
Consolidation treatment for Acute Lymphoblastic Leukaemia (ALL)

A Guide for
Patients

Introduction

Patients only receive consolidation treatment when they have achieved complete remission after induction treatment. This reinforces their remission. This means it reduces the risk of a relapse. If you have any questions about this phase of ALL treatment - this booklet covers the basics for you.

The booklet was written and updated by our Patient Information Writer, Isabelle Leach, and peer reviewed by consultant haematologists.

We are also grateful to our patient reviewers, Ross Happell, Meryl Simons and Karen Collier for their contribution.

Throughout this booklet, you will see QR codes that will take you to the relevant webpage for further support. Open the camera app on your phone and hover it over the QR code to open the link (suitable for Android, iPhone 7 and above).

Alternatively, if you are not able to use QR codes and would like to be sent the relevant webpages as URLs, or you would like the list of references used for this booklet, please email communications@leukaemiacare.org.uk.

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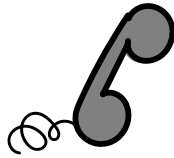
About Leukaemia Care

Leukaemia Care is the UK's leading leukaemia charity. For over 50 years, we have been dedicated to ensuring that everyone affected receives the best possible diagnosis, information, advice, treatment and support.

Our services

Helpline

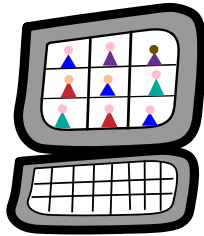
Our helpline is available 9am to 5pm Monday to Friday. If you need someone to talk to, call **08088 010 444**.



Alternatively, you can send a message via WhatsApp on **07500 068065** on weekdays 9am to 5pm.

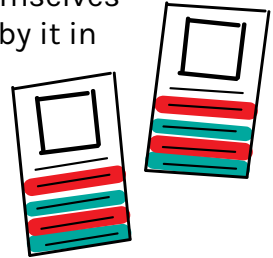
Support groups

Our nationwide support groups are a chance to meet and talk to other people who have been affected by a ALL diagnosis. For more information, scan this QR code:



Buddy support

We offer one-to-one phone support with volunteers who have had ALL 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@leukaemicare.org.uk



Counselling service

Our counselling service helps ALL patients and their loved ones access up to six sessions of counselling. To apply, scan this QR code:



Advocacy and welfare

Our advocacy and welfare officers are here to help you find the support you need for many issues surrounding a ALL diagnosis. These include insurance, benefits and clinical trials. If you would like support from our advocacy or welfare officer, email advocacy@leukaemiacare.org.uk or call **08088 010 444**.



Cost of living fund

This fund provides grants to patients and families affected by ALL, to help with essential living costs. All applications must be made via the form which can be found by scanning the QR code:



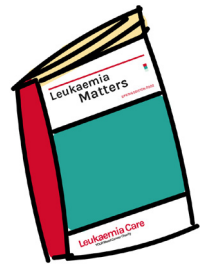
Write a free will

Using our complimentary service, you can write a simple will so you know what happens to your estate when you die. To start writing your free will today, scan this QR code:



Patient magazine

Our magazine includes inspirational patient and carer stories as well as informative articles by medical professionals. To subscribe to our magazine, scan this QR code:



Glossary of medical terms

Acute leukaemia

Leukaemia which progresses rapidly and is generally aggressive. There are two types: acute lymphoblastic leukaemia and acute myeloid leukaemia.

Acute lymphoblastic leukaemia (ALL)

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

Allogeneic stem cell transplant

A procedure where bone marrow stem cells are taken from a genetically matched donor and given to the patient through an intravenous line. The donor may be related or unrelated.

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.

Chemotherapy

Therapy for cancer using chemicals that stop the growth of cells.

Clinical trial

A medical research study involving patients with the aim of improving treatments and their side effects. You will always be informed if your treatment is part of a trial.

Consolidation (phase)

Treatment following remission intended to kill any cancer cells that may be left in the body (also called intensification phase).

Fatigue

Extreme tiredness, which is not alleviated by sleep or rest. Fatigue can be acute and come on suddenly or it can be chronic

and persistent.

Induction (phase)

First treatment after diagnosis intended to kill the majority of the leukaemia cells and stimulate remission.

Intrathecal therapy

Injection of chemotherapy into the cerebrospinal fluid that surrounds and protects the brain and spinal cord.

Maintenance

Treatment given to prevent cancer from coming back after it has disappeared following the first-line treatment.

Monoclonal antibody

Man-made antibodies created from identical cloned immune cells so that they all bind to the same protein commonly found on the leukaemia cells such as CD20.

Neutropenia

A condition in which the number of neutrophils (a type of white blood cell) in the bloodstream is decreased.

Neutrophil

A type of white blood cell that helps fight infection.

Palliative care

Also known as supportive care, this is a type of care that focusses on improving the quality of life for a patient with a life threatening illness and their loved ones.

Stem cells

Cells that have the potential to develop into many different or specialised cell types.

Summary: What is consolidation treatment for ALL?

- Haematologists divide the treatment of acute lymphoblastic leukaemia (ALL) into **three separate phases**:
 1. Induction of remission
 2. Consolidation
 3. Maintenance
- Following induction treatment, **consolidation treatment strengthens the remission** you have achieved. This helps to prevent a relapse of your ALL. Consolidation treatment aims to kill any leukaemia cells still present in your body.
- In this booklet, we concentrate on the **consolidation** phase of treatment.

We have several booklets on the treatment of ALL, including induction and maintenance. Scan the QR code to order or download our booklets:



What is consolidation treatment for ALL?

Consolidation treatment for ALL is the second phase of treatment for ALL.

The three separate phases of treatment for ALL are:

1. Induction of remission
2. Consolidation
3. Maintenance

Patients only receive consolidation treatment when they have achieved complete remission after induction treatment. This reinforces their remission to reduce the risk of a relapse. Relapse is the return of ALL after treatment (there are different terms depending on how soon it comes back).

Continuing with consolidation treatment is important even if your leukaemia is in remission. Consolidation treatment removes any leukaemia cells that might still be in your body. Although we have very sensitive tests to detect leukaemia, it is still possible that there may be leukaemia cells left. Consolidation helps prevent your ALL from coming back.

For patients in first remission, consolidation treatment options are:

- Consolidation chemotherapy followed by maintenance chemotherapy, and/or
- Allogeneic stem cell transplantation (ASCT)

The intensity of your consolidation therapy varies according to the risk of relapse of your ALL. Potential side effects linked with your treatment are also taken into account.

If you have a standard risk of relapse, consolidation chemotherapy is preferable. An ASCT will not give you a better chance of survival and can have serious side effects.

If you have a high risk of relapse, an ASCT when you are in first remission offers you the best outcome.

Summary: What treatments are usually given in consolidation for ALL?

- Consolidation drugs are the same as those used for induction, but at higher doses. The reason for using higher doses is to reach adequate drug levels in your brain, spinal cord and to a lesser extent your testes if you are a man. These are areas in your body where leukaemia cells may remain.
- In general, consolidation treatment can take place as an outpatient. This means you do not need to remain in the hospital overnight.
- Your haematology team will determine your consolidation treatment based on:
 - Your measurable residual disease (MRD) results
 - Any genetic changes detected
- Your consolidation treatment consists of methotrexate or cytarabine with or without asparaginase. Other drugs used in the consolidation treatment phase include:
 - Vincristine
 - 6-mercaptopurine
 - Cyclophosphamide
 - Corticosteroids (prednisone, dexamethasone)
- Haematologists administer a combination of these drugs. Combining the drugs helps prevent the leukaemia cells from developing any drug resistance.
- The main side effects from chemotherapy include infections, bleeding, nausea and vomiting, and hair loss.



What treatments are usually given in consolidation for ALL?

Your haematology team will select your consolidation treatment according:

- Your measurable MRD results
- Genetic changes detected

Measurable residual disease

MRD is the measure of any small amount of leukaemia still present in your body after treatment.

- Being MRD-positive means there are still small amounts of leukaemia cells detectable in your body. This is not the same as relapse, which is more active disease.
- Being MRD-negative means there are no leukaemia cells detectable in your body.

Your haematology team will perform a MRD test after your induction treatment. Your haematology team can check your MRD using either a blood or bone marrow sample. Your MRD results can help forecast your response to treatment and your risk of ALL relapse. A negative MRD at the start of your consolidation phase predicts a good prognosis. Yet, if your MRD is still positive after the second cycle of induction, then the risk of relapse is high. An allogeneic stem cell transplantation with blinatumomab as bridging therapy can be an option.

Standard tests for measuring your MRD are flow cytometry and polymerase chain reaction.

You can find more details of these tests in our induction booklet for ALL. Scan the QR code to order or download the booklet:



Treatment options for consolidation of ALL

Depending on your MRD results you might have one or more of the following:

- More chemotherapy
- Targeted drugs
- A stem cell transplant using cells from a well-matched donor

As well as your MRD results, your haematology team will also consider the following factors for your treatment:

- Presence or absence of leukaemia cells in your cerebrospinal fluid
- Your state of remission
- Number of chemotherapy cycles you have had before going into remission
- Your general health and level of fitness following your first treatment

Chemotherapy

Consolidation chemotherapy treatment often lasts for several months. It includes six to eight cycles of high doses of methotrexate or cytarabine. A cycle is where you alternate having treatment with periods of time off treatment. For example, you might have treatment the first week of every month, then break for the other three weeks. Your haematology team will add in asparaginase if they think it will help you.

Asparaginase is an enzyme that breaks down the compound asparagine. All body cells need asparagine to make proteins and create new cells. Unlike normal cells, ALL cells are unable to make their own asparagine. So asparagine is important for leukaemia cells.

Asparaginase prevents asparagine being available to the

leukaemia cells. This stops the leukaemia cells from dividing and growing.

Other drugs used in the consolidation treatment phase include:

- Vincristine
- 6-mercaptopurine
- Cyclophosphamide
- Corticosteroids (prednisone, dexamethasone)

Nelarabine is also added to the consolidation regimens for patients with T-cell ALL. It has shown to be safe and effective with excellent survival rates.

In general, your haematology team administers your chemotherapy drugs as a combination. This helps prevent the leukaemia cells from developing drug resistance.

Targeted therapy

Targeted therapy drugs target specific proteins found on leukaemia cells. This helps your immune system to destroy them.

Targeted drugs do not affect normal cells to a great extent, so they tend to cause fewer side effects than chemotherapy. But, they still have some side effects which tends to be particular to each drug.

Targeted drugs used in consolidation include:

Tyrosine kinase inhibitors (TKIs)

TKIs inhibit the tyrosine kinase enzyme which controls the function of cells. These drugs stop cells growing and dividing. ALL patients who have the Philadelphia chromosome (Ph+ ALL) receive TKIs.

You might receive the TKIs imatinib, dasatinib or ponatinib as part of your treatment if you are Ph+ ALL. You will also receive steroids for a further 24 days afterwards.

For more details on TKIs, you can read our newly diagnosed booklets. Scan the QR code to order or download our booklets:



Antibody drugs

Targeted monoclonal antibody drugs focus on antigens on the leukaemia cells. This allows them to kill the leukaemia cells.

ALL patients in remission but with a positive MRD receive targeted antibody drugs. The positive MRD indicates they have the potential for relapse. These targeted antibody drugs include blinatumomab or inotuzumab ozogamicin:

- Blinatumomab targets the CD19 protein present on the leukaemia cells. It also targets the CD3 protein seen on leukaemia T-cells. Once bound to the leukaemia cells, blinatumomab destroys them.
- Inotuzumab ozogamicin combines a monoclonal antibody and a potent anticancer drug. The monoclonal antibody that targets the CD22 protein is inotuzumab. The potent anticancer drug is ozogamicin that kills leukaemia cells.

For more details on these ALL treatments, we have dedicated booklets on blinatumomab and inotuzumab ozogamicin. Scan the QR code to order or download our booklets:



Stem cell transplants

As mentioned before, a SCT is an option when your haematology team are worried about your risk of relapse. It is a much more intensive way of treating the ALL.

An allogeneic stem cell transplant is by far the most common type of SCT. It uses cells from a donor. The donor is usually a matched family member or a matched unrelated donor.

Procedure of the transplant

Before your transplant, you will receive high-dose chemotherapy and/or radiotherapy, if appropriate. This is to kill the leukaemia cells in your bone marrow. This is called 'conditioning'. The bone marrow is then ready to receive healthy stem cells from the donor.

You may receive less intensive, low doses of chemotherapy to make it easier for you to tolerate. This is called 'reduced-intensity conditioning'.

You then receive the healthy donor stem cells into a vein. The cells then migrate to your bone marrow where they form new blood cells to restore the bone marrow as normal.

You will receive drugs to prevent rejection of the donated stem cells. Patients must stay in hospital for four to six weeks during this period.

The allogeneic stem cell transplant fights the ALL in two ways:

- The conditioning kills your leukaemia cells in the blood and bone marrow.
- The transplanted cells replace your bone marrow. This should mean you only produce normal cells in the future.
- Some of the transplanted donor stem cells also actively help to destroy any of your remaining leukaemia cells. This is called "graft-versus-leukaemia" affect.

While an ASCT can achieve a cure, it does have important risks for patients. These include:

- Rejection of the transplanted cells
- Bleeding
- Infections

You can find out more details on stem cell transplants as a treatment for ALL in our dedicated booklet. Scan the QR code to order or download the booklet:



Summary: Supportive care

Each phase of ALL treatment comes with new physical and emotional issues. The main goals of supportive care is to help relieve the symptoms from your ALL as well as side effects from your treatment.

Consolidation treatment consists of the same drugs as used for induction but at higher doses. This is to achieve adequate drug levels in all areas of the body including the brain, spinal cord and testes in men.



Supportive care

ALL is an aggressive illness and requires relatively intensive treatments to deal with it. During your treatment and afterwards, supportive care will help prevent, or even treat, the symptoms of ALL. Additionally, supportive care can help you stand the side effects of your treatment.

Consolidation treatment is important because it strengthens the remission you have reached. It also helps to prevent relapse of your ALL.

In general, the drugs consist of methotrexate or cytarabine with or without asparaginase. In addition, the following drugs used in the consolidation treatment phase include:

- Vincristine
- 6-mercaptopurine
- Cyclophosphamide
- Corticosteroids (prednisone, dexamethasone)

Haematologists administer combinations of these drugs to help prevent the leukaemia cells from developing any drug resistance.

Supportive care is not only limited to the physical impact of your ALL. It will provide support for matters that are:

- Psychological
- Social
- Spiritual

For more information about side effects, we have dedicated booklets on the common side effects of treatment and late effects of treatment. Scan the QR code to order or download our booklets:



Common side effects with chemotherapy include fatigue and infections.

What are the side effects with chemotherapy treatment?

Chemotherapy treats the leukaemia cells and normal cells in the same manner. The effect of the chemotherapy on the normal cells is the cause of side effects. Chemotherapy causes more side effects than targeted treatment. You are unlikely to experience every side effect. It is difficult to predict which side effects you will have. This is because people react to treatment in different ways.

There are three types of side effects:

1. **Short-term side effects:** these side effects can last for a few days or weeks, but for some, they can last for the duration of treatment.
2. **Long-term side effects:** these are side effects that last for a long period of time (six to 12 months).
3. **Late effects:** these are side effects that develop months or years after treatment has stopped.

Common late side effects of chemotherapy

Common side effects in patients receiving chemotherapy for the treatment of leukaemia include:

- Increased risk of infection
- Anaemia
- Bleeding
- Fatigue
- Gastrointestinal (nausea, vomiting, diarrhoea and constipation)

- Sore mouth
- Hair loss
- Fertility
- Cognitive or thinking effects
- Heart and lung toxicity

Late and long-term side effects in patients receiving chemotherapy

Possible late and long-term side effects in patients receiving cancer treatment include:

- Fatigue
- Eye, hearing and mouth changes
- Skin and nail side effects
- Bone and joint issues
- Endocrine and thyroid changes
- Cognitive or thinking effects
- Lung toxicity
- Heart toxicity
- Nerve side effects
- Kidney and urinary toxicity
- Secondary cancers

Side effects that you have which can be concerning are:

- Fatigue
- Infection risk

Fatigue

This is a very common side effect of ALL treatment. It can be caused directly by the drugs. It can also have other causes. One example is the psychological and emotional stress of your diagnosis. Fatigue is often frustrating as it cannot be treated with medicines.

Solutions to decrease your level of fatigue are available. This includes pacing yourself or improving the quality of your sleep.

Infections

You should be aware that you are vulnerable to infections whilst on treatment. This is because most treatments have an effect on your immune system. You should be able to recognise symptoms of infections. Common symptoms of infection include:

- Fever – a raised temperature (38°C or higher)
- Aching muscles
- Diarrhoea
- Headaches
- Excessive tiredness

You should seek help as soon as possible if you experience any of these symptoms. Infections can progress more quickly if you are receiving active cancer treatment. Your haematology team have to give you a specific phone number and instructions on what to do if you are aware of symptoms of infection.

Prevention of infections

Simple precautions can help you reduce your risk of infection. These include:

- Washing your hands.
- Limiting your time in crowds, especially if there is an epidemic of flu or other illness.
- Following food safety advice and not keeping food after use-by dates. Cleanliness in the kitchen is important.

Specific advice on how to protect yourself from COVID-19 infection is available on our website. It is constantly updated. Scan the QR code to take you there:



Antibiotics normally used to treat infections can also be used to prevent them where applicable. Most common antibiotics and antifungals used are:

- Trimethoprim/sulfamethoxazole (cotrimoxazole) for pneumocystis pneumonia prophylaxis
- Aciclovir to prevent viral infections

How can you cope with an initial bad response?

Being told your treatment is not working or has not worked is disappointing. We suggest you view your position as if you were newly diagnosed again, taking things slowly and being kind to yourself.

ALL can go into remission but it can come back after a period of remission. This known as a relapse. If this happens, other treatments can be tried as long as you are well enough to have them.

We have a dedicated booklet on relapsed and refractory ALL and its treatment which you might find helpful. Scan the QR code to order or download our booklet:



Supportive care is not only limited to the physical impact of your ALL. It will provide you with support for concerns such as an initial bad response. They include:

- Emotional health
- Mental health
- General wellbeing
- Home life
- Work and money
- Support with transfusions

Information on the supportive care for the topics listed above are available in our newly diagnosed booklets for B-cell ALL and T-cell ALL. Scan the QR code to order or download our booklets:





Leukaemia Care is a national blood cancer charity supporting anybody affected by a blood cancer. This includes patients, family, friends and the healthcare professionals that support them.

To make a donation or become a regular giver, please visit www.leukaemiacare.org.uk/donate

Thank you!

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

Leukaemia Care

Leukaemia Care is the UK's leading leukaemia charity. For over 50 years, we have been dedicated to ensuring that everyone affected receives the best possible diagnosis, information, advice, treatment and support. We are here for everyone affected by leukaemia and related blood cancer types – such as myelodysplastic syndromes (MDS) and myeloproliferative neoplasms (MPN). We believe in improving lives and being a force for change. To do this, we have to challenge the status quo and do things differently.

Helpline: **08088 010 444**
www.leukaemiacare.org.uk
support@leukaemiacare.org.uk

Blood Cancer UK

Leading charity into the research of blood cancers.

0808 2080 888
www.bloodcancer.org.uk

Cancer Research UK

Leading charity dedicated to cancer research.

0808 800 4040
www.cancerresearchuk.org

Macmillan

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

0808 808 0000

www.macmillan.org.uk

Maggie's Centres

Offers free practical, emotional and social support to people with cancer and their loved ones.

0300 123 1801

www.maggiescentres.org

Citizens Advice Bureau (CAB)

Offers advice on benefits and financial assistance.

08444 111 444

www.adviceguide.org.uk

How you can help us

If you've been affected by ALL, sharing your story can help others going through a similar situation and help the public to better understand.

Scan the QR to share your story:



Alternatively, you can email our Communications Team at communications@leukaemiacare.org.uk.

We are continually working to make sure our information is up to date and includes everything you need to help feel supported and empowered to advocate for yourself. With this, it is important for us to listen to any feedback you might have about our consolidation treatment for ALL booklet.

Scan the QR to take you to our shop to leave a review of our booklet:



Alternatively, you can email our Information Team at information@leukaemiacare.org.uk, call our office line on **01905 755 977** or write a letter to our Head Office at **Leukaemia Care, One Birch Court, Blackpole East, Worcester, WR3 8SG.**

Take on a challenge for Leukaemia Care



We have a range of fundraising challenges that you can get involved in to help us continue to provide care and support to those affected by a leukaemia, MDS or an MPN.

Running, swimming, cycling and adrenaline challenges are available to take part in, both in the UK and abroad. There really is something for everyone.

If you're interested in taking part in a challenge, speak to a member of our Fundraising Team by emailing fundraising@leukaemiacare.org.uk or calling **01905 755977**.

Alternatively, scan this QR code to find out all the ways you can get involved with Leukaemia Care:



"It was a pleasure to meet you and to take part in my first half marathon together with the Leukaemia Care team! I'm a scientist and work in immunology research. A dear family member passed away from leukaemia seven years ago this month, so I did this in his memory. I smashed my goal of under two hours with a final time of 1:53! I'm extremely happy, thank you so much for all your hard work and it was great to see you cheering us on along the track. I loved the look of the vests too! See you again, next year maybe!" - **Alexandru Bacita ran London Landmarks for Leukaemia Care in 2022**



Your gift today will ensure that Leukaemia Care can continue to offer support to leukaemia patients and those who love them

Yes, I want to make a regular gift to Leukaemia Care of £5 or £ a month starting on the 1st or the 15th of each month (please tick one).

Please note: the minimum for a direct debit is £2 a month.

Title:

First name or initial(s): Surname:

Full home address:

.....

Postcode: Phone:

Email:

Gift Aid Declaration: Please tick here if you want Leukaemia Care to reclaim the tax that you have paid on all your donations you make in the future or have made in the past four years.

Instruction to your Bank or Building Society to pay by Direct Debit

Name of Account Holder(s): /

Bank/Building Society account number:

Branch sort code:

Name and full postal address of you Bank or Building Society:

.....

Instruction to your Bank or Building Society: Please pay Leukaemia Care from the account detailed in this instruction subject to the safeguards assured by the Direct Debit Guarantee. I understand that this instruction may remain with Leukaemia Care and, if so, details will be passed electronically to my Bank/Building Society.

Signature(s): /

Date:

This guarantee should be detached and retained by the payee.

The Direct Debit Guarantee



This Guarantee is offered by all banks and building societies that accept instructions to pay Direct Debits.

The efficiency and security of the scheme is mentioned and protected by your own Bank or Building Society.

If the amounts to be paid or the payment dates change, Leukaemia Care will notify you 10 working days in advance of your account being debited or as otherwise agreed.

If an error is made by Leukaemia Care or your Bank or Building Society, you are guaranteed a full and immediate refund from your branch of the amount paid.

You can cancel a Direct Debit at any time by writing to your Bank or Building Society. Please also send a copy of your letter to us.

Leukaemia Care is the UK's leading leukaemia charity. For over 50 years, we have been dedicated to ensuring that everyone affected receives the best possible diagnosis, information, advice, treatment and support.

Every year, 10,000 people are diagnosed with leukaemia in the UK. 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.leukaemiacare.org.uk

support@leukaemiacare.org.uk

Leukaemia Care,
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Blackpole East,
Worcester,
WR3 8SG

Leukaemia Care is registered as a charity in England and Wales (no. 1183890) and Scotland (no. SC049802).

Company number: 11911752 (England and Wales).

Registered office address: One Birch Court, Blackpole East, Worcester, WR3 8SG

Leukaemia Care
YOUR Blood Cancer Charity

