



## Treating Neuroblastoma

Children with neuroblastoma and their families have special needs. These needs can be met best by cancer centers for children, working closely with the child's primary care doctor. These centers have teams of specialists who understand the differences between cancers in adults and those in children, as well as the unique needs of younger people with cancer.

Treating neuroblastoma is complex and often requires the expertise of many different doctors, nurses, and other health professionals. The doctors on the treatment team often include:

- A **pediatric cancer surgeon**
- A **pediatric oncologist** (doctor who uses chemotherapy and other medicines to treat childhood cancers)
- A **pediatric radiation oncologist** (doctor who uses radiation therapy to treat cancer in children)

Many other specialists may be involved in your child's care as well, including physician assistants, nurse practitioners, nurses, psychologists, social workers, rehabilitation specialists, and other health professionals. You can read more about this in [Children Diagnosed With Cancer: Understanding the Health Care System](#).

The types of treatment used for neuroblastoma can include:

- [Surgery](#)
- [Chemotherapy](#)
- [Radiation therapy](#)
- [High-dose chemotherapy/radiation therapy and stem cell transplant](#)
- [Retinoid therapy](#)
- [Immunotherapy](#)

Treatment of neuroblastoma depends on the [risk group](#) of the cancer, the child's age, and other factors, and might include more than one type of treatment. (Treatment based

on the risk group is discussed [here](#).)

Your child's cancer care team will discuss the treatment options with you. It's important to discuss these options and their possible side effects with your child's doctors so you can make an informed decision. (For a list of some questions to ask, see [What Should You Ask Your Child's Doctor About Neuroblastoma?](#))

## Thinking about a clinical trial

Clinical trials are carefully controlled research studies that are done to get a closer look at promising new treatments or procedures. Clinical trials are one way to get state-of-the-art cancer treatment. In some cases they may be the only way to get access to newer treatments. They are also the best way for doctors to learn better methods to treat cancer. Still, they are not right for everyone.

If you would like to learn more about clinical trials that might be right for your child, start by asking your doctor if your clinic or hospital conducts clinical trials. See [Clinical Trials](#) to learn more.

## Considering complementary and alternative methods

You may hear about alternative or complementary methods that your doctor hasn't mentioned to treat cancer or relieve symptoms. These methods can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few.

Complementary methods refer to treatments that are used along with your regular medical care. Alternative treatments are used instead of a doctor's medical treatment. Although some of these methods might be helpful in relieving symptoms or helping you feel better, many have not been proven to work. Some might even be dangerous.

Be sure to talk to your child's cancer care team about any method you are thinking about using. They can help you learn what is known (or not known) about the method, which can help you make an informed decision. See [Complementary and Alternative Medicine](#) to learn more.

## Help getting through cancer treatment

The cancer care team will be your first source of information and support, but there are other resources for help when you need it. Hospital- or clinic-based support services are

an important part of your child's care. These might include nursing or social work services, financial aid, nutritional advice, rehab, or spiritual help.

The American Cancer Society also [has programs and services](#) – including rides to treatment, lodging, and more – to help you get through treatment. Call our National Cancer Information Center at 1-800-227-2345 and speak with one of our trained specialists.

*The treatment information given here is not official policy of the American Cancer Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor. Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask him or her questions about your treatment options.*

## Neuroblastoma Surgery

Surgery can be used both to help [diagnose](#) neuroblastoma and to treat it. For smaller tumors that have not spread, surgery is often the only treatment that is needed.

### **Surgical (open) biopsy**

In many cases, doctors need to get a sample of the tumor to be sure it is a neuroblastoma before deciding which treatment might work best. Tumor samples are removed during a surgical biopsy to be looked at under a microscope and for other lab tests.

If the tumor is in the abdomen (belly), the surgeon may do the biopsy with the aid of a laparoscope. This is a long, thin tube with a tiny video camera on the end. It is put into the abdomen through a small incision to allow the surgeon to see inside. The surgeon then makes a second small incision to reach inside the abdomen with long, thin instruments and remove pieces of tumor.

### **Surgery as treatment**

After neuroblastoma is diagnosed, surgery is often used to try to remove as much of the tumor as possible. In some cases, surgery can remove the entire tumor and bring about a cure.

During the operation, the surgeon looks carefully for signs of tumor spread to other organs. Nearby lymph nodes (small collections of immune system cells to which cancers often spread first) are removed and looked at under a microscope for cancer cells.

If possible, the surgeon will remove the entire tumor. This is less likely if the tumor is near vital structures or wrapped around large blood vessels. Even if some of the tumor is left behind, treatment with [chemotherapy](#) (and sometimes [radiation therapy](#)) after surgery may still result in a cure. Sometimes surgery is repeated after other treatments (chemotherapy and/or radiation therapy) to check the results of therapy and to remove any remaining cancer if possible.

If the tumor is very large, chemotherapy may be used before surgery to shrink the tumor and make it easier to remove.

## **Possible risks and side effects of surgery**

The risks from surgery depend on the location and extent of the operation and the child's health beforehand. Serious complications, although rare, can include problems with anesthesia, excess bleeding, infections, and damage to blood vessels, kidneys, other organs, or nerves. Complications are more likely if the tumor is large and growing into blood vessels or nerves. Most children will have some pain for a while after the operation, but this can usually be helped with medicines if needed.

- [References](#)

[See all references for Neuroblastoma](#)

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# **Chemotherapy for Neuroblastoma**

Chemotherapy (chemo) uses anti-cancer drugs, which are usually given into a vein. The drugs enter the bloodstream and travel throughout the body to reach and destroy cancer cells. This makes chemo useful for treating neuroblastoma that has spread to the lymph nodes, bone marrow, liver, lungs, or other organs.

Some children with neuroblastoma are treated with chemo either before [surgery](#) (neoadjuvant chemotherapy) or after surgery (adjuvant chemotherapy). In other cases, especially when the cancer has spread too far to be removed completely by surgery, chemotherapy is the main treatment.

Chemo for neuroblastoma usually includes a combination of drugs. The main chemo drugs used include:

- Cyclophosphamide or ifosfamide
- Cisplatin or carboplatin
- Vincristine
- Doxorubicin (Adriamycin)
- Etoposide
- Topotecan
- Busulfan and melphalan (sometimes used during stem cell transplant)

The most common combination of drugs includes carboplatin (or cisplatin), cyclophosphamide, doxorubicin, and etoposide, but others may be used. For children in the high-risk group, larger combinations are used, and the drugs are given at higher doses, which may be followed by a [stem cell transplant](#) (described further on).

Doctors give chemo in cycles, which consist of treatment on a few days in a row, followed by time off to allow the body time to recover. The cycles are typically repeated every 3 or 4 weeks. The total length of treatment depends on which risk group the child is in – higher risk groups usually require longer treatment.

## **Possible side effects of chemotherapy**

Chemo drugs attack cells that are dividing quickly, which is why they work against cancer cells. But other cells in the body, such as those in the bone marrow (where new blood cells are made), the lining of the mouth and intestines, and the hair follicles, also divide quickly. These cells are also likely to be affected by chemo, which can lead to side effects.

The side effects of chemo depend on the type and dose of drugs given and the length of time they are taken. General side effects can include:

- Hair loss
- Mouth sores
- Loss of appetite
- Nausea and vomiting

- Diarrhea or constipation
- Increased chance of infections (from having too few white blood cells)
- Easy bruising or bleeding (from having too few blood platelets)
- Fatigue (from having too few red blood cells)

Most of these side effects are short-lived and tend to go away after treatment is finished. There are often ways to lessen these side effects. For example, drugs can be given to help prevent or reduce nausea and vomiting. Be sure to ask your child's doctor or nurse about medicines to help reduce side effects, and let him or her know if your child has side effects so they can be managed.

Along with the effects listed above, some drugs can have specific side effects. For example:

Cyclophosphamide and ifosfamide can damage the bladder, which can cause blood in the urine. The risk of this can be lowered by giving the drugs with plenty of fluids and with a drug called mesna, which helps protect the bladder. These drugs can also damage the ovaries or testicles, which could affect fertility (the ability to have children).

Doxorubicin can cause heart damage. Doctors try to reduce this risk as much as possible by limiting the doses of doxorubicin and by checking the heart with a test called an *echocardiogram* (an ultrasound of the heart) during treatment. This drug can also cause skin damage if it should leak out of the vein while it is being given.

Cisplatin and carboplatin can affect the kidneys. Giving plenty of fluids can help reduce this risk. These drugs can also affect hearing. Your child's doctor may order hearing tests (audiograms) during or after treatment.

Vincristine can damage nerves. Some patients may have tingling, numbness, weakness, or pain, particularly in the hands and feet.

Chemotherapy can also have some longer-term side effects. For example, some drugs can increase the risk of later developing another type of cancer (such as leukemia). While this is a serious risk, it is not common, and the small increase in risk has to be weighed against the importance of chemotherapy in treating neuroblastoma. For more on the possible long-term effects of treatment, see the section, [Late and Long-term Effects of Neuroblastoma and Its Treatment](#).

For more information on chemotherapy in general, see the [Chemotherapy](#) section of our website.

- [References](#)

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## Radiation Therapy for Neuroblastoma

Radiation therapy uses high-energy rays or particles to kill cancer cells. It is sometimes a necessary part of treatment, but because of the possible long-term side effects in children, doctors avoid using it when possible. Two types of radiation therapy can be used to treat children with neuroblastoma.

### External beam radiation therapy

External radiation therapy focuses the radiation on the cancer from a source outside the body. This type of treatment might be used:

- To destroy neuroblastoma cells that remain behind after [surgery](#) and [chemotherapy](#)
- To try to shrink tumors before surgery, making them easier to remove
- To treat larger tumors that are causing serious problems (such as trouble breathing) and do not respond quickly to chemotherapy
- As part of the treatment regimen (along with high-dose chemotherapy) before a [stem cell transplant](#) in children with high-risk neuroblastoma
- To help relieve pain caused by advanced neuroblastoma

Most often, the radiation is aimed only at the tumor, but in some cases it may also target other parts of the body to reduce the risk of cancer spread. When radiation is aimed at the whole body, it is known as *total body irradiation* (TBI).

Before treatments start, the radiation team takes careful measurements with [imaging tests](#) such as MRI scans to determine the correct angles for aiming the radiation beams and the proper dose of radiation.

Radiation therapy is much like getting an x-ray, but the dose of radiation is much higher. Your child might be fitted with a plastic mold resembling a body cast to keep him or her in the same position during each treatment so that the radiation can be aimed more

accurately.

The number of radiation treatments given depends on the situation. For each treatment session, your child lies on a special table while a machine delivers the radiation from a precise angle. The treatment is not painful. Each actual treatment lasts only a few minutes, but the setup time – getting your child into place for treatment – usually takes longer. Young children may be given medicine to make them sleep so they will not move during the treatment.

**Possible side effects:** Radiation therapy is sometimes an important part of treatment, but young children's bodies are very sensitive to it, so doctors try to use as little radiation as possible to help avoid or limit any problems. Radiation can cause both short-term and long-term side effects, which depend on the dose of radiation and where it is aimed.

Possible short-term effects:

- Effects on skin areas that receive radiation can range from mild sunburn-like changes and hair loss to more severe skin reactions.
- Radiation to the abdomen (belly) can cause nausea or diarrhea.
- Radiation therapy can make a child tired, especially toward the end of treatment.

Radiation can also make the side effects of chemotherapy worse. Talk with your child's doctor about the possible side effects because there are ways to relieve some of them.

Possible long-term effects:

- Radiation therapy can slow the growth of normal body tissues (such as bones) that get radiation, especially in younger children. In the past this led to problems such as short bones or a curving of the spine, but this is less likely with the lower doses of radiation used today.
- Radiation that reaches the chest area can affect the heart and lungs. This does not usually cause problems right away, but in some children it may eventually lead to heart or lung problems as they get older.
- Radiation to the abdomen in girls can damage the ovaries. This might lead to abnormal menstrual cycles or problems getting pregnant or having children later on.
- Radiation can damage the DNA inside cells. As a result, radiation therapy slightly increases the risk of developing a second cancer in the areas that get radiation, usually many years after the radiation is given.

Close follow-up with doctors is important as children grow older so that any problems can be found and treated as soon as possible. For more on the possible long-term

effects of treatment, see the section [Late and Long-term Effects of Neuroblastoma and Its Treatment](#).

## MIBG radiotherapy

As described in the section [How Is Neuroblastoma Diagnosed?](#) MIBG is a chemical similar to norepinephrine, which is made by sympathetic nerve cells. A slightly radioactive form of MIBG is sometimes injected into the blood as part of an imaging test to look for neuroblastoma cells in the body.

A more highly radioactive form of MIBG is also used to treat some children with advanced neuroblastoma, often along with other treatments. Once injected into the blood, the MIBG goes to tumors anywhere in the body and delivers its radiation. The child will need to stay in a special hospital room for a few days after the injection until most of the radiation has left the body. Most of the radiation leaves the body in the urine, so younger children might need to have a catheter in the bladder to help urine leave the body, usually for a couple of days.

**Possible side effects:** Most of the radiation from MIBG therapy stays in the area of the neuroblastoma, so most children do not have serious side effects from this treatment. MIBG therapy can sometimes cause mild nausea and vomiting. It can also make some children feel tired or sluggish. Some children might have swollen cheeks from the MIBG because it can affect the salivary glands. In rare cases it may cause high blood pressure for a short period of time.

- [References](#)

[See all references for Neuroblastoma](#)

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# High-Dose Chemotherapy/Radiation Therapy and Stem Cell Transplant for Neuroblastoma

This type of treatment is often used in children with high-risk neuroblastoma who are unlikely to be cured with other treatments.

Giving higher doses of [chemotherapy](#) (and sometimes [radiation](#)) might be more effective in treating these cancers, but normally this can't be done because it would cause severe damage to the bone marrow, where new blood cells are made. This could lead to life-threatening shortages of blood cells.

Doctors can sometimes get around this problem by giving the high-dose treatments, then replacing the patient's bone marrow cells by giving them new blood-making cells (called *stem cells*). This is known as a *stem cell transplant* (SCT).

In the past, the stem cells were often collected from the child's own bone marrow before treatment, which required drilling small holes in certain bones. The treatment was commonly referred to as a *bone marrow transplant*.

But doctors have found that stem cells can be collected from the bloodstream during a procedure known as *apheresis*. This is similar to donating blood, but instead of going into a collecting bag, the blood goes into a special machine that filters out the stem cells and returns the other parts of the blood back to the person's body. This process may be repeated over a few days. The stem cells are then frozen until the transplant.

## **How the transplant is done**

Typically, the child will be admitted to the stem cell transplant unit of the hospital on the day before the high-dose chemo begins. He or she will usually stay in the hospital until after the chemo and the stem cells have been given, and until the stem cells have started making new blood cells again (see below).

The child gets high-dose chemotherapy, often along with radiation. This destroys the cancer cells in the body, as well as the normal cells in the bone marrow. After treatment, the frozen stem cells are thawed and given as a blood transfusion. The stem cells travel through the bloodstream and settle in the child's bone marrow.

Usually within a couple of weeks, the stem cells begin making new white blood cells. This is later followed by new platelet production and new red blood cell production. Until this happens, the child is at high risk of [infection](#) because of a low white blood cell count, as well as bleeding because of a low platelet count. To help lower the risk of infection, the child stays in a special hospital room, and visitors must wear protective clothing. Blood and platelet transfusions and treatment with IV antibiotics may also be used to help prevent or treat infections or bleeding problems.

The child usually stays in the hospital room until part of the white blood cell count (known as the *absolute neutrophil count*, or *ANC*) rises to a safe level. The child is then seen in an outpatient clinic almost every day for several weeks. Because platelet counts often take longer to return to a safe level, the child may get platelet transfusions as an outpatient. Patients may need to make regular visits to the outpatient clinic for about 6 months, after which time their care may be continued by their regular doctors.

## **Practical points**

A stem cell transplant is a complex treatment that can cause life-threatening side effects. If the doctors think your child can benefit from a transplant, the best place to have this done is at a nationally recognized cancer center where the staff has experience with the procedure and with managing the recovery period.

A stem cell transplant often requires a long hospital stay and can be very expensive (costing well over \$100,000). Be sure to get a written approval from your insurer if the procedure is recommended for your child. Even if the transplant is covered by your health insurance, co-pays or other costs could easily amount to many thousands of dollars. Find out what your insurer will cover before the transplant so you will have an idea of what you might have to pay.

## **Possible side effects**

The possible side effects from SCT are generally divided into early and long-term effects.

### **Early or short-term side effects**

The early complications and side effects are basically the same as those caused by high-dose chemotherapy or radiation therapy and can be severe. They are caused by damage to the bone marrow and other quickly growing tissues of the body, and can include:

- Low blood cell counts (with fatigue and increased risk of infection and bleeding)
- Nausea and vomiting
- Loss of appetite
- Mouth sores
- Diarrhea
- Hair loss

One of the most common and serious short-term effects is an increased risk for serious

infections. Antibiotics are often given to try to prevent this. Other side effects, like low red blood cell and platelet counts, might require [blood product transfusions](#) or other treatments.

### Late or long-term side effects

Some complications and side effects can last for a long time or might not occur until months or years after the transplant. These can include:

- Radiation damage to the heart or lungs
- Problems with the thyroid or other hormone-making glands
- Problems with fertility
- Damage to bones or problems with bone growth
- Development of another cancer (including leukemia) years later

Be sure to talk to your child's doctor before the transplant to learn about possible long-term effects your child might have. For more on the possible long-term effects of this and other treatments, see the section, [Late and Long-term Effects of Neuroblastoma and Its Treatment](#).

For more information on stem cell transplants in general, see our document [Stem Cell Transplant for Cancer](#).

- [References](#)

[See all references for Neuroblastoma](#)

Last Medical Review: March 14, 2014 Last Revised: January 22, 2016

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## Retinoid Therapy for Neuroblastoma

Retinoids are chemicals that are related to vitamin A. They are known as *differentiating agents* because they are thought to help some cancer cells mature (differentiate) into normal cells.

In children with high-risk neuroblastoma, treatment with a retinoid called *13-cis-retinoic*

*acid* (isotretinoin) reduces the risk of the cancer coming back after [high-dose chemotherapy and stem cell transplant](#). Most doctors now recommend 6 months of 13-cis-retinoic acid after the transplant. This drug is taken as a capsule, twice a day for 2 weeks, followed by 2 weeks off.

Researchers are now trying to develop more effective retinoids and to define the exact role of this approach in treating neuroblastoma.

## Possible side effects

The most common side effect of 13-cis-retinoic acid is dry and cracked lips. Dry skin or eyes are also possible, as are nosebleeds, muscle and joint pains, and changes in the nails.

- [References](#)

[See all references for Neuroblastoma](#)

Last Medical Review: March 14, 2014 Last Revised: January 22, 2016

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# Immunotherapy for Neuroblastoma

Immunotherapy is the use of medicines to help a patient's own immune system recognize and destroy cancer cells more effectively. Several types of immunotherapy are now being studied for use against neuroblastoma (some of which are described in the section [What's New in Neuroblastoma Research and Treatment?](#)).

Monoclonal antibodies are man-made versions of immune system proteins that can be made to attack a very specific target. They can be injected into the body to seek out and attach to cancer cells.

A monoclonal antibody called **dinutuximab (Unituxin)** attaches to GD2, a substance found on the surface of many neuroblastoma cells. This antibody can be given together with cytokines (immune system hormones) such as GM-CSF and interleukin-2 (IL-2) to help the child's immune system recognize and destroy neuroblastoma cells. This antibody is now part of the routine treatment for many children with high-risk

neuroblastoma, often after a [stem cell transplant](#).

## Possible side effects

Side effects of dinutuximab treatment can include:

- Nerve pain (which can sometimes be severe)
- Leaking of fluid in the body (which can lead to low blood pressure, fast heart rate, shortness of breath, and swelling)
- Allergic reactions (which can lead to airway swelling, trouble breathing, and low blood pressure)
- Vomiting
- Diarrhea
- Infections
- [References](#)

[See all references for Neuroblastoma](#)

Last Medical Review: March 14, 2014 Last Revised: January 22, 2016

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# Treatment of Neuroblastoma by Risk Group

Treatment for neuroblastoma is largely based on which [risk group](#) a child falls into.

## Low risk

Children at low risk usually don't need very intensive treatment to cure the neuroblastoma. In fact, some children might not need to be treated at all because some of these neuroblastomas will mature or go away on their own.

Many children can have [surgery](#) as their only treatment. Even if some neuroblastoma is left behind after surgery, the child can usually be watched carefully without further

treatment because the remaining tumor will often mature or go away on its own.

If much of the tumor can't be removed or if it has some unfavorable features, [chemotherapy](#) is typically given after surgery. A common chemo regimen is a combination of carboplatin, cyclophosphamide, doxorubicin, and etoposide. But other combinations may be used.

For those few children that have symptoms from a low-risk tumor that can't safely be treated right away with surgery, a short course of chemotherapy might be given first. For example, if the tumor is pressing on the spinal cord or affecting breathing, chemotherapy may be used to shrink the tumor to control the symptoms. [Radiation therapy](#) might be needed if chemotherapy doesn't shrink the tumor fast enough.

Infants with stage 4S disease and no symptoms can often be watched carefully with no treatment, because these cancers typically mature or go away on their own. If the tumor causes problems such as an enlarged liver, which can be life-threatening for very young infants, chemotherapy that is less intense may be used to shrink the tumor. Radiation therapy may be used if chemo does not shrink the liver right away.

Recent research has also shown that infants younger than 6 months with small adrenal tumors (which are assumed to be neuroblastomas) can often be watched closely without needing surgery or other treatments. Many of these tumors will mature or go away on their own, but if a tumor keeps growing or is causing symptoms, surgery can be done to remove it.

## **Intermediate risk**

[Surgery](#) is an important part of treatment for children at intermediate risk, but it is rarely enough on its own. Children are typically given 4 to 8 cycles (about 12 to 24 weeks) of [chemotherapy](#) before or after surgery. The chemo drugs used usually include carboplatin, cyclophosphamide, doxorubicin, and etoposide. Radiation therapy may be used if chemotherapy is not effective.

If chemotherapy is used after surgery, a "second look surgery" may be done to see if there is any cancer remaining and, if there is, remove it if possible. This might be followed by radiation therapy, if needed.

Doctors are now looking at the possibility of not giving chemo after surgery in some infants whose tumors are not causing symptoms. These children might just be watched closely after surgery and would only get further treatment if the tumor begins growing or causing symptoms. This approach is now being studied.

## High risk

Children at high risk require more aggressive treatment, which often includes [chemotherapy](#), [surgery](#), and [radiation](#). Treatment is often divided into 3 phases.

**Induction:** The goal of this phase is to get the cancer into remission by destroying or removing as much of it as possible. Treatment usually starts with chemotherapy, using alternating regimens of several drugs (typically cisplatin, etoposide, vincristine, cyclophosphamide, doxorubicin, and topotecan) given at higher doses than what is used in other risk groups. Surgery is usually done after this to try to remove any tumors that are still visible.

**Consolidation:** This phase uses more intensive treatment to try to get rid of any cancer cells that remain in the body. High-dose chemotherapy is given (sometimes along with radiation therapy), followed by a [stem cell transplant](#).

**Maintenance:** The goal of this phase of treatment is to try to lower the chance that the cancer will come back. The [retinoid](#) drug 13-cis-retinoic acid (isotretinoin) is often given for 6 months after other treatments are completed. [Immunotherapy](#) with the monoclonal antibody dinutuximab, along with immune-activating cytokines (GM-CSF and IL-2), is often given as well.

## Recurrent neuroblastoma

If neuroblastoma comes back after initial treatment, it is known as a recurrence or relapse. Treatment of recurrent neuroblastoma depends on many factors, including the initial [risk group](#), where the cancer recurs, and what treatments have been used.

For low- and intermediate-risk neuroblastomas that recur in the same area where they started, surgery with or without chemotherapy may be effective.

For high-risk cancers or those that recur in distant parts of the body, treatment is usually more intense, and may include a combination of chemotherapy, surgery, and radiation therapy (such as MIBG radiotherapy). Chemotherapy might include drugs that weren't used during the initial treatment. Intensive treatment with high-dose chemotherapy/radiation therapy followed by a stem cell transplant might be another option. Because these cancers can be hard to treat, clinical trials of newer treatments, such as monoclonal antibodies or new anti-cancer drugs, might be another reasonable option. (See the section [What's New in Neuroblastoma Research and Treatment?](#))

- [References](#)

[See all references for Neuroblastoma](#)

Last Medical Review: March 14, 2014 Last Revised: January 22, 2016

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## Emotional and Social Issues in Children With Neuroblastoma

Most children with neuroblastoma are very young when they are diagnosed. Still, some children may have emotional or psychological issues that need to be addressed during and after treatment. Depending on their age, they may also have some problems with normal functioning and school work. These can often be overcome with support and encouragement. Doctors and other members of the health care team can also often recommend special support programs and services to help children during and after cancer treatment.

Parents and other family members can also be affected, both emotionally and in other ways. The family's situation should be evaluated by the treatment center as soon as possible. Some common family concerns include financial stresses, traveling to and staying near the cancer center, the need for family members to take time off from work, the possible loss of a job, and the need for home schooling. Social workers and other professionals at cancer centers can help families sort through these issues. If family members have concerns, they can be addressed before they become a crisis. You can read more about financial concerns in our document [Children Diagnosed With Cancer: Financial and Insurance Issues](#).

Centers that treat many patients with neuroblastoma may have programs to introduce new patients and their families to others who have finished their treatment. This can give parents an idea of what to expect during and after treatment, which is very important. Seeing another patient with neuroblastoma doing well is often helpful for the patient and family.

Many experts recommend that school-aged children attend school as much as possible. This can help them maintain a sense of daily routine and keep their friends informed about what is happening.

Friends can be a great source of support, but patients and parents should know that some people have misunderstandings and fears about cancer. Some cancer centers have a school re-entry program that can help in these situations. In this program, health educators visit the school and tell students about the diagnosis, treatment, and changes that the cancer patient may go through. They also answer any questions from teachers and classmates. (For more information, see our document [Children Diagnosed With Cancer: Returning to School.](#))

During treatment, children and their families tend to focus on the daily aspects of getting through it and beating the cancer. But once treatment is finished and as children who have had neuroblastoma grow older, a number of emotional issues can arise. Some of these might last a long time. They can include things like:

- Dealing with physical changes or long-term side effects from the treatment
- Worries about the cancer returning or new health problems developing
- Feelings of resentment for having had cancer or having gone through treatment when others did not
- Concerns about being treated differently or discriminated against (by friends, classmates, coworkers, employers, etc.)
- Concerns about dating, marrying, and having a family later in life

No one chooses to have cancer, but for many survivors, the experience can eventually be positive, helping to establish strong self-values. Other survivors may have a harder time recovering, adjusting to life after cancer, and moving on. It is normal to have some anxiety or other emotional reactions after treatment, but feeling overly worried, depressed, or angry can affect many aspects of a young person's growth. It can get in the way of relationships, school, and other aspects of life.

With support from family, friends, other survivors, mental health professionals, and others, many people who have survived cancer can thrive in spite of the challenges they've had to face. If needed, doctors and other members of the health care team can often recommend special support programs and services to help children after cancer treatment.

- [References](#)

[See all references for Neuroblastoma](#)

Last Medical Review: March 14, 2014 Last Revised: January 22, 2016

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