

Leukaemia: how pharmacy can support patients

- What leukaemia is and the parts of the body it can affect
- The different types of leukaemia and their risk factors
- How the condition presents and is diagnosed
- The support pharmacists can provide, including signposting to sources of reliable information

Leukaemia is a cancer of the blood-forming tissue. It usually starts in the bone marrow and results in the overproduction of abnormal leucocytes (white blood cells), which do not die when they should. This leads to an accumulation of leucocytes, occupying the space of healthy blood cells.

Although no tumours are formed in this type of cancer of the blood, these abnormal leucocytes – known as blasts – continue to grow and divide, eventually preventing the normal blood cells from functioning. This makes it difficult for the body to fight infection, control bleeding and transport oxygen. The leucocyte cells gradually replace the bone marrow and can extend into the peripheral circulation, potentially affecting the:

- lymph nodes
- spleen
- liver
- testes
- membranes surrounding the brain and spinal cord
- gums
- skin.

Around 8,000 people are diagnosed with some form of leukaemia every year in the UK.

There are several subtypes, and they are defined by whether they develop quickly (acute) or slowly (chronic). These subtypes are further defined by the type of white blood cell affected.

Although the different subtypes of leukaemia affect different demographics, Cancer Research UK found that, in general, incidence is highest in two groups: the elderly population, aged 85-89 years; and children aged nought to four years. Leukaemia also tends to be more common in men than in women, with white males affected more than other groups.

The fast progression of acute leukaemia means that a late diagnosis can affect survival rates. While chronic leukaemia progresses

slowly, an earlier diagnosis ensures a higher quality of life. The acute forms of leukaemia are generally treated urgently with chemotherapy.

The four most common subtypes of leukaemia are set out below:

This is most commonly diagnosed in children between the ages of two and five years old. Three in four childhood leukaemia cases are ALL.

Standard treatments for ALL are very effective in children. ALL chemotherapy treatment spans five phases (induction, consolidation, interim maintenance, delayed intensification and maintenance). The whole treatment process has a typical duration of between two to three years.

Some of the chemotherapy medications that may be used are:

- pegaspargase
- vincristine
- mercaptopurine
- methotrexate
- doxorubicin
- cytarabine
- cyclophosphamide
- a steroid – usually dexamethasone.

Cancer Research UK has created a list of medicines frequently used in cancer (available at [tinyurl.com/CRUKlist](https://www.cancerresearchuk.org/infancia/treatment/medicines)) that is useful as a referral source for pharmacists, as well as when providing simplified explanations to patients about their treatment.

The average age at diagnosis for this form of leukaemia is between 65 and 70 years old. The survival rates for AML are significantly higher with early diagnosis.

Treatment of AML involves an induction phase, followed by a consolidation phase of treatment – usually using cytarabine with an anthracycline such as daunorubicin, doxorubicin or idarubicin. Other treatment options could include etoposide or thioguanine.



Chronic lymphocytic leukaemia (CLL)

The average age of diagnosis of CLL is over 70 years old. The condition can be maintained, and symptoms minimised, but typically it is incurable.

Normally, no treatment is required immediately, and a 'watch and wait' approach is often adopted. You should be aware that this can cause anxiety for patients, who may be concerned their condition is not being treated.

If chemotherapy is required then the drugs normally used include: chlorambucil; fludarabine; cyclophosphamide; bendamustine; or sometimes a combination of cyclophosphamide, doxorubicin (hydroxydaunomycin) and vincristine (Oncovin) with oral prednisolone – this latter combination of treatments is usually referred to as CHOP chemotherapy.

Chronic myeloid leukaemia (CML)

The average age of diagnosis for this form of leukaemia is between 60 and 65 years old.

Most patients who are diagnosed with CML have a normal life span and maintain a good quality of life with treatment.

CML is normally treated immediately with a tyrosine kinase (TK) inhibitor such as imatinib. Chemotherapy in the form of hydroxycarbamide may also be used. If the cancer is unresponsive to this then it may be treated as an acute form, using similar drugs to AML treatment.

What other treatments are available?

Other treatment options for the various forms of leukaemia are:

- **bone marrow or stem cell transplant** may be required if chemotherapy is not successful at preventing relapse and the patient is healthy enough to undergo this process
- **radiation therapy** is usually only used to allow for stem cell transplant or to treat local disease
- **supportive care** typically involves preventative antibiotic therapy and blood transfusions.

What are the risk factors for developing leukaemia?

The cause of leukaemia is still unknown and there is currently no way to prevent it. However, there are several factors – some of which are modifiable – that are recognised as increasing a person's risk of developing the various subtypes of this cancer. You should bear in mind that the presence of a risk factor does not mean leukaemia is certain to occur, nor does the lack of a risk factor mean it will not.

Known risk factors include:

- **gender** – men are more likely to develop CML, CLL and AML than women
- **age** – the risk of most leukaemias, except for ALL, increases with age
- **family history** – most leukaemias are not caused by an inherited faulty gene; however,

being a first-degree relative of a CLL patient, or having an identical twin who has or had AML or ALL, increases the likelihood of developing the disease

- **genetic diseases** – certain genetic abnormalities, such as Down's syndrome, may play a role in the development of ALL or AML
- **smoking** – cigarettes increase the risk of developing AML
- **previous cancer treatment** – certain types of chemotherapy and radiation therapy for other cancers are considered risk factors for AML
- **chemical exposure** – in very rare cases, ALL, AML or CLL may occur in people who have had long-term exposure to certain pesticides or industrial chemicals, such as benzene
- **radiation** – the risk of ALL and AML is increased by exposure to extremely high

doses of radiation (eg atom bomb explosion); however, it is not clear how much lower levels of radiation – such as x-rays (including of the foetus in the first few months of development) – increases the risk and so it is advisable to limit a person's radiation exposure as much as possible.

How does leukaemia present?

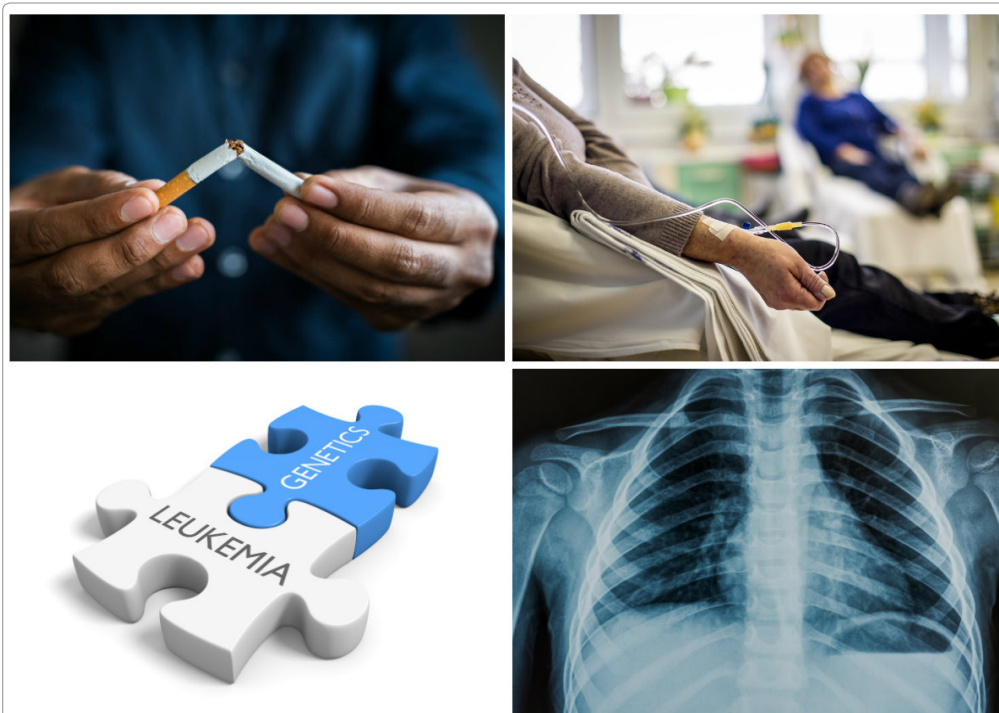
It is vital for pharmacy professionals to be aware of the initial presentation of leukaemia, as the patient's first stop may well be the pharmacy, for what they consider to be a minor ailment.

The importance of being able to piece together the other symptoms to ensure appropriate and urgent referral is key to ensuring a good outcome for the patient, due to early treatment.

The initial presentation of all subtypes of leukaemia is similar. This is due to damaged blood cells and reduced blood cell production resulting in bone marrow suppression. The most common symptoms include:

- fatigue
- shortness of breath
- fever and night sweats
- bruising or bleeding (including bleeding gums or nosebleeds)
- joint, muscle or bone pain (including back pain)
- sleeping problems
- recurrent infections
- pale skin
- red or purple spots on the skin (petechiae)
- swollen lymph nodes
- stomach discomfort (caused by swelling of the liver or spleen)
- nausea or vomiting
- numbness in hands or feet
- heart palpitations
- loss of concentration
- itchy skin
- weight loss.

In rare cases, the affected cells can spread into the central nervous system, causing symptoms such as headaches, fits/seizures, vomiting, blurred vision and/or dizziness.



There are several factors that increase the risk of developing the various subtypes of leukaemia, including: smoking, previous cancer treatment, exposure to high levels of radiation and genetics

How is the condition recognised and diagnosed?

If a patient presents with any of the symptoms listed above, they should be referred immediately, as they will require an urgent, full blood count within 48 hours.

If the results from the blood test indicate an abnormal level of white blood cells (either very high or very low), then the patient is typically referred to a haematologist for a bone marrow biopsy. This biopsy takes around 15 minutes and involves taking a sample of marrow from the hip bone. This sample will be examined – using genetic testing among other techniques – to determine the type and grade of the leukaemia.

For all types of leukaemia, biopsies may be carried out on any enlarged lymph nodes that are present. CT scans, chest x-rays and echocardiograms may be carried out to determine if the cancer has spread and to check the health of the organs ahead of treatment.

Quite often there is a risk that the leukaemia

has spread to the nervous system – this usually requires a lumbar puncture to confirm.

What complications exist with this condition?

A high risk of neutropenia – with subsequent infection – exists for patients. This is due to both the prolonged low levels of blasts caused by the illness and the associated treatment. This means that leukaemia patients are particularly at risk of bacterial, viral and fungal infections.

Symptoms of neutropenia can include:

- high temperature of 38°C or above
- chills and shivering
- mouth sores that return
- gingival pain and swelling
- odynophagia (painful swallowing)
- skin abscesses or rash
- recurrent sinusitis and otitis
- symptoms of pneumonia (eg cough, dyspnoea).

It is important patients and those around them (eg carers) are aware of the risk of infection. Hand

washing is particularly essential for the patient – as well as for visitors and the healthcare professionals dealing with them – and should always take place ahead of contact.

The side effects of the chemotherapy required for treatment include: nausea; vomiting; diarrhoea; loss of appetite; sore mouth and mouth ulcers (mucositis); tiredness; skin rashes; hair loss and infertility; which may be temporary or permanent. If the patient has had radiotherapy, it can result in hair loss, nausea and fatigue. For more information on how you can help patients with their chemotherapy, see C+D's Update module *Coping with chemotherapy* at tinyurl.com/CDcopingchemo.

The doses of steroids taken during the chemotherapy can cause the patient to experience a range of side effects, including:

- hyperglycaemia
- an increased appetite, resulting in weight gain
- water retention, with a swollen puffy face
- myopathy, which may cause anxiety if the patient thinks it is a symptom of cancer
- mood changes, which patients may not put down to their medication.

Pharmacy support

In the community setting, pharmacy professionals may not have access to patient records to enable them to immediately recognise that an individual or their relative has leukaemia. If you have been made aware, then there are many counselling and discussion points that can help you support them.

Firstly, a good consultation should take place in the consultation room, to allow for privacy during your discussion. However, be careful not to shake hands, in case you are transmitting germs from other customers to these – often immunocompromised – patients.

Asking how the patient or carer is managing with the condition or diagnosis is a good opportunity for them to talk objectively about how they are feeling and provides them with an understanding, listening ear.

You should check that the patient or carer



Patients should use a thermometer to monitor any changes in their body temperature – as this may be a sign of neutropenia

knows they should be checking for signs of infection. Make sure they are using a thermometer and in the event of even a slight increase in temperature, you should encourage them to seek treatment if an infection is suspected.

Adults may be directed straight to A&E and children may have an option to be admitted directly to a ward. Prior to referral, patients should not be offered paracetamol to control their temperature, as this may mask the signs of a growing infection.

Supporting patients with the side effects of their medication can be beneficial for them. For example, patients may require emollients for any rashes that appear – these should be fragrance-free, paraben-free and alcohol-free.

You could also support patients with advice about suitable mouthcare and oral hygiene to help prevent mucositis (painful ulceration and inflammation of the mucous membranes), infections and oral thrush. Advise patients to use a soft toothbrush twice a day. Soft, moist foods are advisable and chewing gum through the day can also help to keep the mouth hydrated.

It is important you offer the patient, their carer and close contacts a flu vaccination, but this cannot be a live vaccine (such as an intranasal



If a patient's symptoms suggest leukaemia, then they should have a blood test carried out urgently

formulation) and the vaccine should not be administered when they are neutropenic.

Due to their compromised immune system, it is advisable to discuss food risks with patients. Suggest they avoid unpasteurised foods, raw meat, unwashed fruit and vegetables, reheated rice, soft cheeses, undercooked eggs and fish.

While the patient may not feel like exercising, research has shown that trying to stay active even when feeling fatigued can improve mood and wellbeing, as well as improving symptoms of constipation. It is therefore useful to suggest they try this whenever they feel up to it.

Many carers or patients may consider complementary therapies, such as massage or meditation. While these will not cause harm and may improve relaxation and wellbeing, they will not improve the cancer.

Patients may ask about herbal remedies and



Leukaemia patients – and carers – should be offered the flu vaccination, but this cannot be the live vaccine or given when patients are neutropenic

it is important to help them to understand the risks of including these alongside their standard medical therapy. Garlic and cod-liver oil have blood-thinning effects, which could interfere with some of their treatment, while St John's wort could interact with their medication, as it is an enzyme inducer.

Echinacea should not be recommended either, as it may have an effect on the immune system. Milk thistle is thought to protect the liver, but there is insufficient evidence to determine if it will interfere with treatment, so is best avoided.

Signposting for support

Leukaemia can be a traumatic disease to deal with, both for the patient and those close to them. The pharmacy team can support those affected by leukaemia by ensuring they are aware of the signposting options available.

Patients may need financial support and Macmillan (www.macmillan.org.uk) is proficient in providing this information.

Cancer is considered a disability under the Equality Act, so employers and places of study are required by law to make adjustments and cannot discriminate against patients or their carers. In addition, individuals with cancer aged 16-64 years can claim a disability living allowance. Once diagnosed with leukaemia, remind patients to obtain an exemption certificate if they normally pay for their prescriptions, to allow them access to free medication.

Other than Macmillan, there are other informative and useful charities and support groups available to patients, their carers and relatives, such as Leukaemia Care (www.leukaemiacare.org.uk) and Bloodwise (bloodwise.org.uk).

Leukaemia: how pharmacy can support patients CPD

Reflect

Which blood cells does leukaemia affect? What type of leukaemia may not require immediate treatment? What are the symptoms of neutropenia?

Plan

This article contains information about the four most common types of leukaemia and their risk factors, as well as the presenting symptoms, diagnosis and complications of the condition. The support pharmacists can provide, including signposting patients to sources of reliable information, is also discussed.

Act

- Find out more about leukaemia on the Leukaemia Care website at tinyurl.com/leukaemia1
- Read the advice from the Oxford Radcliffe Hospital about coping with the side effects of chemotherapy at tinyurl.com/leukaemia2
- Find out about reliable sources of information for patients and carers such as Bloodwise at tinyurl.com/leukaemia3 and Macmillan Cancer Support at tinyurl.com/leukaemia4

Evaluate

Are you now confident in your knowledge of the most common forms of leukaemia and how they present? Do you know where to signpost patients and carers asking about advice and support?

Take the 5-minute test online

- Around 8,000 people are diagnosed with some form of leukaemia every year in the UK.
True or false
- Leukaemia is more common in women than in men.
True or false
- The average age at diagnosis for acute lymphoblastic leukaemia is between 65 and 70 years old.
True or false
- Acute myeloid leukaemia is most commonly diagnosed in children between the ages of two and five years.
True or false
- A 'watch and wait' approach is often adopted in the treatment of chronic myeloid leukaemia.
True or false
- Chronic lymphocytic leukaemia is normally treated with a tyrosine kinase inhibitor.
True or false
- Certain types of chemotherapy and radiation therapy for other cancers are considered risk factors for acute myeloid leukaemia.
True or false
- Common symptoms seen in the initial presentation of leukaemia include: fatigue; shortness of breath; bruising or bleeding; and joint, muscle or bone pain.
True or false
- The annual flu vaccine is not recommended for patients being treated for leukaemia.
True or false
- Patients with leukaemia aged 16-64 years can claim a disability living allowance.
True or false