

## **Leukemia - Acute Myeloid - AML - Treatment Options** [1]

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**ON THIS PAGE:** You will learn about the different ways doctors use to treat people with AML. To see other pages, use the menu on the side of your screen.

This section outlines treatments that are the standard of care (the best proven treatments available) for this specific type of cancer. When making treatment plan decisions, patients are also strongly encouraged to consider clinical trials as an option. A clinical trial is a research study to test a new approach to treatment to evaluate whether it is safe, effective, and possibly better than the standard treatment. Clinical trials may test such approaches as a new drug, a new combination of standard treatments, or new doses of current therapies. Your doctor can help you review all treatment options. For more information, see the [Clinical Trials](#) [3] and [Latest Research](#) [4] sections.

### **Treatment overview**

In cancer care, different types of doctors often work together to create a patient's overall treatment plan that combines different types of treatments. This is called a [multidisciplinary team](#) [5].

Descriptions of the most common treatment options for AML are listed below. Treatment options and recommendations depend on several factors, including the subtype, morphology, and cytogenetics of AML (see [Subtypes](#) [6]), possible side effects, and the patient's preferences and overall health. Your care plan may also include treatment for symptoms and side effects, an important part of cancer care.

The most successful treatment for AML depends on the results of the first treatment, so it is important for patients to have their first treatments at a center experienced with AML.

Take time to learn about all of your treatment options and be sure to ask questions about things that are unclear. Also, talk about the goals of each treatment with your doctor and what you can expect while receiving the treatment. Learn more about [making treatment decisions](#) [7].

### **Intensive chemotherapy**

Chemotherapy is the use of drugs to destroy cancer cells, usually by stopping the cancer cells?

ability to grow and divide. The drugs travel through the bloodstream to reach cancer cells throughout the body. Chemotherapy is given by a medical oncologist, a doctor who specializes in treating cancer with medication, or a hematologist, a doctor who specializes in treating blood disorders.

Chemotherapy is the primary treatment for AML. Systemic chemotherapy is delivered through the bloodstream to reach cancer cells throughout the body. Common ways to give chemotherapy include an intravenous (IV) tube placed into a vein using a needle, or injected into the cerebral spinal fluid, or in a pill or capsule that is swallowed (orally). Chemotherapy may also be given by an injection under the skin, called a subcutaneous injection. When chemotherapy is given by IV, it may be given into a larger vein or a smaller vein, such as in the arm. When it is given into a larger vein, a central venous catheter or port may need to be placed in the body. A chemotherapy regimen, or schedule, usually consists of a specific number of cycles given over a set period of time. A patient may receive one drug at a time or combinations of different drugs at the same time. Several drugs are used to treat AML, which are discussed below.

Learn more about [chemotherapy](#) [8] and [preparing for treatment](#) [9]. The medications used to treat cancer are continually being evaluated. Talking with your doctor is often the best way to learn about the medications prescribed for you, their purpose, and their potential side effects or interactions with other medications. Learn more about your prescriptions by using [searchable drug databases](#) [10].

## Chemotherapy by phase

Chemotherapy for AML can be divided into three phases: Induction, post-remission, and consolidation.

**Induction therapy.** This is the first period of treatment after the diagnosis is made. The goal of induction therapy is a complete remission (CR), which means that the blood counts have returned to normal, the leukemia cannot be found in a bone marrow sample when examined under the microscope, and the signs and symptoms of AML are gone.

The combination of cytarabine (Cytosar-U) given over four to seven days and an anthracycline drug, such as daunorubicin (Cerubidine) or idarubicin (Idamycin), given for three days is used most often. Patients may also be given hydroxyurea (Droxia, Hydrea) to help lower white blood cell counts. In addition to killing leukemia cells, these drugs also damage healthy cells, increasing the risk of infection and bleeding (see below). Most patients will need to stay in the hospital for three to five weeks during induction therapy before their blood counts return to normal. Sometimes, two rounds of therapy are needed to achieve a CR. Approximately 75% of younger adults with AML and about 50% of patients older than 60 achieve a CR after treatment.

Some older adults may not be able to have induction therapy with the standard drugs, and the drugs decitabine (Dacogen), azacitidine (Vidaza), and clofarabine (Clolar) may be used instead. A clinical trial is also an option.

**Post-remission therapy.** After induction therapy, a variety of different drugs are used to destroy undetectable AML cells that remain. AML will almost certainly recur if no further treatment is given after a CR. For some patients, bone marrow/stem cell transplantation (see below) is

recommended as part of post-remission therapy.

**Consolidation chemotherapy.** Younger adults in remission are commonly given two to four rounds of high-dose cytarabine or other intensive chemotherapy at monthly intervals, while several different regimens are used for older patients. Although chemotherapy is usually given in the hospital, most of the recovery time can be spent at home. A stem cell transplantation is often recommended as consolidation therapy for younger patients in whom cytogenetic or molecular studies predict a poorer outcome using chemotherapy alone.

**Stem cell transplantation/bone marrow transplantation.** A stem cell transplant is a medical procedure in which bone marrow that contains leukemia is destroyed and then replaced by highly specialized cells, called hematopoietic stem cells, that develop into healthy bone marrow. Hematopoietic stem cells are blood-forming cells found both in the bloodstream and in the bone marrow. Today, this procedure is more commonly called a stem cell transplant, rather than bone marrow transplant, because it is the stem cells in the blood that are typically being transplanted, not the actual bone marrow tissue.

Before recommending transplantation, doctors will talk with the patient about the risks of this treatment and consider several other factors, such as the type of cancer, results of any previous treatment, and patient's age and general health.

There are two types of stem cell transplantation depending on the source of the replacement blood stem cells: allogeneic (ALLO) and autologous (AUTO). ALLO uses donated stem cells, while AUTO uses the patient's own stem cells. ALLO transplants are generally used for AML.

The goal is to destroy all of the cancer cells in the marrow, blood, and other parts of the body using high doses of chemotherapy and/or radiation therapy and then allow replacement blood stem cells to create healthy bone marrow. Learn more about [stem cell and bone marrow transplantation](#) [11].

## Side effects of chemotherapy

Chemotherapy for AML attacks rapidly dividing cells, including those in normal tissues, such as the hair, lining of the mouth, intestines, and bone marrow. People with AML receiving chemotherapy may lose their hair, develop mouth sores, or have nausea and vomiting. Hair will regrow after treatment is finished, and effective drugs [help prevent and control nausea and vomiting](#) [12]. The side effects of chemotherapy may be different depending on the drugs used. Patients are encouraged to talk with their doctors about short-term and long-term side effects before treatment begins.

Because of the effect on normal blood cells in the bone marrow, chemotherapy used for AML will lower the body's ability to fight infection for a short time, and increased bruising, bleeding, and fatigue may be common. People with AML often receive antibiotics to prevent and treat infections and will need transfusions of red blood cells and platelets throughout chemotherapy. Chemotherapy may also affect the patient's [fertility](#) [13], or ability to have a child in the future. Patients concerned about this are encouraged to talk with a fertility specialist before treatment begins.

## **Acute promyelocytic leukemia (APL) treatment**

The treatment of the APL subtype of AML is very different. This subtype is very sensitive to the effects of all-trans retinoic acid (ATRA), a drug that is similar to vitamin A and is given by mouth. People with the APL subtype who receive a combination of ATRA and chemotherapy (see above) with idarubicin or daunorubicin are very likely to have a CR. Occasionally, the drug cytarabine may also be used. Arsenic trioxide (Trisenox) is another drug that works well for APL, either during initial induction therapy alone or in combination with ATRA, during post-remission therapy, or for APL that has come back after treatment. The combination of ATRA and arsenic trioxide is now often used as the initial and consolidation treatment of APL, avoiding the use of drugs that can be more damaging to healthy cells.

Mild to severe bleeding is a common symptom of APL, and patients with this subtype often need many platelet and blood transfusions during initial treatment. Compared with other subtypes of AML where maintenance therapy is not used, some patients with APL benefit from use of ATRA for one to two years after the initial treatment.

## **Radiation therapy**

Radiation therapy is the use of high-energy x-rays or other particles to destroy cancer cells. A doctor who specializes in giving radiation therapy to treat cancer is called a radiation oncologist. The most common type of radiation therapy is called external-beam radiation therapy, which is radiation given from a machine outside the body. A radiation therapy regimen usually consists of a specific number of treatments given over a set period of time. Because AML is found throughout the blood, radiation therapy is generally used only when leukemia cells have spread to the brain or to shrink a myeloid sarcoma, which is a mass of tissue in only one area of the body.

Side effects from radiation therapy may include fatigue, mild skin reactions, upset stomach, and loose bowel movements. Most side effects go away soon after treatment is finished. Learn more about [radiation therapy](#) [14].

## **Getting care for symptoms and side effects**

Leukemia and its treatment often cause side effects. In addition to treatment to slow, stop, or eliminate the disease, an important part of care is relieving a person's symptoms and the side effects of treatment. This approach is called palliative or supportive care, and it includes supporting the patient with his or her physical, emotional, and social needs.

Palliative care can help a person at any stage of illness. People often receive treatment for the leukemia and treatment to ease side effects at the same time. In fact, patients who receive both often have less severe symptoms, better quality of life, and report they are more satisfied with treatment.

Palliative treatments vary widely and often include medication, nutritional changes, relaxation techniques, and other therapies. You may also receive palliative treatments similar to those meant to eliminate the leukemia, such as chemotherapy and radiation therapy. Talk with your

doctor about the goals of each treatment in the treatment plan.

Before treatment begins, talk with your health care team about the possible side effects of your specific treatment plan and supportive care options. And during and after treatment, be sure to tell your doctor or another health care team member if you are experiencing a problem so it is addressed as quickly as possible. Learn more about [palliative care](#) [15].

## **Refractory AML**

If leukemia is still present after initial treatment, the disease is called refractory AML. Patients with this diagnosis are encouraged to talk with doctors who are experienced in treating this type of leukemia, because there can be different opinions about the best treatment plan. Learn more about seeking a [second opinion](#) [16] before starting treatment, so you are comfortable with the treatment plan chosen. This discussion may include [clinical trials](#) [3].

Your health care team may recommend a treatment plan that includes new drugs being tested in clinical trials. An ALLO stem cell transplant should also be considered as part of the treatment plan. Supportive care will also be important to help relieve symptoms and side effects.

For most patients, a diagnosis of refractory leukemia is very stressful and, at times, difficult to bear. Patients and their families are encouraged to talk about the way they are feeling with doctors, nurses, social workers, or other members of the health care team. It may also be helpful to talk with other patients, including through a support group.

## **Remission and the chance of recurrence**

A remission is when the leukemia cannot be detected in the body, there are no symptoms, and a patient's blood counts are normal. This may also be called "no evidence of disease" or NED.

A remission can be temporary or permanent. This uncertainty leads to many survivors feeling worried or anxious that the disease will come back. While many remissions are permanent, it's important to talk with your doctor about the possibility of the leukemia returning. Understanding the risk of recurrence and the treatment options may help you feel more prepared if the disease does return. Learn more about [coping with the fear of recurrence](#) [17].

If the leukemia does return after the original treatment, it is called recurrent or relapsed leukemia. When this occurs, a cycle of testing will begin again to learn as much as possible about the recurrence, including whether the subtype has changed. After testing is done, you and your doctor will talk about your treatment options. Often the treatment plan will include the therapies described above, such as chemotherapy, stem cell transplantation, and radiation therapy, but they may be used in a different combination or given at a different pace. Your doctor may also suggest clinical trials that are studying new ways to treat this type of recurrent leukemia.

The treatment for recurrent AML often depends on the length of the initial remission. If the AML comes back after a long remission, the original treatment may work again. If the remission was short, then other drugs are used, often through a clinical trial. An ALLO stem cell transplant may be the best option for patients whose leukemia has come back after initial treatment. However, many drugs and other approaches are being evaluated in clinical trials.

People with recurrent leukemia often experience emotions such as disbelief or fear. Patients are encouraged to talk with their health care team about these feelings and ask about support services to help them cope. Learn more about [dealing with cancer recurrence](#) [18].

## **If treatment fails**

Recovery from leukemia is not always possible. If treatment is not successful, the disease may be called advanced or terminal leukemia.

This diagnosis is stressful, and it may be difficult to discuss because the advanced leukemia is incurable. However, it is important to have open and honest conversations with your doctor and health care team to express your feelings, preferences, and concerns. The health care team is there to help, and many team members have special skills, experience, and knowledge to support patients and their families. Making sure a person is physically comfortable and free from pain is extremely important.

Patients with advanced leukemia who have no more effective treatment options available may want to consider a type of palliative care called hospice care. Hospice care is designed to provide the best possible quality of life for people who are near the end of life. You and your family are encouraged to think about where you would be most comfortable: at home, in the hospital, or in a hospice environment. Nursing care and special equipment can make staying at home a workable alternative for many families. Learn more about [advanced cancer care planning](#) [19].

After the death of a loved one, many people need support to help them cope with the loss. Learn more about [grief and loss](#) [20].

*The next section helps explain clinical trials, which are research studies. Use the menu on the side of your screen to select About Clinical Trials, or you can select another section, to continue reading this guide.*

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### **Links:**

[1] <http://www.cancer.net/cancer-types/leukemia-acute-myeloid-aml/treatment-options>

[2] <http://www.cancer.net/about-us>

[3] <http://www.cancer.net/node/19073>

[4] <http://www.cancer.net/node/19076>

[5] <http://www.cancer.net/node/25356>

[6] <http://www.cancer.net/node/19071>

[7] <http://www.cancer.net/node/24582>

[8] <http://www.cancer.net/node/24723>

[9] <http://www.cancer.net/node/24473>

[10] <http://www.cancer.net/node/25369>

[11] <http://www.cancer.net/node/24717>

- [12] <http://www.cancer.net/node/29891>
- [13] <http://www.cancer.net/node/25240>
- [14] <http://www.cancer.net/node/24728>
- [15] <http://www.cancer.net/node/25282>
- [16] <http://www.cancer.net/node/25355>
- [17] <http://www.cancer.net/node/25241>
- [18] <http://www.cancer.net/node/25042>
- [19] <http://www.cancer.net/node/25113>
- [20] <http://www.cancer.net/node/25111>