

PATIENT INFORMATION BOOKLETS

This booklet is one of a series prepared by the Leukaemia Foundation to provide information and advice on the various types of leukaemias and associated blood diseases.

Each booklet has been carefully written to answer most of the questions patients will have about the diagnosis and treatment of a particular disease. However, this does not mean that patients should assume the ideal treatment for them is described in these booklets.

Treatment programs will be selected by doctors in consultation with patients, taking into consideration the many special details that are relevant to each individual case. The clinical haematologists associated with the Leukaemia Foundation are aware that the experience of undergoing treatment for cancer can be difficult, and that patients wish to be informed about, and participate in the decision-making process with regard to what will be happening to them.

It is unlikely that patients will be able to take in all the information contained in this booklet in one reading. It may be more helpful to read one section at a time. In addition, please pass on this booklet to relatives and friends who would like to be more informed so they can provide the support and understanding the patient may need during the course of their illness.



**Leukaemia
Foundation**

VISION TO CURE
MISSION TO CARE

The Leukaemia Foundation gratefully acknowledges the help and advice of Leukaemia Foundation medical consultant Dr Ian Bunce; Dr Kerry Taylor of the Mater Private Hospitals, Brisbane; and Dr James Morton of the Royal Brisbane Hospital and Haematology and Oncology Clinics of Australasia.

THE LEUKAEMIA FOUNDATION

The Leukaemia Foundation is a national organisation formed to raise significant funds to provide support and care for all Australians with leukaemia, related blood disorders and diseases where treatments have evolved from leukaemia therapies. The Foundation also enhances collaboration between the scientific, pharmaceutical and medical professions across the continent.

Since 1975, the Foundation has been a driving force in Australia in improving the survival rates for patients and caring for them and their families. Three in four children and three in 10 adults now survive this devastating disease but in the next five years 30,000 Australians will be diagnosed with leukaemia, lymphoma, myeloma or a related blood disorder.

The Foundation provides patient support services, funds research and supports hospitals in the care of leukaemia patients. It is funded almost entirely by the generous support of the public. Government grants for major projects have assisted the Foundation on occasions.

The Leukaemia Foundation operates in New South Wales, Queensland, South Australia, Victoria and Western Australia, and new leukaemia support groups are being forged across the nation as part of the Leukaemia Foundation of Australia. Please refer to pages 29-30 of this booklet for more information on the services and facilities offered by the Foundation in each state.

This patient information booklet is a small example of how a national umbrella group can help people with bone marrow cancer. It saves on duplication costs, so donations and funding can be directed and utilised to achieve the greatest benefits for those who living with leukaemia or a related disorder, regardless of where they live.

For more information on the Leukaemia Foundation, please call 1800 620 420, 07. 3250 0500 or visit www.leukaemia.com.

CONTENTS

	PAGE
Ablative therapy _____	4
Anti-emetic _____	5
Bacteria _____	6
Bone marrow transplant _____	7
Cell markers _____	8
Chronic myelomonocytic leukaemia _____	9
Cytomegalovirus _____	10
Electrolytes _____	11
Fungus _____	12
Growth hormone _____	13
HTLV _____	14
Intramuscular injection _____	15
Long-term survival _____	16
Maintenance treatment _____	17
Myeloblasts _____	18
Packed cell volume _____	19
Plasma cells _____	20
Purging _____	21
Remission induction _____	22
Subcutaneous injection _____	23
Trisomy _____	24
The Leukaemia Foundation _____	25



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 stem cell rescue.

Acute leukaemia: A rapidly progressive 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, it is 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 known as lymphocytes. It is the most common form of childhood cancer but also occurs in adults.

Acute myeloid leukaemia (AML): A rapidly progressing cancer of the blood affecting immature cells of the bone marrow, usually of the white cell population. It is more common in adults than in children.

Adenosine deaminase inhibitors: Drugs used in the treatment of chronic lymphocytic leukaemia and lymphoma that appear to be less toxic because they act by encouraging cell death rather than actively killing cells. They may be more effective in some diseases than more conventional chemotherapy.

Aetiology: The scientific study of the factors that cause a disease, for example, environmental factors such as infections and radiation. (Spelled etiology in the USA.)

Alkylating agent: Anti-cancer drugs that interact with genetic material (DNA) in such a way as to prevent division of the cells. Drugs of this type include busulphan, chlorambucil, cyclophosphamide, and melphalan.

Allogeneic stem cell or bone marrow transplant: A stem cell transplant using marrow collected from a matched healthy donor, usually a brother or sister. The risk associated with such a transplant increases with age and 55 has until now been regarded as the upper age limit for patients.

Alopecia: The loss of hair. A side-effect of some forms of chemotherapy or radiotherapy used to treat leukaemia and other cancers. Usually temporary.

Anaemia: Deficiency of red blood cells and/or the oxygen carrying pigment haemoglobin in the blood. Causes pallor and tiredness.

Anorexia: Loss of appetite.

Anthracyclines: Drugs used in leukaemia therapy to prevent cell division by disrupting the structure of DNA. Drugs of this type include daunorubicin, doxorubicin (adriamycin), epiubicin, and idarubicin.

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

Antibodies: Naturally produced substances in the blood that destroy or neutralise specific toxins or foreign bodies, for example, viruses. They are produced by the white blood cells known as lymphocytes in response to exposure to the antigens

of the foreign body against which they act. They form an important part of the body's defence system against infection.

Anti-emetic: 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), zofran (ondansetron).

Antigen: A substance, usually on the surface of foreign body such as a virus or bacteria, that stimulates cells of the body's immune system to react against the antigen by producing antibodies.

Antihistamines: Drugs given to diminish allergic reactions.

Antilymphocyte globulin: Antibodies that attach to and destroy lymphocytes. This may be used clinically by injection into a vein, for example, in aplastic anaemia or in other conditions where the body's immune system is being harmful. (See also auto-immune diseases.)

Antimetabolites: A group of anti-cancer drugs that prevent cells growing and dividing by blocking the chemical reactions required in the cell to produce DNA. Drugs of this type include mercaptopurine, azathioprine, thioguanine, and methotrexate.

Apheresis: From the Greek 'aphairesis' meaning 'removal'. The process of 'skimming off' the stem cells from the blood to be used for transplant or stored in frozen form until needed. This occurs through an apheresis machine that filters the blood, gradually separating and collecting the stem cells and progressively returning the processed blood to the person. Stem cells are usually not seen in the blood stream and so special drugs are used to mobilise the stem cells to move from their normal place in the bone marrow into the blood stream.

Aplastic anaemia: A rare disorder characterised by failure of the bone marrow to produce blood cells, as opposed to leukaemia where cells are produced but do not mature. It may occur as an inherited condition (see Fanconi's anaemia) or, more often, the disease develops in later life, the cause of which may or may not be known. It leads 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 antithymocyte globulin or bone marrow (stem cell) transplant.

Audiogram: Hearing test charted for different frequencies. Usually used for early detection of drug toxicity to the nerve controlling hearing.

Auto-immune disease: A disease caused by an individual's immune system producing antibodies against tissues of its own body. The type of antibody so produced must have an adverse effect in the body, as some antibodies are necessary for normal function. Examples include some haemolytic anaemias, rheumatoid arthritis and systemic lupus erythematosus (Lupus).

Autologous bone marrow (stem cell) transplant (ABMT): A bone marrow transplant using stem cells taken from the patient's own bone marrow. These stem cells are collected and stored at an early disease stage or after treatment that has not

controlled the disease. The marrow may be manipulated in the laboratory to try to reduce the risk of contamination with leukaemia cells and to increase the stem cell numbers. There are no problems with tissue matching, so this type of procedure may be carried out on patients in their 60s.

B cell (B lymphocyte): A type of white blood cell normally involved in the production of antibodies to combat infection. The mature B cell is often called a plasma cell. An antibody 'sticks' to an antigen on a foreign cell, causing the antibody-antigen cell to be destroyed or to break down. Tumours of mature B cells result in B cell lymphoma and sometimes myeloma.

Bacteria: Microscopic organisms which cause many types of infectious disease, for example pneumonia. The reduced ability of patients to fight infections following chemotherapy or bone marrow transplantation means that even normally harmless bacteria existing, for example, on the skin or mouth, may cause serious illness. Bacteria often are easier to treat than viruses.

Basophil: A type of white blood cell which is involved in allergic and inflammatory reactions. Normally present in low numbers in the blood. It is called a basophil because the granules in the cell take up basic dye in a test tube and can be recognised under the microscope.

Basophilia: An increase in the number of basophils in the blood.

Bence-Jones protein (BJP): A characteristic protein found in the urine of some patients with multiple myeloma. It is derived from the antibody produced by myeloma cells and can be used to help in diagnosis of the disease and to monitor the effects of treatment. The amount of BJP in the urine may reflect the amount of myeloma left in the body.

Benign: Non-cancerous. Such a growth may or may not need to be surgically removed.

Biopsy: A small sample of fresh tissue, for example, lymph node or bone marrow, removed for laboratory analysis to establish exact diagnosis.

Blast cells: Blood cells that normally represent up to five per cent of the cells in the bone marrow and those cells which divide to replenish the normal cells in the bone marrow. They are not normally visible in healthy blood. Acute leukaemia is characterised by the accumulation of abnormal blast cells that take over the bone marrow and often spill out into the bloodstream.

Blood cells: There are three main types of cells in the bloodstream – the red blood cell, which carries oxygen (petrol tanker), the white blood cell (soldier), which fights infection, and the platelet (sticky sponge), which helps prevent bleeding. The correct balance between each cell type must be maintained for the body to remain healthy.

Blood count: A routine test requiring a small blood sample to estimate the number and type of cells circulating in the blood.

Blood disease: This is a misleading term, for although malignant cells are often found in the blood, they do not originate there. Diseases are classified by their origin eg. lymphoma, from lymph gland.

Bone marrow: The tissue that forms the blood cells and is found within the hollow cavities of many of the flat bones of the body. Bone marrow contains stem cells from which all blood cells are derived. Bone marrow is not found in the bones of the arms and legs in adults.

Bone marrow aspirate: A small volume of bone marrow removed under local or general anaesthetic usually from the hipbone (pelvis) or occasionally breastbone (sternum). The cells in the sample can then be examined under the microscope or with a special test to identify any abnormality in the developing blood cells.

Bone marrow transplant (BMT): An old-fashioned term for a procedure, best called a stem cell transplant, 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 empties the bone marrow and makes the blood count fall. Replacement marrow is taken from a matched donor (allogeneic stem cell transplant) or from the patient's own bone marrow (autologous stem cell transplant) and returned to the patient through a vein (or central venous line) in similar way to a blood transfusion.

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 treatment without an increase in toxicity.

Burkitt's lymphoma: A rapidly growing type of non-Hodgkin's lymphoma. First described in Africa where it may present as a cancer of the facial bones. However, in other countries it more usually affects the abdomen. It requires immediate treatment and is uncommon in western countries.

Cancer: Disease due to the uncontrolled growth, accumulation, division and maturation of cells; often called malignant disease or neoplasia. It causes problems as a result of the cells acquiring abnormal ailments or losing normal activities.

Cannula: A plastic tube which can be inserted into a vein to allow fluid to enter the blood circulation.

Carcinogen: A substance that may have the ability to cause cells to become cancerous. The best known example is the relationship between cigarette smoking and lung cancer. Not all cancers have recognised carcinogens as a cause or high risk.

Carcinogenesis: The development of cancer.

Cardiac: Related to the heart.

CT scan (CAT scan): Computer assisted tomography (CAT) is a complex x-ray technique used to produce serial detailed internal images of any part of the body. The patient lies on a couch, which gradually moves through the X-ray machine, and the image is built up by a computer as a cross-section of the body. It is a special type of tomography.

Catheter: A hollow tube inserted into organs of the body for admitting or removing gases or liquids. For example, for the removal of urine from the bladder.

CD 34 cells: Number allocated to the population of cells in the blood and marrow which contain most of the stem cells used in transplant. A 'CD 34 count' is used to measure a patient's readiness to have cells collected after mobilisation.

Cell biology: The study of the structure, composition and function of cells.

Cell markers: Biochemical or genetic characteristics that distinguish and discriminate between different cell types. They are like flags stuck to the outside of a cell which can be analysed in special machines.

Cells: The individual units from which tissues of the body are formed. They are not visible to the naked eye, but can be seen under the microscope and can be grown in culture.

Central nervous system (CNS): The brain and spinal cord.

Cerebrum: The thinking part of the brain.

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.

Chemotherapy: Treatment using anti-cancer drugs. These may be used singly or in combination to kill or prevent the growth and division of cells. Although aimed at the cancer cells, modern chemotherapy will still, to a degree, unavoidably affect rapidly dividing normal cells such as in the scalp and gut, causing hair loss and nausea, which are usually temporary and reversible. There are a range of substances under development that may be able to protect the normal cells during chemotherapy treatment.

Chromosomes: Chromosomes contain the genetic code compactly packaged. They 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 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. The leukaemia is usually called chronic because the leukaemic cells are more mature than acute leukaemia cells.

Chronic lymphocytic leukaemia (CLL): A slowly progressing form of leukaemia characterised by an increased number of the type of white blood cells known as lymphocytes. It is the most common form of leukaemia and occurs predominantly in late middle age onwards. It has variable symptoms and unknown cause but may be diagnosed by chance long before the patient develops any clinical symptoms of disease.

Chronic myeloid leukaemia (CML): A leukaemia which is initially slow progressing. It is characterised by the presence of large numbers of abnormal mature granulocytes circulating in the blood. Often referred to as chronic granulocytic leukaemia (CGL) and typically will transform over time into acute leukaemia.

Chronic myelomonocytic leukaemia (CMML): A form of myelodysplasia characterized by an increase in the number of circulating white blood cells of monocyte type. It may transform into acute leukaemia or patients may develop problems with infection or bleeding.

Clinical trial: A controlled and carefully monitored assessment of new forms of treatment. Trials can vary in design and size from small-scale trials of experimental treatments to large national trials that compare subtle variations in current therapies. The patient will be informed and will always be given the option not to join, or not without detriment to their treatment when their treatment is part of a trial.

Clinical haematologist: A specialist trained as a physician and pathologist to diagnose and treat diseases of the blood, marrow and lymph glands, e.g. the person who normally diagnoses and treats leukaemia, lymphoma and myeloma.

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 may originate from one abnormal cell.

Clotting factors: A group of chemical constituents of the fluid part of the blood (factors I to XIII) which interact to make blood clot.

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

Coagulation: Clotting of the blood. A complex reaction depending on a series of biochemical components and platelets in the blood.

'Common' acute lymphoblastic leukaemia (cALL): A sub-type of acute lymphoblastic leukaemia affecting cells early in the B lymphocyte family which accounts for about 80 per cent of all acute lymphoblastic leukaemia.

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 small number of cancerous cells.

Corticosteroids (steroids): A group of synthetic hormones including prednisone, prednisolone, methylprednisolone and dexamethasone used in the treatment of some leukaemia and also to suppress graft rejection and graft versus host disease following bone marrow transplant. Side-effects include an increased risk of infection, weight gain, and sometimes bone softening with long term use.

Cyclosporin: A drug used to prevent and treat rejection and graft versus host disease in transplant patients by suppressing their normal immune system.

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 help in the diagnosis and selection of optimal treatment. Results can be delayed because the cells may need to be grown for days in a test tube before analysis.

Cytomegalovirus (CMV): A virus which is usually harmless in healthy people but may cause serious disease in immunosuppressed patients. Particularly dangerous following a bone marrow transplant.

Cytopenia: (Cells in reduced numbers.) A reduction in the number of cells circulating in the blood.

Cytoplasm: The jelly-like substance inside each cell.

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

Deletion: A chromosome abnormality in which a visible part of a single chromosome has been lost.

Dendritic reticulin cells (DRC): Cells of bone marrow origin whose job is to 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 cancer cells.

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 mismatch problems (particularly in relation to unrelated donor transplants) or to remove a sub-set of potentially leukaemic cells in the autograft.

Differentiation: The gradual maturation of a cell whereby its functions and properties become increasingly specialised. Leukaemic cells often are poorly differentiated, that is, show immature characteristics. The more a cell is differentiated, usually the less able it is to divide.

Diphosphonates: A very important new drug type used to prevent or treat high calcium levels in cancer. It is very useful in strengthening bones in breast cancer and myeloma to prevent fractures and pain.

Disseminated disease: Disease in which the cancerous cells have spread from the tissue of origin into several other organs.

Diuretic: A drug to increase the production of urine by the kidneys. May be used during chemotherapy to assist the excretion of anti-cancer drugs.

DNA (Deoxyribonucleic acid): Provides the essential building block for storing genetic material in 'tapes' or chromosomes. There are four different chemical

compounds of DNA (bases) arranged in coded sequence as genes that determine an individual's inherited characteristics.

Echocardiogram: Ultrasound scan of the heart.

Electrocardiogram (ECG): Electrical trace of the heart.

Electroencephelogram (EEG): Electrical brain recording.

Electrolytes: Various salts in the blood. Measurement helps to monitor kidney function.

Embolus: A blood clot that starts in the leg or other distant vein or artery, which breaks loose only to lodge elsewhere in the body and block blood supply. For example, a clot in a vein may cause a problem in the lung, (pulmonary embolism).

Enzymes: Proteins that control the chemical reactions essential for life. Every cell contains many enzymes that control all of its functions.

Eosinophil: A type of white blood cell involved in inflammatory, allergic or antiparasitic responses. Usually present in the circulation in very low numbers. It is called an eosinophil, as cells in a test tube take up acidic (eosinophilic) dyes.

Eosinophilia: Increased numbers of eosinophils circulating in the blood. It occurs occasionally in some cases of Hodgkin's disease, in drug reactions, in asthma, hayfever and parasitic infections.

Epidemiology: The science of studying the occurrence of disease in populations and relating this to genetic and/or environmental causes. This is not a very precise science as yet because of difficulty in collecting and collating disease data.

Epstein Barr virus: A common virus which causes glandular fever. Also associated with Burkitt's lymphoma. Epstein and Barr first described this virus.

Erythroleukaemia: A rare cancer of the blood affecting immature red blood cells, e.g. acute erythroleukaemia which is a type of myeloid leukaemia.

Essential thrombocythemia: A condition caused by abnormal marrow growth (myeloproliferative disease) related to polychythemia rubra vera. The disease occurs when part of the bone marrow produces cells normally but they do not mature. It is characterised by the production of large numbers of platelets. Symptoms include bleeding, blood clots and enlargement of the spleen. Treatment varies according to the severity of the disease.

Exterial beam: Delivering radiotherapy to the inside of the body through an 'external beam' - that is, by 'shining' radiotherapy thorough the skin as opposed to delivering it internally through an implant in or near a tumour (known as brachytherapy or internal radiation).

Extra nodal lymphoma: A lymphoma that presents outside the lymph nodes, but in tissues containing containing lymph cells. A term used to describe the extent and site of disease.

Fanconi's anaemia: A rare inherited type of aplastic anaemia which carries an increased risk to the patient of developing leukaemia. May be treated by bone marrow transplant.

Febrile: Having a fever or high temperature.

Folic acid: A vitamin necessary for marrow cell growth that is obtained from green leafy vegetables, for example, spinach. It is essential for production of DNA and therefore the growth and division of cells.

Folic acid antagonist: A chemical which inhibits a cell's capacity to use folic acid and so prevents cell division for example, methotrexate.

Fungus: A minute infective agent such as a mould or yeast, causing particular problems in immunosuppressed patients. Usually larger than bacteria and harder to treat, fungi require different drugs which are not yet as easy to use as bacterial antibiotics. Many fungi live normally in the mouth and other parts of the body and are usually helpful to the body's functioning.

Gallium scan: A way of looking at the spread of lymphoma by injecting a dye that is taken up by active lymph glands. A way of staging lymphoma and Hodgkin's disease. This test takes a couple of days to read.

Gamma globulin: A concentrated solution of the antibody fraction of human blood given through vein to fight infections, for example, measles in patients with low resistance. Gamma globulin is a very important by-product from blood donations.

Generic drug: This is a more scientific name for a particular drug. Each drug company will have its own name to a particular drug. This is called the 'brand name' for the drug. For example, allopurinol (generic name) is called zyloprim (brand name) by one drug company and progout (brand name) by another drug company. There may be differences in the costs and pharmaceutical benefits of different brands. This should be discussed with your specialist.

Genes: Collection of DNA on a chromosome. Genes direct the activities of cells. They are responsible for the inherited characteristics that distinguish one individual from another. Each human individual has an estimated 100,000 separate genes.

Graft versus host disease (GVHD): A common, and sometimes serious, complication of allogeneic stem cell transplantation. Some of the donor's immune cells try to reject the patient's own cells as foreign. The skin, liver and gut may be affected. It can occur in either chronic or acute forms and is treatable by immunosuppressive drugs. It is the cause of most of the deaths following transplantation.

Graft versus leukaemia (GVL): Cells either identical to or similar to the cells that cause GVHD disease (usually mature T lymphocytes). GVL is a very important mechanism in stem cell (bone marrow) transplants. Much effort is being expended in trying to separate cells responsible for GVL from GVHD in the hope of reducing risk of transplantation without losing efficacy.

Granulocyte: A type of white blood cell containing granules in its cytoplasm (e.g. neutrophil, eosinophil, basophil). They protect the body against infection by seeking out and killing micro-organisms. Neutrophilic granulocytes are commonly called neutrophils.

Growth factors: A complex family of proteins produced by the body to control growth, division and maturation of blood cells by the bone marrow. Some are now available as products of genetic engineering and may be used clinically to stimulate normal cell production following chemotherapy or bone marrow transplantation. For example, G-CSF (granulocyte-colony stimulating factor).

Growth hormone: A biochemical 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 with leukaemia may lead to a deficiency in growth hormone. This may be replaced by intramuscular injections.

Haematologist: A doctor specialising in the diagnosis and treatment of blood diseases.

Haematology: The study of blood diseases including leukaemia.

Haemoglobin: The iron containing pigment in red blood cells, which carries oxygen around the body. Lack of haemoglobin is one cause of anaemia. Normal adult values can be between 120 grams to 180 grams per litre, but normal levels vary greatly with age and sex. Haemoglobin levels can vary significantly in any person on any given day.

Haemorrhage: Bleeding either to the outside through the skin, or internally (May be spelt hemorrhage in American literature.)

Hairy cell leukaemia: A rare leukaemia distantly related to chronic lymphocytic leukaemia and characterised by the presence of abnormal cells with hair-like projections. It occurs in middle age onwards. Treatment may involve removal of the spleen but usual current therapy is a single course of the drug 2-chlorodeoxyadenosine (2CDA) which usually induces sustained remissions.

Hepatitis: Inflammation of the liver.

Hepatomegaly: Enlargement of the liver.

Hickman catheter: A narrow plastic tube inserted through the skin, under anaesthetic, into a major blood vessel in the chest. It is used for patients undergoing intensive therapy and provides a route for taking blood samples and the administration of drugs without repeated needle puncture of a vein. It may have a single, double, or triple tube or lumen. Other companies produce similar venous access devices with different names.

Histology: The investigation of tissue samples by chemical and microscopic analysis.

HLA antigens (human leucocyte antigens): A complex family of genetically inherited proteins which are found on the surface of cells throughout the body. They determine the match between patient and potential donor in bone marrow transplantation. HLA factors are inherited from the mother and father and so the greatest chance of having the same HLA type is between brothers and sisters, that is one in four. HLA types are inherited differently from the red blood cell types.

Hodgkin's disease: A type of lymph gland tumour named after Thomas Hodgkin, who first described the disease in the 19th century.

HTLV: Human T cell lymphotropic virus. A family of viruses which invade T cells. Includes a rare leukaemia virus, HTLV-1, found primarily in Japan and the Caribbean, causing an increased incidence of T cell leukaemias in these populations. The family also includes the AIDS-causing virus, HIV.

Hypercalcaemia: Abnormally high levels of calcium in the blood. It is commonly associated with multiple myeloma due to degradation of the bones but can occur in other cancers such as lung cancer. It is dangerous if not controlled and leads to constipation, confusion, dehydration and renal failure and death due to heart irregularity. It is now commonly controlled by tablets or infusion of bonefos or aredia (diphosphonates).

Iatrogenic disease: A disease produced as a consequence of medical or surgical treatment.

Idiopathic: Term applied to diseases to indicate their cause is unknown, i.e. 'unknown pathogens'.

Idiopathic thrombocytopenia pupura (ITP): A rare disorder characterised by an acute shortage of platelets as a result of their increased destruction in the spleen that can result in bruising and spontaneous bleeding. Anti-platelet antibodies are detectable in some cases. It may present in either an acute or a chronic form and the immediate viral or other cause is often unknown.

Immune deficiency: Impaired ability of the body's defence mechanisms to combat infections by bacteria, viruses and fungi and may also imply impaired surveillance of a resistance to cancer.

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.

Immunoglobins: Proteins in the blood plasma which function as antibodies and play an important part in controlling infections. Some new therapies of synthesised antibodies are useful in controlling lymphoma without chemotherapy.

Immunosuppression: A treatment induced reduction in the body's defence mechanisms. Deliberate immunosuppression is a necessary part of the bone marrow transplant procedure to prevent graft versus host disease and graft rejection.

Immunosuppressive drug: A drug which inhibits the body's normal defence mechanisms. For example, cyclosporin A.

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

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

Interferons: A family of proteins derived from human cells which normally has a role in fighting viral infections. It is now available as a product of molecular engineering to be used in the treatment of leukaemia and leukaemia related diseases including malignant lymphoma, chronic myeloid leukaemia and myeloma.

Intramuscular injection: Injection into the muscle.

Intrathecal injection: Injection of drugs into the spinal fluid to prevent or treat CNS Leukaemia or lymphoma. The space between the brain and spinal cord and their coverings is known as the intrathecal space.

Intravenous injection: The giving of drugs into a vein through a needle.

In vitro: Literally meaning 'in glass'. Used to describe studies carried out on living cells or tissues grown in the laboratory in a test tube.

In vivo: Within the living body.

Karyotype: Analysis to check the number, form and structure of chromosomes. This can give valuable information to aid in the diagnosis and the selection of treatment.

Karyotypic abnormality: Abnormality in the number, form or structure of chromosomes. Particular abnormalities are associated with particular sub-types of leukaemia.

Laparotomy: An operation in which the abdominal cavity is opened. May rarely be required in some cases of lymphoma to investigate the extent of the disease.

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 patients treated before puberty.

Leucocytes: Collective term for white blood cells. Leuco = white; cyte = cell.

Leucopenia: Condition in which the number of white cells in the blood is greatly reduced. Leads to increased risk of infections.

Leucopheresis: Method of separating blood into its liquid and cellular components for the removal of white blood cells before returning the remainder of the blood to the patient. It is used to reduce an abnormal white cell count when chemotherapy is to be avoided, for example, during pregnancy. It is the technique used to collect stem cells from the blood to be used in transplants.

Leukaemia: From the Greek meaning 'white blood'. Characterised by the widespread, uncontrolled growth or proliferation of large numbers of abnormal

blood cells, which in the blood look like white cells but usually involve all cell types. These cells take over the bone marrow and often spill into the bloodstream and may spread to spleen and lymph glands eventually.

Leukaemogenesis: The generation of leukaemia.

Lineage: Term used to describe cell families with a common ancestry, that is, developing from the same type of identifiable immature cell, e.g. myeloid lineage and lymphoid lineage.

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

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

Lymphoid: Pertaining to the lymphatic system including lymphocytes, lymph nodes and lymph cell channels.

Lymphoma: A cancer of lymphatic cells whose normal counterparts have already left the bone marrow to be found in lymph glands and spleen and other tissues. Lymphoma can spread back to involve the bone marrow and blood and then look like leukaemia. The disease results from the uncontrolled production of the white blood cell known as the lymphocyte. The general term includes about a dozen different forms of the disease but there are two main categories: Hodgkin's disease and non-Hodgkin's lymphoma. Although this is an old-fashioned term it is still commonly used as a term of convenience.

Lymphoproliferation: An increase in the production of lymphocytes. This may occur as a normal response to infection for the whole marrow or for only part. Only lymph cells are involved.

Lymphangiography: A method of detecting enlarged lymph nodes, sometimes used to determine the extent of disease in lymphoma patients. It involves the injection of dye into the feet, which allow the lymph system and lymph nodes inside the body to be detected on an X-ray. Very rarely used now in modern practice as other means such as MRI are safer, more sensitive and less invasive.

Lymph nodes or glands: Structures found throughout the body, for example, in the neck, groin, armpit, and abdomen, which contain both mature and immature lymphocytes. There are millions of very small lymph glands in all organs 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 combat).

Macrophage: A type of white blood cell which migrates from the blood into tissues and acts as a scavenger, ingesting particles such as bacteria.

Magnetic resonance imaging (MRI): A body scanning technique, which uses an intense magnetic field to generate images of the internal organs. Properties of normal and cancerous tissue differ, allowing malignant tumours to be visualised by the computer processing of the signals detected. It also is very good for detecting blockages in veins.

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, usually for acute lymphoblastic leukaemia.

Malignancy: A term applied to tumours characterised by the uncontrolled proliferation of cells. See also cancer, for example, malignant lymphoma.

Mediastinum: The central part of the chest surrounded by lungs and heart containing thymus and lymph glands.

Megakaryocyte: Large cell in the bone marrow that produces platelets by maturing and fragmenting into discrete platelets.

Mixed lymphocyte culture (MLC): Final matching test for donor and patient prior to bone marrow transplantation. For example, mixing patient and potential donor cells in test tube and measuring their activity or ability to fight one another.

Mobilisation: Process by which stem cells are moved out of the bone marrow into the blood stream. This is done to permit collection of stem cells for later reinfusion (stem cell transplant).

Monoclonal antibodies: Highly specific antibodies produced by cells grown in the laboratory. Current research is investigating their clinical application for targeted delivery of drugs to leukaemia cells. Some antibodies against lymphoma have been developed which are directly toxic to lymphoma cells.

Monocyte: A type of white blood cell of relatively large size which acts as a scavenger and ingests large particles. A macrophage of the blood.

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

Monosomy: Term which indicates the loss of a whole chromosome. Each person usually carries 46 chromosomes (23 pairs) but in monosomy this is reduced to 45.

Multiple myeloma: A cancer caused by uncontrolled growth or proliferation of mature lymph cells specialised to make antibodies (called plasma cells) within the bone marrow. The abnormal cells do not usually accumulate in the blood and the tumour growth is often restricted to the bones but may spread locally beyond the bones. This leads to bone destruction and is often associated with kidney problems. The damage done by myeloma is a result of the abnormal properties of the secreted antibody, e.g. bone softening, high calcium content and blood thickening.

Mutation: A minute change to the DNA code, caused for example by exposure to hazardous chemicals or copying errors during cell division. If these affect normal cell function it can lead to disease development by loss of normal function or the development of abnormal functions for that cell.

Myeloblasts: Immature cells of the myeloid series. They develop from primitive cells and develop into mature granulocytes and monocytes.

Myelodysplasia: (Myelodysplastic syndromes, MDS, smouldering leukaemia) 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 maturation beyond the blast or stem cell stage. Sometimes referred to as preleukaemia or smouldering leukaemia. Treatment may be based on supportive therapy or involve the use of anti-cancer drugs, depending on the sub-type of disease or in younger people an allogenic stem cell transplant.

Myelofibrosis: A disease in which the bone marrow is taken over by fibrous tissue and is no longer able to produce adequate numbers of mature blood cells. It is a myeloproliferative disease overproducing scar tissue. Often accompanied by enlargement of the spleen. It is occasionally found secondarily in cases of acute myeloid, acute lymphoid, or chronic myeloid leukaemia.

Myeloid: Collective term for the non-lymphocyte groups of white blood cells. It includes cells from the red cell, granulocyte, monocyte and platelet families. Occasionally used to refer to all cells of marrow origin.

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

Neutropenia: A condition in which the neutrophil count is reduced. It may be caused by high dose chemotherapy and carries an increased risk of infection. It also may result from vitamin deficiency, the effect of drugs or viruses.

Neutrophil: The most common type of cell within the granulocyte group of white blood cells. A neutrophilic granulocyte.

Non-Hodgkin's lymphoma: A group of lymphoma that differs in important ways from Hodgkin's disease and is classified according to the microscopic appearance of the cancer cells. The disease is classified either as low grade (slow growing), intermediate grade or high grade (rapidly growing) and may be treated in a variety of ways depending on the exact diagnosis.

Nucleus: The central body of a cell that contains the chromosomes which contain the genetic code and controls the cell's activities.

Oncogenes: Genes with the potential to cause cancer.

Oncologist: General term for a specialist who treats cancer by different means, e.g. medical, surgical, radiation oncologist.

Packed cell volume: Measurement of the proportion of the blood occupied by the red blood cells when packed down in a tube. Normal values are 40-54% in males, and 35-47% in females.

Palliative care: Treatment aimed at relieving symptoms and pain rather than effecting a cure or reduction of tumour size or activity.

Pancytopenia: Condition in which there are reduced numbers of all types of blood cells.

Paraprotein (malignant): Abnormal accumulation of the antibody protein produced by mature B cells (usually plasma cells). Paraproteins are usually associated with diseases such as myeloma but do occur commonly in older people sometimes without any disease evolving.

Paroxysmal nocturnal haemoglobinuria (PNH): A rare disorder characterised by an increased rate of breakdown of red blood cells and platelets. This leads to excretion of the red blood pigment, haemoglobin, in the urine, particularly at night. The cause is unknown and the severity of disease variable.

Pathogenesis: The process of disease development.

Pathologist: A doctor who specialises in the laboratory diagnosis of disease and how disease affects the organs of a body.

Pernicious anaemia: An autoimmune disease of the stomach which leads to a deficiency of vitamin B12 absorption required for red blood cell production and, thus, anaemia. It is treatable by regular intramuscular B12 injections. There are other causes of vitamin B12 deficiency.

Petechiae: Small red or purple pin-head spots on the skin. They are small haemorrhages and usually the result of a shortage of platelets. They have greater clinical importance than bruises or purpura.

PET scan: A special type of radiological examination which appears to have the capacity to distinguish between cancerous and non-cancerous tissue deep in the body. It also is able to detect smaller sized tumours than CT scans.

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

Phenotype: The characteristic appearance and function of a cell or tissue.

Philadelphia chromosome: An abnormal chromosome associated with chronic myeloid leukaemia and some cases of acute lymphoblastic leukaemia. It is formed when part of chromosome 9 attaches to chromosome 22. This abnormality is found in nearly all cases of chronic myeloid leukaemia. It is called Philadelphia after the city in which it was first described.

Plasma: The fluid component of the blood in which the cells are suspended. Contains soluble substances, for example, 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. They are fully grown B lymphocytes.

Plasma cell leukaemia: The end stage of multiple myeloma when immature plasma cells are found circulating in the blood.

Plateau phase: Stable stage of disease in multiple myeloma following good response to anti-cancer treatment, where the myeloma although not cured is not growing or causing disease.

Platelets: Tiny cell-like bodies derived from megakaryocytes in the bone marrow. They circulate in the blood and play an important role in the prevention and control of bleeding. Normal values, $150-400 \times 10^9$ per litre.

Polycythemia rubra vera (PRV): A myeloproliferative disease characterised by the over-production of red blood cells by the bone marrow. Diagnosis is based on an increased number and volume of red cells. The total number of white blood cells and platelets also may be increased. Treatment will vary according to the age of the patient and severity of the disease but is usually by blood letting or venesection. This condition carries a small risk of developing into acute leukaemia.

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

Progenitor cell (Precursor cell): Immature cell in the bone marrow which is responsible for producing mature blood cells.

Prolymphocytic leukaemia: An aggressive variant of chronic lymphocytic leukaemia in which the malignant cells have a more immature appearance. The disease may require removal of the spleen, chemotherapy and/or radiotherapy.

Promyelocytic leukaemia (acute promyelocytic leukaemia): A variant of acute myeloid leukaemia characterised by the over production of cells of intermediate maturity and often associated with particular bleeding problems. Treatment includes the use of retinoic acid in addition to conventional chemotherapy. Retinoic acid is the first substance to be used effectively to cause leukaemia cells to mature.

Prognosis: An assessment of the likely benefits of treatment for patients, particularly concerning the chances of cure and complete recovery or likely years of survival.

Prophylaxis: Precautionary treatment given with the aim of preventing a disease occurring. For example, an antibiotic to prevent infection.

Protocol: A schedule of treatment. For example, the number, frequency and timing of administration of courses of anti-cancer drugs.

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 cells and thus reducing the theoretical chance of relapse. The use of this procedure varies between treatment centres and depends on the type of leukaemia being treated.

Purpura: A condition characterised by the occurrence of purple spots on the skin, often accompanied by bleeding from the gums. It is caused by a shortage of platelets as well as skin fragility but does not imply the same severity as petechiae.

Radiology: The use of X-rays in the diagnosis of a disease.

Radiotherapy: The use of X-rays and other forms of radiation in treatment. It kills cancer cells in the area of the body being treated and is therefore effective treatment for localised disease, particularly in lymphoma and multiple myeloma. Side-effects vary according to the type of treatment and will be discussed with the patient by the hospital staff. It can be administered by injection, by an external beam or by internally placed tube (brachytherapy).

Randomised trial: A scientific study where patients are randomly allocated to one or two or more therapies to test effectiveness and toxicity. The trial is regularly reviewed and if at any time one treatment option is found to be superior, all future patients will receive that therapy.

Recombinant: A term used to describe drugs which have been produced using genetic engineering techniques. The products are exact equivalents of compounds produced naturally by the body.

Red blood cells: The cells of the blood which contain the red pigment haemoglobin and carry oxygen to all the tissues of the body. Normal red cell count in the blood is $4.5 - 5.0 \times 10^{12}$ per litre. They are the petrol tankers of the blood which carry oxygen.

Refractory anaemia: A type of myelodysplasia which primarily affects red cell production by the bone marrow. In some cases the developing red cells show an internal ring of iron granules. These cells are called sideroblasts. Refractory anaemia (RA) and refractory anaemia with sideroblasts (RAS) are the common forms of myelodysplasia. These are usually the least aggressive types.

Refractory anaemia with excess blasts (RAEB): A form of myelodysplasia characterised by the accumulation of immature white blood cells in the bone marrow. If the immature cells are particularly numerous it may indicate a risk of transformation to acute leukaemia and the condition is called RAEB in transformation.

Relapse: The recurrence of disease in marrow or other organs. In leukaemia this may be indicated by changes in the blood, bone marrow, CNS or testicle, even before the patient experiences any symptoms.

Remission: Restoration of the blood, bone marrow and general health of the patient to normal. Induced by chemotherapy and/or radiotherapy.

Remission induction: The initial course of treatment given to patients on admission to hospital to remove all clinically detectable cancer.

Renal: Related to the kidney.

Reticulocytes: Immature red blood cells normally restricted to the bone marrow and present in the bloodstream in very low numbers (0.2-2%). An increase in numbers in the blood indicates increased activity in the bone marrow, for example following chemotherapy. It may include increased red cell production due to bleeding.

Retinoic acid: A synthetic compound related to vitamin A which can stimulate some marrow cells to become fully mature. It may be used clinically to treat some forms of leukaemia, notably a sub-type of acute myeloid leukaemia called acute promyelocytic leukaemia.

RNA (ribonucleic acid): A copy of the genetic code, used by cells as a template for making proteins. It copies the message given out by the DNA.

Secondary leukaemia: A leukaemia arising from either previous chemotherapy or radiotherapy often for a cancer other than leukaemia or as the development of a pre-existing condition such as myelodysplasia.

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

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

Spleen: An organ that accumulates lymphocytes, acts as a reservoir for red blood cells for emergencies, and destroys red cells, white cells and platelets at the end of their lifespan. Situated high in the abdomen on the left-hand side. It is often enlarged in leukaemia and some other blood diseases.

Splenectomy: Surgical removal of the spleen. This is sometimes done in leukaemia or lymphoma as part of a patient's treatment.

Splenomegaly: Enlargement of the spleen. Megalo = big.

Staging: As assessment of the spread of disease through the body, for example, in lymphoma. Stage 1 usually means localised disease only, whereas stage IV represents widespread disease. Staging is of importance for the selection of the best treatment.

Stem cells: The most primitive cells in the bone marrow from which all the various types of blood cell are derived. These can be normal or leukaemic.

Stem cell transplant: The more modern and correct term for 'bone marrow transplant'. Stem cells can be collected from the blood by apheresis or blood separation machines after mobilisation. They are still sometimes collected by separation of stem cells from bone marrow collected directly from the bone. This is usually done by inserting a needle into the hip bone under a general anaesthetic. Stem cell transplants can be autologous (collected from the patient) or allogeneic (collected from another person who is usually a matched brother or sister). Occasionally stem cells can be collected by separation from the umbilical cord discarded after the birth of a baby (cord blood stem cells). These cord blood stem cells can be stored against future need.

Subcutaneous injection: An injection into tissue immediately under the skin.

T cell (T lymphocyte): A type of white blood cell derived from the thymus (hence T cells) involved in controlling immune reactions. Uncontrolled growth of this type of cell gives rise to T cell leukaemia/lymphoma.

Testicular relapse: Recurrence of leukaemia in the testicles. The disease may be restricted to the testicles or may also show evidence of involvement of either the bone marrow or CNS. Treatment will depend on the timing and extent of the relapsed disease.

Thrombocytopenia: Over-production of platelets. A myeloproliferative disease involving the megakaryocytes which produce platelets.

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: A gland at the base of the neck concerned with the production of functional T cells. Lymphocytes destined to be thymocytes are 'finished' in the thymus after they leave the bone marrow.

Tissue typing: Identification of an individual's HLA type. Analysis of blood samples from both the patient and prospective donors is performed when a bone marrow transplant is being considered.

Tomography: Serial X-ray pictures of internal organs of the body. CT scanning is a special type of tomography.

Total body irradiation (TBI): Radiotherapy often given in several doses prior to bone marrow transplantation with the aim of killing any residual leukaemia in the patient. It is used in conjunction with high dose anti-cancer drugs. The procedure and its side-effects will be discussed individually with the patient. This treatment may in future be delivered by attaching radioactive substances which are injected and home in on lymph glands and bone marrow.

Transformation: A term to describe either the change of a normal cell into a cancerous cell, or the acceleration of disease (e.g. in chronic myeloid leukaemia from the chronic to a more acute phase characterised by the production of large numbers of blast cells). Also occurs in CLL (rarely) and low grade lymphoma.

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

Trephine biopsy: Removal of a small 'core' of bone marrow under local anaesthetic. It is used to assess bone marrow structure, the number and distribution of all the blood cell types. Trephines are usually taken from the back of the pelvis (hip) in adults under special anaesthetic or relaxing drugs.

Trisomy: Term which indicates the presence of an additional whole chromosome. Each cell usually has 46 chromosomes but in trisomy this is increased to 47.

Tumour: An accumulation of abnormal cells which may be benign or malignant.

Ultrasonography (ultrasound): Pictures of the body's internal organs built up from the interpretation of reflected sound waves.

Ventilator: Machine which maintains a patient's breathing by mechanical means.

Vinca alkaloids: Anti-cancer drugs originally derived from vinca (periwinkle) plants. Drugs of this type include vincristine, 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, it behaves like a 'wild gene' and attaches to the genetic code.

White blood cells (also leucocytes): They comprise several different types of cells within three main groups: granulocytes, lymphocytes and monocytes. They are formed in the bone marrow and it is usually their uncontrolled proliferation that leads to leukaemia. Normal values are within the range $4.5 - 11.0 \times 10^9$ per litre.

X-rays: A form of radiation used both in diagnosis and treatment.

Zoster immune globulin (ZIG): Gamma globulin directed specifically against chicken pox, which sometimes can be given to an immuno-suppressed patient following direct contact with the disease to prevent infection.

THE LEUKAEMIA FOUNDATION

The Leukaemia Foundation is dedicated to helping people with leukaemia, lymphoma, myeloma, aplastic anaemia, related bone marrow disorders and diseases where treatments have evolved from leukaemia therapies. Also, to finding better treatments and cures for these debilitating cancers.

The Foundation is an innovative, national leukaemia network which aims to provide all Australian leukaemia patients with access to excellent, world-class services and facilities regardless of where they live, where they are diagnosed, or where they are treated.

The Leukaemia Foundation's services, facilities and activities include:

- Patient and family accommodation/support centres in New South Wales, Queensland, South Australia, Victoria and Western Australia. At any one time these provide a comfortable home base and a supportive environment for patients and their families who have to go to a major metropolitan centre for life-saving treatment. Planning is well underway to expand these services further.
- A team of support services professionals across Australia.
- Extensive patient education and resource materials on leukaemia and the related bone marrow disorders.
- An innovative range of support courses for patients, families and carers, including the *Taking Control* program.
- Grief counselling and the *Living Well With Grief* program.
- Specialised groups such as the survivor's group, *Thankfully I'm Still Here* (TISH) and Cellink, a haematology specialist group for health professionals.
- A fleet of patient transit vehicles to assist patients travelling to and from hospital for treatment.
- A 'buddy' system of support using past patients to help current patients.
- Counselling and assistance with employment, social services, and patient transport assistance.
- Funding to establish a cord blood bank and three bone marrow transplant units in Queensland.
- Educational grants to haematologists and nurses, and the Greg Johnson Memorial Scholarship for young scientists.

- Patient advocacy in areas including state and federal government grants for medical, nursing, scientific, pharmaceutical, social and financial uses.
- Appointment of Australia's first Professor of Experimental Haematology. The research program at the Leukaemia Foundation Research Unit, established in 1992, is recognised worldwide for its front line research into better treatments and cures for bone marrow cancer.
- Establishment of a psychosocial research program. The results are used to guide strategic planning for the Foundation's support services as well as health policy development elsewhere and has brought strong international recognition to the Foundation's innovative programs.

The Foundation's policy is to provide all forms of support which are an appropriate use of existing resources, and maintains the flexibility to be as supportive as possible in the uncertain environment of dealing with a life-threatening disease.

For more details about the Leukaemia Foundation's support services available in your state, contact the support services division:

New South Wales: 02.9969 1762 or email lfnsw@leukaemia.com

Queensland: 07.3840 3844 or email lfq@leukaemia.com

South Australia: 08.8357 3555 or email lfsa@leukaemia.com

Victoria: 03.9620 1815 or email lfv@leukaemia.com

Western Australia: 08.9272 9332 or email lfwa@leukaemia.com



Leukaemia Foundation

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Please send me a copy of the following patient information booklets:

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Or information on:

- The Leukaemia Foundation's support services
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- How to become a volunteer
- I would like to receive copies of the newsletter, *The Carer*.

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Send to:

The Leukaemia Foundation, GPO Box 9954, in your capital city, or phone freecall 1800 620 420.

Information, as listed above and more, is available from the Leukaemia Foundation's website - **www.leukaemia.com**.



Leukaemia Foundation

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The Leukaemia Foundation's aim is to provide the very best in treatment care and support for people with leukaemia and their families, and research into a cure.

You can help by making a donation. Please fill out the form below or visit www.leukaemia.com to make your gift online.

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