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[Leukemia - Acute Lymphoblastic - ALL - Childhood - Treatment Options \[1\]](#)

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

The following are used to describe the state of disease for children with ALL:

Untreated ALL. The child has not yet received any treatment.

ALL in remission. There are normal levels of white and other blood cells after treatment. Physical examinations, blood counts, and bone marrow aspirates show no detectable leukemia. Remission is the absence of signs or symptoms of leukemia. However, it is very important to continue treatment, even when a child is in remission, to keep the leukemia from coming back.

Recurrent ALL. Recurrent ALL is leukemia that comes back after the child has had some period of remission. The leukemia may recur in the bone marrow, spinal fluid, a boy's testicles, or less commonly, in other areas of the body.

Refractory ALL. The leukemia did not go into remission, despite remission induction treatment (see below).

Treatment overview

In general, cancer in children is uncommon, so it can be hard for doctors to plan treatments unless they know what has been most effective in other children. That's why more than 60% of

children with cancer are treated as part of a clinical trial. [Clinical trials](#) [3] are research studies that compare standard treatments (the best known treatments available) with newer approaches to treatments that may be more effective. Clinical trials may test such approaches as a new drug, a new combination of standard treatments, or new doses of current therapies. Studying new treatments involves careful monitoring using scientific methods, and all participants are followed closely to track their health and progress.

To take advantage of these newer treatments, it is best that children with cancer be treated at a cancer center with access to specialists in pediatric cancer. Doctors at these centers have extensive experience in treating children with cancer and have access to the latest research. A doctor who specializes in treating children with cancer is called a pediatric oncologist. If a pediatric cancer center is not nearby, general cancer centers sometimes have pediatric specialists who are able to be part of your child's care.

In many cases, a team of doctors works with a child and the family to provide care; this is called a [multidisciplinary team](#) [4]. Pediatric cancer centers often have extra support services for children and their families, such as child life specialists, nutritionists, physical and occupational therapists, social workers, and counselors. Special activities and programs to help your child and family cope may also be available.

Descriptions of the most common treatment options for childhood ALL are listed below. Three types of treatments are used to treat childhood ALL: chemotherapy, radiation treatment, and stem cell transplantation/bone marrow transplantation. All children with ALL receive chemotherapy. Some children will also need radiation or stem cell transplantation/bone marrow transplantation. Treatment options and recommendations depend on several factors, including the classification of ALL, possible side effects, and the patient's preferences and overall health. Your child's care plan may also include treatment for symptoms and side effects, an important part of cancer care. Take time to learn about all of your child's treatment options and be sure to ask questions about things that are unclear. Also, talk about the goals of each treatment with your child's doctor and what your child can expect while receiving the treatment. Learn more about [making treatment decisions](#) [5].

Chemotherapy

Chemotherapy is the use of drugs to destroy cancer cells, usually by stopping the cancer cells' ability to grow and divide. Chemotherapy is given by a pediatric hematologist-oncologist, a doctor who specializes in treating cancer in children with medication.

Systemic chemotherapy gets into the bloodstream to reach cancer cells throughout the body. A chemotherapy regimen (schedule) usually consists of a specific number of cycles of drugs 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.

Chemotherapy is the primary treatment for ALL. It may be given by mouth (orally), injected into

a vein or muscle, or injected into the cerebral spinal fluid (CSF). It is generally done in four phases:

- **Remission induction therapy** uses chemotherapy to kill as many of the leukemia cells as possible to cause the cancer to go into remission.
- **Central nervous system directed therapy** kills any leukemia cells in the central nervous system and prevents the spread of the disease to the spinal fluid.
- **Consolidation therapy** begins when the child's leukemia has gone into remission. Higher doses of chemotherapy, or drugs not used during previous treatment, are used to kill the majority of the remaining leukemia cells.
- **Continuation or maintenance therapy** lasts for two to three years to kill any remaining (residual) leukemia cells.

The side effects of chemotherapy depend on the individual and the dose used, but they can include short-term side effects like hair loss, fatigue, loss of appetite, nausea and vomiting, diarrhea, and kidney and liver problems. If a drug called vincristine (Oncovin, Vincasar) is part of your child's chemotherapy, there may be muscle weakness and nerve pain. These side effects usually go away once treatment is finished. Other side effects related to chemotherapy that may last longer or develop after treatment is finished include bone and joint problems and learning problems.

The severity of the side effects depends on the type and amount of the drug being given and the length of time the child receives the drug. The side effects each child experiences may also be affected by other factors, including genetic differences in the way the medications are processed by the body, the child or teen's age when diagnosed, and their overall health.

Learn more about the basics of [chemotherapy](#) [6] and [preparing for treatment](#) [7]. The medications used to treat cancer are continually being evaluated. Talking with your child's doctor is often the best way to learn about the medications prescribed for your child, their purpose, and their potential side effects or interactions with other medications. Learn more about your prescriptions by using [searchable drug databases](#) [8].

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 treatment is called external-beam radiation therapy, which is radiation given from a machine outside the body. A radiation therapy regimen (schedule)

usually consists of a specific number of treatments given over a set period of time.

Radiation therapy for ALL is generally used only when the leukemia has spread to the brain, spinal fluid, or a boy's testicles, or in high-risk disease to help prevent the spread of leukemia to the spinal fluid. Radiation therapy is more often used for patients with T-cell leukemia.

Side effects from radiation therapy may include hair loss, fatigue, mild skin reactions, upset stomach, and loose bowel movements. Most side effects go away soon after treatment is finished. However, long-term side effects of radiation treatment to the brain and body can occur and may possibly include hormone problems affecting growth and metabolism, learning problems, and an increased risk of developing a second cancer including a [brain tumor](#) [9]. [Skin](#) [10], [salivary gland](#) [11], and [thyroid](#) [12] cancers can also occur after radiation treatment for ALL (see [Follow-Up Care](#) [13]). Learn more about the basics of [radiation therapy](#) [14].

Stem cell transplantation/bone marrow transplantation

Stem cell transplantation is most often used as a treatment for recurrent or refractory ALL. Rarely, transplantation may be recommended as part of the initial therapy when leukemia is associated with very high risk features. A stem cell transplant is a medical procedure in which bone marrow that contains cancer is 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 and family members 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. In both types, 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 the basics of [stem cell and bone marrow transplantation](#) [15].

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 child's symptoms and side effects. 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 is any treatment that focuses on reducing symptoms, improving quality of life, and supporting patients and their families. Any person, regardless of age or type and stage of

cancer, may receive palliative care. It works best when palliative care is started as early as needed in the cancer treatment process. Children 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, emotional support and other therapies. Your child may also receive palliative treatments similar to those meant to eliminate the cancer, such as chemotherapy, surgery, or radiation therapy. Talk with your child's doctor about the goals of each treatment in the treatment plan.

Before treatment begins, talk with your child's health care team about the possible side effects of the specific treatment plan and palliative care options. And during and after treatment, be sure to tell your doctor or another health care team member if your child is experiencing a problem so it can be addressed as quickly as possible. Learn more about [palliative care](#) [16].

Remission and the chance of recurrence

A remission is when leukemia cannot be detected in the body and there are no symptoms. This may also be called having "no evidence of disease" or NED.

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

If the ALL recurs, a cycle of testing will begin again to learn as much as possible about the recurrence. After testing is done, you and your child's doctor will talk about treatment options. Often the treatment plan will include the treatments described above such as chemotherapy, radiation therapy, and/or stem cell transplantation but they may be used in a different combination or given at a different pace. Your child's doctor may also suggest clinical trials that are studying new ways to treat this type of recurrent cancer. Just as for newly diagnosed patients, clinical trials typically offer the best chance of cure. Whichever treatment plan you choose, palliative care will be important for relieving symptoms and side effects.

If the ALL recurs, treatment depends on many factors, including the type of treatment the child received originally, the length of time between the initial diagnosis and the recurrence, and whether leukemia cells are found in the bone marrow, CSF, testicles, or in more than one of these sites when it recurs.

When ALL recurs, patients and their families often experience emotions such as disbelief or fear. Families 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

Although treatment is successful for the majority of children with ALL, sometimes it is not. If a child's leukemia cannot be cured or controlled, this is called advanced or terminal leukemia. This diagnosis is stressful, and advanced cancer may be difficult to discuss. However, it is important to have open and honest conversations with your child's doctor and health care team to express your family's 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.

Parents or guardians are encouraged to think about where the child would be most comfortable: at home, in a home-like setting elsewhere, in the hospital, or in a hospice environment. Hospice care is a type of palliative care for people who are expected to live less than six months. It is designed to provide the best possible quality of life for people who are near the end of life.

Nursing care and special equipment can make staying at home a workable alternative for many families. Some children may be happier if they can arrange to attend school part-time or keep up other activities and social connections. The child's health care team can help parents or guardians decide on an appropriate level of activity. Making sure a child is physically comfortable and free from pain is extremely important as part of end-of-life care. Learn more about [caring for a terminally ill child](#) [19] and [advanced cancer care planning](#) [20].

The death of a child is an enormous tragedy, and families may need support to help them cope with the loss. Pediatric cancer centers often have professional staff and support groups to help with the process of grieving. Learn more on [grieving the loss of a child](#). [21]

The [next section in this guide is About Clinical Trials](#) [3] and it offers more information about research studies that are focused on finding better ways to care for people with cancer. Or, use the menu on the side of your screen to choose another section to continue reading this guide.

Links

[1] <http://www.cancer.net/cancer-types/leukemia-acute-lymphoblastic-all-childhood/treatment-options>

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

[3] <http://www.cancer.net/node/19031>

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

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

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

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

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

[9] <http://www.cancer.net/node/31323>

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