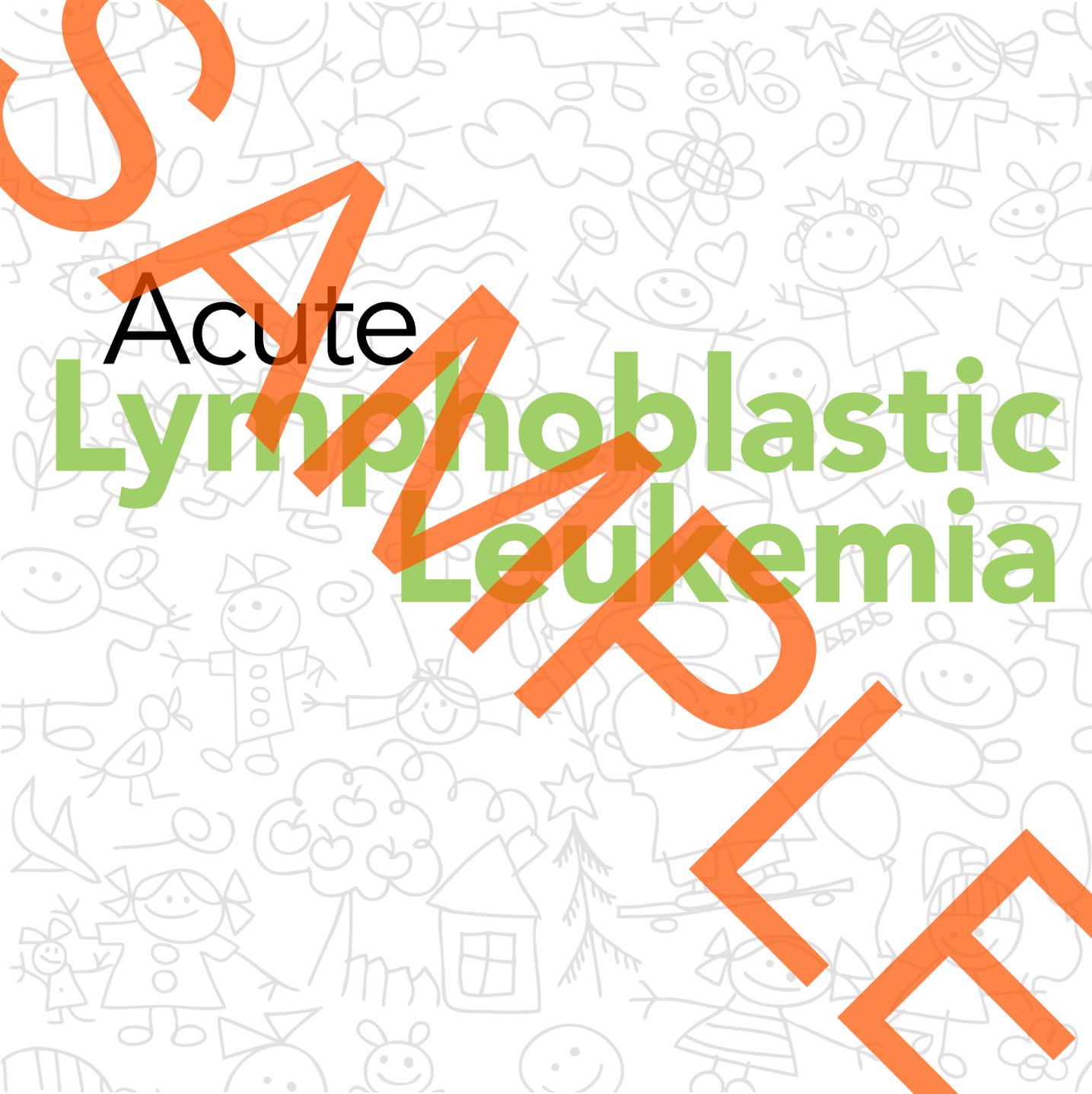




Acute  
**Lymphoblastic  
Leukemia**



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# ACUTE LYMPHOBLASTIC LEUKEMIA

## A Handbook for Families

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## WHAT IS LEUKEMIA?

*Leukemia* is a cancer of the blood and bone marrow. The bone marrow is the soft, spongy tissue found inside of bones where normal blood cells are made. The blood cells that are made in the bone marrow include the white blood cells (WBCs), red blood cells (RBCs), and platelets.

Each type of blood cell has its own job in the body. WBCs are the infection-fighting cells. RBCs provide oxygen and energy to the body. Platelets help blood to clot; the blood's ability to clot is important during certain situations, such as when you have a cut.

Leukemia occurs as a result of abnormal growth of immature blood cells. These cells are called *blast cells*. These immature cells grow out of control, crowd-out the normal cells (WBCs, RBCs, and platelets) in the bone marrow, and eventually spill out into the bloodstream. As a result, leukemia may be found in other parts of the body such as the lymph nodes, liver, spleen, central nervous system (which is the brain and spinal cord), testicles, skin, or other organs.

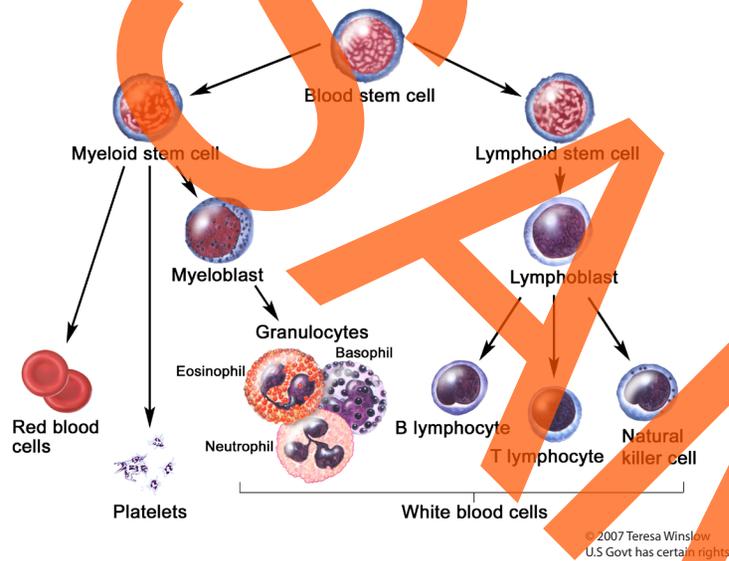
### Bone marrow

To understand leukemia better, it is important to look at the function of the bone marrow in more detail. The bone marrow is responsible for the development of blood cells and the immune system. Bone marrow produces stem cells, which are the cells that all of our blood cells come from; sometimes they are called "mother" cells. Stem cells mature into two different types of cells: lymphoid cells or myeloid cells.

Lymphoid stem cells further develop into lymphocytes. These cells make up the body's immune system, which is important in fighting infection and attacking cancer cells. Myeloid cells further develop into RBCs, platelets, or other types of WBCs called *granulocytes*.

Leukemia occurs in cells that develop from either the lymphoid or myeloid cell line.

## Blood Cell Development



## White blood cells (WBCs)

WBCs, also called *leukocytes*, help to defend the body against infections. Infections can be caused by bacteria, viruses, and fungus. The three different types of WBCs are lymphocytes, granulocytes, and monocytes.

*Lymphocytes* are a type of WBC that help to fight infections. The three types of lymphocytes are B lymphocytes (B cells), T lymphocytes (T cells), or natural killer cells (NK cells). B cells and T cells help the body by developing antibodies to fight infection. NK cells fight viruses and attack cancer cells.

*Granulocytes* are a type of WBC that develop from the myeloid stem cell. They are white cells that help destroy infections caused by bacteria.

*Monocytes* are a third type of WBC that are related to granulocytes. Monocytes help fight against bacteria by surrounding and digesting them. They also help lymphocytes to identify germs.

## Red blood cells (RBCs)

RBCs carry oxygen to all of the cells in the body. If the amount of RBCs is low, a child may look pale and feel tired and/or have headaches, dizziness, a fast heart beat, or shortness of breath. The amount of RBCs is measured by the hemoglobin level blood test. A low level of RBCs is called *anemia*.

## Platelets

Platelets are the blood-clotting cells that are needed to stop bleeding and form a clot. If the level of platelets in the blood is low, there is an increased chance of bleeding and bruising. A rash that looks like small red-purple freckles may also be seen. These freckles are called *petechiae*. A low level of platelets is called *thrombocytopenia*.

## WHAT ARE THE TYPES OF LEUKEMIA?

There are several different types of leukemia, with two main classifications based on how quickly cells grow: acute leukemia and chronic leukemia.

Acute leukemia develops from young, immature cells called *blasts*. The *blast* cells divide frequently, causing the leukemia cells to grow and accumulate very quickly. The main types of acute leukemia are acute lymphoblastic leukemia (ALL) and acute myeloid leukemia (AML).

- ALL is a cancer that occurs in the lymphocytes, affecting either the T or B lymphocytes. This is the most common type of childhood leukemia.
- AML is a cancer that occurs in the myeloid cells, usually affecting the WBCs; however, in some cases, it may involve the RBCs or platelets.
- *Biphenotypic leukemia*, which is less common, is a cancer that has features of both ALL and AML.

Chronic leukemia develops more slowly and occurs in more mature, abnormal cells. This type of leukemia is seen more often in adults than in children. The two main types of chronic leukemia are chronic myelogenous leukemia (CML) and chronic lymphoblastic leukemia (CLL). Treatment for chronic leukemia is very different than treatment for acute leukemia, and it is not discussed in this booklet.