the chest cavity, and assists with breathing.

Differentiation

The gradual maturation (ageing) of a cell usually associated with increased function and specialisation. Leukaemic cells are poorly differentiated, that is, they show immature features. When a cell is differentiated (such as a red blood cell), it is usually unable to divide, and has a specific function.

Disease progression

Disease advancement, or worsening, despite treatment.

Disseminated disease

Spread of cancerous cells from the tissue of origin into other organs or other parts of the body.

Diuretic

A drug to increase the production of urine by the kidneys. These are sometimes used during chemotherapy or with a blood transfusion to prevent fluid overload, to treat heart or kidney failure, or to increase kidney flow.

Donor lymphocyte infusion

The giving of lymphocytes from the donor of an allogeneic stem cell transplant. This is sometimes used to treat disease that has relapsed following a stem cell transplant.

Echocardiogram (echo)

Ultrasound scan of the heart.

Electrocardiogram (ECG)

Electrical trace of the heart.

Electroencephalogram (EEG)

Electrical brain recording.

Electrolytes

Various salts in the blood especially sodium and potassium.

Embolus

Something that travels through the blood stream, lodges in a blood vessel and blocks it. Examples include detached blood clots, clumped bacteria, amniotic fluid and air.

Engraftment

The process by which transplanted or transfused cells (for example, after a bone marrow transplant) begin to grow and reproduce themselves within the recipient.

Enzymes

Proteins that control the chemical reactions essential for life, without being destroyed or altered upon completion of the reactions. Every cell contains many enzymes that control its functions.

Eosinophil

A type of white blood cell involved in inflammatory, allergic or anti-parasitic responses. Called an eosinophil as the cells take up acidic (eosinophilic) staining dyes. Usually present in the circulating blood in very low numbers.

Eosinophilia

Increased numbers of eosinophils circulating in the blood. This occurs in some cases of Hodgkin lymphoma, drug reactions, asthma, hay fever and parasitic infections.

Epidemiology

The science of studying the occurrence of disease in populations and relating this to genetic and/or environmental causes.

Epstein Barr virus

A common virus which causes glandular fever, and is also strongly associated with some cases of Burkitt lymphoma and Hodgkin lymphoma. Epstein and Barr are the two people who first described this virus.

Erythrocyte sedimentation rate (ESR)

A blood test that detects and monitors inflammation in the body. Measurement of the rate at which red blood cells fall to the bottom of the test tube. ESR increases in inflammation and infection and in diseases where antibodies are increased, such as myeloma. An abnormal ESR may indicate certain forms of cancer, auto-immune disease or infection.

Erythroleukaemia

A rare cancer of the blood affecting the progenitors (or erythroblasts) of red blood cells. Acute erythroleukaemia is a subtype of acute myeloid leukaemia.

Essential thrombocythemia (ET)

A condition caused by abnormal marrow growth (myeloproliferative disorder) resulting in the production of large numbers of platelets. Symptoms may include bleeding, blood clots and enlargement of the spleen. Treatment varies according to the severity of the disease and age of the patient.

Exterior beam

Delivering radiotherapy by beaming radiation through the skin as opposed to brachytherapy.

Extra-nodal lymphoma

A lymphoma that presents outside the lymph nodes, in tissues containing lymphocytes. A term used when describing the extent and site(s) of disease.

Factor V leiden

A genetic mutation of a blood coagulation (clotting) factor that carries an increased risk of venous thromboembolism (the formation of clots in the veins).

Fanconi anaemia (FA)

A rare inherited type of aplastic anaemia where the cells of the body have an increased sensitivity to chemotherapy. FA carries an increased risk to the patient of developing leukaemia and other tumours. The marrow aplasia can be treated by a stem cell transplant.

Febrile

Having a fever or a high temperature above the normal baseline (37 degrees celsius).

Ferritin

The major iron storage protein in the body. The blood level of ferritin serves as an indicator of the amount of iron stored in the body. Ferritin is reduced in iron deficiency anaemia, and can be grossly increased in untreated haemochromatosis.

Fine needle aspiration (FNA)

Removal of a small piece of tissue or fluid from a suspicious mass in the body using a hypodermic needle and syringe. The tissue is then microscopically examined and tested for cancer and other cells.

Folic acid

A vitamin necessary for marrow cell growth obtained from green leafy vegetables, such as spinach. Folic acid is essential for the production of DNA and therefore the growth and division of cells. Also known as folate.

Folic acid antagonist

A chemical which inhibits a cell's capacity to use folic acid and so prevents cell division. An example is methotrexate which is used to treat some leukaemias and auto-immune diseases, such as rheumatoid arthritis.

Fungus

An infective agent such as a mould or yeast (includes candida and aspergillus), which can cause clinical problems in immuno-suppressed patients. These are usually larger than bacteria. Treatment of fungal infections require different drugs which are not as easy to use as bacterial antibiotics.

Gallium scan

A way of looking at the spread of lymphoma by injecting a dye that is taken up by active lymph glands. This test can be used to stage non-Hodgkin lymphoma and Hodgkin lymphoma, and to detect areas of occult infection.

Gamma-globulin

A concentrated solution of the antibody fraction of human blood given usually through a vein to prevent or fight infections by providing passive immunity, Gamma-globulins are purified and sterilised from donated blood donations.

Generic drug

This is the chemical or scientific name for a particular drug, such as aspirin or paracetamol. Each drug company will also add a trade name to the drug, such as Cartia or Solprin (examples of aspirin) or Panadol (a brand of paracetamol). There may be differences in the costs and pharmaceutical benefits of different brands. Any changes in the type of drug that you are dispensed should be discussed with the pharmacist or your doctor.

Genes

Collection of DNA on a chromosome, present in the nucleus of the cell. Genes which direct the cell activity and functions, are responsible for the inherited characteristics that distinguish one individual from another. Each person has an estimated 100,000 separate genes.

Genome

The total set of genes carried by an individual or cell.

Grade

A term used to describe how aggressive a disease is.

Graft rejection

May occur following transplantation where the transplanted donor cells fail to grow within the recipient's bone marrow.

Graft versus host disease (GvHD)

A common and sometimes serious complication of allogeneic transplants, whereby the donor's immune cells try to reject the patient's own cells as foreign. The skin, liver and gut are commonly affected organs. There are acute and chronic forms of GvHD, which can be treated by immunosuppressive drugs. GvHD can sometimes cause death following transplant, but in those who survive, relapse is less common.

Graft versus leukaemia (GvL)

Cells either identical to or similar to the cells that cause GvHD (usually mature T-lymphocytes) can suppress the recipient's leukaemia. Much effort is being expended in trying to separate cells responsible for GvL from those which cause GvHD in the hope of reducing the risks of transplantation without losing efficacy.

Granulocyte

A type of white blood cell containing granules in its cytoplasm. The three subtypes, neutrophils, eosinophils and basophils, protect the body against infection by seeking out and killing micro-organisms. Mature neutrophils known as segmented neutrophils are the body's most important protection from bacteria.

Groshong catheter

A form of central venous line/catheter.

Growth factors and cytokines

A complex family of proteins produced by the body to control growth, division and maturation of blood cells by the bone marrow. Synthetic growth factors may be given to stimulate normal cell production following chemotherapy or transplantation. G-CSF (granulocyte-colony stimulating factor) is a growth factor which stimulates the production of neutrophils.

Growth hormone

A hormone secreted by the pituitary gland in the brain which controls growth and is particularly important during adolescence. Radiotherapy given to the head and neck of children may lead to a deficiency and thus impaired growth. This deficiency can be replaced by intramuscular injections of synthetic growth hormone.

Haem-

Referring to the blood and bone marrow. (Spelled 'hem-' in USA; for example 'hematologist; hemoglobin').

Haematologist

A specialist doctor who diagnoses and treats diseases of the blood and bone marrow. These diseases may be malignant such as leukaemia and lymphoma, or non-malignant such as inherited blood disorders like haemophilia and thalassemia.

Haematology

The study of diseases of the blood and bone marrow.

Haematoma

A localised collection of blood, usually clotted, in an organ, space or tissue. Due to a break in the wall of a blood vessel, usually after trauma.

Haemochromatosis

An inherited disorder where the individual absorbs increased amounts of iron from the intestine. The excess storage of iron in certain organs such as the liver, pancreas and heart, can cause disease. This iron overload can be treated by venesection.

Haemoglobin

The iron containing pigment in red blood cells, which carries oxygen around the body. A lack of haemoglobin is defined as anaemia, and an increase as polycythaemia. Normal haemoglobin levels vary with age and sex.

Haemolysis

The destruction of red blood cells which leads to the release of haemoglobin from within the red blood cell into the blood plasma.

Haemophilia

A group of inherited disorders in which the ability of the blood to clot is impaired because of a deficiency of one of the clotting factors. The two most common forms of the disorder are haemophilia A (classic haemophilia due to factor VIII deficiency) and haemophilia B (factor IX deficiency or Christmas disease).

Haemopoiesis or haematopoiesis

Term used to describe the growth of cells maturing from very primitive (stem) cells through to fully developed and functional blood cells.

Haemorrhage

Technical name for bleeding, can occur inside the body (internal), as well as outside the body (external).

Hairy cell leukaemia

A rare leukaemia distantly related to chronic lymphocytic leukaemia, characterised by abnormal cells with hair-like projections. This condition occurs in middle age and onwards. Treatment may involve removal of the spleen or treatment with one of the drugs that can control the disease, especially 2-chlorodeoxyadenosine (CDA) which usually induces a sustained remission.

Heparin

A naturally occurring anticoagulant and drug used to decrease blood clotting. It is used to treat blood clots by preventing any increase or extension in clotting, while the body's own anticoagulation system clears the formed clots. Small amounts of heparin are also flushed into a central venous line in a patient to stop clots forming in the line.

Hepatitis

Inflammation of the liver from a number of causes including viral infections, chemicals, drugs and auto-immune conditions.

Hepatomegaly

Enlargement of the liver.

Hickman catheter

A type of central venous line/catheter.

High dose therapy

The use of higher than normal doses of chemotherapy.

Histology

The investigation of tissue samples by chemical and microscopic analysis.

Hodgkin lymphoma (HL)

A type of lymphoma named after Dr Thomas Hodgkin, an English physician and pathologist who first described the disease in the 19th century. Also known as Hodgkin's lymphoma or Hodgkin's disease.

Human immunodeficiency virus (HIV)

The virus that causes AIDS (acquired immune deficiency syndrome).

Human leucocyte antigens (HLA)

A complex family of genetically inherited proteins which are found on the surface of cells throughout the body. HLA antigens must be matched between patient and potential donor(s) in transplantation. HLA factors are inherited from both parents, and the chance of having the same HLA type between brothers and sisters is one in four. HLA types are inherited differently from red blood cell types.

Human T-cell lymphotropic virus (HTLV)

A group of viruses which invade helper/inducer T-lymphocytes and are associated with adult T-cell leukaemia which is found primarily in Japan and the Caribbean. The family also includes the AIDS causing virus, HIV.

Hypercalcaemia

Elevated level of calcium in the blood. This can occur in a number of cancers, especially myeloma, where the tumour cells secrete chemicals which increase the resorption of bone. Hypercalcaemia can lead to constipation, confusion, dehydration and renal failure and abnormal heart rhythms. One form of treatment is with a group of drugs called bisphosphonates.

Iatrogenic disease

A disease produced as a consequence of medical or surgical treatment. Many drug treatments have recognised risks which need to be monitored. Side effects of leukaemia drugs often include a low white count and an infection risk. Haematologists try and reserve such treatments for situations where the risks to life or health outweigh the risk of non-treatment.

Idiopathic

A term applied to conditions indicating that the cause in this situation or individual is unknown.

Immune-mediated thrombocytopenia purpura (ITP)

A rare disorder characterised by thrombocytopenia or a low platelet count as a result of increased destruction of platelets by antibodies that can result in bruising and spontaneous bleeding. ITP may present in either an acute short-lived form, or persist as a chronic disorder. The cause is sometimes known (associated with an auto-immune disorder, a drug reaction or viral infection etc.), but many cases are idiopathic, especially in adults. Treatments include immunosuppressive drugs, splenectomy, and platelet transfusions on occasions.

Immune response

The reaction of the body to a foreign antigen (for example, an infectious agent), or to the tissues of another individual (as in the rejection of an organ transplant).

Immune system

The cells and tissues that make up the body's defence mechanism against infection and disease.

Immunocompromised

Lowered immune function, can be due to disease or treatment side effects.

Immunodeficiency

Impaired ability of the body's defence mechanisms to combat infections by bacteria, viruses and fungi. This can also result in impaired resistance to cancer.

Immunoglobulins

Proteins in the blood plasma known as antibodies play an important part in controlling infections. Purified immunoglobulins from blood donors (such as Intragam P) are used as treatment to prevent or treat infections.

Immunophenotyping

Specialised laboratory test used to detect markers on the surface of cells. These markers identify the origin of the cell.

Immunosuppression

A reduction in the body's defence mechanisms. Deliberate immunosuppression is a necessary part of the transplant procedure to allow engraftment and to prevent graft versus host disease. Immunosuppression is also used to treat other diseases such as rheumatoid arthritis and ITP.

Immunosuppressive drug

A drug which inhibits the body's normal immune responses. Examples include cyclosporin, azathioprine, tacrolimus and prednisone.

Immunotherapy

Treatment of disease by stimulating the body's own immune system. This is a type of therapy currently being researched as a treatment for cancer.

Indolent

Slow growing.

Informed consent

A form that a person signs to indicate that they understand the information they have been given about the treatment or trial and agree to take part.

Infusion

The giving of antibiotics, blood transfusions, anti-cancer drugs or nutrients into a patient's vein over a period of time.

Intensification

Increasing the amount, number or combination of anti-cancer drugs given to a patient in an attempt to kill aggressive, drug-resistant or residual malignant cells.

Interferon

A family of proteins derived from human cells which normally have a role in fighting viral infections. Purified interferons, are used to treat some leukaemias and lymphomas, as well as other conditions such as chronic hepatitis B infection.

International normalised ratio (INR)

A comparative rating of a patient's prothrombin time (PT) ratio. Used as a standard for monitoring warfarin treatment.

Intramuscular injection (IM)

Injection into a muscle.

Intrathecal injection (IT)

Injection of drugs into the spinal fluid to prevent or treat brain or central nervous system (CNS) leukaemia or lymphoma, or to treat meningitis. The space between the brain and spinal cord and their coverings is known as the intrathecal space.

Intravenous (IV)

Into a vein; this route is used to inject antibiotics, chemotherapy and other drugs, blood products and fluids quickly as a bolus, or slowly as an infusion.

In vitro

Within a glass, e.g. observable in a test tube.

In vivo

Within the living body.

Karyotype

The complete set of chromosomes. The term is used especially for the display prepared from photographs of chromosomes arranged in pairs. This allows a check of their number, form and structure. This can give valuable information to aid in the diagnosis of certain bone marrow conditions especially leukaemias.

Laparoscopy

An operation done through a small key-hole through the skin, often assisted by camera views. Spleens and gall bladders are often removed using this technique.

Laparotomy

An operation in which the abdominal cavity is opened. This is sometimes required to remove a diseased organ (such as an inflamed appendix or enlarged spleen).

Late effects

Side effects of chemotherapy and/or radiotherapy which only become apparent with long-term monitoring of the patient over a period of years. These are of particular concern in children treated before puberty.

Leucocytes

Collective term for white blood cells. Leuco = white, cyte = cell.

Leucopenia

The reduction in the number of white cells in the blood below the normal range. When the white cell count is very low, there is an increased risk of infections.

Leukaemia

Cancer of the blood and bone marrow characterised by the widespread, uncontrolled production of large numbers of abnormal and/or immature blood cells. These cells crowd the bone marrow and spill out into the bloodstream.

Leukaemic blasts

Abnormal blast cells which multiply in an uncontrolled manner, crowding out the bone marrow and preventing it from producing normal blood cells. These abnormal cells also spill out into the blood stream and can accumulate in other organs.

Leukaemogenesis

The generation or development of leukaemia.

Leucopheresis

A type of apheresis during which blood is collected into a machine, the white blood cells are removed, and the other cells and plasma are returned to the patient. This is used to reduce an abnormally high white cell count in emergencies or when chemotherapy is to be avoided, such as during pregnancy.

Lineage

Term used to describe cell families with a common ancestry that develop from the same type of immature cell, for example, erythroid lineage refers to cells that include red cells and their progenitors; lymphoid lineage refers to immature and mature lymphocytes.

Localised disease

Disease that is confined to a small area or areas of the body.

Long-term survival

Term used to describe the survival of leukaemia patients who have been disease-free for a prolonged period of time - usually at least five years. The chance of the disease returning (relapse) decreases with time.

Low grade

Slow growing.

Lumbar puncture

A procedure for removing cerebrospinal fluid from around the spinal cord using a fine needle in the lower part of the back. Samples are analysed for evidence of infection or CNS leukaemia. Also used to administer anti-cancer drugs either to prevent or treat CNS disease.

Lupus anticoagulant

An antibody is produced by the body that interferes with blood coagulation and can lead to thrombosis. This antibody can occur spontaneously or in certain diseases such as SLE.

Lymph

The almost colourless fluid in the lymphatic system, which transports lymphocytes around the body.

Lymph nodes

Tissue structures found throughout the body in the neck, groin, armpit and abdomen, which contain both mature and immature lymphocytes. These can be enlarged in infections or cancers, especially lymphomas. Also known as lymph glands.

Lymphatic system

Term used to describe the spleen, lymph nodes and areas of lymph tissue involved in the immune response of the body.

Lymphocyte

A type of white blood cell which is involved in the immune defences of the body. There are two main groups – B-cells (which make antibodies) and T-cells (involved in cell-to-cell defence).

Lymphoid

Refers to the lymphatic system including lymphocytes, lymph nodes and lymphatic channels.

Lymphoma

A cancer of lymphatic cells which originates from the uncontrolled cancerous proliferation of lymphocytes. This can be nodal in lymph nodes, or extranodal in the spleen, the bone marrow and other tissues. This general term includes over 40 different forms classified into two main categories: Hodgkin lymphoma and non-Hodgkin lymphoma. The treatment and outcome is very dependent on the sub-type, the grade and extent of the disease.

Lymphoproliferation

An increase in the production of lymphocytes. This may occur as a normal response to infection (an example is the Epstein Barr virus which causes glandular fever and the whooping cough virus, pertussis) or as a consequence of a lymphoproliferative disorder such as a lymphoma or chronic lymphocytic leukaemia.

Macroglobulinaemia

A condition in which the blood contains high levels of antibodies from the IgM subclass, which are large proteins or macroglobulins. The blood viscosity increases causing reduced blood flow especially through small blood vessels. The most common cause is a condition related to lymphoma and myeloma, called Waldenstrom's macroglobulinemia, where clonal cancerous lymphoid cells make the abnormal antibody.

Macrophage

A type of white blood cell which migrates from the blood into tissues and acts as a scavenger, ingesting particles such as bacteria and cells coated with antibodies.

Magnetic resonance imaging (MRI)

A body scanning or imaging technique which uses a magnetic field and radiation waves to produce very clear and detailed three dimensional (3D) images of internal organs and structures.

Maintenance treatment

Treatment given for a period of months or years to maintain remission and eliminate or suppress any residual leukaemic cells in the body, especially used in the treatment of acute lymphoblastic leukaemia.

Malignancy

A term applied to tumours characterised by uncontrolled proliferation of cells. See 'cancer'.

Matched unrelated donor (MUD) transplant

A type of allogeneic stem cell or bone marrow transplant where the donor is not related to the patient, but has a similarly matched tissue type. Also called voluntary unrelated donor (VUD) transplant.

Mediastinum

The central part of the chest surrounded by the lungs and heart which contains the thymus gland, lymph glands and blood vessels.

Medical Research Council

Government funded body in the United Kingdom coordinating clinical trials. Patients in New Zealand are often invited to participate in the international trials coordinated by the Medical Research Council.

Megakaryocyte

A large cell in the bone marrow that produces platelets by maturing and fragmenting into a number of discrete small cells.

Metastatic cancer

Cancer that has spread from an original or primary site. This happens when cancer cells in the primary tumour break away and travel through the lymph system or blood stream to another part of the body where they can multiply forming new growths, known as metastases.

Mixed lymphocyte culture (MLC)

A matching test for donor and patient prior to transplantation. This involves the mixing of patient and potential donor cells in a test tube and measuring their activity or ability to fight or react to one another.

Mobilisation

A process using drugs and growth factors by which increased numbers of stem cells are produced which then overflow out of the bone marrow into the blood stream ready for collection via apheresis. This is done to collect adequate numbers of stem cells for transplantation.

Monoclonal antibodies

Highly specific antibodies produced by cells grown in the laboratory. These are used in the diagnosis and treatment of blood conditions, to treat some diseases, and to remove cells from bone marrow prior to transplantation. An example is rituximab (MabThera) for treatment of some kinds of lymphoma.

Monoclonal gammopathy of uncertain significance (MGUS)

Condition where a low level of a monoclonal protein, produced by mature B-cells, is detected. Requires long term occasional monitoring as a small percentage may progress to develop myeloma.

Monocyte

A type of white cell or macrophage of the blood of a relatively large size which acts as a scavenger and ingests large particles. The number of these cells is increased in some conditions such as tuberculosis and becomes cancerous in other conditions such as acute monocytic leukaemia or chronic myelomonocytic leukaemia.

Monocytic leukaemia

Cancer of the bone marrow due to growth or proliferation of cells of the monocyte series, usually a subtype of acute myeloid leukaemia called acute monocytic leukaemia (M5).

Monosomy

Term which indicates the loss of a whole chromosome, such as monosomy 7. Each person usually carries 46 chromosomes (23 pairs), but in monosomy there is a reduction to 45.

Mucositis

Inflammation of the lining of the mouth and throat which can also extend to the lining of the whole gastrointestinal tract (stomach and intestines).

Multiple myeloma

See 'myeloma'.

Mutation

A minute change to the DNA code, caused (for example) by exposure to hazardous chemicals or copying errors during cell division. Some mutations can affect normal cell function leading to disease development and can be inherited by the next generation.

Myeloblasts

Immature stem cells of the myeloid series, which arise from primitive stem cells and develop into mature granulocytes and monocytes.

Myeloma

A cancer caused by uncontrolled growth or proliferation of plasma cells which make antibodies in the bone marrow. The abnormal cells also secrete chemicals which cause thinning of the bones, resulting sometimes in fractures after a trivial accident. The abnormal antibody in the blood and the high calcium from the bone disease can cause kidney malfunction. This condition is rarely curable, but can be controlled often for several years with a range of treatments including chemotherapy, radiotherapy, transplantation and other anti-cancer drugs. Also known as multiple myeloma.

Myelodysplastic syndromes (MDS)

Also known as myelodysplasia. A group of closely linked conditions in which the process of blood cell formation is disturbed by a failure of the immature cells to grow and develop normally. Unlike acute leukaemia, myelodysplasia is associated with some cell growth beyond the blast or stem cell stage. These conditions often lead to a failure of one or more of the bone marrow cell lineages, resulting in anaemia, neutropenia and/or thrombocytopenia. There is also an increased risk of leukaemia which varies from subtype to subtype. Treatment involves supportive therapy such as blood transfusions, and sometimes chemotherapy depending on the sub-type. Younger patients are sometimes treated with an allogeneic stem cell transplant.

Myelofibrosis

A myeloproliferative disorder in which the bone marrow taken over by fibrous tissue is not able to produce adequate numbers of mature blood cells. In this condition, the spleen gradually becomes enlarged.

Myeloid

The collective term for the non-lymphocyte groups of blood cells, usually including cells from the red cell, granulocyte, monocyte and platelet families or cell lineages.

Myeloproliferative disorders (MPD)

A group of disorders characterised by the over-production of blood cells by the bone marrow, normally without impairment in maturity. One or more of the cell lineages – red, white, platelet, support tissue, may be involved and treatment varies according to the type and severity of the disease. Includes polycythaemia vera, essential thrombocythaemia and myelofibrosis.

Nadir

The point at which the white blood cell count is at the lowest after chemotherapy (the point at which the patient is at a greater risk of infection).

Neuropathy

Damage to nerves, usually of hands and feet. This is seen in some diseases such as diabetes, but can also occur as a side effect of treatment with some drugs such as vincristine or thalidomide.

Neutropenia

Reduction in the blood neutrophil count. This may be caused by bone marrow disease, infection, auto-immune disorders, vitamin B12 or folate deficiency, or by high dose chemotherapy. The normal adult range is $>2.0 \times 10^9/L$, less than this is considered neutropenic and if $<0.5 \times 10^9/L$, the patient is considered severely neutropenic and is at high risk of infection.

Neutrophil

This is the most common type of cell within the granulocyte group of white blood cells and are responsible for fighting bacterial infections.

Non-Hodgkin lymphoma (NHL)

A group of lymphomas that differ from Hodgkin lymphoma in the histological appearance down the microscope. Lymphomas, classified either as low grade/indolent (slow growing), intermediate grade or high grade/aggressive (rapidly growing), are treated in a variety of ways depending on the subtype and age of the patient.

Non-myeloablative transplant (NMAT)

Term used to describe a type of stem cell or bone marrow transplant where lower dosages of chemotherapy and/or radiotherapy are used than those in a standard transplant and the patient's bone marrow is not totally eradicated prior to receiving the donor cells.

Nucleus

The central body of a cell that contains the chromosomes which have the genetic codes that control the cell's activities.

Oncogenes

Genes with the potential to cause cancer.

Oncologist

A specialist doctor who diagnoses and treats cancers, usually those other than diseases of the bone marrow, such as breast, lung, prostate.

Osteoporosis

A condition that is characterised by a thinning of the bones with a reduction in bone mass, due to depletion of calcium and bone protein. This can occur from bone marrow diseases, but there are other risk factors such as smoking, lack of exercise, poor diets, familial causes and some drugs notably steroids.

Packed cell volume (PCV)

Measurement of the proportion of the blood occupied by the red blood cells when packed down in a test tube. Normal values are 40-50% in males, and 35-47% in females. The remaining blood volume is plasma.

Palliative care

Treatment aimed at relieving symptoms, pain and improving quality of life, if possible. This type of treatment is given to all patients, often in addition to other treatment aimed at reducing the cancer size or disease activity. Patients with advanced disease receive palliative care to relieve pain and other symptoms, even when curative treatment is no longer an option.

Pancytopenia

Reduced numbers of all types of blood cells.

Paraprotein

Monoclonal antibody protein produced by mature B cells (usually plasma cells). Abnormal accumulation of paraproteins are usually associated with diseases such as myeloma, Waldenstrom's macroglobulinemia or lymphoma. Some individuals however can have a low level of a monoclonal protein which never progresses to a disease; this type of protein, called monoclonal gammopathy of uncertain significance (MGUS) often needs long term occasional monitoring.

Paroxysmal nocturnal haemoglobinuria (PNH)

A rare disorder characterised by an increased rate of breakdown of red blood cells and reduced production of white blood cells and platelets. This leads to excretion of haemoglobin in the urine, particularly at night. The severity of the disease is variable. PNH is caused by a defect in the formation of a red cell surface protein anchor. The subsequent loss of proteins from the cell surface results in increased cell destruction.

Partial remission

The disease has responded to treatment but remains detectable.

Pathogenesis

The process of disease development.

Pathologist

A doctor who specialises in the laboratory diagnosis and investigation of diseases.

Peripheral blood stem cells

Stem cells which have spilled over from the bone marrow to the blood stream and are circulating in the blood throughout the body.

Peripherally inserted central catheter (PICC line)

A form of a central intravenous long line, which is a narrow plastic tube inserted into and threaded up a vein of the arm. This is used in patients undergoing intensive therapy for the administration of drugs, transfusions and other treatment and may also be used for taking blood samples.

Pernicious anaemia

An autoimmune disease of the stomach which leads to reduced absorption of vitamin B12 in the small bowel. Vitamin B12 is required by the bone marrow to make blood cells – patients with severe deficiency can have anaemia, pancytopenia and/or thrombocytopenia and/or nerve damage. Treated by regular intramuscular vitamin B12 injections. There are other causes of vitamin B12 deficiency such as bowel disease.

Petechiae

Small red or purple pinhead spots in the skin or mucous membrane (such as the lining of the mouth). These are small bleeds and usually occur when the platelet count is very low. Smaller in size than purpura.

Pharmacokinetics

The study of the action of a drug in the body over a period of time, including the absorption, metabolism and excretion.

Phenotype

An individual's anatomical structure, physiology and behaviour under a particular set of environmental factors, regardless of the actual genotype or inherited genes. For example, in haemochromatosis, patients with the same gene mutation can have varying degrees of iron overload and organ damage; or the differences that can occur in identical twins. Also used to describe the characteristics of a cell or tissue.

Philadelphia (Ph) chromosome

An abnormal chromosome that is present in almost all cases of chronic myeloid leukaemia and some cases of acute lymphoblastic leukaemia. It is formed when part of chromosome 9 (the abl gene) is translocated to chromosome 22 (the bcr gene). This translocation t(9;22) produces a new gene bcr-abl and can be measured with PCR testing. Named Philadelphia after the city in which it was first described.

Plasma

The yellow fluid component of the blood in which the cells are suspended. This contains soluble substances such as glucose, fats, hormones, clotting factors, for distribution around the body.

Plasma cells

Large B-cells derived from mature lymphocytes. Not normally found in circulating blood but restricted to bone marrow and lymph nodes where they make antibodies. The cancer of the plasma cells is known as myeloma.

Plasma cell leukaemia

Immature plasma cells are found circulating in the blood. This can occur in advanced myeloma.

Plasmacytoma

When myeloma cells (abnormal plasma cells) collect in one location forming a single tumour they are called a plasmacytoma. May form in the bones/bone marrow or may be extramedullary (in tissues outside of the bone marrow).

Plasmapheresis

The removal of plasma from the blood via apheresis. The blood goes through an apheresis machine, which extracts the plasma, separating it from the other blood cells. These blood cells are then returned to the donor.

Plateau phase

Refers to a stable stage of disease in myeloma following a good response to anti-cancer treatment, where the myeloma although not cured is not growing or progressing. Patients in plateau phase may not always need treatment.

Platelets

Type of blood cells produced in the bone marrow, which circulate in the blood playing an important role in the prevention and immediate control of bleeding.

Pneumocystis

Pneumocystis jiroveci is a fungus that causes pneumocystis pneumonia (PCP). PCP can occur in immunosuppressed individuals, including those that have been receiving certain types of chemotherapy, such as transplant patients. Some patients will be prescribed trimethoprim-sulfamethoxazole (cotrimoxazole) tablets to prevent this infection.

Polycythaemia vera (PV)

A non-malignant myeloproliferative disease characterised by the over-production of red blood cells by the bone marrow. Patients are at an increased risk of clotting due to excessive numbers of red blood cells in the circulating blood. Treatment usually includes the removal of red cells by blood letting (known as venesection) combined with medication to suppress marrow production of cells to prevent the blood clotting. This condition carries a small risk of developing into acute leukaemia. Also known as polycythaemia rubra vera.

Polymerase chain reaction (PCR)

Type of cytogenetic blood test looking at molecular changes in a cell's DNA. Used in the diagnosis and monitoring of conditions such as bcr-abl levels in chronic myeloid leukaemia.

Portacath

A form of central venous line with a reservoir implanted under the skin in the chest or abdomen. This is used in patients undergoing intensive therapy and provides a route for taking blood samples and administering drugs, transfusions and other treatment.

Positron emission tomography (PET scan)

Type of scan or imaging technique in which a small amount of radioactive glucose is injected into a vein, which highlights cancerous tissues when the patient is scanned. It is also able to detect smaller sized tumours than CT scans, and is particularly useful in detecting the disease state of some types of lymphoma.

Pre-leukaemia

A general term referring to some cancerous blood disorders, such as some types of myelodysplasia or smouldering leukaemia, which carry an increased risk to the patient of developing acute leukaemia.

Progenitor cell (Precursor cell)

Immature cell in the bone marrow which has the potential to develop into a functioning mature blood cell.

Proliferation

Growing and increasing in number.

Prolymphocytic leukaemia

An aggressive variant of chronic lymphocytic leukaemia in which the malignant lymphoid cells are more immature. This disease can be treated with removal of the spleen, and/or chemotherapy and/or radiotherapy.

Prognosis

An assessment of the likely progression of disease, particularly concerning the chances of cure, complete recovery or likely years of survival.

Prophylaxis

Precautionary treatment given with the aim of preventing an event occurring. Examples include an antibiotic to prevent infection, or a heparin injection to prevent clotting after certain types of surgery.

Protocol

A schedule of treatment which defines the number, frequency and timing of administration of medications, procedures and tests. May refer to a clinical trial, chemotherapy or stem cell transplant schedule.

Pulmonary

Of the lungs.

Purging

The laboratory treatment of bone marrow harvested from a patient for an autologous bone marrow stem cell transplant with the aim of removing any residual leukaemic or tumour cells with the aim of reducing the chance of relapse.

Purpura

A small bleed (up to about 1cm in diameter) in the skin or a mucous membrane (such as the lining of the mouth), which may be caused by a shortage of platelets, clotting factors or because of trauma.

Quality of life

A measure of how your disease and its treatment is affecting you and your ability to carry out your normal daily activities.

Radiation

Energy that is radiated or transmitted in the form of rays or waves of particles.

Radiation field

The area of the body to which the radiation therapy is targeted.

Radiation therapy

Also known as radiotherapy. High-energy rays are used to damage cancer cells and stop them from growing and dividing. This can be very effective, particularly in lymphoma and myeloma. Side effects vary according to the dose and site of treatment and are discussed with the patient when such treatment is being planned. Radiation can be administered by an external beam (the usual type), by an internally placed tube (brachytherapy), or by an implant (a small container of radioactive material) placed directly into or near the tumour.

Radiologist

A doctor who specialises in the treatment of cancer by radiation therapy. Calculates the dose and location of treatment.

Radiology

The use of x-rays in the diagnosis of a disease.

Radiotherapist

Also known as a Medical Radiation Therapist (MRT). Specially trained to administer radiation therapy treatment.

Randomised trial

A scientific study where patients are randomly allocated to one or two or more therapies to test effectiveness and toxicity. The type of treatment is sometimes blinded, meaning that the patient and their doctors do not know who is receiving which form of treatment. These trials are regularly reviewed by investigators, coordinators and ethics committees and if at any time one treatment option is found to be superior, future patients are usually likely to receive that therapy. Such studies are very important in patients with leukaemia and other blood conditions, as many diseases are relatively rare and the best type of treatment is unknown or is still to be identified.

Recombinant DNA technology

A collection of experimental procedures that allow molecular biologists to splice a DNA fragment from one organism into DNA from another organism and to clone the new recombinant DNA molecule. It includes the development and application of particular molecular techniques, such as biotechnology or genetic engineering. This technology is used in the production of antibiotics, growth factors and other medical agents used in the diagnosis and treatment of certain genetic diseases.

Red blood cells

The cells of the blood containing haemoglobin which carries oxygen from the lungs to all the tissues of the body. Low haemoglobin is called anaemia. Sometimes referred to as 'red cells'.

Red cell aplasia

Refers to a type of anaemia which arises when the red blood cell precursors in the bone marrow are nearly absent, leading to the low production of red blood cells. This is usually caused by an underlying autoimmune disorder, sometimes in association with a thymoma although there are other causes such as an infection called the parvovirus, and some drugs. White cells and platelets are usually not affected.

Reduced intensity conditioning (RIC) transplant

Refers to a type of stem cell or bone marrow transplant in which reduced dosages of chemotherapy are used in the pre-transplant conditioning treatment.

Reed-Sternberg cell

A giant, abnormal cell with several nuclei that is present in the cells of Hodgkin lymphoma. The identification of this cell helps the pathologist to make the diagnosis.

Refractory anaemia

A subtype of myelodysplastic syndrome which primarily affects bone marrow red cell production. In some cases the developing red cells which have a ring of iron granules around the nucleus and are called ringed sideroblasts. Refractory anaemia (RA), refractory anaemia with ringed sideroblasts (RARS), and refractory anaemia with excess blasts (RAEB) are all types of myelodysplastic syndromes.

Relapse

The recurrence of disease in the bone marrow or other organs after a remission has been achieved. In leukaemia this may be indicated by changes in the blood, bone marrow, CNS or testes, even before the patient experiences any symptoms.

Remission

Restoration of the blood, bone marrow and general health of the patient to normal. Usually induced by chemotherapy and/or radiotherapy.

Remission induction chemotherapy

The initial course of treatment given to patients to remove all clinically detectable cancer.

Renal

Related to the kidney.

Resistant disease

Disease that does not respond to treatment.

Reticulocytes

Young red blood cells normally present in the bloodstream in very low numbers (0.2-2.0% of all the red cells). An increase in numbers in the blood indicates increased red cell marrow production, as occurs following chemotherapy, after bleeding or in situations of haemolytic anaemia. Absence

of reticulocytes is seen in red cell aplasia or temporarily after chemotherapy.

Retinoic acid

A synthetic compound related to vitamin A which can stimulate some marrow cells to become fully mature. It is used to treat a sub-type of acute myeloid leukaemia called acute promyelocytic leukaemia (APML).

Ribonucleic acid (RNA)

A copy of the genetic code or DNA, used by cells as a template for making proteins.

Secondary leukaemia

A leukaemia arising from previous chemotherapy or radiotherapy (often given for a cancer other than leukaemia), or the development of leukaemia from a pre-existing condition such as a myelodysplastic syndrome.

Septicaemia

This is a general term to describe a serious bacterial infection in the body with leakage into the blood of substances which cause high fever, sometimes shock and organ failure.

Serum

The part of the blood plasma which remains after cells, platelets and fibrinogen have been removed, usually by allowing the blood to clot.

Serum free light chain assay

A test which detects the light chain part of antibodies. Increasingly used for monitoring myeloma. High levels of light chains in the serum and/or urine (the latter is known as Bence-Jones protein or BJP), can damage the kidneys.

Severe combined immunodeficiency disease (SCID)

Severe combined immunodeficiency disease is a congenital disease affecting antibody production and T-cells (type of white blood cell). Children born with SCID are susceptible to infections; treatment can include bone marrow transplant and/or gene replacement therapy.

Shingles

An acute infection caused by the reactivation of the herpes zoster virus that has remained dormant in the nerves of the body after a previous episode of chickenpox. Shingles is a painful condition that involves inflammation of sensory nerves, causes numbness, itching or pain followed by the appearance of clusters of little blisters or vesicles. The infection can be particularly troublesome when it affects the ophthalmic nerve. Treatments include the early use of the anti-viral drug acyclovir, and techniques to reduce the nerve pain and to stop the virus spreading in patients with low immunity.

Sibling

Brother or sister.

Sickle cell disease

A genetic blood disease due to the presence of an abnormal form of haemoglobin, particularly prevalent in Africa and the Middle East. The red blood cells, normally disc shaped, become crescent shaped and inflexible when the blood oxygen pressure is low, causing blockage of the small blood vessels. Also known as sickle cell anaemia.

Side effect

Unintended effects of a drug or treatment.

Spleen

An organ that is involved in the development of the immune system, which destroys red cells at the end of their lifespan and helps the body to fight certain infections. The spleen, situated high on the left side of the abdomen under the ribcage adjacent to the stomach, is often enlarged in leukaemia and some non-malignant blood conditions.

Splenectomy

Surgical removal of the spleen done by laparoscopic techniques or laparotomy, is sometimes performed in leukaemia or lymphoma as part of a patient's treatment and in other conditions such as immune mediated thrombocytopenia (where the spleen is the site of platelet destruction).

Splenomegaly

Enlargement of the spleen. Mega=big.

Stable disease

When the underlying disease is not getting any better or worse, with or without treatment.

Staging

An assessment of the spread of disease through the body, for example, in lymphoma. Stage I means localised disease only, whereas stage IV represents widespread disease. Staging is of importance in some disorders for the selection of the best treatment.

Standard therapy

The most effective and safest treatment currently being used.

Stem cells

The most primitive cells in the bone marrow from which all the various types of blood cell develop from.

Stem cell transplant

General name given to bone marrow and peripheral blood stem cell transplants, used in the treatment of a variety of bone marrow disorders including leukaemia, lymphoma and myeloma. The patient receives very high doses of chemotherapy and/or radiotherapy to treat the disease. This destroys the bone marrow and makes the blood count fall. Stem cells are collected from the blood via apheresis, the bone marrow or placental (cord) blood of a matched donor. Stem cell transplants can be autologous (collected from the patient) or allogeneic (collected from another person). Replacement cells are returned to the patient through a vein (or central venous line) in a similar way to a blood transfusion. See also 'bone marrow transplant'.

Subcutaneous injection

An injection into the tissue immediately under the skin.

Supportive care

Treatment directed against the effects of the cancer, not against the cancer itself.

Syngeneic

Identical twins that have exactly the same genes.

Systemic

Throughout the body.

Systemic lupus erythematosus (SLE)

A chronic, inflammatory autoimmune disease, where certain organs of the body are attacked by the patient's immune system. This may affect the blood, skin, joints, kidneys, heart, lungs and nervous system.

T-cell (T-lymphocyte)

A type of white blood cell derived from the thymus (hence T-cells) involved in controlling immune reactions and fighting certain infections (such as tuberculosis, viruses). Uncontrolled growth of this type of cell gives rise to T-cell leukaemia/lymphoma. Deficiency of T-lymphocytes is seen in congenital forms of immune deficiency, or acquired forms such as occurs in HIV infection or AIDS.

Testicular relapse

Recurrence of leukaemia in the testicles. The disease may be restricted to the testicles or may also be present in the bone marrow or CNS. Treatment will depend on the timing and extent of the relapsed disease.

Thalassemia

One of a number of inherited diseases of the red blood cells where a genetic defect results in the reduced synthesis of one of the globin chains of the haemoglobin molecule. This can result in mild blood changes such as smaller sized red blood cells or severe anaemia.

Thrombocythaemia

Over-production of platelets as occurs in the myeloproliferative disorder essential thrombocythaemia.

Thrombocytopenia

Abnormally low platelet count in the blood.

Thromboembolism

Blockage of a blood vessel by a clot that can travel or has moved in the bloodstream to the heart, lungs or brain where it can cause serious damage.

Thrombophilia

The tendency to form blood clots (thrombosis).

Thrombosis

The development of a clot in a blood vessel, usually in a vein but sometimes in an artery. Potentially life-threatening if left untreated.

Thymus

The gland in the upper mediastinum that is involved in the production of functional T-cells. White cells destined to be T-lymphocytes complete their development in the thymus after leaving the bone marrow. The thymus gland can be markedly enlarged in some cases of ALL, Hodgkin lymphoma and thymoma.

Tissue typing

Testing of an individual's human leukocyte antigen (HLA type) on their white cells. Analysis of blood samples from the patient, their family and prospective donors is performed when a transplant is being considered to find a matched donor.

Tomography

The process of generating a two dimensional picture of a three-dimensional body. CT scanning is a special type of tomography allowing serial x-ray pictures of internal organs.

Total body irradiation (TBI)

Radiotherapy often given in several small doses or fractions prior to stem cell or bone marrow transplant with the aim of killing any residual cancer in the patient and to allow the infused marrow to engraft.

Transformation

A term to describe either the change of a normal cell into a cancerous cell, or the acceleration of disease. For example, in chronic myeloid leukaemia, transformation from the chronic to a more acute phase (characterised by the production of large numbers of blast cells).

Translocation

A chromosome abnormality in which part of one chromosome has transferred to another.

Trisomy

Term which indicates the presence of an additional chromosome. Each cell usually has 46 chromosomes but in trisomy this is increased to 47. Trisomy 21 is the chromosome abnormality that is present in Down syndrome.

Tumour

A growth or mass of abnormal cells which may be benign (non-cancerous) or malignant (cancerous).

Ultrasound scan

Pictures of the body's internal organs built up from the interpretation of reflected sound waves. This is used frequently to determine the size of the liver and spleen, and also to see if there is a thrombosis in leg veins.

Vaccine

A preparation of a weakened or killed microorganism that can stimulate an immune response in the body to prevent future infections with similar micro-organisms.

Ventilator

A machine which maintains a patient's breathing by mechanical means.

Vinca alkaloids

A group of chemotherapy drugs originally derived from vinca (periwinkle) plants. Drugs of this type include vincristine and vinblastine.

Virology

The study of viruses and viral diseases.

Virus

A minute infective agent which depends on the cell it infects for its replication and survival. Sometimes a virus behaves like a 'wild gene' and attaches to the genetic code.

Von Willebrand disease (vWD)

The most common inherited bleeding disorder which occurs when a clotting protein called the von Willebrand factor is deficient or defective. This factor, when released from the lining of blood vessels, acts to help platelets clump to stop bleeding.

Warfarin

An anticoagulant drug used to prevent the blood from clotting and to treat blood clots. Warfarin works by suppressing the production of some clotting factors and thereby inhibiting the clotting of blood. INR blood test measures warfarin therapy.

White blood cells

Also known as leucocytes, these include several different types of cells within three main groups: granulocytes, lymphocytes and monocytes. White blood cells are formed in the bone marrow; their uncontrolled proliferation leads to leukaemia. Sometimes referred to as 'white cells'.

X-ray

A form of low dose radiation used both in diagnosis and treatment.

Zoster immune globulin (ZIG)

Gamma globulin directed specifically against the chicken pox or shingles virus (also known as herpes zoster), which is sometimes given to an immunosuppressed patient following direct contact with the infection to prevent infection.

Useful internet addresses

The value of the internet is widely recognised; however, not all the information available may be accurate and up to date. For this reason, we have selected some of the key sites that people with blood cancers and conditions might find useful.

With the exception of our own websites, Leukaemia & Blood Cancer New Zealand do not maintain these listed sites. We have only suggested sites we believe may offer credible and responsible information, but we cannot guarantee the information on them is correct, up to date or evidence based medical information.

Leukaemia & Blood Cancer New Zealand

www.leukaemia.org.nz

Cancer Society of New Zealand

www.cancernz.org.nz

International Lymphoma Coalition

www.lymphoma.org

Lymphoma Association (UK)

www.lymphomas.org.uk

Leukaemia Foundation of Australia

www.leukaemia.org.au

American Cancer Society

www.cancer.org

MacMillan Cancer Support (UK)

www.macmillan.org.uk

Leukemia & Lymphoma Society of America

www.leukemia-lymphoma.org

Leukaemia & Lymphoma Research (UK)

www.llresearch.org.uk

Notes

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**Dictionary of terms**

We hope that you found this information booklet useful. We are interested in what you thought of the booklet – whether you found it helpful or not. If you would like to give us your feedback, please fill out this questionnaire and send it to Leukaemia & Blood Cancer New Zealand, at the address at the bottom of the following page.

1. Did you find this booklet helpful?

Yes No

Comments _____

2. Did you find this booklet easy to understand?

Yes No

Comments _____

3. Where did you get this booklet from?

4. Did you have any questions that were not answered in the booklet?

Yes No

If yes, what were they?

5. What did you like the most about this booklet?

6. What did you like least about this booklet?

7. Any other comments?

Thank you for helping us review this booklet. We will record your feedback and consider it when this booklet is reviewed for the next edition.

Please return to: Leukaemia & Blood Cancer New Zealand
PO Box 99182 Newmarket, Auckland 1149



Important information for haematology patients

It is important that you contact your doctor or the hospital for advice immediately (at any time of the day or night) if you are feeling very unwell, or if you experience any of the following:

- a temperature of 38°C or over and / or an episode of shivering
- bleeding or bruising, for example blood in your urine, faeces, sputum, bleeding gums or a persistent nose bleed
- nausea or vomiting that prevents you from eating or drinking or taking your normal medications
- diarrhoea, stomach cramps or constipation
- coughing or shortness of breath
- the presence of a new rash, reddening of the skin, itching
- a persistent headache
- a new pain or soreness anywhere
- if you cut or otherwise injure yourself
- if you notice pain, swelling, redness or pus anywhere on your body



our mission is to care, our vision is to cure

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07/2013 V4

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