

# Patient information from BMJ

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## Leukemia (acute lymphocytic)

**Acute lymphocytic leukemia is a type of cancer that affects the blood. It is rare, but it is the most common type of leukemia in children. Most children recover with treatment, but the outlook is less good for adults.**

### What is acute lymphocytic leukemia?

Acute lymphocytic leukemia (ALL) is a type of cancer that starts in the bone marrow. It is very rare in adults. About three quarters of people who get ALL are children under five years old.

Leukemia is often called “cancer of the blood” because it affects blood cells. Blood cells are made in bone marrow in the middle of our long bones, and we have three types:

- red cells carry oxygen around the body
- white cells help fight infection
- platelets help with blood clotting when we have a wound.

If you have ALL, the white blood cells don't work properly and can't fight infection as well as they should. This makes you more likely to get serious infections.

With ALL, the white cells also grow out of control so that there are too many of them and not enough red cells and platelets. This means that not enough oxygen gets around your body to your organs.

The cause of ALL is not always clear. But possible causes include:

- the genes you inherit from your parents
- smoking
- a viral infection, and
- exposure to radiation.

### What are the symptoms?

The symptoms of ALL usually appear over several weeks. They can include:

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- fatigue (tiredness)
- shortness of breath
- bleeding and easy bruising
- recurrent infections, which may cause fever
- changes in skin color
- a red or purple rash
- abdominal pain
- painful bones
- enlarged lymph nodes. The lymph nodes are glands in various parts of the body. Swollen lymph nodes are often most obvious in the armpits, groin, neck, and under the chin.

ALL usually occurs in very young children, who may either be too young to talk at all, or to describe their symptoms clearly. So if you notice these symptoms in your child, get medical help right away.

ALL is very rare, so a child with a few of these symptoms is unlikely to have it. But any child with these symptoms still needs to see a doctor.

If your doctor thinks that your child (or you) has ALL, he or she will want to do some tests. These might include:

- blood tests
- bone marrow tests. This involves taking a small part of the soft bone marrow using a needle. This is done under local anesthetic to reduce pain
- scans, such as a chest x-ray.

These tests can tell whether someone definitely has ALL. They can also detect complications, such as fluid building up around the lungs, that might need treatment.

## What treatments are available?

### Chemotherapy

The main treatment for ALL is chemotherapy. Chemotherapy drugs are medications that kill cancer cells.

There are three stages of chemotherapy treatment for ALL:

- **Induction.** This first stage of treatment aims to kill all the cancer cells in the bone marrow.
- **Consolidation** is the second stage of treatment. The aim is to kill any cancer cells that have survived the first round of treatment or that are hard to detect on tests.
- **Maintenance** is the third stage. It is longer-term treatment that helps stop the leukemia from returning.

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The three stages might involve different treatments. For example, induction treatment is given in the hospital or in a specialist cancer center, while some treatments in the consolidation and maintenance stages can be taken as outpatients, especially for older children and adults.

Many of the medications in this first stage will probably be given as injections and possibly as intravenous (IV) drips, while older children and adults may also be able to take some of these stage-two and stage-three treatments as pills.

Unfortunately, chemotherapy causes some side effects in almost everyone. But not everyone gets the same ones, and some people are less badly affected than others. Possible side effects of chemotherapy can include:

- nausea and vomiting
- changes in bowel habits, such as diarrhea or constipation
- loss of appetite
- mouth ulcers
- fatigue (tiredness)
- skin rashes
- hair loss
- infertility
- bruising and bleeding.

Nearly all these side effects are temporary and end when the treatment ends. But infertility caused by chemotherapy is often permanent. Adults with ALL can talk with their doctor about possible treatment options if you are concerned about the effect on fertility.

### **Other treatments alongside chemotherapy**

While having chemotherapy, people with ALL might need other treatments, including:

- intravenous (IV) fluids, to prevent dehydration
- platelet and red blood cell transfusions, to help maintain the balance of the different types of cells in your blood
- medications to help prevent infections. These might include antibiotics to kill bacteria, antifungals for fungal infections, and antivirals to fight viruses.

### **Stem cell transplantation**

Some people might also need stem cell transplantation. This involves taking cells from the bone marrow of a donor. These cells should help to grow new, healthy white blood cells.

Stem cell transplantation is usually used when there is thought to be a strong chance of the cancer returning after chemotherapy.

Stem cell donors are usually relatives, preferably siblings (brothers or sisters), because their cells will be a good match. But they can just be people whose bone marrow matches that of the person with ALL.

## Immunotherapy

Unfortunately, chemotherapy doesn't always work. When this happens, one possible option is a treatment called immunotherapy. Immunotherapy drugs help the body's immune system to fight cancer.

Immunotherapy isn't suitable for everyone. But you can discuss with your doctor what the best options are for you or your child.

## What to expect in the future

Treatment for most types of cancer is improving all the time. But ALL is a serious illness, and the treatment doesn't always work.

Survival rates for ALL depend very much on age. Younger people have the best chance of remission and recovery. Remission means that the cancer is gone after treatment, but that it could still come back. ALL that comes back after remission is hard to treat.

- More than half of people aged under 55 years will be alive 5 years having treatment.
- About 30 in 100 people aged between 55 and 64 will be alive 5 years later.
- Less than 20 in 100 people aged 5 and over will be alive 5 years later.

Remember, these numbers don't mean that people are only expected to live for 5 years after treatment. They just mean that studies longer than 5 years are difficult to do, because it's hard to keep track of people for longer than that.

You might find it useful to contact an organization that helps people with leukemia and their families. Your doctor might be able to put you in touch with such an organization in your area, or you could search online.

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