

Cancer in Children



WHAT IS CANCER IN CHILDREN?

What is cancer?

The body is made up of trillions of living cells. Normal body cells grow, divide to make new cells, and die in an orderly way. During the early years of a person's life, normal cells divide faster to allow the person to grow. Once the person becomes an adult, most cells divide only to replace worn-out or dying cells or to repair injuries.

Cancer begins when cells in a part of the body start to grow out of control. There are many kinds of cancer, but they all start because of out-of-control growth of abnormal cells.

Cancer cell growth is different from normal cell growth. Instead of dying, cancer cells continue to grow and form new, abnormal cells. Cancer cells can also invade (grow into) other tissues, something that normal cells can't do. Growing out of control and invading other tissues are what makes a cell a cancer cell.

Cells become cancer cells because of damage to DNA. DNA is in every cell and directs all its actions. In a normal cell, when DNA is damaged the cell either repairs the damage or the cell dies. In cancer cells, the damaged DNA is not repaired, but the cell doesn't die like it should. Instead, this cell goes on making new cells that the body does not need. These new cells will all have the same damaged DNA as the first abnormal cell does.

People can inherit damaged DNA, but often the DNA damage is caused by mistakes that happen while a normal cell is reproducing or by something in our environment. In adults, sometimes the cause of the DNA damage is something obvious, like cigarette smoking. But often no clear cause is found.

In most cases the cancer cells form a tumor. Some cancers, like leukemia, rarely form tumors. Instead, these cancer cells start in the blood and blood-forming organs and circulate through other tissues where they grow.

Cancer cells often travel to other parts of the body, where they begin to grow and form new tumors. This process is called *metastasis*.

Different types of cancer can behave very differently. They grow at different rates and respond to different treatments. That is why children with cancer need treatment that is aimed at their particular kind of cancer.

CAUSES, RISK FACTORS, AND PREVENTION

What are the risk factors and causes of childhood cancer?

A risk factor is anything that affects the chance of getting a disease such as cancer. Different cancers have different risk factors.

Lifestyle-related risk factors play a major role in many types of cancer in adults. Examples include being overweight, eating an unhealthy diet, not getting enough exercise, and habits like smoking and drinking alcohol. But 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) might 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. DNA is the chemical in each of our cells that makes up our genes – the instructions for nearly everything our cells do. We usually look like our parents because they are the source of our DNA. But DNA affects more than just how we look. It also influences our risks for developing certain diseases, including some kinds of cancer.

Some genes (parts of our DNA) control when our cells grow, divide into new cells, and die. Genes that help cells grow, divide, or stay alive are called *oncogenes*. Others that slow down cell division or cause cells to die at the right time are called *tumor suppressor genes*. Cancers can be caused by DNA changes that turn on oncogenes or turn off tumor suppressor genes.

Some children inherit DNA changes (mutations) from a parent that increase their risk of certain types of cancer. These changes are present in every cell of the child's body, and can often be tested for in the DNA of blood cells or other body cells. 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.

But most childhood cancers are not caused by inherited DNA changes. They 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 2 new cells, it must copy its DNA. This process isn't perfect, and errors sometimes 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.

Sometimes the causes of gene changes in certain adult cancers are known (such as cancer-causing chemicals in cigarette smoke), but the reasons for DNA changes that cause most childhood cancers are not known. Some may have outside causes like radiation exposure, and others may have causes

that have not yet been found. But many are likely to be caused by random events that sometimes happen inside a cell, without having an outside cause.

EARLY DETECTION, DIAGNOSIS, AND STAGING

How are childhood cancers found?

Screening for childhood cancers

Screening is testing for a disease such as cancer in people who don't have any symptoms. Childhood cancers are rare, and there are no widely recommended screening tests to look for cancer in children who are not at increased risk.

Some children have a higher chance of developing a specific type of cancer because of certain gene changes they inherit from a parent. These children may need careful, regular medical check-ups that include special tests to look for early signs of cancer.

Possible signs and symptoms of cancer in children

Many cancers in children are found early, either by a child's doctor or by parents or relatives. But cancers in children can be hard to recognize right away because early symptoms are often like those caused by much more common illnesses or injuries. Children often get sick or have bumps or bruises that might mask the early signs of cancer. Parents should be sure that their children have regular medical check-ups and watch for any unusual signs or symptoms that do not go away. These include:

- An unusual lump or swelling
- Unexplained paleness and loss of energy
- Easy bruising
- An ongoing pain in one area of the body
- Limping
- Unexplained fever or illness that doesn't go away
- Frequent headaches, often with vomiting
- Sudden eye or vision changes
- Sudden unexplained weight loss

More specific information on common symptoms is in the section "[What are the most common types of childhood cancers?](#)" Other symptoms are also possible, depending on the type of cancer.

Most of these symptoms are much more likely to be caused by something other than cancer, such as an injury or infection. Still, if your child has any of these symptoms, see a doctor so that the cause can be found and treated, if needed.

Seeing the doctor

The doctor will ask about the symptoms and examine your child. If cancer is a possible cause, the doctor might order [imaging tests](#) (such as x-rays) or other tests. In some cases if an abnormal lump or

tumor is found, the doctor might need to remove some or all of it so that it can be looked at under a microscope for cancer cells. This is known as *biopsy*.

If your child is found to have cancer, our document [Children With Cancer: Dealing With Diagnosis](#) offers ideas for coping and moving forward after the diagnosis is made.

TREATING CANCER IN CHILDREN

How are childhood cancers treated?

Treatments are chosen for childhood cancers based mainly on the type and stage (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.

For detailed information on how a certain type of childhood cancer is treated, see our document on that specific [type of cancer](#).

The cancer treatment team

Children with cancer and their families have special needs that can be best met at children's cancer centers. Treatment of childhood cancer in 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. For more information, see our document [Children Diagnosed With Cancer: Understanding the Health Care System](#).

Getting the best treatment possible

Treating children with cancer requires special expertise. Today, most children with cancer are treated at specialized children's cancer centers. These centers are often members of the Children's Oncology Group (COG). Going to a hospital that specializes in treating childhood cancer helps ensure that a child gets the best available cancer treatment.

These centers offer the most up-to-date-treatment by conducting clinical trials (studies of promising new therapies). Children's cancer centers often conduct many clinical trials at any one time, and in fact most children treated at these centers take part in a clinical trial as part of their treatment.

Clinical trials are one way to get state-of-the-art cancer care for your child. They may be the only way to get access to some newer treatments. They are also the best way for doctors to learn better methods to treat cancer. Still, they might not be right for every child. Talk to your child's cancer care team to learn about possible clinical trials for your child, and ask about the pros and cons of enrolling in one of them.

If your child qualifies for a clinical trial, it's up to you whether or not to enter (enroll) your child into it. Older children, who can understand more, usually must also agree to take part in the clinical trial before the parents' consent is accepted.

Source:

