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Oncology
—
Hematology

Fast Facts for Patients

Chronic Lymphocytic Leukemia

Karger

HEALTHCARE

Important contacts

You can write the names and contact details of your healthcare team and other important contacts here…

Name .....

Role .....

Phone .....

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Oncology
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Hematology

First, the facts...

1. Chronic lymphocytic leukemia (CLL) is a slow-growing type of blood cancer and the most common form of leukemia in adults.
2. CLL results in large numbers of abnormal B lymphocytes in the bone marrow and prevents the production of healthy blood cells.
3. It is more commonly diagnosed in older people: almost 80% of cases are in people over 60 years old.
4. Changes in chromosomes or genes in some patients affect how the disease develops and what treatment is prescribed.
5. CLL cannot be completely cured but many people will have a normal lifespan and a good quality of life.

This booklet aims to help you understand your options so you can talk to your medical team and family about your condition and its treatment. You can use the spaces on the pages to organize your notes and questions.

The information in this booklet is general and if you have any concerns about your health, you should speak directly with your doctor or healthcare team.

Karger HEALTHCARE

What is chronic lymphocytic leukemia?

Chronic lymphocytic leukemia (CLL) is a condition that involves a type of **white blood cell** called **B lymphocytes**. In CLL, B lymphocytes don't develop normally.

Leukemia is a blood cancer. There are different types of leukemia and most of them involve white blood cells. There are different types of white blood cell, and each has a specific role in protecting your body from infection and disease.

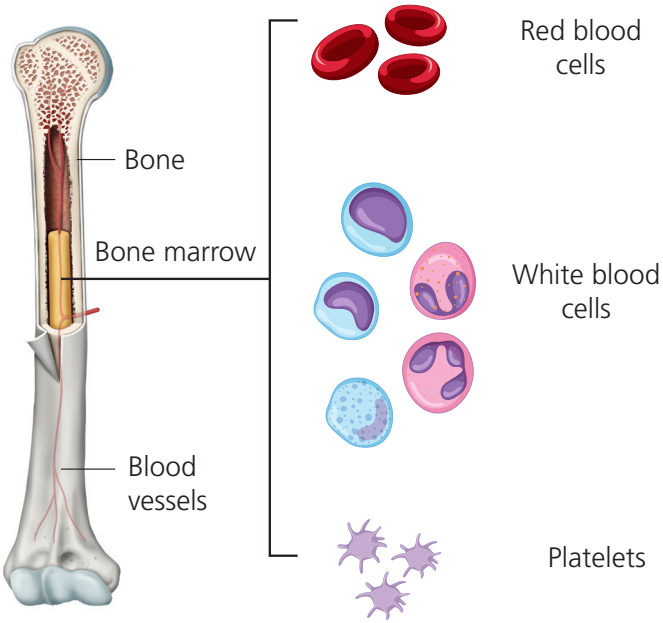
CLL develops very slowly. **Chronic** means 'developing slowly' or 'long-lasting'. Many people diagnosed with CLL find out when they have a blood test for a different reason. Most new diagnoses are in people over the age of 60. Many people have no symptoms when they are diagnosed and don't need any treatment at first. In fact, around a third of people with CLL will never need treatment.

CLL is a little more common in men than in women. It is the most common form of chronic leukemia in adults in Europe and North America though in some regions of the world, such as Asia, CLL is less common.

CLL is a treatable condition, there are promising new therapies being developed all the time and it's usually possible to control the disease for long periods. CLL cannot yet be completely cured. However, many people with CLL have a normal lifespan and a good quality of life.

How does CLL develop?

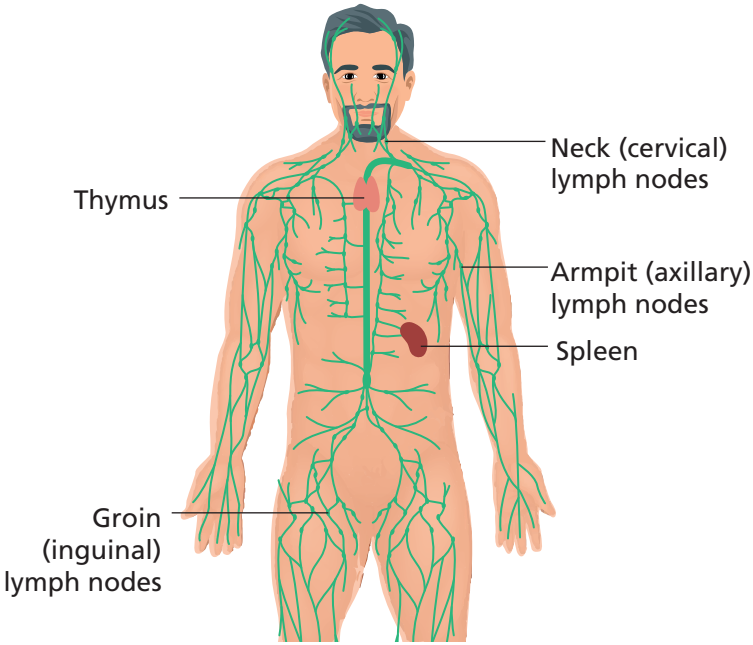
All blood cells, including lymphocytes, are made in the **bone marrow**. This is a spongy material found inside our bones.



The bone marrow also makes several other types of blood cell including **red blood cells**, which carry oxygen around the body, and **platelets**, which help the blood to clot. In CLL, lymphocytes develop in the body incorrectly and do not work properly.

When these abnormal lymphocytes build up in the immune organs, they cause swellings and pain in the spleen and stop the immune system from working properly. The abnormal lymphocytes also infiltrate the bone marrow where they crowd out other cells such as white blood cells, red cells, and platelets and prevent their normal function in the body.

The lymphatic system



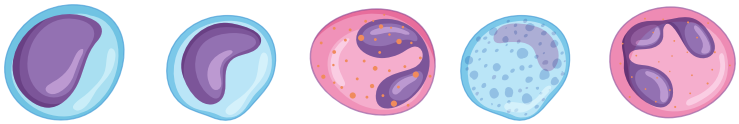
The lymphatic system is made up of a network of vessels, similar to blood vessels, that branch out into all the tissues of the body. These vessels carry the lymphocytes to help fight disease and infection. In CLL, the abnormal lymphocytes build up over time in the immune system, crowding out the normal cells. The overcrowding prevents normal cell production and the normal functioning of red and white blood cells and platelets. The problems this can cause include:

- anemia
- blood clotting problems
- repeated infections.

You can read more information about the possible symptoms of CLL on page 10.

What are white blood cells?

White blood cells (also called **leukocytes**) are the cells that make up most of the body's **immune system.** The immune system is the body's defense against infection.

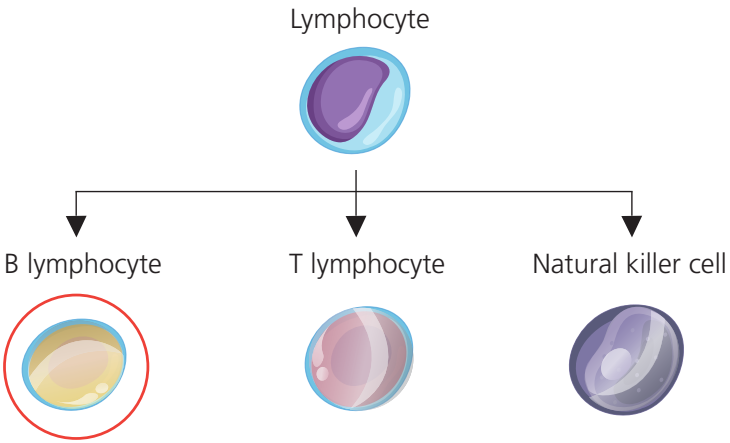


There are five different types of white blood cell. Each has a different function and all work together to fight infection and disease.

Lymphocytes

Lymphocytes are the smallest white blood cell and there are three major types:

- B lymphocytes (also known as B cells)
- T lymphocytes (T cells)
- natural killer cells.

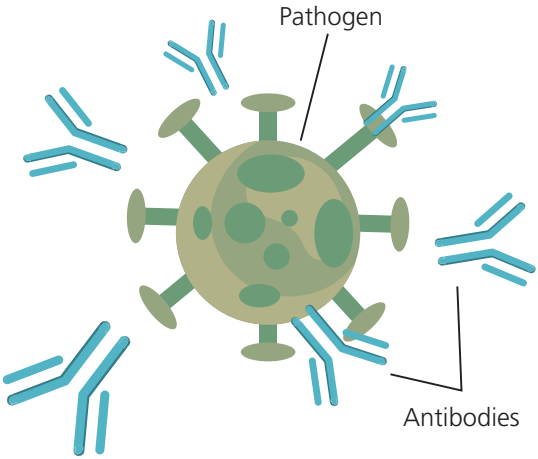


The B lymphocyte is one of the most important cells in the body. Its function is to make **antibodies** against **infections**.

In CLL, the B lymphocyte doesn't develop properly and cannot produce antibodies. This means people with CLL are likely to develop infections and have more difficulty fighting them.

What are antibodies?

An antibody is a Y-shaped protein that the body makes to defend itself against something harmful like viruses, bacteria, or toxins. These harmful invaders are called **pathogens**.



Antigens are molecules attached to the pathogen.

Antibodies can **neutralize toxins** produced by pathogens. They can also help other white blood cells to destroy the pathogen in various ways.

Small lymphocytic lymphoma

Small lymphocytic lymphoma (SLL) was once thought to be a different disease from CLL, but today doctors understand that the difference is only in where the abnormal lymphocytes are located.

In CLL, most of the abnormal B lymphocytes collect in the bloodstream; in SLL most of the abnormal B lymphocytes collect in the lymph nodes and **lymphoid tissue**, such as the spleen and the tonsils. Lymphoid tissue is the part of the lymphatic system that is responsible for the production of lymphocytes and antibodies.

The first symptoms of SLL are usually painless swellings in the lymph nodes in the armpits, neck, or groin. The other symptoms are the same as for CLL. You may read CLL/SLL in your notes if you have been diagnosed with SLL.

My questions

Why did I get CLL?

Like all other cancers, CLL is caused by specific changes that occur over a lifetime in the cells of the tissue where the cancer occurs. These changes, called mutations, are mostly caused by aging. The mutations occur in the genes of these cells. In CLL, the genes of B lymphocytes are affected.

Rarely, CLL can also be inherited, and we know that close relatives (father, mother, brother, sister, or child) of a patient with CLL have a higher risk of also having CLL.

IMPORTANT: Remember that the background risk of developing CLL is very low so most family members will never develop CLL. Because the risk is so low, screening for CLL is generally not recommended.

Because of the way it affects the immune system, CLL is sometimes described as a cancer of the immune system. At the same time, the immune system plays an important role in keeping cancer cells under control.

My questions

Make a note of anything you want to discuss with your doctor here…

How will CLL affect me?

How CLL develops in any one person is very individual and this booklet can only give general information about the disease. Some people can have no symptoms for many years. Some people will develop symptoms quickly or have symptoms at the time of their diagnosis that require treatment. You can read more about the symptoms of CLL on page 10.

Will I need treatment?

As many as one-third of people diagnosed with CLL will never need any treatment while another third will not need any treatment at first. Doctors will usually 'actively monitor' for the disease in these people. You can read more about **active monitoring** on page 28.

And for those people who do need treatment, it's reassuring to know that the treatment landscape is continually developing. Treatment options are discussed on page 38.

CLL may not be currently curable, but many people with CLL can live well for a long time.

> *"People with CLL have different paths – different paths to treatment and different timelines. The experience is so varied. I know people can be on active monitoring for years but the progression of the disease was pretty quick for me and within a few months I was looking at treatment."* **– Giles**

Signs and symptoms of CLL

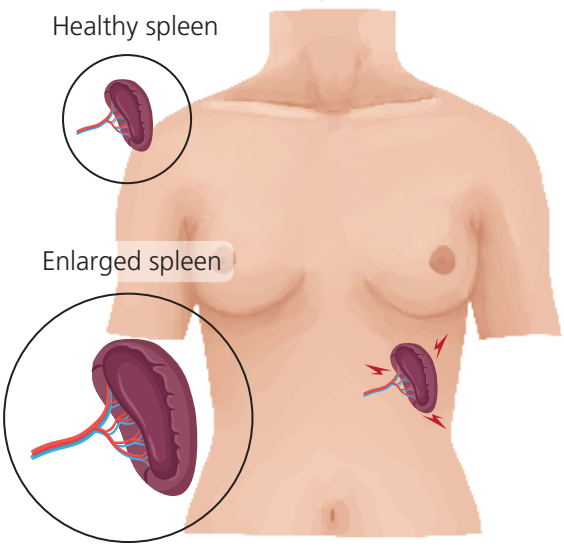
The symptoms of CLL are generally caused by the build-up of abnormal lymphocytes in the lymphatic system and in the bone marrow (see page 3). Some symptoms only appear later in the course of the disease.

If you have symptoms, you may have some or all of the following.

Swollen glands (lymph nodes). Most often in your neck or under your arms. This is often the first symptom that people notice.

Repeated infections. Caused by the failing immune system.

Pain or discomfort under the ribs on your left side caused by a swollen spleen. The spleen swells up because abnormal lymphocytes build up inside it.



Fatigue. Not having enough red blood cells (because they have been crowded out by abnormal lymphocytes) causes anemia. One of the symptoms of anemia is fatigue, though chronic fatigue often has other causes. You can read more about fatigue and how to manage it on page 16.

Feeling breathless is another symptom of anemia. Breathlessness happens because fewer red blood cells in your body results in less oxygen reaching your muscles.

Bleeding or bruising. An increase in nosebleeds or easy bruising can be caused by not having enough platelets. Platelets help to clot the blood.

Night sweats. You wake up feeling 'wet with sweat' and often need to change the sheets.

Weight loss. Unintentional weight loss of more than 10% of body weight over 6 months.

IMPORTANT: When you have your regular check-ups, be sure to tell your healthcare team about any symptom that seems new or different.

My questions

Make a note of anything you want to discuss with your doctor here…

Managing the symptoms of CLL

Whether you're receiving treatment or not, a person with CLL does not have an immune system that is fully functioning. As a result, you will need to take certain precautions.

Infections

When you have CLL, B lymphocytes don't work properly. This means that people with CLL are much more likely to develop infections, and some of these infections can be serious. They will also have more difficulty fighting infections without the support of drugs like antibiotics.

> *"With CLL, you have to make a lot of choices every day. You really have to stop and think: do I really need to go to this party? With all those people? When I go shopping, I'm in the shop right when it opens because I know it will be empty."*
> **– Leanne**

Monitoring changes in the way you feel

It's important to tell your healthcare team immediately if you notice any changes in the way you feel. Signs of infection can be easy to miss and can come on very quickly. Possible signs of infection include:

- feeling more tired than usual and/or sleeping more
- feeling achy all over
- a change in your body temperature
- headache or sore throat
- feeling shivery or like you're coming down with flu
- diarrhea or vomiting.

Treating infections. Depending on the type of infection, your doctor can prescribe antibiotics, antivirals, or antifungals.

Preventing infections

Vaccination. Aside from basic preventative behavior like washing your hands and avoiding people who have an infection, vaccination can help reduce the chance of you picking up an infection.

It is important to be vaccinated against common infections and your doctor is likely to recommend that you have an annual flu vaccine, pneumonia vaccine, and the COVID vaccine.

Shingles vaccination. You are more at risk of developing shingles when you have CLL. Shingles is a viral infection which you can get if you've had chickenpox in the past. It causes a painful skin rash and blisters.

There are generally two vaccines available for shingles: a live vaccine which contains a weakened chicken pox virus (varicella-zoster virus) and a non-live vaccination. People with CLL (and anyone with a weakened immune system) should only have the **non-live vaccination**. You should also avoid people who have shingles until they have fully recovered.

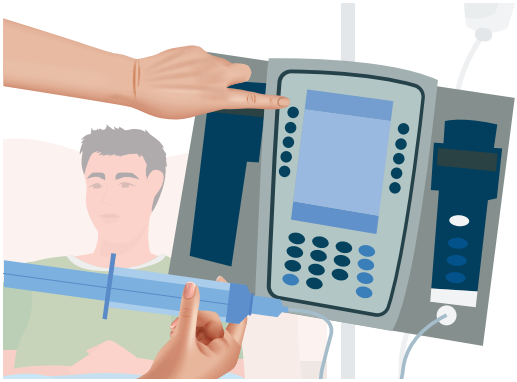
Immunoglobulin replacement therapy

Protection against infection can also be given by **immunoglobulin replacement therapy**, a transfusion of antibodies from donated blood. Immunoglobulin is another word for antibody.

Immunoglobulin replacement therapy can be helpful for people with low levels of antibodies and who have repeated and severe infections.

If your doctor thinks you will benefit from immunoglobulin replacement therapy, you can have it in one of the two ways described below.

Intravenous immunoglobulin (IVIg) through a drip into a vein. It takes around 2–3 hours, though the first time it will be slower and take twice as long. People usually have IVIg every 3–4 weeks. This is an outpatient (day hospital) treatment.



Subcutaneous immunoglobulin (SCIg). A motorized pump delivers the treatment under your skin at a steady rate. It can go into your thigh, upper arm, or abdomen and takes around 2 hours. Treatment is weekly though for some people it will be more frequent. It can be done as an outpatient or in some cases at home.

IMPORTANT: Immunoglobulin replacement therapy is a safe procedure and serious side effects are very rare. But if you feel unwell or are worried about any change in how you feel after the therapy, you should speak to your doctor or a member of your healthcare team immediately.

White blood cell growth factor

If you have prolonged low white blood cell counts (neutropenia) after chemotherapy, your doctor may suggest a treatment called **white blood cell growth factor**.

Growth factors are proteins that are made naturally in the body. Growth factor treatment enhances the bone marrow production of white blood cells and so reduces the time your immune system is vulnerable to infection.

Granulocyte-colony stimulating factor (G-CSF) is a growth factor that can increase the number of neutrophils made in the bone marrow. Neutrophils are a white blood cell and a key part of our immune system.

You receive G-CSF as an injection under your skin in a fleshy part of your body, like your stomach, thigh, or upper arm. You can find more information about this on some of the websites at the end of this booklet.

Skin cancer

People with CLL are particularly sensitive to the sun and have a higher risk of skin cancer than the general population. This is likely to be because the immune system is not working properly. Regular skin cancer screening is important, especially if you have a history of skin cancer or your CLL is more advanced at diagnosis. Everybody with CLL should remember to cover up and use a high factor sunscreen when out in the sun.

Fatigue

Fatigue is one of the symptoms people with CLL say they find the most difficult to cope with. Fatigue is not tiredness: it is extreme tiredness that can mean even simple daily activities feel hard or even impossible to do.

Fatigue can be mental and/or physical. The CLL Society says that 70% of people with CLL have fatigue when they are diagnosed and more than 50% say they have fatigue during active monitoring.

The cause of fatigue

Fatigue has many causes. It can be caused by CLL and its complications, such as anemia. It can also be caused by an infection such as a virus, or by stress and anxiety, or by problems with your thyroid or another organ.

If the cause of your fatigue is the progression of CLL, your healthcare team may propose treatment. If you're already receiving treatment, your team can give you advice on how to manage the fatigue.

Fatigue is also caused by cancer treatment itself: cancer-related fatigue is experienced by nearly all people with cancer who are undergoing treatment.

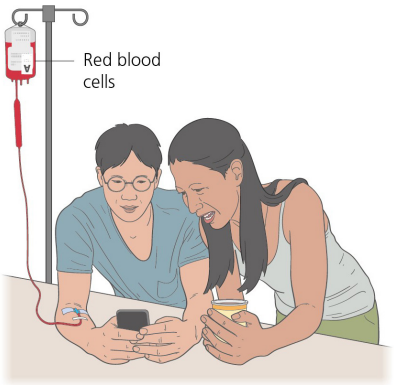
Treating fatigue

If you're feeling fatigued and are struggling to complete daily tasks, speak to your healthcare team. They will run some tests to try to understand the cause of your fatigue. Some causes, like a viral or bacterial infection, or more severe anemia, can be treated.

Blood transfusions can help to give you more red blood cells if you have severe anemia.

Whether you are given a transfusion depends on several factors including your health and local practices.

A blood transfusion can be done as an outpatient.



Having a blood transfusion

Depending on the reason for the transfusion, you may receive a **blood component** which for CLL could be red blood cells, platelets, granulocytes (rarely), or antibodies (see page 14).

Blood components are carefully matched to your blood. Most people receive a blood transfusion without problems, but there can be complications. If you have an appointment for a blood transfusion, you can find out more about the process from your healthcare team and on the CLL dedicated websites listed at the back of this booklet.

Managing fatigue

There are things you can do to help reduce the impact of fatigue on your life, irrespective of the cause.

Prioritizing activities. Not everything is a priority. Learning which tasks to focus on and which tasks to leave for another day – or delegate to someone else – can be an important strategy to manage fatigue.

Many people have more energy at certain parts of the day. Listening to your body and not attempting tiring tasks when your energy levels are low can also be very helpful.

Conserving energy. It can be difficult to learn to manage the energy you have. Feeling energetic can sometimes drive people with CLL to do more than their body can manage, and more fatigue results. Even simple tasks can be tiring so finding ways to conserve your energy can be very helpful.

Saying 'no' to family members who want you to socialize when you're not up to it, or help out with childcare as frequently as you used to, can be hard to do. Explaining not only how you physically feel, but why you feel like this may help others to better understand.

> *"I'm fortunate that I can work from home and am able to plan my own work schedule, which I need to do. Sometimes, if I have 20 minutes before my next meeting, I'll set my alarm and have a quick power nap."* **– Michelle**

Using exercise to reduce fatigue

One of the very best things to lessen the impact of fatigue is exercise. Many studies have shown that aerobic exercise – for example, walking, cycling, or swimming – for just 30 minutes three or four times a week brings enormous benefits for the body and the mind for people living with fatigue and cancer.

Exercise can be done at home if you have a stationary bicycle or treadmill, in a gym, or outside in your neighborhood. Some CLL charities even have exercise videos on their websites. There will be days when you cannot exercise. It's not laziness. Go easy on yourself.

Getting help to navigate your exercise options

If you need help planning your exercise sessions and need advice and guidance on what exercise to do and how often to do it, you may be able to see an **exercise physiologist**. Many exercise physiologists are experienced working with people with cancer. An exercise physiologist can be especially helpful if you haven't exercised for a while and are out of condition.

If you have low hemoglobin levels and have concerns about what exercise may be safest for you, ask your healthcare team.

Complementary therapies

Complementary therapies and practices can be used to help manage the symptoms of CLL, including fatigue. You can read more about these on page 32.

> *"I have found exercise really helpful. And it's often the last thing you want to do but working with a specialist exercise physiologist has been a complete game-changer for me, especially in terms of pacing myself and understanding the importance of that."* **– Giles**

CLL testing

As a person with CLL you are likely to have many different types of tests on your patient journey.

Some of these tests are used to diagnose the disease and you will have had them already. Other tests are used to understand the development of the disease (also called **progression**). Some tests are used to decide on the best kind of therapy for you or to understand if a therapy will be beneficial.

Understanding what these tests are and when they are used can help you feel confident when discussing your condition with your healthcare team.

Tests to diagnose CLL

Blood tests

Full blood count (FBC). A full blood count is usually the first test a person will have. A blood sample is sent to a laboratory where the number and appearance of red blood cells, white blood cells, and platelets are examined.

The results of an FBC may suggest that a person has CLL but they are not enough on their own to confirm the diagnosis.

Blood tests will also be had regularly to monitor the disease.

Peripheral blood smear. This test looks at a blood sample under a microscope. It can help identify abnormal cells that are typical for CLL known as **smudge cells**.

Immunophenotyping. This is the most important test to diagnose CLL. The test looks for **antigens** on the surface of cells or the interior of white blood cells. An antigen is a molecule that stimulates an immune response in your body.

The test is usually done on a blood sample though it can also be done on bone marrow or other body fluids. The laboratory technique used for immunophenotyping is called **flow cytometry**.

If this test is performed on solid tissue, for example a lymph node biopsy in a patient with SLL who does not have CLL cells in their blood stream, then it is called **immunohistochemistry.**

Quantitative immunoglobulin test. This test measures the concentration of immunoglobulins (antibodies) in the blood. People with CLL often have low immunoglobulin levels, which increases the risk of infections.

Other tests to diagnose CLL

Lymph node biopsy. If your lymph nodes are swollen but your blood test results are normal, your doctor may suggest a lymph node biopsy. This is more frequent with SLL.

Medical imaging. CT or MRI scans or other radiography examinations are generally not needed for the diagnosis of CLL. They can be used before and after certain treatments.

Interpreting your blood test results

As a person with CLL, you will have regular blood tests to monitor your general health and the level of CLL cells in your body.

Generally, when CLL progresses, white blood cell counts will rise and the other blood cell counts will fall as they are crowded out and cannot function properly (see page 3).

However, while the FBC is an important test when you are a CLL patient, keep in mind that changes in blood cell counts have many causes including infections, other illnesses, having surgery, or medications. Not every change is necessarily significant or relevant to CLL.

More detailed information on how to read and understand an FBC in the context of CLL can be found on some of the websites of the patient advocacy groups listed at the back of this booklet.

Tests after diagnosis

Bone marrow tests

Sometimes your doctor may want to do **bone marrow tests** as well as a blood test. Bone marrow tests can give more information about the progression of the cancer. These tests might be repeated during or after treatment, too.

There are two different procedures used to get samples for testing and both are usually done at the same time.

- **Bone marrow aspirate** is when some liquid from the bone marrow in your hip is taken out using a syringe. This liquid contains the cells of the bone marrow.
- **Bone marrow biopsy** takes out a very small piece of bone marrow in one piece. This can give information about the structure of the bone marrow.

The procedure is usually done as an outpatient so you can go home afterwards.

Will I feel anything?

The procedure can be uncomfortable or painful for some people and your hip may ache or be bruised for a few days afterwards.

Local anesthetic is used to numb the area and reduce any discomfort you may feel. Sometimes sedation is used to make you more relaxed.

Testing for gene changes

Tests can be done to look for gene changes (**mutations**) in cells. These mutations can mean you have a greater chance of your CLL progressing and needing treatment.

One gene test uses a technique called **FISH** (**f**luorescence **i**n **s**itu **h**ybridization). This test is sometimes called a cytogenetic test or molecular analysis. The FISH test is used to look for specific changes in the **chromosomes** or **DNA** of a cell. It generally uses a blood sample or bone marrow sample.

Some of the genetic changes that happen in CLL include:

- the deletion of part of chromosome 13 [del(13q)], which is found in about half of patients
- the deletion of part of chromosome 11 [del (11q)]
- an extra copy of chromosome 12
- *TP53* gene abnormalities.

These genetic tests help your doctor understand more about your outlook and make decisions about your treatment. This is a complex area. If you are interested in learning more about genes and genetic changes in CLL, some of the recommended resources listed at the back of this booklet have more information.

My questions

Use this space to write questions for your healthcare team about testing…

After diagnosis: what next?

Staging

When you receive a diagnosis of CLL, your doctors will **stage** the cancer. The 'stage' is the growth or spread of the cancer.

Staging is a description of where the cancer is, if and where it has spread, and what other parts of the body are affected. This information comes from some of the tests you have read about in the previous section. Knowing the stage of the cancer can help your healthcare team decide whether to begin treatment and what treatment may be beneficial for you.

Different staging descriptions are used for different cancers; for CLL two systems are used across the world.

- The RAI system is most often used in North America. It describes 5 stages, from 0 (zero) to IV (4).
- The BINET system is most often used in the UK, Australia, and Europe. This system describes 3 stages, A, B, and C.

The following table summarizes the BINET and RAI systems.

Stage	Characteristic	Risk	Likely treatment
BINET A RAI 0	High lymphocyte count. Cancer in fewer than 3 areas of lymph nodes	Low	Active monitoring
BINET B RAI I, II	High lymphocyte count. Cancer in 3 or more areas of lymph nodes	Mid	Supportive care Some treatment
BINET C RAI III-IV	Anemia and/or low levels of platelets. CLL cells fill bone marrow	High	Treatment

My questions

Write any questions you have about staging here…

Active monitoring (watch and wait)

What is active monitoring?

Many people diagnosed with CLL will not receive treatment but will be on active monitoring. Active monitoring usually means seeing your primary care practitioner/general practitioner or hematologist every 3–6 months. They will run a number of tests, including your blood count, and monitor for any changes in your symptoms.

Active monitoring is also called 'watch and wait' or 'watchful waiting'. This period can last for months or it can last for many years.

Managing active monitoring

Being told you have cancer and it can't be cured but you won't be receiving any immediate treatment will very likely be hard for you and your family to understand.

Some people with CLL call this period 'watch and worry' for this reason.

But it's important to remember that some CLL patients don't need treatment for many years and around 30% of people diagnosed with CLL will *never* need any treatment.

And the fact is, there is no benefit to having treatment when it isn't needed. There is strong evidence that starting treatment early doesn't change the progression of CLL. Nor does it improve a person's quality of life.

If you want to understand more about why you are not receiving treatment, ask your primary care practitioner or your specialist healthcare team (see page 30). They will be happy to talk to you about it.

Finding support

Finding someone to talk to, and hearing from other people with CLL, can be a huge benefit.

Patient advocacy groups and patient organizations can be a great source of valuable information and support. You'll find a list at the back of this booklet. There may well be local groups in your region that organize meetings or online events.

You can also choose to look after your own emotional and mental well-being in this period. You'll find helpful tips about this on page 35.

> *"I'm not really a social media person or even a support group person, but I've found the groups so valuable. I think it's just that you're with people who understand how you're feeling, what you're going through. They've helped me a lot."*
> **– Michelle**

YOUR HEALTHCARE TEAM

Your diagnosis and care is likely to involve a full team of medical professionals, all centered around **YOU** and the needs you may have throughout your journey.

You may also receive care and treatment from these **'allied health care professionals'**.

DIETITIAN | EXERCISE PHYSIOLOGIST | COUNSELOR | CLINICAL PSYCHOLOGIST

Living with CLL

While each person's experience of CLL will be individual, a good diet, physical exercise, and stress relief will benefit everybody. This is true if you are on active monitoring or if you're receiving treatment. Patient groups and CLL organizations often have excellent information about supportive treatments.

Diet

There is a lot of evidence that a diet rich in fruit and vegetables along with healthy fats like avocado and olive oil, and fatty fish like salmon and mackerel, with limited amounts of red meat, minimal processed foods, and minimal sugar is helpful for people with cancer of all kinds, including CLL. Eating a nutritious diet will also help increase your energy levels and support your recovery from any treatment.

If you enjoy alcohol, remember to limit your intake to a healthy amount.

If you're having chemotherapy, you may find it more difficult to eat regular meals as the side effects of the treatment may make eating difficult. You may lose your appetite or have nausea. A dietician working with your healthcare team can advise on appropriate foods to eat during this period.

You may also need to supplement your diet with vitamins, particularly when you're undergoing treatment, or your diet is reduced due to treatment side effects. Some vitamins may interact with some therapies however, so tell your healthcare team exactly what you're taking and they can advise you.

Complementary therapies

Complementary therapies are often used by people with cancer alongside conventional treatment to help reduce stress, fatigue, and the impact of any treatment. You may hear complementary therapies referred to as 'alternative' therapies, or 'holistic' therapies.

Practices that people with CLL use to manage their illness include **yoga**, **tai chi**, **pilates**, and **meditation** while therapies include **massage**, **reflexology**, **acupuncture**, and **aromatherapy**. Patient groups will often have information about other complementary therapies that people find useful.

Yoga. There are different aspects to yoga – physical, breathing, and meditation to name three – and many different styles of yoga. All can help energize the body and offer relief from fatigue, pain, stress, and anxiety. Yoga can be done in a class or at home – there are many online yoga teachers offering free or low-cost classes.

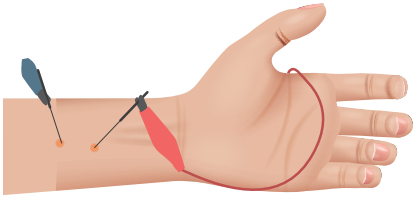
Tai chi is a traditional Chinese martial art that combines slow movements with deep breathing and mental focus. It is an energizing practice that can be done in a class or at home. Studies show that, like yoga, tai chi can help with pain relief, fatigue, sleep problems, and depression.

Pilates. A form of low-impact exercise, similar to yoga, that focuses on balance, posture, strength, and flexibility.

Massage and reflexology. Massage increases blood flow around the body and can ease pain and discomfort and help you feel relaxed. Reflexology works on pressure points in your feet or sometimes your hands. It can also promote a deep feeling of relaxation. While both are generally safe for people with CLL, it's a good idea to find a practitioner who works with people with cancer. Deep tissue massage is not recommended for people with CLL.

Acupuncture uses needles to stimulate pressure points around the body. Electroacupuncture, where a small electric current is passed between two needles, is also used.

Studies have shown that both types of acupuncture can give relief from pain, from vomiting and nausea associated with cancer treatments, and from fatigue.



IMPORTANT: Always use a registered acupuncturist and preferably someone with experience of working with people with cancer. And speak to your healthcare team before starting a program of acupuncture or any other complementary therapy: for some people with a low platelet count, acupuncture may not be suitable.

Aromatherapy. Studies have shown that aromatherapy can relieve stress and anxiety, lower blood pressure, and relieve nausea and headache.

Oils from plants – 'essential oils' – can be applied diluted during a massage by a massage therapist or the scent of the oils can be inhaled, usually by heating the oils to release their perfumes in a diffuser (which can be used with a small candle or be electric) or by inhaling directly from the bottle or a pad with a couple of drops of the oil applied.

Exercise. Regular exercise has a very positive effect on the body and the mind. For more about exercising and how to exercise when you have fatigue, see page 19.

> *"I do pilates, I do some strength work. But I do find the thing that makes me feel better is getting my heart rate up. Good aerobic exercise."* **– Giles**

> *"I find tai chi is really good for my mind, body, and spirit. It turns my head off, which is a perfect result."* **– Leanne**

Psychological support

A diagnosis of CLL can be an enormous shock. Some people say they feel numb with shock. Thoughts and worries about family, relationships, work, finances, and lifestyle can crowd in. The stress of a diagnosis, and its treatment, can lead to sleep problems, a loss of interest in sex, and problems with relationships. If these feelings develop, they can lead to depression.

Finding support at this difficult time can help you, your partner, and close family.

Talking to family and friends

Talking about your health with family and friends may be uncomfortable and difficult for you, but sharing what you know about your condition, and sharing your concerns and how you feel with your family and friends may help them to cope and to better support you.

You may prefer not to talk to everyone in your family or not to tell everyone at the same time.

It's entirely your choice who you tell, what you tell them, and when you tell them.

> *"It can be hard to tell your family because you're worried about the hurt to them, and there's something about the word leukemia that can set people panicking. I don't know... I just think it's hard to tell your spouse and your children that you've got a serious disease."* **– Pat**

Outside the family

You may prefer to talk to someone outside of your family about your concerns, such as your specialist nurse, primary care practitioner, or a religious or spiritual leader. If you prefer to talk to someone you don't know, but who understands what you are going through, your healthcare team may be able to refer you to a counselor. Some cancer charities offer free telephone or online support, too.

Find others in a similar situation

Finding others in a similar situation to you can be an important source of psychological support. Your specialist nurse may know of local support or patient advocacy groups that you can go to. While these groups may not be specific to CLL, they can be a huge help for some people.

With online forums and patient groups, finding other people with the same condition as you is easier than it used to be. A lot of people prefer to make contact online because it's anonymous. There are details at the back of this booklet of support organizations for CLL you may find helpful.

IMPORTANT: It can be comforting to talk to someone who knows what living with cancer is like. However, if you feel worried after a conversation you should seek information and support from your healthcare team.

Effects on professional life and finances

You are not obliged to tell anyone at work about your diagnosis of CLL. However, there are laws in many countries to protect your rights at work and for this reason alone, it is a good idea to contact your human resources department as soon as you can. If your employer knows about your diagnosis, they can make what are sometimes called 'reasonable adjustments'. This means allowing you to take time off work for hospital appointments, to alter your working hours, or to adapt your job description.

You should check patient advocacy groups and support networks in your own country for more specific advice related to work.

Travel

You can travel when you have CLL but it's sensible to be mindful about how you travel and where you go. Airplanes are not recommended for people who are prone to infections, for example. Being within easy access to medical care is important as is preserving your reserves of energy. Patient groups often have excellent advice on how to travel safely and comfortably with CLL.

Starting treatment

Your treatment options

If the time comes to start treatment, the treatment you have will depend on several aspects. These aspects include your age and level of fitness, how the cancer has progressed, genetic test results, any previous treatment for CLL, and any other health conditions you have.

The aims of treatment

For most patients, the aim of treatment is to achieve a **remission** with well-tolerated treatment. Remission means the signs and symptoms of CLL are reduced. You could go back on active monitoring again (see page 28).

Types of treatment

Treatment for CLL is generally **targeted therapies** with or without **chemotherapy**. Many people will receive a combination of both. A very small number of people may be offered a **stem cell transplant**.

Targeted therapies work by 'targeting' the proteins that cause cancer cells to grow and divide. There are many different types. Most targeted therapies are **small-molecule drugs** or **monoclonal antibodies**.

- **Small-molecule drugs** are small enough to enter cancer cells and target enzymes inside the cells. They are also called **inhibitors**.
- **Monoclonal antibodies** work by targeting antigens found on the cancer cells.

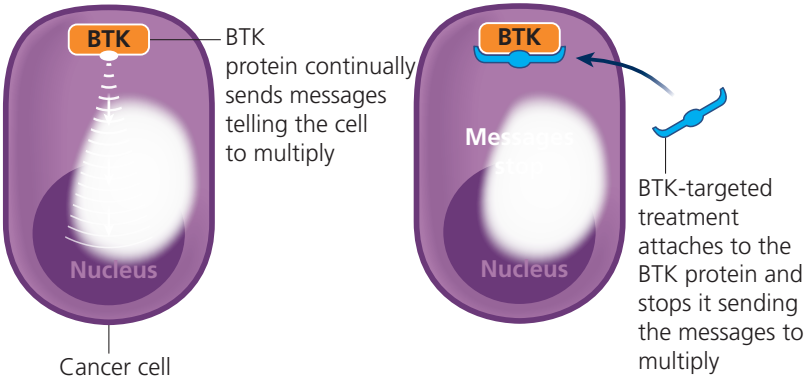
Chemotherapy drugs. Chemotherapy works by killing cells that multiply rapidly. This includes cancer cells.

These days, it is very unusual for chemotherapy to be used by itself to treat CLL. It is usually used in combination with a monoclonal antibody. This combination treatment is called **chemoimmunotherapy**.

More about inhibitors

Inhibitors are one kind of targeted therapy. There are three different classes of inhibitors. They work differently and they target different pathways in the cell. A pathway is a series of actions involving molecules in a cell that leads to a certain product being made or to a change in the cell. There are many types of biological pathways. If your CLL becomes resistant to an inhibitor that targets one pathway of cell function, it may still respond to the others.

BTK inhibitors are commonly used as first-line therapy in CLL, and to treat recurring/relapsing CLL. BTK inhibitors target a protein called Bruton's tyrosine kinase (BTK). BTK is involved in sending signals to a cell to make it divide and it plays a key role in B cell growth. BTK inhibitors are drugs that can block the signals sent by BTK and so can stop cells multiplying.



There may be multiple drug options within a class of pathway inhibitor. These drugs may differ in how effective they are against your disease, and they may have different effect profiles. Your doctor will discuss with you which one of them might suit you best.

The treatment landscape for CLL is developing quickly. The information in this booklet was correct when it was published. Drug developments and therapy approval will change as more clinical trials are conducted.

You will find more detailed information about CLL treatment and therapy combinations on the patient resource websites listed at the end of this booklet.

My questions

Questions for your doctor about your treatment for CLL may include...

What is the aim of this treatment?

How and when do I take this treatment?

For how long will I take the treatment?

Can I continue to take other prescribed drugs?

Can I continue to take vitamins and minerals?

CONTD

What should I do if I forget to take a dose?

What should I do if I am sick after taking a dose?

What should I do if I have difficulty swallowing it?

What are the most common side effects?

What can I do to manage the side effects?

How will you monitor me when I am on the treatment?

How do we know that the treatment is working?

What are the risks of this treatment in light of my overall health and age?

How do the outcome and side effects of this treatment compare to other treatments for CLL?

Stem cell transplant

A stem cell transplant is not common as a treatment for CLL and is generally only suggested for younger, fitter patients. Because it is uncommon and will not be offered to many patients, we haven't included any details about the process here. You can find information about the procedure on many of the resource websites listed at the end of this booklet.

New developments in treatment

If you are interested in new treatments, you may want to ask your doctor about **clinical trials**.

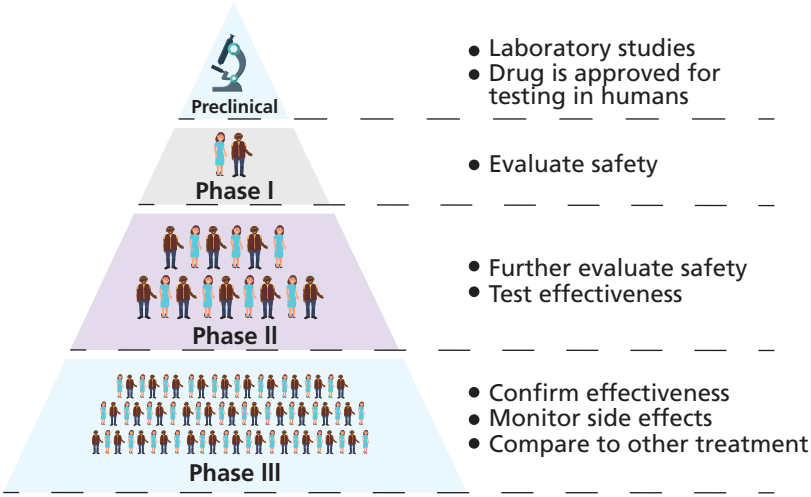
A new treatment must go through several phases of testing before it can be proven to work better than, or as well as, existing treatment and be adopted into routine care. 'Adopted into routine care' means it can be prescribed as treatment for the condition it was tested for. A potential treatment will only move on to the next phase of research if it is safe and shows promise.

Clinical trial phases

Phase I. The first stage is to make sure a new treatment is safe. These trials are usually small, with only a few people in each one.

Phase II. These trials are larger. In a phase II trial, the safety of the potential new treatment continues to be evaluated. The drug is also evaluated to see if it will be effective for a particular medical condition.

Phase III. These trials test the new treatment against the standard existing treatment to see which works best. These are the largest trials and are often international, particularly for rare conditions.



Phase III trials are usually randomized. In randomized trials, patients are put into different groups. A computer is used to decide who is in which group. Neither you nor the researchers can choose which group you are in, and you may never know which group you were allocated to. You may be in the group not receiving the new trial treatment. If you are not receiving the trial drug you will receive a placebo in addition to standard treatment, so your care is not affected. Randomizing means that the researchers can be more certain that differences in the results at the end of the trial are caused by the treatment being tested and not any other reason.

Phase IV. These are 'real world' data collections which take place after the drug has been approved and is being prescribed.

When treatment is successful

Remission

When treatment for CLL is successful, your cancer is in **remission**. There are two categories of remission.

- **Complete remission** (CR) – you have no evidence of CLL cells or enlarged lymph nodes.
- **Partial remission** (PR) – you have a reduced number of CLL cells in your blood or bone marrow and your lymph nodes are smaller.

When CLL comes back

Relapse

If the CLL comes back after 6 or more months of remission, it's called a **relapse**. This can be a great shock, but there are many treatment options. Depending on your test results, your doctor may decide that you can return to active monitoring (watch and wait) or you may be offered more treatment immediately.

Treatment after relapse

When cancer has relapsed, the treatment you receive is called **second-line treatment**.

Many therapies and therapy combinations that are already available as first-line treatment (see page 38) also have approval as second-line treatment.

In addition, there are drugs that haven't been approved to treat CLL (they are approved to treat a different condition) but are also thought to be helpful for treating CLL.

You may also be eligible for experimental therapy in a clinical trial (see page 42).

Guide to words and phrases

Active monitoring: Closely monitoring a patient's condition but not giving treatment unless symptoms appear or change. Other terms for active monitoring are watchful waiting, and watch and wait.

Antibody: A protein made by white blood cells in response to an antigen.

Antigen: Anything that comes from outside of the body, e.g., toxins, viruses, and bacteria, and which causes the body's immune system to respond.

Asymptomatic: No symptoms, feeling well.

B lymphocyte: A type of white blood cell that makes antibodies.

Basophil: A type of white blood cell with granules that release enzymes during an allergic reaction and asthma to reduce the impact of the reaction.

Biopsy: When cells or tissue are taken from your body for examination.

Bone marrow: The soft, spongy tissue found in the center of most bones and where blood cells are made.

Chemoimmunotherapy: A treatment that involves both chemotherapy and immunotherapy.

Chemotherapy: A treatment that kills cancer cells or stops them from dividing.

Chronic: Describes something like an infection, disease, or pain that continues or gets worse over a long time.

Chromosomes: Parts of a cell that contain genetic information.

DNA: Deoxyribonucleic acid. The molecules in a cell that carry genetic information.

Eosinophil: A type of white blood cell with granules that release enzymes during an allergic reaction, infection and asthma.

FISH: A laboratory test that looks at genes in samples of tissue or cells. Used to diagnose CLL and other cancers and to plan treatment. Also called fluorescence in situ hybridization.

Fatigue: Extreme tiredness, both physical and mental.

First-line treatment/therapy: The first treatment received for a disease. Also called primary treatment/ therapy.

Flow cytometry: A laboratory analysis that looks at the number, type, and size of cells in a sample. Used to diagnose and manage CLL and other diseases.

Granulocyte: A type of white blood cell that has granules with enzymes that are released during infections, allergic reactions, and asthma. Neutrophils, eosinophils, and basophils are granulocytes.

Immunoglobulin: A type of protein made by B lymphocytes that acts as an antibody. Found in serum and other tissues and body fluids such as urine, spinal fluid, lymph nodes, and spleen.

IGHV: A gene that contains instructions for making a part of immunoglobulin proteins (also known as antibodies). In CLL, these genes are either mutated or unmutated.

Immunophenotyping: A process that uses antibodies to identify cells based on the types of antigens or markers on the surface of the cells.

Immunohistochemistry: A laboratory test to check for antigens in a sample of tissue. The test is used to test for cancer and to differentiate between different cancers.

Inhibitors: Inhibitors are targeted drugs which block the signals that make cells grow.

Leukocyte: A type of white blood cell; the immune system's primary defense against infection.

Lymphatic system: A large network of vessels, organs, and nodes that carry a clear fluid called lymph, which contains white blood cells and antibodies.

Lymphocyte: A type of white blood cell.

Lymphoid tissue: Part of the lymphatic system and present throughout the body. It includes lymph nodes, spleen, tonsils, adenoids, and other structures.

Monoclonal antibody: A single type of antibody targeted against a specific antigen that is made in large quantities in a laboratory and used as a medical treatment.

Monocyte: A type of white blood cell.

Mutation: Any change in the DNA sequence of a cell.

Neutrophil: A type of white blood cell.

P53: A gene that makes a protein that is found inside the nucleus of cells and plays an important role in controlling cell division and cell death.

Pathogens: Viruses, bacteria, or other microorganisms that can cause disease.

Pathway: A biological pathway is a series of actions involving molecules in a cell that leads to a certain product being made or to a change in the cell.

Peripheral blood smear: A procedure in which a sample of blood is viewed under a microscope to count different types of circulating blood cells.

Plasma: The liquid portion of blood.

Platelets: Components in the blood that help the blood to clot.

Progression: Describes the worsening of a disease over time.

Red blood cell: A type of blood cell made in the bone marrow. Red blood cells contain hemoglobin, which carries oxygen from the lungs to the rest of the body.

Relapse: The return of a disease or the signs and symptoms of a disease after previously improving.

Remission: A decrease in or disappearance of signs and symptoms of cancer. In partial remission, some, but not all, signs and symptoms of cancer have disappeared. In complete remission, all signs and symptoms of cancer have disappeared, although cancer may still be in the body.

Second-line treatment: Treatment used against a disease after the first choice of treatment has failed or no longer works.

SLL: Small lymphocytic lymphoma.

Small-molecule drugs: A type of anticancer drugs that inhibit certain proteins in cancer cells.

Staging: Tests and examinations to find out if the cancer has spread and to what extent.

Stem cell: A cell from which other types of cells develop. For example, blood cells develop from blood-forming stem cells.

Targeted therapy: A type of treatment that uses drugs or other substances – usually monoclonal antibodies or small-molecule drugs – to target specific molecules that cancer cells need to survive and spread.

TP53: Another name for the p53 gene.

Watch and wait: Another name for active monitoring.

Useful resources

American Cancer Society
cancer.org

Blood Cancer UK
bloodcancer.org.uk

Cancer Research UK
cancerresearchuk.org

CLL Society
cllsociety.org

CLL Support
cllsupport.org.uk

Leukaemia Foundation
leukaemia.org.au

Leukemia & Lymphoma Society
lls.org

Macmillan Cancer Support
macmillan.org.uk

National Cancer Institute Dictionary of Cancer Terms
cancer.gov/publications/dictionaries/cancer-terms/

UKCLL Forum
ukcllforum.org

Discussion forums and patient support groups
healthunlocked.com/cllsupport
forum.bloodcancer.org.uk

Fast Facts for Patients

Oncology

Kathryn Huntley
CLL Advocates Network

Professor Anna Schuh
University of Oxford, Oxford, UK

Dr Alessandra Tedeschi
Grande Ospedale Metropolitano Niguarda, Milan, Italy

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Oncology

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Hematology

Fast Facts for Patients

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