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# Pregnancy and Leukaemia

**A Guide for  
Patients**

**Leukaemia Care**  
YOUR Blood Cancer Charity

# Introduction

Leukaemia in pregnancy is rare, and is estimated to occur in only 1 in 75,000 to 100,000 pregnancies, although its incidence is poorly documented. Controlled studies of leukaemia in pregnancy are very limited given its nature, and most of the data comes from analysis of previous case reports. If you have any questions about pregnancy and leukaemia - the types of leukaemia, diagnosis and treatment - this booklet covers the basics for you.

The booklet was compiled by our Patient Information Writer Isabelle Leach and peer reviewed by CLL CNS Helen Knight, CML specialist Dragana Milojkovic and Consultant Haematologist Manos Nikolousis. We are also grateful to Vickie Webster for her valuable comments as a patient reviewer.

For more tailored information, talk to your haematologist, clinical nurse specialist or hospital pharmacist.

If you would like any information on the sources used for this booklet, please email [communications@leukaemiacare.org.uk](mailto:communications@leukaemiacare.org.uk) for a list of references.

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# About Leukaemia Care

**Leukaemia Care is a national charity dedicated to ensuring that people affected by blood cancer have access to the right information, advice and support.**

## Our services

### Helpline

Our helpline is available 8:30am – 5:00pm Monday - Friday and 7:00pm – 10:00pm on Thursdays and Fridays. If you need someone to talk to, call **08088 010 444**.

Alternatively, you can send a message via WhatsApp on **07500068065** on weekdays 9:00am – 5:00pm.

### Nurse service

We have two trained nurses on hand to answer your questions and offer advice and support, whether it be through emailing **nurse@leukaemicare.org.uk** or over the phone on **08088 010 444**.

### Patient Information Booklets

We have a number of patient information booklets like this available to anyone who

has been affected by a blood cancer. A full list of titles – both disease specific and general information titles – can be found on our website at **www.leukaemicare.org.uk/support-and-information/help-and-resources/information-booklets/**

### Support Groups

Our nationwide support groups are a chance to meet and talk to other people who are going through a similar experience. For more information about a support group local to your area, go to **www.leukaemicare.org.uk/support-and-information/support-for-you/find-a-support-group/**

### Buddy Support

We offer one-to-one phone support with volunteers who have had blood cancer themselves or been affected by it in some

way. You can speak to someone who knows what you are going through. For more information on how to get a buddy call **08088 010 444** or email **support@leukaemiacare.org.uk**

### Online Forum

Our online forum, **www.healthunlocked.com/leukaemia-care**, is a place for people to ask questions anonymously or to join in the discussion with other people in a similar situation.

### Patient and carer conferences

Our nationwide conferences provide an opportunity to ask questions and listen to patient speakers and medical professionals who can provide valuable information and support.

### Website

You can access up-to-date information on our website, **www.leukaemiacare.org.uk**.

### Campaigning and Advocacy

Leukaemia Care is involved in campaigning for patient well-being, NHS funding and drug and treatment availability. If you would like an update on any of the work we are currently doing or want to know how to get involved, email **advocacy@leukaemiacare.org.uk**

### Patient magazine

Our quarterly magazine includes inspirational patient and carer stories as well as informative articles by medical professionals: **www.leukaemiacare.org.uk/communication-preferences/**

# Types of leukaemia in pregnancy

## Leukaemia complicating pregnancy and pregnancy in a patient with leukaemia

Approximately 90% of leukaemias which occur during pregnancy are acute leukaemias. Acute leukaemias are more commonly diagnosed in teenagers and young adults, which coincides with the age of fertility. These leukaemias are often diagnosed during the course of the pregnancy, usually in the second and third trimester.

Chronic leukaemias during pregnancy occur in a smaller proportion of patients as the median age at diagnosis is much higher.

The median age of patients with CML is 50 years, ranging from 18 to 87 years. CML can occur at any age, but is more common in middle aged and older people.

The median age of patients with

CLL is 72 years, with only about 10% of patients under the age of 55 years old.

These patients tend to have existing chronic leukaemias and become pregnant subsequently.

## Acute and chronic

Out of the acute leukaemias that are diagnosed during pregnancy, 66% are acute myeloid leukaemia (AML), and 28% are acute lymphoblastic leukaemia (ALL).

The remainder of the cases of leukaemia in pregnancy include CML, CLL and myelodysplastic syndromes.

Myelodysplastic syndromes is the collective name for a group of cancers where bone marrow cells of varying types reproduce uncontrollably and have dysplastic changes. Myelodysplastic means abnormal growth in the bone marrow. Myelodysplastic syndromes are characterised by a poorly functioning bone marrow and a

likelihood for developing into AML.

## **Myeloid and lymphoid**

In pregnancy, the majority of leukaemia cells are myeloid in origin (relating to bone marrow cells) in 68% of cases: 61% being AML and 7% being CML.

The remaining 31% of cases are lymphoid in origin (relating to lymphocyte white blood cells): 28% being ALL and 3% being CLL.

# A diagnosis of leukaemia in pregnancy

Acute leukaemia in pregnant women requires a rapid diagnosis because it can be life-threatening for both the mother and baby. However, the similarity of some of the symptoms in pregnancy and leukaemia, such as weakness, fatigue, shortness of breath and anaemia may make diagnosis difficult.

As with most types of leukaemia, diagnosis can usually be made with a bone marrow biopsy, which can help analyse the number and types of the leukaemic cells in the bone marrow. Guidelines by the British Committee for Standards in Haematology (BCSH) for the diagnosis of leukaemia in pregnancy recommend the following investigations:

- **Full blood count:** This shows the number of red blood cells, white blood cells and platelets in the blood. Inclusion of a differential count, which will provide additional details of the different types of white blood cells, is useful. Additionally, vitamin B9, vitamin B12 and ferritin measurements, blood

coagulation screening, renal and liver function tests are also advised.

- **Peripheral blood smear:** A sample of blood is smeared and viewed under a microscope to count different circulating blood cells and to see whether the cells look normal.
- **Bone marrow aspiration and biopsy:** The bone marrow aspiration procedure removes a liquid marrow sample and the biopsy removes a small amount of bone filled with marrow. Examination of the bone marrow liquid sample and biopsy can determine the percentage of leukaemia cells in the bone marrow and any abnormalities.
- **Immunophenotyping:** This process uses antibodies to identify cells based on the types of antigens or markers on the surface of the leukaemia cells, and can diagnose specific types of leukaemia by comparing the cancer cells to normal.
- **Chromosomal analysis:** This

involves analysing the bone marrow or blood cells to identify any changes in the number and size of chromosomes within cells that might have led to the development of the leukaemia cells.

- **Cerebrospinal fluid examination:** If a spread of leukaemia cells to the central nervous system (brain and spinal cord) is suspected, a sample of cerebrospinal fluid, obtained from a lumbar puncture, is examined using flow cytometry. This process can rapidly measure the size and structures of thousands of cells in the sample.

# Treatment

Leukaemia occurring during pregnancy is challenging and treatment should be tailored to the need of each patient. Both the immediate health of mother and baby, and the long term health of the infant, need to be considered.

During the first trimester, treatment is best avoided if possible, while it is safer to administer treatments during the second and third trimesters.

## General considerations

Pregnant women with leukaemia need to be managed by a multidisciplinary team that includes haematologists, obstetricians, neonatologists, anaesthetists and pharmacists in order to manage all the treatments required.

Treatment during the first trimester can be associated with congenital anomalies and miscarriage. Treatment after the first trimester, when the baby's organs have been developed, is safer, although rare complications can't be excluded.

Delay in treatment until after

the first trimester needs to be balanced against consequence of delay to the mother and baby, particularly for acute types of leukaemia such as AML and ALL.

Treatments for leukaemia during pregnancy may differ from the standard of care. It will depend on how far along the pregnancy is when the leukaemia is diagnosed, the characteristics of the leukaemia, and potential toxic effects of treatment on mother and baby.

Supportive therapies in pregnant patients are similar to those in non-pregnant patients with a few changes:

## Antibiotics

- Penicillins, cephalosporins and erythromycin have been shown to be safe in pregnancy.
- Aminoglycosides, despite only limited data, seem to be safe in the first trimester of pregnancy.
- Trimethoprim-sulfamethazine has been associated with cardiovascular malformations, even in the second and third trimesters of pregnancy, and is

to be avoided.

- Quinolones and tetracyclines are known to affect joints, bone and teeth, and should be avoided during pregnancy.
- Sulphonamides have been associated with brain and spinal cord defects and cardiac malformations, and should also be avoided.

### Antifungal drugs

- The best intravenous antifungal drug during pregnancy is liposomal amphotericin B.

### Anti-emetics

- Metoclopramide, antihistamines or ondansetron-based anti-emetics have not been associated with foetal malformations.

### Corticosteroids

- Methylprednisolone and hydrocortisone are broken down by the placenta and therefore are safe for the baby.

### Growth factors

- Erythropoietin does not cross

the placenta and is safe to use in pregnancy.

- Granulocyte colony-stimulating factor has not revealed an increase in congenital abnormalities or death of the baby when used in pregnant women, although the data is limited.

### Pain control

- Paracetamol can be administered safely throughout pregnancy.
- Nonsteroidal anti-infective drugs such as ibuprofen should not be given during pregnancy because of potential side effects for the baby.

### Breast feeding

- This is invariably contraindicated for medication which is excreted in breast milk.

### Leukapheresis for very high white blood cell blast levels

- This process involves collecting blood from a vein in one arm, passing it through a machine which removes the excess of

# Treatment (cont.)

white blood cells (including the leukaemia blast cells), and then re-inserting the blood back through a vein in the other arm. This process is thought to have minimal risk to the baby and is safe to be performed during pregnancy.

## Acute leukaemias

Acute leukaemias are usually reported in 37% of pregnancies during the second trimester and 40% of pregnancies during third trimester. Acute leukaemias in the first trimester of pregnancy are thought to occur in approximately 23% of pregnancies (including miscarriages).

### AML

If pregnant women with AML are left without treatment, both the mother and baby could die as the chance of remission is seriously compromised. Immediate treatment is therefore recommended. This is generally a standard daunorubicin and cytarabine regimen and must be dosed according to the woman's body weight as it changes during pregnancy.

If the diagnosis of AML is made during the first trimester, it is unlikely that the pregnancy will be successful, and the risks for the mother remain significant. Although a sensitive topic, planned termination may need to be discussed, as it is easier to manage than a miscarriage.

When the pregnancy is between 24 and 32 weeks at the time of diagnosis, the risks to the baby from the chemotherapy must be weighed up against the risks of prematurity if it is delivered early.

If delivery is planned between 24 and 35 weeks, corticosteroids given for 48 hours in the week before the delivery can help the baby's lungs to function better.

If delivery is planned before 30 weeks, magnesium sulphate can be given in the 24 hours before delivery to protect the baby's developing brain and help reduce disability.

When the diagnosis of AML is after 32 weeks, it may be practical to deliver the baby before starting chemotherapy.

Blood products that may include cytomegalovirus will need to be screened to make sure they are negative for the virus. An epidural anaesthetic in women who have a very low platelet count ( $80 \times 10^9/L$ ) and/or white blood cell count ( $<1 \times 10^9/L$ ) should be avoided.

## ALL

It is important to give the appropriate chemotherapy as soon as possible after the diagnosis in order to control the ALL. Treatment regimens for ALL are continually changing and differ between countries and hospitals. This makes developing specific recommendations or guidelines for the management of ALL problematic. Nevertheless, the regimens contain similar drugs, but just with different doses and schedules.

A practice followed by many haematology teams is giving young adults and adults up to the age of 50 years the intensive ALL chemotherapy regimens normally given to children because these regimens have been getting better results in terms of survival in the older patients.

High doses of methotrexate are a main component of these ALL intensive regimens, but unfortunately, methotrexate is associated with severe foetal malformations. When methotrexate is given during the first trimester of pregnancy, it results in a high risk of miscarriage or development of methotrexate syndrome, characterised by defects in the bones of the skull, abnormal structure of the face, delayed development, and limb defects.

If ALL is diagnosed before 20 weeks of pregnancy, termination of pregnancy is strongly recommended in order to commence chemotherapy.

After 20 weeks of pregnancy, modified ALL regimens of chemotherapy can be given until the third trimester, although patients must be advised that damage to the baby is still possible. Prednisolone alone for one to two weeks can enable the patient to reach a stage where they can receive more intensive chemotherapy thereafter.

In the third trimester of

# Treatment (cont.)

pregnancy, patients may be given the same chemotherapy regimens as non-pregnant women with ALL. Planned delivery after 32 weeks should be the goal, but delivery is not advisable if the patient has pancytopenia (deficiency of all three types of blood cells).

## Chronic leukaemias

### CML

In the chronic phase of CML, patients can have little or no symptoms, and can remain in this phase for years. If patients proceed to the accelerated phase, symptoms become more obvious such as tiredness, weight loss and a swollen abdomen due to enlargement of the spleen. The accelerated phase normally lasts between three to nine months if untreated. In the final phase, known as the blast phase, the disease is similar to AML and unless it is treated, death can occur within three to six months.

Treatment of CML in pregnancy includes leukapheresis, and interferon alfa. Interferons are a naturally occurring body protein that send signals to interfere with

the ability of viruses to multiply. In patients with cancer, interferon alfa stimulates the T lymphocyte white blood cells and other immune system cells to attack the cancer.

All patients should be managed in a specialised haematology centre used to dealing with CML and pregnancy.

### Tyrosine kinase inhibitors (TKIs)

The use of tyrosine kinase inhibitors has markedly improved the survival of all CML patients. Patients can expect a relatively normal lifestyle, even if the majority of patients will have lifelong treatment. Therefore, patients with CML may not only be diagnosed while pregnant, but some may also wish to become pregnant while on treatment. Promisingly, the course of CML does not appear to be adversely affected by pregnancy.

It is important to advise young female patients with CML of the effect of tyrosine kinase inhibitors on the baby's development. Due to the potential risks of miscarriage

or foetal malformations, TKIs are not to be used during pregnancy. Both men and women are advised to use effective contraception during treatment. It is also important to be aware that vomiting or diarrhoea may reduce the effectiveness of oral contraceptives.

Pregnancy should only be considered when the patient has achieved at least a major molecular response (<0.1%) for at least two years, and been on therapy for at least three years as a minimum requirement. There are recommendations for patients who respond very well and may be able to discontinue therapy in general. Tyrosine kinase inhibitors should be discontinued on the first day of the menstrual cycle, and a RT-PCR (reverse transcriptase polymerase chain reaction, a test to analyse a short sequence of DNA) for BCR-ABL will be done to closely monitor after that, usually on a four-weekly basis to begin with.

If it takes some time to become pregnant your doctor may refer you for assisted conception.

If the RT-PCR remains low, then no intervention is usually necessary after conception and during pregnancy. If the blood count rises, then your doctor may consider IFN to ensure the blood counts do not increase significantly.

After conception, you are likely to be referred for a nuchal scan (used to detect chromosomal abnormalities in the baby), and the pregnancy to be managed in hospital. Ideally, the pregnancy care will be supervised by an obstetrician and a haematologist with a special interest in pregnancy.

At present, there is no evidence to suggest that TKIs impair female fertility.

For more information on TKIs and TFR, you can read our booklet *Chronic Myeloid Leukaemia (CML) - TKIs and TFR*. You can order one by calling **08088 010 444** or by going online to [www.leukaemiacare.org.uk](http://www.leukaemiacare.org.uk)

# Treatment (cont.)

## CLL

For CLL, a 'Watch and Wait' approach may be possible, which means there is the option for haematologists to keep a close watch on the disease without starting any treatment.

In pregnant patients with untreated CLL, there may be a risk of a blast crisis. This is where the levels of immature white blood cells become so high as to cause a malfunction in organs by affecting the small blood vessels. This condition may also cause damage to the placenta, low birth weight, premature births and, sadly, the death of the baby.

Other complications for pregnant women with CLL include anaemia, which requires blood transfusions, infections and autoimmune conditions, in which the immune system mistakenly attacks healthy cells in the body.

During the first trimester of pregnancy, chlorambucil cannot be given to treat CLL because of its harmful effect on the development of the baby. It is

also recommended to avoid fludarabine in pregnancy.

Because CLL is a less aggressive disease, these treatments may be delayed until after delivery.

During the second and third trimester of pregnancy, rituximab, chlorambucil and cyclophosphamide may be given, if required. Rituximab is a monoclonal antibody drug whose effect during pregnancy has been difficult to assess because it is usually given with other chemotherapies. Monoclonal antibody drugs are antibodies created in the laboratory from the same original cell and which target specific proteins on the cancerous cells.

Despite the reporting of only a few foetal malformations with treatments including rituximab, it is recommended that women wait a minimum of 12 months after rituximab exposure before becoming pregnant until more definitive data is available.



# Glossary

## Acute lymphoblastic leukaemia (ALL)

A leukaemia in which lymphocytes start multiplying uncontrollably in the bone marrow resulting in high numbers of abnormal, immature lymphocytes called blasts. Lymphocytes are a type of white blood cell involved in the immune response.

## Acute myeloid leukaemia (AML)

A rapid and aggressive cancer of the myeloid cells in the bone marrow.

## Anaemia

A condition where the number of red blood cells are reduced. Red blood cells contain haemoglobin and transport oxygen to body cells. This may be due to a lack of iron, leukaemia, or sickle cell disease.

## Antibody

A large Y-shaped protein produced by B-cell lymphocytes in response to a specific antigen, such as a bacteria, virus, or a foreign substance in the blood. The antibodies neutralise the bacteria and viruses.

## Antigen

A toxin or other foreign substance

which induces an immune response in the body, especially the production of antibodies.

## Blast cells (blasts)

Immature, abnormal cells found in high numbers in the bone marrow of patients with leukaemia. Normally, only a maximum of 5% of blast cells are found in the bone marrow.

## Blast crisis

A situation where the levels of immature white blood cells become so high as to cause malfunction of the body organs by affecting their small blood vessels.

## Bone marrow

The soft blood-forming tissue that fills the cavities of bones and contains fat, immature and mature blood cells, including white blood cells, red blood cells and platelets.

## Bone marrow aspirate

The process of taking a sample of the liquid part of the soft tissue bone marrow inside the bones using a syringe. It is crucial in establishing a diagnosis of leukaemia and may be performed at stages of the disease during

treatment to monitor progress.

### Bone marrow biopsy

A bone marrow biopsy involves the collection of a sample of bone marrow from the hip bone, generally under local anaesthesia. A bone marrow surgical instrument with a cylindrical blade, called trephine, is used to remove a 1 or 2cm core of bone marrow in one piece.

### Cerebrospinal fluid

A clear, colourless fluid surrounding the brain and spinal cord.

### Chemotherapy

Drugs that work in different ways to stop the growth of cancer cells, either by killing the cells or by stopping them from dividing.

### Chromosomes

An X-shaped, thread-like structure which carries the genes, and are located in the nuclei of every cell in the body. There are 46 chromosomes (23 pairs) in humans.

### Chronic lymphocytic leukaemia

A leukaemia in which the B-lymphocytes in the bone

marrow start multiplying uncontrollably leading to large numbers of abnormal, immature cells called blasts, which prevent the bone marrow from producing enough healthy blood cells of all types.

### Chronic myeloid leukaemia

A leukaemia in which the myeloid cells start multiplying in the bone marrow leading to large numbers of abnormal, immature myeloid cells called blasts, which prevent the bone marrow from producing enough healthy blood cells of all types.

### Complete remission

Complete remission has occurred when:

- Blood cell counts have returned to normal
- Less than 5% of blasts (abnormal, immature leukaemia cells) are still present in the bone marrow

### Cytarabine

An antimetabolite drug which works by disrupting the DNA of cancer cells, thereby slowing or stopping their growth.

# Glossary (cont.)

## Cytotoxic drugs

Drugs that are toxic to cancer cells and prevent their growth and replication.

## DNA (deoxyribonucleic acid)

A thread-like chain of amino acids found in the nucleus of each cell in the body which carries genetic instructions used in the growth, development and functioning of the cells.

## Fatigue

Tiredness and weakness rendering the patient unable to work or perform usual activities.

## Ferritin

A blood cell protein that contains iron.

## Flow cytometry

Technology used to analyse the physical and chemical characteristics of particles in a fluid as it passes through at least one laser. A flow cytometer can rapidly measure the size and structures of thousands of cells.

## Granulocyte-macrophage colony-stimulating factor

A growth factor required to stimulate the growth of living cells.

## Immunophenotyping

A process that uses antibodies to identify cells based on the types of antigens or markers on the surface of the cells. This process is used to diagnose specific types of leukaemia and lymphoma by comparing the cancer cells to normal cells of the immune system.

## Interferons

A naturally occurring body protein that sends signals to interfere with the ability of viruses to multiply.

## Leucocytosis

An increase in the number of white blood cells in the blood.

## Leukaemia

A group of cancers that usually begin in the bone marrow and result in high numbers of abnormal white blood cells. These white blood cells are not fully developed and are called blasts or leukaemia cells. Depending on the type of white blood cell involved, the leukaemia will have varying characteristics, such as being acute (develop quickly) or chronic (develop slowly).

## Lymphocytes

Lymphocytes are a type of white blood cell that are vitally important to the immune response. There are three types of lymphocytes: B-cells, T-cells and natural killer (NK)-cells. B-cells produce antibodies that seek out invading organisms. T-cells destroy the organisms that have been labelled by the B-cells, as well as internal cells that have become cancerous. NK-cells attack cancer cells and viruses.

## Leukapheresis

A process that involves collecting blood from a vein in one arm, passing it through a machine to remove an excess of white blood cells, and then re-inserting the blood back through a vein in the other arm.

## Lymphoid

Relates to lymphocytes.

## Median

Median is the "middle" value when the data points are sorted into a list from the lowest to highest value.

## Minimal residual disease (MRD)

A measure of the presence of

leukaemia at a molecular level rather than at a cell level. It is measured using molecular techniques such as flow cytometry and polymerase chain reaction analysis.

## Monoclonal antibody drugs

Antibodies created in the laboratory from the same original cell and which target specific proteins on the cancerous cells.

## Multiple myeloma

A cancer of the plasma cells which are a type of white blood cell which normally produce antibodies.

## Myelodysplastic syndromes (MDS)

Also called myelodysplasia, myelodysplastic syndromes occur when the bone marrow does not make enough normal blood cells. The blood cells made are not fully developed and not able to work normally. These blood cells include red blood cells which supply oxygen to the body's tissues, white blood cells which fight infection and platelets which help blood to clot.

## Myeloid

Relates to bone marrow.

# Glossary (cont.)

## Myeloid cell

A cell originating in the bone marrow which will eventually become the following white blood cells: neutrophils, monocytes (present in the blood), macrophages (present in different tissues), basophils, and eosinophils. Myeloid cells can also become red blood cells and platelets.

## Obstetrician

A doctor who specialises in the surgical field of obstetrics (pregnancy, giving birth and after). They will deliver the baby.

## Pancytopenia

A deficiency of all three types of blood cells (red cells, white cells, and platelets).

## Plasma cell

A type of white blood cell that produces antibodies and is derived from a B-cell lymphocyte. It has a distinct appearance being ovoid (egg-shaped) with an off-centre nucleus.

## Platelets

Small blood cells that help the body form clots to stop bleeding.

## Red blood cells

Small blood cells that contain haemoglobin and carry oxygen and other substances to all tissues of the body.

## Spleen

The largest organ of the lymphatic system whose function is to help rid the body of toxins, waste and other unwanted materials. The spleen is located under the ribs on the left of the abdomen.

## Standard of care

Treatment accepted by medical experts as the most appropriate treatment for a certain disease and that is widely used by healthcare professionals.

## Thrombocytopenia

Low levels of platelets, which are small blood cells that help the body form clots to prevent or stop bleeding.

## Tyrosine kinase receptors

Receptors present in the membranes of all of the body's cells which can be activated by the enzyme tyrosine kinase. The system functions as an 'on' or 'off' switch in many cellular functions.

# Useful contacts and further support

There are a number of helpful sources to support you during your diagnosis, treatment and beyond, including:

- Your haematologist and healthcare team
- Your family and friends
- Your psychologist (ask your haematologist or CNS for a referral)
- Reliable online sources, such as Leukaemia Care
- Charitable organisations

There are a number of organisations, including ourselves, who provide expert advice and information.

## Leukaemia Care

We are a charity dedicated to supporting anyone affected by the diagnosis of any blood cancer.

We provide emotional support through a range of support services including a helpline, patient and carer conferences, support group, informative website, one-to-one buddy service and high-quality patient information. We also have a nurse on our help line for any medical queries relating to your diagnosis.

Helpline: **08088 010 444**  
**[www.leukaemicare.org.uk](http://www.leukaemicare.org.uk)**  
**[support@leukaemicare.org.uk](mailto:support@leukaemicare.org.uk)**

## Bloodwise

Bloodwise is the leading charity into the research of blood cancers. They offer support to patients, their family and friends through patient services.

**020 7504 2200**  
**[www.bloodwise.org.uk](http://www.bloodwise.org.uk)**

## Cancer Research UK

Cancer Research UK is a leading charity dedicated to cancer research.

**0808 800 4040**  
**[www.cancerresearchuk.org](http://www.cancerresearchuk.org)**

## Macmillan

Macmillan provides free practical, medical and financial support for people facing cancer.

**0808 808 0000**  
**[www.macmillan.org.uk](http://www.macmillan.org.uk)**

## Maggie's Centres

Maggie's offers free practical, emotional and social support to people with cancer and their families and friends.

**0300 123 1801**  
**[www.maggiescentres.org](http://www.maggiescentres.org)**

## Citizens Advice Bureau (CAB)

Offers advice on benefits and financial assistance.

**08444 111 444**  
**[www.adviceguide.org.uk](http://www.adviceguide.org.uk)**

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Leukaemia Care is a national charity dedicated to providing information, advice and support to anyone affected by a blood cancer.

Around 34,000 new cases of blood cancer are diagnosed in the UK each year. We are here to support you, whether you're a patient, carer or family member.

## Want to talk?

Helpline: **08088 010 444**

(free from landlines and all major mobile networks)

Office Line: **01905 755977**

**[www.leukaemicare.org.uk](http://www.leukaemicare.org.uk)**

**[support@leukaemicare.org.uk](mailto:support@leukaemicare.org.uk)**

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