

## Patient Education

# WHAT IS ACUTE MYELOID LEUKEMIA?

Acute myeloid leukemia (AML) is the most common acute leukemia in the United States, comprising 33 percent of all leukemias. The cancer progresses rapidly if not treated, making timely diagnosis an important goal. Recent diagnostic tests and treatment options such as stem cell transplantation are improving the remission and cure rates for some patients with AML, but generally, the standard of care for AML has not changed in 40 years.

Read below to learn more about the diagnosis, treatment, and prognosis of AML, and how clinical trials are helping researchers develop new therapies for this disease.

This “Patient Education” tear sheet was produced in collaboration with The Leukemia & Lymphoma Society ([lls.org](http://lls.org)).

## What Is AML?

Acute myeloid leukemia (AML) is a cancer of the bone marrow and the blood. AML develops when the DNA (genetic material) of a developing stem cell in the bone marrow is damaged. This change is called an *acquired mutation*.

Once the bone marrow stem cell becomes a leukemic cell, it multiplies uncontrollably into billions of cells (leukemic blasts) that do not function normally, are able to grow and survive better than normal cells, and block the production of normal cells. As a result of these “blasts,” the number of healthy blood cells (red blood cells, white blood cells, and platelets) is usually lower than normal.

## How Common Is AML?

AML is the most common acute leukemia affecting adults. The estimated number of new cases to be diagnosed in 2016 is 19,950, representing 1.2 percent of all new cancer cases.

People 50 years and older are more likely to develop AML than younger adults or children. However, AML is one of the most common types of leukemia diagnosed during infancy.

## How Is AML Diagnosed?

It is important to have an accurate diagnosis of the type of leukemia in order to estimate how the disease will progress and determine the appropriate treatment.

Diagnosing AML and the AML subtype usually involves a series of tests. Some of these tests may be repeated

during and after therapy to measure the effects of treatment. Doctors may use blood and bone marrow tests, as well as genetic tests, to diagnose AML.

**Blood tests:** A change in the number and appearance of blood cells can help make an AML diagnosis. Blood samples are sent to the laboratory for:

- **Complete blood count:** Counts the number of red cells, white cells, and platelets in the blood
- **Peripheral blood smear:** Shows the presence of leukemic blast cells (myeloblasts)

**Bone marrow tests:** Bone marrow samples are examined under a microscope to look for chromosomal and other cell changes. These samples are obtained via a two-step process:

- bone marrow aspiration to remove a liquid marrow sample
- bone marrow biopsy to remove a small amount of bone filled with marrow

**Karyotyping and cytogenetic analysis:** These processes are used to identify certain changes in chromosomes and genes. A laboratory test called *polymerase chain reaction* may be performed, in which cells in a sample of blood or marrow are studied to look for certain changes in the structure or function of genes, such as *FLT3* and *NPM1*, that can provide important information for risk assessment and treatment planning.

## The Leukemia & Lymphoma Society Resources

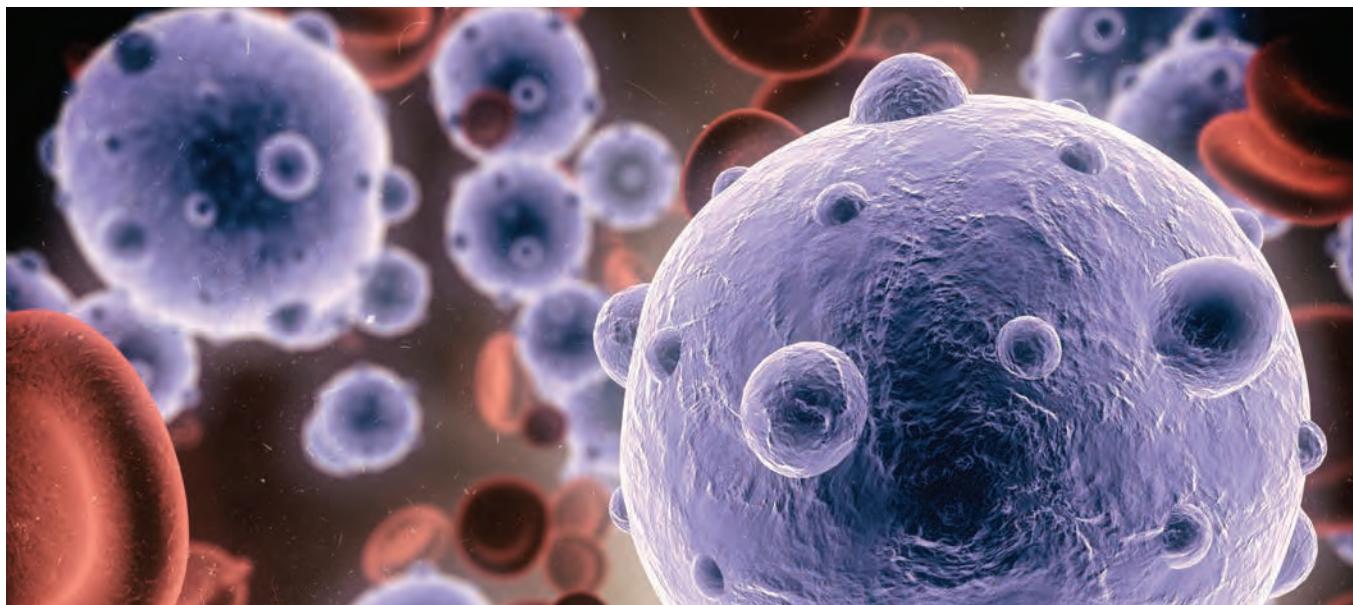
The Leukemia & Lymphoma Society (LLS) is the world's largest voluntary health organization dedicated to finding cures for blood cancer patients. Its mission is to cure leukemia, lymphoma, Hodgkin disease, and myeloma, and to improve the quality of life of patients and their families. LLS drives research in areas of unmet medical need and helps to bridge the gap between academic discovery and drug development. LLS identifies and funds blood cancer research projects and collaborates with academic institutions, as well as biotechnology and pharmaceutical companies, to accelerate the development of new therapies. In addition, LLS is the leading source of free, highly specialized blood cancer information, education, and support for patients, survivors, families, and health-care professionals.

To reach LLS's Information Resource Center, a toll-free call center staffed with master's level health-care professionals, known as LLS Information Specialists, who can offer various support services, including assistance in finding appropriate clinical trials, call (800) 955-4572.

For more information on LLS, visit [lls.org](http://lls.org).

For more information on AML, visit [lls.org/content/what-is-aml](http://lls.org/content/what-is-aml).

For patient support resources, visit [lls.org/support-resources](http://lls.org/support-resources).



### What Are the Risk Factors for AML?

For most people who are diagnosed with AML, there are no obvious reasons why they developed the disease, but researchers have identified potential risk factors, including:

- repeated exposure to the chemical benzene, which damages the DNA of normal marrow cells
- certain genetic disorders such as Down syndrome, Fanconi anemia, Shwachman-Diamond syndrome, and Diamond-Blackfan syndrome
- past chemotherapy or radiation treatments for other cancers
- progression of other blood cancers or disorders, including polycythemia vera, primary myelofibrosis, essential thrombocythemia, and myelodysplastic syndrome (MDS)

### What Are the Symptoms of AML?

Because of the under-production of normal bone marrow cells, it is common for patients with AML to tire more easily and have shortness of breath during normal physical activities. Other symptoms include:

- pale complexion due to anemia
- signs of bleeding caused by a very low platelet count, including black-and-blue marks or bruises occurring for no reason or because of a minor injury, the appearance of pinhead-sized red spots on the skin (petechiae), or prolonged bleeding from minor cuts
- mild fever
- swollen gums
- frequent minor infections
- loss of appetite and weight loss
- discomfort in bones or joints
- enlarged spleen
- enlarged liver

In addition, people with AML may experience the following conditions, which can be dangerous without treatment:

- bleeding in the brain or lung
- infection (especially if your body produces too few white cells known as neutrophils)
- myeloid sarcoma (when a mass of AML cells can form a tumor elsewhere in the body)

### How Is AML Treated?

Doctors use several types of treatment for adults with AML, some at different stages.

*Chemotherapy or other drug therapies:* Most patients with AML start chemotherapy right away. The standard treatment for AML includes high-dose chemotherapy with a cytarabine/anthracycline combination, followed by either one to four cycles of chemotherapy after

remission (consolidation) and stem cell transplantation, either using a patient's own cells (autologous transplant) or a donor's cells (allogeneic transplant).

*Stem cell transplantation:* This may be used with a second phase of chemotherapy.

*Clinical trials:* Clinical trials can involve therapy with new drugs and new drug combinations or new approaches to stem cell transplantation. Taking part in a clinical trial may be the best treatment choice for some patients. Clinical trials are underway for patients at every treatment stage and for patients in remission.

The choice of treatment and resulting outcomes depend on:

- the AML subtype
- the results of cytogenetic analysis
- use of chemotherapy in the past to treat another type of cancer
- the presence of MDS or another blood cancer
- whether the AML has reached the central nervous system
- whether the AML has not responded to treatment or relapse has occurred
- the presence of systemic infection at diagnosis
- the patient's age and general health

### Prognosis and Follow-Up Care

After treatment, patients who are in remission and have completed post-remission (consolidation) therapy continue to be examined regularly by their doctors. Patients' health, blood cell counts, and marrow should be monitored through careful periodic assessments. As time progresses, the length of time between assessments may grow, but assessments should continue indefinitely.

Doctors should also discuss monitoring for long-term adverse effects or late effects of treatment.

