

Patient Education

UNDERSTANDING CHILDHOOD CANCER

Childhood cancers make up less than 1 percent of all cancers diagnosed each year. About 10,380 children in the United States under the age of 15 will be diagnosed with cancer in 2015. Because of major treatment advances in recent decades, more than 80 percent of children with cancer now survive five years or more, but survival rates vary depending on the type of cancer, the specific cancer treatments used, the doses of cancer treatment, and the child's age at the time of treatment.

Read below for more information about childhood cancer and what to expect after a diagnosis.

This Patient Education tear sheet was produced in collaboration with the American Cancer Society (www.cancer.org).



The Most Common Types of Childhood Cancers

The most common cancers of children are:

- **Leukemia**
- **Brain and other central nervous system tumors**
- **Neuroblastoma**
- **Wilms tumor**
- **Lymphoma (including both Hodgkin and non-Hodgkin)**
- **Rhabdomyosarcoma**
- **Retinoblastoma**
- **Bone cancer (including osteosarcoma and Ewing sarcoma)**

Risk Factors and Causes of Childhood Cancers

Although lifestyle-related risk factors play a major role in many types of cancer in adults (such as being overweight, smoking, and eating an unhealthy diet), lifestyle factors usually take many years to influence cancer risk, and they are not thought to play much of a role in childhood cancers.

A few environmental factors, such as radiation exposure, have been linked with some types of childhood cancers. Some studies have also suggested that some parental exposures (such as smoking) may increase a child's risk of certain cancers, but more studies are needed to explore these possible links. So far, most childhood cancers have not been shown to have outside causes.

In recent years, scientists have made great progress in understanding how certain changes in our DNA can cause cells to become cancerous. Some children inherit DNA changes (mutations) from a parent that increase their risk of certain types of cancer. Some of these DNA changes are linked only with an increased risk of cancer, while others can cause syndromes that also include other health or developmental problems.

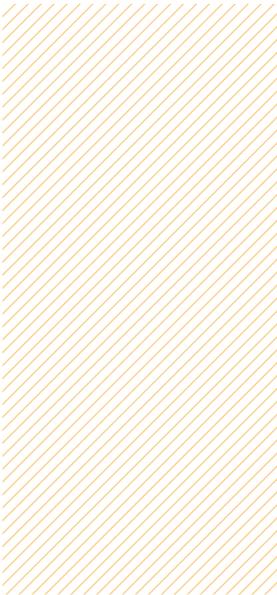
However, most childhood cancers are not caused by inherited DNA changes, but are the result of DNA changes that happen early in the child's life, sometimes even before birth. Every time a cell prepares to divide into two new cells, it must copy its DNA. This process isn't perfect, and errors sometime occur, especially when the cells are growing quickly. This kind of gene mutation can happen at any time in life and is called an *acquired* mutation. Acquired mutations start in one cell. That cell then passes the mutation on to all the cells that come from it. These acquired DNA changes are only in the person's cancer cells and will not be passed on to his or her children.

Treatment of Childhood Cancers

Treatments are chosen for childhood cancers based mainly on the type and extent of the cancer. Treatment options might include surgery, radiation therapy, chemotherapy, and/or other types of treatment. In many cases, more than one of these treatments is used.

There are exceptions, but childhood cancers usually respond well to chemotherapy because they tend to be cancers that grow fast. (Most forms of chemotherapy affect cells that are growing quickly.) Children's bodies are also generally better able to recover from higher doses of chemotherapy than are adults' bodies. Using more intensive treatments gives doctors a better chance of treating the cancer effectively, but it can also lead to more short- and long-term side effects.

Unlike chemotherapy, radiation can often cause more serious side effects in children (especially very young children) than in adults, so its use sometimes needs to be limited. Doctors do their best to balance the need for intensive treatment with the desire to limit side effects as much as possible.



Resources from the American Cancer Society

The American Cancer Society (ACS) is a nationwide, community-based voluntary health organization dedicated to eliminating cancer as a major health problem by preventing cancer, saving lives, and diminishing suffering from cancer, through research, education, advocacy, and service. ACS offers free information, programs, services, and community referrals to patients, survivors, and caregivers through every step of a cancer experience – so they can focus on getting well.

Find information and services any time by visiting www.cancer.org or calling 1-800-227-2345. Cancer Information Specialists are available around the clock to answer questions and point you to resources. To learn more about childhood cancer, visit www.cancer.org/childhood.

The ACS Bookstore also features books and guides for people diagnosed with cancer and their caregivers. Helpful titles for children with cancer include *My Cancer Days*, the story of a young girl who uses color to express her full range of emotions as she undergoes cancer treatment, and *Imagine What's Possible*, a visualization guide to help children with cancer cope with anxiety and fear. The book, *What to Eat During Cancer Treatment*, provides recipes to minimize some of the side effects of treatment that make getting proper nutrition difficult.

For ordering information and to view the full catalog of ACS books, visit www.cancer.org/bookstore.

The Cancer Treatment Team

Most children and teens with cancer are treated at specialized centers designed for them. Care at these specialized centers is coordinated by a team of experts who know the differences between adult and childhood cancers, as well as the unique needs of children with cancer and their families. This team usually includes:

- **Pediatric oncologists:** doctors who specialize in using medicines to treat children with cancer
- **Pediatric surgeons:** doctors who specialize in performing surgery in children
- **Radiation oncologists:** doctors who specialize in using radiation to treat cancer
- **Pediatric oncology nurses:** nurses who specialize in caring for children with cancer
- **Nurse practitioners (NPs) and physician assistants (PAs):** nurses and other professionals who are specially trained and licensed to practice medicine alongside doctors

The team can also include many professionals other than nurses and doctors. Children's cancer centers have psychologists, social workers, child life specialists, nutritionists, rehabilitation and physical therapists, and educators who can support and care for the entire family.

The cancer care team can also discuss clinical trials available to the child and answer questions about the pros and cons of enrolling in one of them.

Long-Term Effects of Cancer Treatment

During and after cancer treatment, the main concerns for most families are the short- and long-term effects of the cancer and its treatment, and concerns about the cancer still being present or coming back. Close follow-up care is a central part of this process that offers children the best chance for recovery and long-term survival.

Once treatment is finished, the health-care team will set up a follow-up schedule. For many years after treatment, it is very important that children have regular follow-up exams with the cancer care team. As time goes by, the risk of the cancer coming back goes down, and doctor visits might be needed less often, but they are still important because some side effects of treat-

ment might not show up until years later.

Because of major advances in treatment, more children treated for cancer are now surviving into adulthood. Doctors have learned that the treatment may affect children's health later in life, so watching for health effects as they get older has become more of a concern in recent years.

Childhood cancer survivors are at risk, to some degree, for several possible late effects of their cancer treatment. It's important to discuss what these possible effects might be with your child's medical team. Some of the more common late effects of cancer treatment include:

- Heart or lung problems (due to certain chemotherapy drugs or radiation therapy to the chest area)
- Slowed or delayed growth and development (in the bones or overall)
- Changes in sexual development and ability to have children
- Learning problems
- Increased risk of other cancers later in life

It's very important to discuss possible long-term complications with your child's health-care team and to make sure there is a plan to watch for these problems and treat them, if needed.

Surviving Childhood Cancer

There has been a lot of progress in treating childhood cancers in recent decades, and many of these cancers can now be cured. Still, the progress in some cancers has been greater than in others. The five-year survival rates for the most recent time period (2004-2010) for the more common childhood cancers range from 64 percent in acute myeloid leukemia to 97 percent in Hodgkin lymphoma.

The type of cancer is important in estimating a child's outlook. But many other factors can also be important, such as the child's age, the location and extent of the tumor, the treatment received, and how well the cancer responds to treatment. ●

