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## About Testicular Cancer

### Overview and Types

If you have been diagnosed with testicular cancer or are worried about it, you likely have a lot of questions. Learning some basics is a good place to start.

- [What Is Testicular Cancer?](#)

### Research and Statistics

See the latest estimates for new cases of testicular cancer and deaths in the US and what research is currently being done.

- [Key Statistics for Testicular Cancer](#)
  - [What's New in Testicular Cancer Research?](#)
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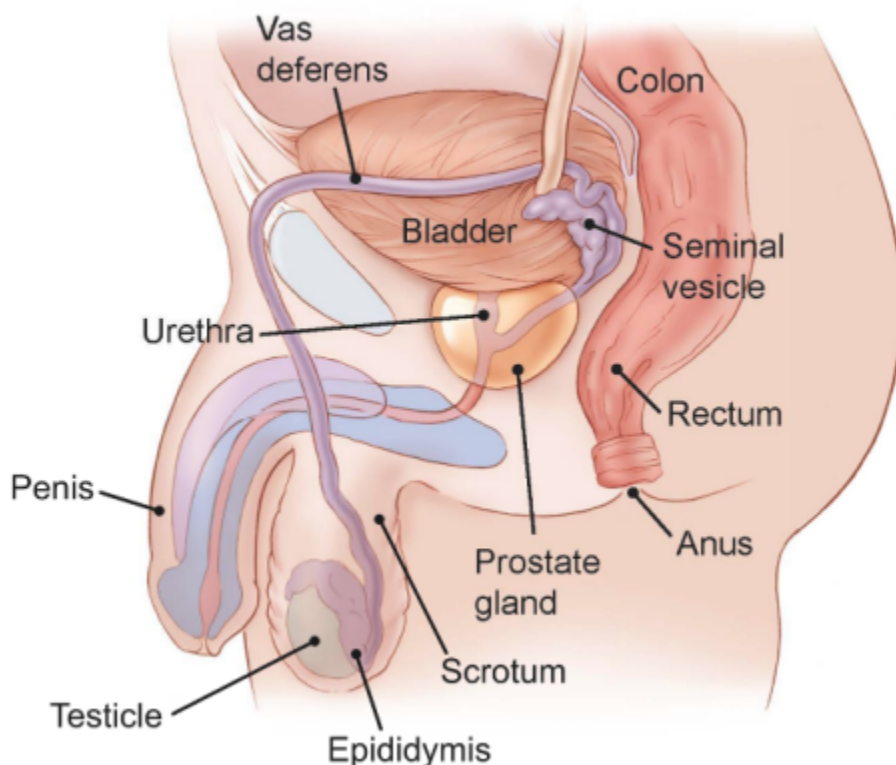
## What Is Testicular Cancer?

Cancer starts when cells begin to grow out of control. Cells in nearly any part of the body can become cancer and spread to other parts of the body. To learn more about how cancers start and spread, see [What Is Cancer?](#)<sup>1</sup>

Cancer that starts in the testicles is called testicular cancer. To understand this cancer, it helps to know about the normal structure and function of the testicles.

## What are testicles?

Testicles (also called **testes**; a single testicle is called a **testis**) are part of the male reproductive system. The 2 organs are each normally a little smaller than a golf ball in adult males. They're held within a sac of skin called the **scrotum**. The scrotum hangs under the base of the penis.



Testicles have 2 main functions:

- They make male hormones (androgens) such as testosterone.
- They make sperm, the male cells needed to fertilize a female egg cell to start a pregnancy.

Sperm cells are made in long, thread-like tubes inside the testicles called seminiferous tubules. They're then stored in a small coiled tube behind each testicle called the epididymis. This is where they mature.

During ejaculation, sperm cells are carried from the epididymis through the vas deferens to the seminal vesicles. There, they mix with fluids made by the vesicles, prostate gland,

and other glands to form semen. This fluid then enters the urethra, the tube in the center of the penis through which both urine and semen leave the body.

## Types of testicular cancer

The testicles are made up of many types of cells, each of which can develop into one or more types of cancer. It's important to know the type of cell the cancer started in and what kind of cancer it is because they differ in how they're treated and in their prognosis (outlook).

Doctors can tell what type of testicular cancer you have by looking at the cells under a microscope.

### Germ cell tumors

More than 90% of cancers of the testicle start in cells known as germ cells. These are the cells that make sperm. The main types of germ cell tumors (GCTs) in the testicles are **seminomas** and **non-seminomas**.

These types occur about equally. Many testicular cancers contain both seminoma and non-seminoma cells. These **mixed germ cell tumors are treated as non-seminomas** because they grow and spread like non-seminomas.

### Seminomas

Seminomas tend to grow and spread more slowly than non-seminomas. The 2 main sub-types of these tumors are classical (or typical) seminomas and spermatocytic seminomas.

- **Classical seminoma:** More than 95% of seminomas are classical. These usually occur in men between 25 and 45.
- **Spermatocytic seminoma:** This rare type of seminoma tends to occur in older men. (The average age is about 65.) Spermatocytic tumors tend to grow more slowly and are less likely to spread to other parts of the body than classical seminomas.

Some seminomas can increase blood levels of a protein called human chorionic gonadotropin (HCG). HCG can be checked with a simple blood test and is considered a tumor marker for certain types of testicular cancer. It can be used for diagnosis and to check how the patient is responding to treatment.

## ***Non-seminomas***

These types of germ cell tumors usually occur in men between their late teens and early 30s. The 4 main types of non-seminoma tumors are embryonal carcinoma, yolk sac carcinoma, choriocarcinoma, and teratoma. Most tumors are a mix of different types (sometimes with seminoma cells too), but this doesn't change the treatment of most non-seminoma cancers.

**Embryonal carcinoma:** These cells are found in about 40% of testicular tumors, but pure embryonal carcinomas occur only 3% to 4% of the time. When seen under a microscope, these tumors can look like tissues of very early embryos. This type of non-seminoma tends to grow rapidly and spread outside the testicle.

Embryonal carcinoma can increase blood levels of a tumor marker protein called **alpha-fetoprotein (AFP)**, as well as **human chorionic gonadotropin (HCG)**.

**Yolk sac carcinoma:** These tumors are so named because their cells look like the yolk sac of an early human embryo. Other names for this cancer include yolk sac tumor, endodermal sinus tumor, infantile embryonal carcinoma, or orchidoblastoma.

This is the most common form of testicular cancer in children (especially in infants), but pure yolk sac carcinomas (tumors that do not have other types of non-seminoma cells in them) are rare in adults. When they occur in children, these tumors usually are treated successfully. But they're of more concern when they occur in adults, especially if they are pure. Yolk sac carcinomas respond very well to chemotherapy, even if they have spread.

This type of tumor almost always increases blood levels of AFP (alpha-fetoprotein).

**Choriocarcinoma:** This is a very rare and fast-growing type of testicular cancer in adults. Pure choriocarcinoma is likely to spread rapidly to other parts of the body, including the lungs, bones, and brain. More often, choriocarcinoma cells are seen with other types of non-seminoma cells in a mixed germ cell tumor. These mixed tumors tend to have a somewhat better outlook than pure choriocarcinomas, although the presence of choriocarcinoma is always a worrisome finding.

This type of tumor increases blood levels of HCG (human chorionic gonadotropin).

**Teratoma:** Teratomas are germ cell tumors with areas that, under a microscope, look like each of the 3 layers of a developing embryo: the endoderm (innermost layer), mesoderm (middle layer), and ectoderm (outer layer). Pure teratomas of the testicles are rare and do not increase AFP (alpha-fetoprotein) or HCG (human chorionic

gonadotropin) levels. Most often, teratomas are seen as parts of mixed germ cell tumors.

There are 3 main types of teratomas:

- **Mature teratomas** are tumors formed by cells a lot like the cells of adult tissues. They rarely spread. They can usually be cured with surgery, but some [come back](#)<sup>2</sup>(recur) after treatment.
- **Immature teratomas** are less well-developed cancers with cells that look like those of an early embryo. This type is more likely than a mature teratoma to grow into (invade) nearby tissues, spread (metastasize) outside the testicle, and come back (recur) years after treatment.
- **Teratomas with somatic type malignancy** are very rare. These cancers have some areas that look like mature teratomas but have other areas where the cells have become a type of cancer that normally develops outside the testicle (such as a sarcoma, adenocarcinoma, or even leukemia).

### **Carcinoma in situ of the testicle**

Testicular germ cell cancers can start as a non-invasive form of the disease called **carcinoma in situ (CIS)** or **intratubular germ cell neoplasia**. In testicular CIS, the cells look abnormal under the microscope, but they have not yet spread outside the walls of the seminiferous tubules (where sperm cells are formed). Carcinoma in situ doesn't always progress to invasive cancer.

It's hard to find CIS before it becomes an invasive cancer because it generally doesn't cause symptoms or form a lump that you or the doctor can feel. The only way to [diagnose](#)<sup>3</sup>testicular CIS is to have a biopsy . (This is a procedure to take out a tiny bit of tissue so it can be checked under a microscope.) Sometimes CIS is found incidentally (by accident) when a testicular biopsy is done for another reason, such as infertility.

Experts don't agree about the best treatment for CIS. Since CIS doesn't always become an invasive cancer, many doctors in the United States consider observation (watchful waiting) to be the best treatment option.

When CIS of the testicle becomes invasive, its cells are no longer just in the seminiferous tubules, they've grown into other structures of the testicle. These cancer cells can then spread either to the lymph nodes (small, bean-shaped collections of white blood cells) through lymphatic vessels (tiny fluid-filled tubes that connect the lymph

nodes), or through the blood to other parts of the body.

## **Stromal tumors**

Tumors can also start in the supportive and hormone-producing tissues, or stroma, of the testicles. These tumors are known as **gonadal stromal tumors**. They make up less than 5% of adult testicular tumors, but up to 20% of childhood testicular tumors. The main types are **Leydig cell tumors** and **Sertoli cell tumors**.

### ***Leydig cell tumors***

These tumors start in the Leydig cells in the testicle that normally make male sex hormones (androgens like testosterone). Leydig cell tumors can develop in both adults and children. These tumors often make androgens (male hormones), but sometimes they make estrogens (female sex hormones).

Most Leydig cell tumors are not cancer (benign). They seldom spread beyond the testicle and can often be cured with surgery. Still, a small number of Leydig cell tumors do spread to other parts of the body. These tend to have a poor outlook because they usually don't respond well to chemo or radiation therapy.

### ***Sertoli cell tumors***

These tumors start in normal Sertoli cells, which support and nourish the sperm-making germ cells. Like the Leydig cell tumors, these tumors are usually benign. But if they spread, they usually don't respond well to chemo or radiation therapy.

## **Secondary testicular cancers**

Cancers that start in another organ and then spread (metastasize) to the testicle are called secondary testicular cancers. These are not true testicular cancers – they don't start in the testicles. They're named and treated based on where they started.

[Lymphoma](#)<sup>4</sup> is the most common secondary testicular cancer. Testicular lymphoma is more common in men older than 50 than primary testicular tumors. The outlook depends on the type and stage of lymphoma. The usual treatment is surgical removal, followed by radiation and/or chemotherapy.

In boys with acute [leukemia](#)<sup>5</sup>, the leukemia cells can sometimes form a tumor in the testicle. Along with chemotherapy to treat the leukemia, this might require treatment

with radiation or surgery to remove the testicle.

Cancers of the prostate, lung, skin (melanoma), kidney, and other organs also can spread to the testicles. The prognosis for these cancers tends to be poor because these cancers have usually spread widely to other organs as well. Treatment depends on the specific type of cancer.

## Hyperlinks

1. [www.cancer.org/cancer/cancer-basics/what-is-cancer.html](http://www.cancer.org/cancer/cancer-basics/what-is-cancer.html)
2. [www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-recurrence.html](http://www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-recurrence.html)
3. [www.cancer.org/cancer/testicular-cancer/detection-diagnosis-staging/how-diagnosed.html](http://www.cancer.org/cancer/testicular-cancer/detection-diagnosis-staging/how-diagnosed.html)
4. [www.cancer.org/cancer/non-hodgkin-lymphoma.html](http://www.cancer.org/cancer/non-hodgkin-lymphoma.html)
5. [www.cancer.org/cancer/leukemia-in-children.html](http://www.cancer.org/cancer/leukemia-in-children.html)

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Last Medical Review: May 17, 2018 Last Revised: May 17, 2018

# Key Statistics for Testicular Cancer

The American Cancer Society's estimates for testicular cancer in the United States for 2019 are:

- About 9,560 new cases of testicular cancer diagnosed
- About 410 deaths from testicular cancer

The incidence rate of testicular cancer has been increasing in the US and many other countries for several decades. The increase is mostly in seminomas. Experts have not been able to find reasons for this. Lately, the rate of increase has slowed.

Testicular cancer is not common: about 1 of every 250 males will develop testicular cancer at some point during their lifetime.

The average age at the time of diagnosis of testicular cancer is about 33. This is largely a disease of young and middle-aged men, but about 6% of cases occur in children and teens, and about 8% occur in men over the age of 55.

Because testicular cancer usually can be treated successfully, a man's lifetime risk of dying from this cancer is very low: about 1 in 5,000. If you would like to know more about survival statistics, see [Testicular cancer survival rates](#)<sup>1</sup>.

Visit the American Cancer Society's [Cancer Statistics Center](#)<sup>2</sup> for more key statistics.

## Hyperlinks

1. [www.cancer.org/cancer/testicular-cancer/detection-diagnosis-staging/survival-rates.html](http://www.cancer.org/cancer/testicular-cancer/detection-diagnosis-staging/survival-rates.html)
2. <https://cancerstatisticscenter.cancer.org/>

## References

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Howlander N, Noone AM, Krapcho M, Miller D, Bishop K, Kosary CL, Yu M, Ruhl J, Tatalovich Z, Mariotto A, Lewis DR, Chen HS, Feuer EJ, Cronin KA (eds). SEER



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Last Medical Review: May 17, 2018 Last Revised: January 8, 2019

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## What's New in Testicular Cancer Research?

Important research into testicular cancer is being done in many university hospitals, medical centers, and other institutions around the world. Each year, scientists find out more about what causes the disease, how to prevent it, and how to improve treatment.

### Genetics

In recent years, researchers have found that changes in certain genes, such as PLAP, NANOG, SOX2, and REX1, appear to be linked to testicular cancer. These findings could someday help identify men at higher risk, but they need to be studied more.

Scientists are also studying changes in the genes of testicular cancer cells to learn more about the causes of this disease. Their hope is that improved understanding will lead to better treatment. Certain gene mutations found in the testicular cancer cells have been linked to resistance to chemotherapy and predict poor outcomes. These findings may help personalize treatment. They could also help find new drugs to treat testicular cancer, drugs that can target these gene mutations. A better understanding of the genetic changes will also help doctors decide which patients need further treatment and which ones can be safely treated with surgery alone.

### Treatment

Clinical trials have refined doctors' approaches to treating these cancers. For example, studies have found factors that help predict which patients have a particularly good

prognosis and may not need lymph node surgery or radiation therapy. Studies also have found unfavorable prognostic factors that suggest certain patients may benefit from more intense treatment.

New drugs and new drug combinations are being tested for patients with testicular cancer that comes back or doesn't respond to treatment. And high-dose chemotherapy followed by a [stem cell transplant](#)<sup>1</sup> is being studied for men who have tumors with a poor prognosis.

Sentinel lymph node biopsy is used for other types of cancer to help limit the number of nodes that are removed, which can decrease the risk of long-term side effects. Researchers are looking at how this procedure might be used with testicular cancer.

Other studies are using robotic-assisted surgery to remove lymph nodes after chemotherapy. It appears to be a safe option instead of standard "open" surgery, but more research is needed to show this and to see if there are other benefits.

## Long-term treatment side effects

A large amount of work is being done to try to better understand, limit, and prevent the long-term toxicities of treatment while maintaining the high cure rate. Chemo combinations are being refined to see if eliminating certain drugs, replacing them with others, or lowering doses can reduce side effects for some men without reducing the effectiveness of treatment.

Doctors also want to be able to predict whose cancer is more likely to [come back later](#)<sup>2</sup>(recur) and then base treatment on this. This way they couldn't under- or over-treat anyone. For instance, one study reported good results by individualizing treatment in men with metastatic cancer based on the decline of tumor marker (AFP and HCG) levels after chemo, giving more intense treatment to those with a slower decline.

## Hyperlinks

1. [www.cancer.org/cancer/testicular-cancer/treating/high-dose-chemo-stem-cell.html](http://www.cancer.org/cancer/testicular-cancer/treating/high-dose-chemo-stem-cell.html)
2. [www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-recurrence.html](http://www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-recurrence.html)

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Last Medical Review: May 17, 2018 Last Revised: May 17, 2018

### Written by

The American Cancer Society medical and editorial content team  
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# Testicular Cancer Causes, Risk Factors, and Prevention

## Risk Factors

A risk factor is anything that affects your chance of getting a disease such as cancer. Learn more about the risk factors for testicular cancer.

- [Risk Factors for Testicular Cancer](#)
- [What Causes Testicular Cancer?](#)

## Prevention

Many men with testicular cancer have no known [risk factors](#). And many of the known risk factors can't be changed. For these reasons, it's not possible to prevent most cases of testicular cancer.

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# Risk Factors for Testicular Cancer

A risk factor is anything that changes your chance of getting a disease such as cancer. Different cancers have different risk factors. Some risk factors, like smoking and diet, can be changed. Others, like a person's age or family history, can't be changed.

But having a risk factor, or even many, does not mean that you will get the disease. Just as not having risk factors doesn't mean you won't get the disease. And some people who get the disease may not have had any known risk factors. Even if a person with

testicular cancer has a risk factor, it's often very hard to know how much that risk factor contributed to the cancer.

Scientists have found few risk factors that make someone more likely to develop testicular cancer. Most boys and men with testicular cancer don't have any of the known risk factors. Risk factors for testicular cancer include:

- An undescended testicle
- Family history of testicular cancer
- HIV infection
- Carcinoma in situ of the testicle
- Having had testicular cancer before
- Being of a certain race/ethnicity
- Body size

## Undescended testicle

One of the main risk factors for testicular cancer is a condition called **cryptorchidism**, or **undescended testicle(s)**. This means that one or both testicles fail to move from the abdomen (belly) into the scrotum before birth. Males with cryptorchidism are many times more likely to get testicular cancer than those with normally descended testicles.

Normally, the testicles develop inside the abdomen of the fetus and they go down (descend) into the scrotum before birth. But in about 3% of boys, the testicles do not make it all the way down before the child is born. Sometimes one or both testicles stay in the abdomen. In other cases, the testicles start to descend but stay in the groin area.

Most of the time, undescended testicles continue moving down into the scrotum during the child's first year of life. If the testicle hasn't descended by the time a child is a year old, it probably isn't going to do it on its own. Sometimes a surgical procedure known as **orchiopexy** is needed to move the testicle down into the scrotum.

The risk of testicular cancer might be a little higher for men whose testicle stayed in the abdomen as opposed to one that has descended at least partway. If cancer does develop, it's usually in the undescended testicle, but about 1 out of 4 cases occur in the normally descended testicle. Because of this, some doctors conclude that cryptorchidism doesn't actually cause testicular cancer, but that there's something else that leads to both testicular cancer and abnormal positioning of one or both testicles.

Orchiopexy may reduce the risk of testicular cancer if it's done when a child is younger,

but it's not as clear if it's helpful if the child is older. The best time to do this surgery is not clear. Experts in the United States recommend that orchiopexy be done soon after the child's first birthday for reasons that aren't related to cancer (such as fertility).

## Family history

Having a father or brother with testicular cancer increases the risk that you will get it, too. But only a small number of testicular cancers occur in families. Most men with testicular cancer do not have a family history of the disease.

Klinefelter's syndrome is an inherited disease that's also linked to an increased risk of testicular cancer.

## HIV infection

Some evidence has shown that men infected with the human immunodeficiency virus (HIV), particularly those with AIDS, are at increased risk. No other infections have been shown to increase testicular cancer risk.

## Carcinoma in situ

This condition, described in [What Is Testicular Cancer?](#)<sup>1</sup> often doesn't cause a lump in the testicles or any other [symptoms](#)<sup>2</sup>. It isn't clear how often carcinoma in situ (CIS) in the testicles progresses to cancer. In some cases, CIS is found in men who have a testicular biopsy to evaluate infertility or have a testicle removed because of cryptorchidism. Doctors in Europe are more likely than the doctors in this country to look for CIS. This may be why the numbers for diagnosis and progression of CIS to cancer are lower in the United States than in parts of Europe.

Since we don't know how often CIS becomes true (invasive) cancer, it isn't clear if treating CIS is a good idea. Some experts think that it may be better to wait and see if the disease gets worse or becomes a true cancer. This could allow many men with CIS to avoid the risks and side effects of treatment. When CIS is treated, [radiation](#)<sup>3</sup> or [surgery](#)<sup>4</sup> (to remove the testicle) is used.

## Cancer in the other testicle

A personal history of testicular cancer is another risk factor. About 3% or 4% of men who have been cured of cancer in one testicle will at some point develop cancer in the

other testicle.

## Age

About half of testicular cancers occur in men between the ages of 20 and 34. But this cancer can affect males of any age, including infants and elderly men.

## Race and ethnicity

The risk of testicular cancer among white men is about 4 to 5 times that of black and Asian-American men. The risk for American Indians falls between that of Asians and whites. The reason for these differences is not known. Worldwide, the risk of developing this disease is highest among men living in the United States and Europe and lowest among men living in Africa or Asia.

## Body size

Several studies have found that tall men have a somewhat higher risk of testicular cancer, but some other studies have not. Most studies have not found a link between testicular cancer and body weight.

## Unproven or controversial risk factors

Prior injury or trauma to the testicles and recurrent actions such as horseback riding do not appear to be related to the development of testicular cancer.

Most studies have not found that strenuous physical activity increases testicular cancer risk. Being [physically active](#)<sup>5</sup> has been linked with a lower risk of several other forms of cancer as well as a lower risk of many other health problems.

## Hyperlinks

1. [www.cancer.org/cancer/testicular-cancer/about/what-is-testicular-cancer.html](http://www.cancer.org/cancer/testicular-cancer/about/what-is-testicular-cancer.html)
2. [www.cancer.org/cancer/testicular-cancer/detection-diagnosis-staging/signs-and-symptoms.html](http://www.cancer.org/cancer/testicular-cancer/detection-diagnosis-staging/signs-and-symptoms.html)
3. [www.cancer.org/cancer/testicular-cancer/treating/radiation-therapy.html](http://www.cancer.org/cancer/testicular-cancer/treating/radiation-therapy.html)
4. [www.cancer.org/cancer/testicular-cancer/treating/surgery.html](http://www.cancer.org/cancer/testicular-cancer/treating/surgery.html)
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Last Medical Review: May 17, 2018 Last Revised: May 17, 2018

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## What Causes Testicular Cancer?

The exact cause of most testicular cancers is not known. But scientists have found that the disease is linked with a number of [other conditions](#). A great deal of research is being done to learn more about the causes.

Researchers are learning how certain changes in a cell's DNA can cause the cell to become cancer. DNA is the chemical in each of our cells that makes up our genes. Genes tell our cells how to function. They are packaged in chromosomes, which are



long strands of DNA in each cell. Most cells in the body have 2 sets of 23 chromosomes (one set of chromosomes comes from each parent), but each sperm or egg cell has only 23 chromosomes (one set). When the sperm and egg combine, the resulting embryo has a normal number of chromosomes in each cell, half of which are from each parent. We usually look like our parents because they are the source of our DNA. But DNA affects more than how we look.

Some [genes](#)<sup>1</sup> control when our cells grow, divide into new cells, and die.

- Certain genes that help cells grow and divide are called **oncogenes**.
- Others that slow down cell division or make cells die at the right time are called **tumor suppressor genes**.

Cancers can be caused by changes in chromosomes that turn on oncogenes or turn off tumor suppressor genes.

Most testicular cancer cells have extra copies of a part of chromosome 12 (called *isochromosome 12p* or *i12p*). Some testicular cancers have changes in other chromosomes as well, or even abnormal numbers of chromosomes (often too many). Scientists are studying these DNA and chromosome changes to learn more about which genes are affected and how this might lead to testicular cancer.

## Hyperlinks

1. [www.cancer.org/cancer/cancer-causes/genetics/genes-and-cancer.html](http://www.cancer.org/cancer/cancer-causes/genetics/genes-and-cancer.html)

Last Medical Review: May 17, 2018 Last Revised: May 17, 2018

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# Can Testicular Cancer Be Prevented?

Many men with testicular cancer have no known risk factors. And some of the known risk factors, such as undescended testicles, white race, and a family history of the disease, can't be changed. For these reasons, it's not possible to prevent most cases of this disease at this time.

Experts recommend correcting cryptorchidism in boys for a number of reasons (such as preserving fertility and body image), but it's not clear how much this changes the child's

risk for testicular cancer.

## References

See all references for Testicular Cancer ([www.cancer.org/cancer/testicular-cancer/references.html](http://www.cancer.org/cancer/testicular-cancer/references.html))

Last Medical Review: May 17, 2018 Last Revised: May 17, 2018

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# Testicular Cancer Early Detection, Diagnosis, and Staging

## Detection and Diagnosis

Finding cancer early, when it's small and before it has spread, often allows for more treatment options. Some early cancers may have signs and symptoms that can be noticed, but that's not always the case.

- [Can Testicular Cancer Be Found Early?](#)
- [Signs and Symptoms of Testicular Cancer](#)
- [Tests for Testicular Cancer](#)

## Stages of Testicular Cancer

After a cancer diagnosis, staging provides important information about the extent of the cancer and how it might respond to treatment.

- [Testicular Cancer Stages](#)

## Outlook (Prognosis)

Doctors often use survival rates as a standard way of discussing a person's outlook (prognosis). Some people want to know the survival statistics for people in similar situations, while others might not find the numbers helpful, or might even not want to know them.

- [Testicular Cancer Survival Rates](#)

## Questions to Ask About Testicular Cancer

Get some questions you can ask your cancer care team to help you better understand your diagnosis and treatment options.

- [Questions to Ask About Testicular Cancer](#)

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# Can Testicular Cancer Be Found Early?

Most testicular cancers can be found at an early stage, when they're small and haven't spread. In some men, early testicular cancers cause symptoms that lead them to seek medical attention. Most of the time a lump on the testicle is the first symptom, or the testicle might be swollen or larger than normal. But some testicular cancers might not cause symptoms until they've reached an advanced stage.

Most doctors agree that examining a man's testicles should be part of a general physical exam during a routine check-up.

Some doctors recommend that all men examine their testicles monthly after puberty. Each man has to decide for himself whether or not to do this, so instructions for testicular exams are included in this section. If you have certain risk factors that increase your chance of developing testicular cancer (such as an undescended testicle, previous germ cell tumor in one testicle, or a family history), you should seriously consider monthly self-exams and talk about it with your doctor.

The American Cancer Society advises men to be aware of testicular cancer and to see a doctor right away if they find a lump in a testicle. Because regular testicular self-exams have not been studied enough to know if they reduce the death rate from this cancer, the ACS does not have a recommendation on regular testicular self-exams for all men.

## Testicular self-exam

The best time for you to examine your testicles is during or after a bath or shower, when the skin of the scrotum is relaxed.

- Hold your penis out of the way and examine each testicle separately.
- Hold your testicle between your thumbs and fingers with both hands and roll it gently between your fingers.
- Look and feel for any hard lumps or nodules (smooth rounded masses) or any change in the size, shape, or consistency of your testicles.

It's normal for one testicle to be slightly larger than the other, and for one to hang lower than the other. You should also be aware that each normal testicle has a small, coiled tube called the epididymis that can feel like a small bump on the upper or middle outer side of the testis. Normal testicles also contain blood vessels, supporting tissues, and tubes that carry sperm. Some men may confuse these with abnormal lumps at first. If you have any concerns, ask your doctor.

A testicle can get larger for many reasons other than cancer. For example, fluid can collect around the testicle to form a **hydrocele**. Or the veins in the testicle can dilate and cause enlargement and lumpiness around the testicle. This is called a **varicocele**. If your testicle seems larger, have a doctor examine you to be sure you have one of these conditions and not a tumor. The doctor may order an [ultrasound exam](#)<sup>1</sup> (see [Tests for Testicular Cancer](#)). This is an easy and painless way of finding a tumor.

If you choose to examine your testicles regularly, you will get to know what's normal and what's different. Always report any changes to your doctor without delay.

## Hyperlinks

1. [www.cancer.org/treatment/understanding-your-diagnosis/tests/ultrasound-for-cancer.html](http://www.cancer.org/treatment/understanding-your-diagnosis/tests/ultrasound-for-cancer.html)

## References

American Society of Clinical Oncology. Testicular Cancer: Signs and Symptoms. 09/2016. Accessed at [www.cancer.net/cancer-types/testicular-cancer/symptoms-and-signs](http://www.cancer.net/cancer-types/testicular-cancer/symptoms-and-signs) on April 27, 2018.

Last Medical Review: May 17, 2018 Last Revised: May 17, 2018

# Signs and Symptoms of Testicular Cancer

Many of these symptoms are more likely to be caused by something other than testicular cancer. A number of non-cancerous conditions, such as testicle injury or inflammation, can cause symptoms a lot like those of testicular cancer. Inflammation of the testicle (known as **orchitis**) and inflammation of the epididymis (**epididymitis**) can cause swelling and pain of the testicle. Both of these also can be caused by viral or bacterial infections.

Some men with testicular cancer have no symptoms at all, and their cancer is found during medical testing for other conditions. For instance, sometimes [imaging tests](#)<sup>1</sup> done to find the cause of infertility can uncover a small testicular cancer.

But if you have any of these signs or symptoms, see your doctor right away.

## Lump or swelling in the testicle

Most often, the first symptom of testicular cancer is a **lump** on the testicle, or the **testicle becomes swollen or larger**. (It's normal for one testicle to be slightly larger than the other, and for one to hang lower than the other.) Some testicular tumors might cause **pain**, but most of the time they don't. Men with testicular cancer can also have a **feeling of heaviness or aching** in the lower belly (abdomen) or scrotum.

## Breast growth or soreness

In rare cases, germ cell tumors can make breasts grow or become sore. This happens because certain types of germ cell tumors secrete high levels of a hormone called **human chorionic gonadotropin (HCG)**, which stimulates breast development.

Some [Leydig cell tumors](#)<sup>2</sup> can make estrogens (female sex hormones), which can cause breast growth or loss of sexual desire.

## Early puberty in boys

Some Leydig cell tumors can make androgens (male sex hormones). Androgen-producing tumors may not cause any symptoms in men, but in boys they can cause signs of puberty at an abnormally early age, such as a **deepening voice** and the

**growth of facial and body hair.**

## Symptoms of advanced testicular cancer

Even if testicular cancer has spread to other parts of the body, many men might not have symptoms right away. But some men might have some of the following:

- **Low back pain**, from cancer spread to the lymph nodes (bean-sized collections of immune cells) in back of the belly.
- **Shortness of breath, chest pain**, or a **cough** (even coughing up blood) may develop from cancer spread in the lungs.
- **Belly pain**, either from enlarged lymph nodes or because the cancer has spread to the liver.
- **Headaches or confusion**, from cancer spread in the brain.

## Hyperlinks

1. [www.cancer.org/treatment/understanding-your-diagnosis/tests/imaging-radiology-tests-for-cancer.html](http://www.cancer.org/treatment/understanding-your-diagnosis/tests/imaging-radiology-tests-for-cancer.html)
2. [www.cancer.org/cancer/testicular-cancer/about/what-is-testicular-cancer.html](http://www.cancer.org/cancer/testicular-cancer/about/what-is-testicular-cancer.html)

## References

American Society of Clinical Oncology. Testicular Cancer: Symptoms and Signs. 09/2016. Accessed at [www.cancer.net/cancer-types/testicular-cancer/symptoms-and-signs](http://www.cancer.net/cancer-types/testicular-cancer/symptoms-and-signs) on April 27, 2018.

National Cancer Institute. Testicular Cancer Treatment (PDQ®)—Patient Version. July 7, 2016. Accessed at [www.cancer.gov/types/testicular/patient/testicular-treatment-pdq](http://www.cancer.gov/types/testicular/patient/testicular-treatment-pdq) on April 27, 2018.

Smith ZL, Werntz RP, Eggener SE. Testicular Cancer: Epidemiology, Diagnosis, and Management. *Med Clin N Am*. 2018;102:251-264.

Last Medical Review: May 17, 2018 Last Revised: May 17, 2018

# Tests for Testicular Cancer

Testicular cancer is usually found as a result of symptoms that a person is having. It can also be found when tests are done for another condition. The next step is an exam by a doctor.

The doctor will feel the testicles for swelling or tenderness and for the size and location of any lumps. The doctor will also examine your belly (abdomen), lymph nodes, and other parts of your body carefully to look for signs of cancer spread. Often the results of the exam are normal other than the changes in the testicles. If a lump or other sign of testicular cancer is found, testing will be needed to look for the cause.

## Ultrasound of the testicles

An ultrasound is often the first test done if the doctor thinks you might have testicular cancer. It uses sound waves to produce images of the inside of your body. It can be used to see if a change is a certain benign condition (like a hydrocele or varicocele) or a solid tumor that could be a cancer. If the lump is solid, it's more likely to be a cancer. In this case, the doctor might recommend other tests or even [surgery](#)<sup>1</sup> to remove the testicle.

## Blood tests for tumor markers

Some blood tests can help diagnose testicular tumors. Many testicular cancers make high levels of certain proteins called [tumor markers](#)<sup>2</sup>, such as alpha-fetoprotein (AFP) and human chorionic gonadotropin (HCG). When these tumor markers are in the blood, it suggests that there's a testicular tumor.

Rises in levels of AFP or HCG can also help doctors tell which [type of testicular cancer](#)<sup>3</sup> it might be.

- Non-seminomas often raise AFP and/or HCG levels.
- Pure seminomas occasionally raise HCG levels but never AFP levels.

This means any increase in AFP is a sign that the tumor has a non-seminoma component. (Tumors can be mixed and have areas of seminoma and non-seminoma.) Sertoli and Leydig cell tumors don't make these substances. It's important to note that some cancers are too small to elevate tumor markers levels.



A testicular tumor might also increase the levels of an enzyme called **lactate dehydrogenase** (LDH). A high LDH level often (but not always) indicates widespread disease. But, LDH levels can also be increased with some non-cancerous conditions.

Tumor marker tests sometimes are also used for other reasons, such as to help estimate how much cancer is present (see [Testicular Cancer Stages](#)) to see how well treatment is working, or to look for signs the cancer might have come back.

## Surgery to diagnose testicular cancer

Most types of cancer are diagnosed by removing a small piece of the tumor and looking at it under a microscope for cancer cells. This is known as a **biopsy**. But a biopsy is rarely done for a testicular tumor because it might risk spreading the cancer. The doctor can often get a good idea of whether it's testicular cancer based on the ultrasound and blood tumor marker tests, so instead of a biopsy the doctor will very likely recommend surgery (a radical inguinal orchiectomy) to remove the tumor as soon as possible.

The entire testicle is sent to the lab, where a pathologist (a doctor specializing in laboratory diagnosis of diseases) looks at pieces of the tumor with a microscope. If cancer cells are found, the pathologist sends back a report describing the type and extent of the cancer.

In very rare cases, when a diagnosis of testicular cancer is uncertain, the doctor may biopsy the testicle before removing it. This is done in the operating room. The surgeon makes a cut above the pubic area, takes the testicle out of the scrotum, and examines it without cutting the spermatic cord. If a suspicious area is seen, a piece of it is removed and looked at right away by the pathologist. If cancer is found, the testicle and spermatic cord are then removed. If the tissue is not cancer, the testicle can often be returned to the scrotum.

If testicular cancer is found, your doctor will order imaging tests of other parts of your body to check for spread outside the testicle. These tests may also be done before the diagnosis is confirmed by surgery.

## Imaging tests

[Imaging tests](#)<sup>4</sup> use x-rays, magnetic fields, sound waves, or radioactive substances to create pictures of the inside of your body. Ultrasound of the testicles, described above, is a type of imaging test. Other imaging tests may be done for a number of reasons after a testicular cancer diagnosis, including:

- To learn if and how far the cancer might have spread
- To help determine if treatment worked
- To look for possible signs of cancer coming back after treatment

### **Chest x-ray**

Your chest may be x-rayed to see if cancer has spread to your lungs.

### **Computed tomography (CT) scan**

CT scans can be used to help determine the stage (extent) of the cancer by showing if it has spread to the lymph nodes, lungs, liver, or other organs.

### **Magnetic resonance imaging (MRI) scan**

MRI scans are very good for looking at the brain and spinal cord. They are only done in patients with testicular cancer if the doctor has reason to think the cancer might have spread to those areas.

### **Positron emission tomography (PET) scan**

A PET scan can help spot small collections of cancer cells in the body. It's sometimes useful to see if lymph nodes that are still enlarged after chemotherapy contain cancer or are just scar tissue. PET scans are often more useful for seminomas than for non-seminomas, so they are less often used in patients with non-seminoma. Many centers have special machines that can do both a PET and CT scan at the same time (PET/CT scan). This lets the doctor compare areas of higher radioactivity on the PET with the more detailed images of the CT.

### **Bone scan**

A bone scan can help show if a cancer has spread to the bones. It might be done if there is reason to think the cancer might have spread to the bones (because of symptoms such as bone pain) and if other test results aren't clear.

## **Hyperlinks**

1. [www.cancer.org/cancer/testicular-cancer/treating/surgery.html](http://www.cancer.org/cancer/testicular-cancer/treating/surgery.html)
2. [www.cancer.org/treatment/understanding-your-diagnosis/tests.html](http://www.cancer.org/treatment/understanding-your-diagnosis/tests.html)

3. [www.cancer.org/cancer/testicular-cancer/about/what-is-testicular-cancer.html](http://www.cancer.org/cancer/testicular-cancer/about/what-is-testicular-cancer.html)
4. [www.cancer.org/treatment/understanding-your-diagnosis/tests/imaging-radiology-tests-for-cancer.html](http://www.cancer.org/treatment/understanding-your-diagnosis/tests/imaging-radiology-tests-for-cancer.html)

## References

American Society of Clinical Oncology. Testicular Cancer: Diagnosis. 09/2016. Accessed at [www.cancer.net/cancer-types/testicular-cancer/diagnosis](http://www.cancer.net/cancer-types/testicular-cancer/diagnosis) on April 27, 2018.

National Comprehensive Cancer Network, Clinical Practice Guidelines in Oncology (NCCN Guidelines®), Testicular Cancer, Version 2.2018 -- February 16, 2018. Accessed at [www.nccn.org/professionals/physician\\_gls/pdf/testicular.pdf](http://www.nccn.org/professionals/physician_gls/pdf/testicular.pdf) on April 27, 2018.

Smith ZL, Werntz RP, Eggener SE. Testicular Cancer: Epidemiology, Diagnosis, and Management. *Med Clin N Am*. 2018;102:251-264.

Last Medical Review: May 17, 2018 Last Revised: May 17, 2018

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# Testicular Cancer Stages

After someone is diagnosed with testicular cancer, doctors will try to figure out if it has spread, and if so, how far. This process is called **staging**. The stage of a cancer describes how much cancer is in the body. It helps determine how serious the cancer is and how best to [treat](#)<sup>1</sup> it. Doctors also use a cancer's stage when talking about survival statistics.

The earliest stage of testicular cancer is stage 0 (also called **germ cell neoplasia in situ**, or GCNIS). The other stage groupings range from I (1) through III (3). There is no stage IV (4) testicular cancer. Some stages are split further to cover more details, using capital letters (A, B, etc.).

As a rule, the lower the number, the less the cancer has spread. A higher number, such as stage III, means cancer has spread more. And within a stage, an earlier letter means

a lower stage. Although each person's cancer experience is unique, cancers with similar stages tend to have a similar outlook and are often treated in much the same way.

## How is the stage determined?

The staging system most often used for testicular cancer is the American Joint Committee on Cancer (AJCC) **TNM** system, which is based on 4 key pieces of information:

- The size and extent of the main **tumor (T)**: How large is the tumor? Has it grown into nearby structures or organs?
- The spread to nearby lymph **nodes (N)**: Has the cancer spread to nearby lymph nodes? How many, and how big are they?
- The spread (**metastasis**) to distant sites (**M**): Has the cancer spread to distant parts of the body? (The most common sites of spread are distant lymph nodes, the bones, the liver, and the lungs.)
- The **serum** (blood) levels of tumor markers (**S**): Are any [tumor marker](#) levels higher than normal? This includes lactate dehydrogenase (LDH), human chorionic gonadotropin (HCG), and alpha-fetoprotein (AFP).

Numbers or letters after T, N, M, and S provide more details about each of these factors. Higher numbers mean the cancer is more advanced. Once a person's T, N, M, and S categories have been determined, this information is combined in a process called stage grouping to assign an overall stage. For more on this, see [Cancer Staging<sup>2</sup>](#).

The system described below is the most recent AJCC system, effective as of January 2018. It's used for germ cell tumors (seminomas and non-seminomas) that occur after puberty, and for sex cord stromal tumors (Leydig cell tumors and Sertoli cell tumors).

Testicular cancer might be given a **clinical T** category (written as cT) based on the results of a physical exam, biopsy, and imaging tests (as described in Tests for Testicular Cancer). Once surgery is done, the **pathologic T** category (written as pT) is determined by examining tissue removed during the operation.

Testicular cancer staging can be complex, so ask your doctor to explain it to you in a way you understand.

## Stages of testicular cancer

AJCC Stage	Stage grouping	Stage description*
<b>0</b>	<b>pTis N0 M0 S0</b>	The cancer is only in the seminiferous tubules (small tubes inside each testicle). It has not grown into other parts of the testicle (pTis). It hasn't spread to nearby lymph nodes (N0) or to distant parts of the body (M0). All tumor marker levels are within normal limits (S0).
<b>I</b>	<b>pT1-pT4 N0 M0 SX</b>	The tumor has grown beyond the seminiferous tubules, and might have grown outside the testicle and into nearby structures (pT1-pT4). The cancer has not spread to nearby lymph nodes (N0) or to distant parts of the body (M0). Tumor marker test results aren't available, or the tests haven't been done (SX).
<b>IA</b>	<b>pT1 N0 M0 S0</b>	The tumor has grown beyond the seminiferous tubules, but is still within the testicle, and it hasn't grown into nearby blood vessels or lymph nodes (pT1). The cancer hasn't spread to nearby lymph nodes (N0) or to distant parts of the body (M0). All tumor marker levels are within normal limits (S0).
<b>IB</b>	<b>pT2-pT4 N0 M0 S0</b>	The tumor has grown outside of the testicle and into nearby structures (pT2-pT4). The cancer has not spread to nearby lymph nodes (N0) or to distant parts of the body (M0). All tumor marker levels are within normal limits (S0).
<b>IS</b>	<b>Any pT (or TX) N0 M0 S1-S3</b>	The tumor might or might not have grown outside the testicle (any pT), or the extent of the tumor can't be assessed for some reason (TX). The cancer has not spread to nearby lymph nodes (N0) or to distant parts of the body (M0). At least one tumor marker level is higher than normal (S1-S3).
<b>II</b>	<b>Any pT (or TX) N1-N3 M0 SX</b>	The tumor might or might not have grown outside the testicle (any pT), or the extent of the tumor can't be assessed for some reason (TX). The cancer has spread to 1 or more nearby lymph nodes (N1-N3), but it hasn't spread to distant parts of the body (M0). Tumor marker test results aren't available, or the tests haven't been done (SX).
<b>IIA</b>	<b>Any pT (or TX) N1 M0 S0 or S1</b>	The tumor might or might not have grown outside the testicle (any pT), or the extent of the tumor can't be assessed for some reason (TX). The cancer has spread to at least 1 nearby lymph node (but no more than 5, if checked by surgery), and none of

		the lymph nodes are larger than 2 centimeters (cm) across (N1). The cancer has not spread to distant parts of the body (M0). All tumor marker levels are within normal limits (S0), or at least 1 tumor marker level is slightly higher than normal (S1).
<b>II B</b>	<b>Any pT (or TX) N2 M0 S0 or S1</b>	The tumor might or might not have grown outside the testicle (any pT), or the extent of the tumor can't be assessed for some reason (TX). The cancer has spread to at least 1 nearby lymph node that's larger than 2 cm but no larger than 5 cm across, OR it has grown outside of a lymph node, OR more than 5 nodes contain cancer (found during surgery) (N2). The cancer has not spread to distant parts of the body (M0). All tumor marker levels are within normal limits (S0), or at least 1 tumor marker level is slightly higher than normal (S1).
<b>II C</b>	<b>Any pT (or TX) N3 M0 S0 or S1</b>	The tumor might or might not have grown outside the testicle (any pT), or the extent of the tumor can't be assessed for some reason (TX). The cancer has spread to at least 1 nearby lymph node that's larger than 5 cm across (N3). The cancer has not spread to distant parts of the body (M0). All tumor marker levels are within normal limits (S0), or at least 1 tumor marker level is slightly higher than normal (S1).
<b>III</b>	<b>Any pT (or TX) Any N M1 SX</b>	The tumor might or might not have grown outside the testicle (any pT), or the extent of the tumor can't be assessed for some reason (TX). The cancer might or might not have spread to nearby lymph nodes (any N). It has spread to distant parts of the body (M1). Tumor marker test results aren't available, or the tests haven't been done (SX).
<b>IIIA</b>	<b>Any pT (or TX) Any N M1a S0 or S1</b>	The tumor might or might not have grown outside the testicle (any pT), or the extent of the tumor can't be assessed for some reason (TX). The cancer might or might not have spread to nearby lymph nodes (any N). It has spread to distant lymph nodes or to the lungs (M1a). All tumor marker levels are within normal limits (S0), or at least 1 tumor marker level is slightly higher than normal (S1).
	<b>Any pT (or TX) N1-N3 M0 S2</b>	The tumor might or might not have grown outside the testicle (any pT), or the extent of the tumor can't be assessed for some reason (TX). The cancer has spread to 1 or more nearby lymph nodes (N1-N3), but it hasn't spread to distant parts of the body (M0). At least 1 tumor marker level is much higher than normal (S2).

<b>IIIB</b>		
	OR	
	<b>Any pT (or TX) Any N M1a S2</b>	The tumor might or might not have grown outside the testicle (any pT), or the extent of the tumor can't be assessed for some reason (TX). The cancer might or might not have spread to nearby lymph nodes (any N). It has spread to distant lymph nodes or to the lungs (M1a). At least 1 tumor marker level is much higher than normal (S2).
<b>IIIC</b>	<b>Any pT (or TX) N1-N3 M0 S3</b>	The tumor might or might not have grown outside the testicle (any pT), or the extent of the tumor can't be assessed for some reason (TX). The cancer has spread to 1 or more nearby lymph nodes (N1-N3), but it hasn't spread to distant parts of the body (M0). At least 1 tumor marker level is very high (S3).
	OR	
	<b>Any pT (or TX) Any N M1a S3</b>	The tumor might or might not have grown outside the testicle (any pT), or the extent of the tumor can't be assessed for some reason (TX). The cancer might or might not have spread to nearby lymph nodes (any N). It has spread to distant lymph nodes or to the lungs (M1a). At least 1 tumor marker level is very high (S3).
	OR	
	<b>Any pT (or TX) Any N M1b Any S</b>	The tumor might or might not have grown outside the testicle (any pT), or the extent of the tumor can't be assessed for some reason (TX). The cancer might or might not have spread to nearby lymph nodes (any N). It has spread to distant parts of the body other than the lymph nodes or to the lungs (M1b). Tumor marker levels might or might not be higher than normal (any S).

\*The following additional category is not listed on the table above:

**NX:** Nearby lymph nodes cannot be assessed due to lack of information.

## Hyperlinks

1. [www.cancer.org/cancer/testicular-cancer/treating.html](http://www.cancer.org/cancer/testicular-cancer/treating.html)
2. [www.cancer.org/treatment/understanding-your-diagnosis/staging.html](http://www.cancer.org/treatment/understanding-your-diagnosis/staging.html)

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American Joint Committee on Cancer. Testis. In: *AJCC Cancer Staging Manual*. 8th ed. New York, NY: Springer; 2017: 727-735.

Last Medical Review: May 17, 2018 Last Revised: May 17, 2018

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# Testicular Cancer Survival Rates

Survival rates can give you an idea of what percentage of people with the same type and stage of cancer are still alive a certain amount of time (usually 5 years) after they were diagnosed. They can't tell you how long you will live, but they may help give you a better understanding of how likely it is that your treatment will be successful.

**Keep in mind that survival rates are estimates and are often based on previous outcomes of large numbers of people who had a specific cancer, but they can't predict what will happen in any particular person's case. These statistics can be confusing and may lead you to have more questions. Talk with your doctor about how these numbers may apply to you, as he or she is familiar with your situation.**

## What is a 5-year relative survival rate?

A **relative survival rate** compares people with the same type and stage of cancer to those in the overall population. For example, if the **5-year relative survival rate** for a specific stage of testicular cancer is 90%, it means that people who have that cancer are, on average, about 90% as likely as people who don't have that cancer to live for at least 5 years after being diagnosed.

## Where do these numbers come from?

The American Cancer Society relies on information from the SEER\* database, maintained by the National Cancer Institute (NCI), to provide survival statistics for



different types of cancer.

The SEER database tracks 5-year relative survival rates for testicular cancer in the United States, based on how far the cancer has spread. The SEER database, however, does not group cancers by [AJCC TNM stages](#) (stage 1, stage 2, stage 3, etc.). Instead, it groups cancers into localized, regional, and distant stages:

- **Localized:** There is no sign that the cancer has spread outside of the testicles.
- **Regional:** The cancer has spread outside the testicle to nearby structures or lymph nodes.
- **Distant:** The cancer has spread to distant parts of the body, such as the lung, liver, or distant lymph nodes.

### 5-year relative survival rates for testicular cancer

(Based on people diagnosed with cancer of the testicle between 2008 and 2014.)

SEER stage	5-year relative survival rate
Localized	99%
Regional	96%
Distant	74%
All SEER stages combined	95%

### Understanding the numbers

- **These numbers apply only to the stage of the cancer when it is first diagnosed.** They do not apply later on if the cancer grows, spreads, or comes back after treatment.
- **These numbers don't take everything into account.** These survival rates are grouped based on how far the cancer has spread. But other factors, including your age and overall health, the [type of testicular cancer](#)<sup>1</sup>, and how well the cancer responds to treatment can also affect your outlook. Ask your doctor to explain how these or other factors might be important for you.
- **People now being diagnosed with testicular cancer may have a better outlook**

**than these numbers show.** Treatments improve over time, and these numbers are based on people who were diagnosed and treated at least five years earlier.

\*SEER = Surveillance, Epidemiology, and End Results

## Hyperlinks

1. [www.cancer.org/cancer/testicular-cancer/about/what-is-testicular-cancer.html](http://www.cancer.org/cancer/testicular-cancer/about/what-is-testicular-cancer.html)

## References

American Cancer Society. *Cancer Facts & Figures 2019*. Atlanta, Ga: American Cancer Society; 2019.

Noone AM, Howlader N, Krapcho M, Miller D, Brest A, Yu M, Ruhl J, Tatalovich Z, Mariotto A, Lewis DR, Chen HS, Feuer EJ, Cronin KA (eds). SEER Cancer Statistics Review, 1975-2015, National Cancer Institute. Bethesda, MD, [https://seer.cancer.gov/csr/1975\\_2015/](https://seer.cancer.gov/csr/1975_2015/), based on November 2017 SEER data submission, posted to the SEER web site, April 2018.

Last Medical Review: May 17, 2018 Last Revised: February 4, 2019

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# Questions to Ask About Testicular Cancer

As you deal with testicular cancer and the process of treatment, you need to be able to have honest, open discussions with your cancer care team. Ask any question, no matter how small it might seem. Among those you might want to ask are:

- What [kind of testicular cancer](#)<sup>1</sup> do I have?
- Has the cancer spread beyond my testicle?
- What is the stage of my cancer? What does this mean for me?
- Will I need other [tests](#) before we can decide on treatment?

- Will I need to see other doctors?
- How much experience do you have treating this type of cancer?
- What are my [treatment choices](#)<sup>2</sup>? What do you recommend? Why?
- Do I need a [retroperitoneal lymph node dissection](#)<sup>3</sup>? If so, how many have you done?
- What should I do to be ready for treatment?
- How long will treatment last? What will it be like? Where will it be done?
- What risks or possible side effects can I expect from my treatment?
- How long will it take me to recover from treatment?
- How soon after treatment can I have sex?
- What are the chances I will become [infertile](#)<sup>4</sup>? Should I bank sperm?
- What are the chances that the cancer will come back? What will we do if that happens?
- Does one type of treatment reduce the risk of recurrence (cancer coming back) more than another?
- Should I get a [second opinion](#)<sup>5</sup> before I start treatment, and when would a second opinion be helpful to me?
- What type of follow-up will I need [after treatment](#)<sup>6</sup>?

Along with these examples, be sure to write down some of your own. For instance, you might want to ask about [clinical trials](#)<sup>7</sup> for which you may qualify. Keep in mind, too, that doctors are not the only ones who can give you information. Other health care professionals, such as nurses and social workers, may have the answers to your questions. You can learn more about communicating with your health care team in [The Doctor-Patient Relationship](#)<sup>8</sup>.

## Hyperlinks

1. [www.cancer.org/cancer/testicular-cancer/about/what-is-testicular-cancer.html](http://www.cancer.org/cancer/testicular-cancer/about/what-is-testicular-cancer.html)
2. [www.cancer.org/cancer/testicular-cancer/treating.html](http://www.cancer.org/cancer/testicular-cancer/treating.html)
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6. [www.cancer.org/cancer/testicular-cancer/after-treatment.html](http://www.cancer.org/cancer/testicular-cancer/after-treatment.html)
7. [www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html](http://www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html)
8. [www.cancer.org/treatment/understanding-your-diagnosis/talking-about-cancer/the-doctor-patient-relationship.html](http://www.cancer.org/treatment/understanding-your-diagnosis/talking-about-cancer/the-doctor-patient-relationship.html)

Last Medical Review: May 17, 2018 Last Revised: May 17, 2018

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## Treating Testicular Cancer

If you've been diagnosed with testicular cancer, your treatment team will discuss your options with you. It's important to weigh the benefits of each treatment option against the possible risks and side effects.

### How is testicular cancer treated?

Depending on the type and stage of the cancer, as well as other factors, treatment options for testicular cancer can include:

- [Surgery for Testicular Cancer](#)
- [Radiation Therapy for Testicular Cancer](#)
- [Chemotherapy for Testicular Cancer](#)
- [High-Dose Chemotherapy and Stem Cell Transplant for Testicular Cancer](#)

### Common treatment approaches

In recent years, a lot of progress has been made in treating testicular cancer. Surgical methods have been refined, and doctors know more about the best ways to use chemotherapy and radiation to treat different types of testicular cancer. In some cases, more than one of type of treatment might be used.

- [Treatment Options for Testicular Cancer, by Type and Stage](#)

### Who treats testicular cancer?

You may have different types of doctors on your treatment team, depending on the stage of your cancer and your treatment options. These doctors may include:

- A **urologist**: a surgeon who specializes in treating diseases of the urinary system and male reproductive system
- A **radiation oncologist**: a doctor who treats cancer with radiation therapy
- A **medical oncologist**: a doctor who treats cancer with medicines like chemotherapy

You might have many other specialists on your treatment team as well, including physician assistants, nurse practitioners, nurses, nutrition specialists, social workers, and other health professionals.

- [Health Professionals Associated With Cancer Care<sup>1</sup>](#)

### **Making treatment decisions**

It's important to discuss all treatment options, including their goals and possible side effects, with your doctors to help make the decision that best fits your needs. You may feel that you need to make a decision quickly, but it's important to give yourself time to absorb the information you have learned. Ask your cancer care team questions.

If time permits, it is often a good idea to seek a second opinion. A second opinion can give you more information and help you feel more confident about the treatment plan you choose.

Where you're treated is important. There's no substitute for experience. You have the best chance for a good outcome if you go to a hospital that treats many men with testicular cancer.

- [Questions to Ask About Testicular Cancer<sup>2</sup>](#)
- [Seeking a Second Opinion<sup>3</sup>](#)

### **Thinking about taking part in 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're not right for everyone.

If you would like to learn more about clinical trials that might be right for you, start by asking your doctor if your clinic or hospital conducts clinical trials.

- [Clinical Trials](#)<sup>4</sup>

## Considering complementary and alternative methods

You may hear about alternative or complementary methods that your doctor hasn't mentioned to treat your 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 harmful.

Be sure to talk to your 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.

- [Complementary and Alternative Medicine](#)<sup>5</sup>

## Help getting through cancer treatment

Your 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 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.

- [Find Support Programs and Services in Your Area](#)<sup>6</sup>

## Choosing to stop treatment or choosing no treatment at all

For some people, when treatments have been tried and are no longer controlling the cancer, it could be time to weigh the benefits and risks of continuing to try new treatments. Whether or not you continue treatment, there are still things you can do to help maintain or improve your quality of life.

Some people, especially if the cancer is advanced, might not want to be treated at all. There are many reasons you might decide not to get cancer treatment, but it's important to talk to your doctors and you make that decision. Remember that even if you choose not to treat the cancer, you can still get supportive care to help with pain or other symptoms.

- [If Cancer Treatments Stop Working](#)<sup>7</sup>
- [Palliative or Supportive Care](#)<sup>8</sup>

*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.*

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## Surgery for Testicular Cancer

Surgery is the first treatment for nearly all testicular cancers .

### Radical inguinal orchiectomy

Surgery to remove a testicle with cancer is called a radical inguinal orchiectomy. An incision (cut) is made just above the pubic area, and the testicle is gently removed from the scrotum through the opening. The surgeon then removes the entire tumor along with the testicle and spermatic cord. The spermatic cord contains part of the vas deferens, as well as blood and lymph vessels that could act as pathways for testicular cancer to spread to the rest of the body. To lessen the chance of this, these vessels are tied off early in the operation.

All testicular cancers are typically treated with this surgery, even those that have spread.

### Retroperitoneal lymph node dissection (RPLND)



Depending on the type and stage of your cancer, lymph nodes around the large blood vessels (the aorta and inferior vena cava) at the back of the abdomen (belly) may be removed at the same time as the orchiectomy or during a second operation. Not all people with testicular cancer need to have lymph nodes removed, so it's important to discuss this (and options to it) with your doctor.

This is a complex and long operation. In most cases, a large incision (cut) is made down the middle of the abdomen to remove the lymph nodes. RPLND should be done by a surgeon who does this often. Experience counts.

### **Laparoscopic surgery**

In some cases, the surgeon can remove lymph nodes through very small skin incisions in the abdomen by using a laparoscope and other long, thin surgical tools. A laparoscope is a narrow, lighted tube with a small camera on the end that lets doctors see inside the abdomen. The surgeon's hands are not inside the patient's body during this type of surgery.

In laparoscopic surgery, after being put to sleep, you're turned onto your side. Several small incisions are made on your abdomen. The laparoscope and surgical tools are put in through the incisions to remove the lymph nodes. The incisions are then closed and you're woken up.

Patients recover much more quickly from this operation than the standard open procedure and are walking soon after surgery. There's usually less pain and patients are eating sooner.

Laparoscopic surgery seems to be a lot easier for the patient, but doctors aren't sure if it's as safe and effective as the standard "open" surgery in removing all of the lymph nodes that may contain cancer. Because of this uncertainty, doctors are more likely to recommend chemotherapy after laparoscopic surgery if cancer is found in the lymph nodes.

This procedure is most often used for patients with early-stage non-seminomas to see if the lymph nodes contain cancer. As with the standard open procedure, this is a complex operation that should only be done if the surgeon is very experienced.

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

The short-term risks of any type of surgery include reactions to anesthesia, excess bleeding, blood clots, and infections. Most men will have at least some pain after the

operation, which can be helped with pain medicines, if needed.

### **Effects of orchiectomy**

Losing one testicle usually has no effect on a man's ability to get an erection and have sex. But if both testicles are removed, sperm cannot be made and a man becomes infertile. Also, without testicles, a man cannot make enough testosterone, which can decrease sex drive and affect his ability to have erections. Other effects could include fatigue, hot flashes, and loss of muscle mass. These side effects can be avoided by taking testosterone supplements, either in a gel, a patch, or a shot. Pills are generally not reliable sources of testosterone.

Usually men with testicular cancer are young and may be concerned about changes in how they look. They may be dating and worry about a partner's reaction, or they may be athletic and feel embarrassed by the missing testicle when in locker rooms.

To restore a more natural look, a man can have a testicular prosthesis surgically implanted in his scrotum. The prosthesis approved for use in the United States is filled with saline (salt water) and comes in different sizes to match the remaining testicle. When in place, it can look like a normal testicle. There can be a scar after the operation, but it's often partly hidden by pubic hair. Some men might want a prosthesis, while others might not. You should discuss your wishes with your surgeon before surgery. It could also help to talk with someone who has a testicular prosthesis, to hear what it has been like for them.

### **Effects of lymph node dissection**

Surgery to remove retroperitoneal lymph nodes is a major operation. Serious complications are not common, but they can happen. About 5% to 10% of patients have short-term problems after surgery, such as infection or bowel obstruction (blockage). The standard approach for an RPLND requires a large incision in the abdomen, which will leave a scar and can take some time to heal. Your ability to get up and around after the operation will be limited for some time. This is less likely to be an issue if you have laparoscopic surgery, which uses smaller incisions.

This type of surgery does not cause impotence – a man can still have erections and sex. But it might damage some of the nerves that control ejaculation. If these nerves are damaged, when a man ejaculates, the semen doesn't come out through the urethra to exit the body but rather goes backwards into the bladder. This is called **retrograde ejaculation**, and it can make it hard to father children.

To save the normal ejaculation function, surgeons have developed a type of retroperitoneal lymph node surgery called **nerve-sparing surgery** that's very successful when done by experienced doctors. Testicular cancer often affects men at an age when they might be trying to have children. These men may wish to discuss nerve-sparing surgery with their doctors, as well as sperm banking (freezing and storing sperm cells obtained before treatment). Men with testicular cancer often have lower than normal sperm counts, which can sometimes make it hard to collect a good sperm sample. See [Fertility and Men With Cancer](#)<sup>1</sup> for more about this.

## Hyperlinks

1. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/fertility-and-sexual-side-effects/fertility-and-men-with-cancer.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/fertility-and-sexual-side-effects/fertility-and-men-with-cancer.html)

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Last Medical Review: May 17, 2018 Last Revised: May 17, 2018

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# Radiation Therapy for Testicular Cancer

Radiation therapy uses a beam of high-energy rays (such as gamma rays or x-rays) or particles (such as electrons, protons, or neutrons) to destroy cancer cells or slow their growth. In treating testicular cancer, radiation is used mainly to kill cancer cells that

have spread to lymph nodes .

Radiation therapy, in which a machine sends radiation to a specific part of the body is known as **external beam radiation**. The treatment is much like getting an x-ray, but the radiation is stronger. Radiation doesn't hurt. Before your treatments start, the medical team will take careful measurements to determine the correct angles for aiming the radiation beams and the proper dose of radiation. Each treatment lasts only a few minutes, but the set-up time – getting you into place for treatment – usually takes longer.

In general, radiation therapy is mainly used for patients with seminoma, which is very sensitive to radiation. Sometimes it's used after [orchietomy](#) (the operation to remove the testicle) and is directed at the lymph nodes at the back of the abdomen (the retroperitoneal lymph nodes). This is to kill any tiny bits of cancer in those lymph nodes that can't be seen. It can also be used to treat small amounts of seminoma that have spread to the nodes (based on changes seen on CT and PET scans).

Radiation is also sometimes used to treat testicular cancer (both seminoma and non-seminoma) that has spread to distant organs (like the brain).

### **Possible side effects of radiation therapy**

Radiation therapy can affect nearby healthy tissue along with the cancer cells. To reduce the risk of side effects, doctors carefully figure out the exact dose you need and aim the beams to hit the tumor. The treatment of testicular cancer often uses lower radiation doses than those needed for other types of cancer.

Common [side effects](#)<sup>1</sup> can include:

- Fatigue
- Nausea
- Diarrhea

Some men have a skin changes such as redness, blistering, or peeling, but those are uncommon.

These side effects get better overtime after radiation is finished. If radiation reaches the healthy testicle it can affect [fertility](#)<sup>2</sup> (sperm counts), so a special protective shield is placed over the remaining testicle to help protect it.

Radiation can also have some long-term effects, such as damage to blood vessels or

other organs near the treated lymph nodes It can also cause an increased risk of getting a [second cancer](#)<sup>3</sup> (outside of the testicle) later in life. These risks were higher in the past when higher doses were used and more tissue was exposed to radiation.

More information can be found in [Radiation Therapy](#)<sup>4, 5</sup>

## Hyperlinks

1. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html)
2. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/fertility-and-sexual-side-effects/fertility-and-men-with-cancer/how-cancer-treatments-affect-fertility.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/fertility-and-sexual-side-effects/fertility-and-men-with-cancer/how-cancer-treatments-affect-fertility.html)
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Last Medical Review: May 17, 2018 Last Revised: May 17, 2018

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# Chemotherapy for Testicular Cancer

Chemotherapy (chemo) is the use of drugs to treat cancer. The drugs can be swallowed in pill form, or they can be injected by needle into a vein or muscle. To treat testicular cancer, the drugs are usually given into a vein (IV). Chemo is systemic therapy. This means that the drug travels throughout the body to reach and destroy the cancer cells. Chemo is used to destroy any cancer cells that break off from the main tumor and travel to lymph nodes or other parts of the body.

Chemo is often used to cure testicular cancer when it has spread outside the testicle. It's also used to help decrease the risk of cancer coming back after the testicle is removed. It's not used to treat cancer that's only in the testicle.

## Chemo drugs used

Chemo is given in cycles, with each period of treatment followed by a rest period to allow the body time to recover. Chemo cycles generally last about 3 to 4 weeks. The main drugs used to treat testicular cancer are:

- Cisplatin
- Etoposide (VP-16)
- Bleomycin
- Ifosfamide (Ifex<sup>®</sup>)
- Paclitaxel (Taxol<sup>®</sup>)
- Vinblastine

Using 2 or more chemo drugs often works better than using any single drug alone. The chemo regimens most commonly used as the first treatment for testicular cancer are:

- BEP (or PEB): bleomycin, etoposide, and cisplatin
- EP: etoposide and cisplatin
- VIP: VP-16 (etoposide) or vinblastine plus ifosfamide and cisplatin

Some doctors use more intensive plans for patients with high-risk disease, and may suggest a different combination of chemo drugs or even a stem cell transplant.

## 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 certain side effects.

The [side effects](#)<sup>1</sup> of chemo depend on the type and dose of drugs used and how long they are given. These side effects can include:

- Hair loss
- Mouth sores
- Loss of appetite
- Nausea and vomiting
- Diarrhea
- Increased chance of infections (from having too few white blood cells)
- Easy bruising or bleeding (from having too few blood platelets)
- Fatigue (extreme tiredness, often from having too few red blood cells)

Some of the drugs used to treat testicular cancer can have other side effects. For example:

- Cisplatin and ifosfamide can cause kidney damage. This can be lessened by giving lots of fluids (usually into a vein – IV) before and after these drugs are given.
- Cisplatin, etoposide, paclitaxel, and vinblastine can damage nerves (known as [neuropathy](#)<sup>2</sup>). This can lead to numbness or tingling in the hands and feet, and sensitivity to cold or heat. In most cases, this gets better once treatment is stopped, but it may last a long time in some people.
- Cisplatin can also cause loss of hearing (called ototoxicity)
- Bleomycin can damage the lungs, causing shortness of breath and trouble with physical activity.
- Ifosfamide can cause the bladder to bleed (called hemorrhagic cystitis). To prevent this, the patient is given plenty of fluids and the drug mesna is given along with ifosfamide.

Most side effects are short-term and go away overtime after treatment ends, but some can last a long time and may never go away completely. Tell your treatment team about any side effects or changes you notice while getting chemo so you can get prompt treatment for them. There are often ways to prevent or lessen side effects. For example, there are drugs to help prevent or reduce nausea and vomiting. In some cases, the doses of the chemo drugs may need to be reduced or treatment may need to be delayed or stopped to keep side effects from getting worse.

Some of the drugs used to treat testicular cancer can cause long-term side effects. These include some of the things mentioned earlier, like hearing loss and kidney or lung damage. Development of a [second cancer](#)<sup>3</sup> (like leukemia) is a very serious but rare side effect of chemo, occurring in less than 1% of testicular cancer patients treated with chemo. People who've had chemo for testicular cancer seem to have a higher risk of heart problems later in life. Several studies have also suggested that chemo can sometimes cause high blood cholesterol to develop over time, which may later require treatment.

For more information about chemotherapy and its side effects, see [Chemotherapy](#).<sup>4</sup>

## Hyperlinks

1. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html)
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Last Medical Review: May 17, 2018 Last Revised: May 17, 2018



# High-Dose Chemotherapy and Stem Cell Transplant for Testicular Cancer

In general, testicular cancers respond well to chemotherapy (chemo), but not all of them are cured. Even though higher doses of chemo might work better, they're not given because they could severely damage the bone marrow, which is where new blood cells form. This could lead to life-threatening [infections](#)<sup>1</sup>, bleeding, and other problems because of low blood cell counts.

But a stem cell transplant allows doctors to use higher doses of chemo. Stem cells used to be taken from the bone marrow, but this is done less often now. In the weeks before treatment, a special machine collects blood-forming stem cells from the patient's bloodstream. They are frozen and stored.

The patient then gets high-doses of chemo. After chemo, the patient gets his stem cells back again. This is called a transplant, but it doesn't involve surgery – the cells are infused into a vein much like a blood transfusion. The stem cells settle in the bone marrow and start making new blood cells over the next few weeks.

Stem cell transplant is most often used to treat testicular cancers that have [come back](#)<sup>2</sup> after treatment with chemo. Current studies are looking at whether a stem cell transplant may be valuable as part of the first treatment for some patients with advanced germ cell cancers.

A stem cell transplant is a complex treatment that can cause life-threatening side effects because of the high doses of chemotherapy used. Be sure you understand the possible benefits and risks. If the doctors think you might benefit from a transplant, it should be done at a hospital where the staff has experience with the procedure and with managing the recovery phase.

Stem cell transplants sometimes require a long hospital stay and can cost a lot. Even if your insurance covers the transplant, your co-pays or other costs could add up to a lot of money. Before deciding on a transplant it's important to find out what your insurer will cover to get an idea of what you might have to pay.

For more information, see [Stem Cell Transplant for Cancer](#)<sup>3</sup>.

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1. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/infections.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/infections.html)
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Last Medical Review: May 17, 2018 Last Revised: May 17, 2018

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# Treatment Options for Testicular Cancer, by Type and Stage

Treatment for testicular cancer is based mainly on the [type](#)<sup>1</sup> and [stage](#)<sup>2</sup> of the cancer. Among the different stages of germ cell tumors, pure seminomas tend to be treated one way, and non-seminomas and mixed germ cell tumors are treated another way.

## Carcinoma in situ (stage 0) testicular tumors

In this stage, the cancer has not spread outside the testicle, and your tumor marker levels (like HCG and AFP) are not elevated.

If CIS is diagnosed after surgery removes the testicle, no other treatment is needed. If CIS is found after a testicular biopsy (such as for fertility problems), your doctor may recommend that it not be treated right away. Instead, you may be watched closely with repeat physical exams, [ultrasound](#)<sup>3</sup> of the testicle, and blood tests of tumor marker levels. Treatment may not be needed as long as there are no signs that the CIS is growing or turning into an invasive cancer. If CIS is treated, it's [surgery](#) (to remove the testicle) or [radiation therapy](#) to the testicle.

If your tumor marker levels are high, the cancer isn't really stage 0 – even when only CIS is found in the testicle and there are no signs of cancer spread. In this case, you'll get the treatment used for stage IS cancers. (See below.)

## Seminomas

### Stage I seminomas

These cancers can be cured in nearly all patients. You first have surgery to remove the testicle and spermatic cord (called a [radical inguinal orchiectomy](#)). After surgery, you have many treatment choices:

**Careful observation (surveillance):** If the cancer has not spread beyond the testicle, the plan most experts prefer is that you be watched closely by your doctor for up to 10 years. This means getting physical exams and blood tests every 3 to 6 months for the first year, and less often after that. [Imaging tests](#)<sup>4</sup> (CT scans and sometimes chest x-rays) are done every 3 months for 6 months, and then once or twice a year. If these tests do not find any signs that cancer has spread beyond the testicle, no other treatment is needed. If the cancer has spread, you may get treatments like [radiation](#) or [chemo](#). The cancer will come back in about 15% to 20% of patients, most often as spread to lymph nodes, but if it does, radiation or chemo can still usually cure the cancer.

**Radiation therapy:** Radiation aimed at para-aortic lymph nodes is another option. These nodes are in the back of your abdomen (belly), around the large blood vessel called the aorta. Because seminoma cells are very sensitive to radiation, low doses can be used and you'll get about 10 to 15 treatments over 2 to 3 weeks.

**Chemotherapy:** An option that works as well as radiation is 1 or 2 cycles of chemotherapy with the drug carboplatin after surgery. Many experts prefer chemo over radiation because it seems to be easier to tolerate.

### Stage IS seminomas

In this stage, one or more of your tumor marker levels is still high after the testicle containing the seminoma has been removed. This is very rare, and it can be treated with chemo.

### Stage IIA seminomas

**Radiation:** After surgery to remove the testicle (radical inguinal orchiectomy), the preferred treatment is radiation to the retroperitoneal lymph nodes. These are the lymph nodes at the back of your abdomen (belly). Usually stage II seminomas are given higher doses of radiation than stage I seminomas.

**Chemotherapy:** Another option is chemo, with either 4 cycles of EP (etoposide and cisplatin) or 3 cycles of BEP (bleomycin, etoposide, and cisplatin). Your doctor will watch you closely (every 3 to 6 months) to look for signs that the cancer has [come back](#)<sup>5</sup>.

### Stage IIB seminomas

These seminomas have spread to cause larger lymph nodes or have spread to many different lymph nodes.

**Chemotherapy:** This is the preferred treatment. You can get either 4 cycles of EP (etoposide and cisplatin) or 3 cycles of BEP (bleomycin, etoposide, and cisplatin).

**Radiation:** This may be an option instead of chemo if your lymph nodes aren't enlarged from cancer spread.

### Stage IIC seminomas

You will get chemotherapy with 4 cycles of EP or 3 or 4 cycles of BEP. Radiation therapy is generally not used for stage IIC seminoma.

## Non-seminomas

### Stage I non-seminomas

Nearly all of these cancers can be cured, but the treatment is different from that of seminomas. As with seminomas, the initial treatment is surgery to remove the testicle and tumor (called radical inguinal orchiectomy). The other treatment choices will depend on the stage.

### Choices for stage IA (T1)

- **Careful observation (surveillance):** Surveillance is preferred by most experts, but it requires a lot of doctor visits and tests. You'll start at every 2 months for the first year, with CT scans every 4 to 6 months; then every 3 months for the second year, with scans every 6 to 12 months. As time goes on and you have no problems, the

time between visits and tests gets longer. If the cancer does come back (relapse), it's usually within the first year or two. Relapses are generally treated with chemo. Even though more patients will have a relapse with surveillance than with lymph node dissection, the cure rates are much the same because the relapses are usually found early.

- **Retroperitoneal lymph node dissection (RPLND):** Having the lymph nodes at the back of your abdomen (belly) removed has the advantage of a high cure rate, but the disadvantages of major surgery with its possible complications, including losing the ability to ejaculate normally. After RPLND, if cancer is found in the nodes, chemo may be recommended.
- **Chemotherapy:** Instead of surgery, your doctor may suggest you get 1 cycle of the BEP regimen (bleomycin, etoposide, and cisplatin). This helps reduce your risk of relapse.

### Choices for stage IB (T2, T3, or T4)

- **Retroperitoneal lymph node dissection (RPLND):** This is surgery to remove the lymph nodes at the back of your abdomen (belly). If cancer is found in the lymph nodes, chemo is often recommended depending on the number of nodes with cancer in them. (See below.)
- **Chemotherapy:** Instead of surgery, your doctor may recommend 1 cycle of the BEP regimen (bleomycin, etoposide, and cisplatin). This can help reduce your risk that the cancer will come back. If cancer was found in your lymph nodes after surgery, you may get 2 to 4 cycles of BEP or EP (etoposide, and cisplatin). It depends on how many nodes had cancer in them. This has a high cure rate, but it can have side effects (which are mostly short-term).
- **Careful observation (surveillance):** This requires frequent doctor visits and tests for several years. This may be an option if you have a T2 tumor that didn't reach blood vessels.

### Stage IS non-seminoma

If your tumor marker levels (like AFP or HCG) are still high even after the cancer has been removed, but the CT scan doesn't show a tumor, chemo is recommended. You may get either 3 cycles of BEP (bleomycin, etoposide, and cisplatin) or 4 cycles of EP (etoposide and cisplatin).

## Stage II non-seminomas

You will first have surgery to remove the testicle and spermatic cord (called a [radical inguinal orchiectomy](#)). After surgery, your treatment choices depend on details about the cancer.

### Stage IIA non-seminomas

Treatment depends on your [tumor marker](#)<sup>6</sup> levels after surgery and the extent of spread to the retroperitoneal lymph nodes. These are the lymph nodes at the back of your abdomen (belly).

If your tumor marker levels are normal, you have 2 main options:

- **Retroperitoneal lymph node dissection (RPLND):** Surgery will be done to remove the lymph nodes at the back of your abdomen. If the lymph nodes that were removed contain cancer, you may get 2 cycles of the chemo drugs listed below. If there's no cancer in the nodes, your doctor will watch you closely for signs that the cancer has come back.
- **Chemotherapy:** If cancer was found in many lymph nodes, you'll get either 4 cycles of EP (etoposide and cisplatin) or 3 cycles of BEP (bleomycin, etoposide, and cisplatin). Your next treatment may be surgery to take out all enlarged nodes if your tumor marker levels are normal.

If your tumor markers are still higher than normal you'll get chemo as listed above.

### Stage IIB non-seminomas

Your treatment depends on your [tumor marker](#)<sup>7</sup> levels after surgery and the extent of spread to the lymph nodes at the back of your the abdomen (belly). These are called the retroperitoneal lymph nodes.

If your tumor marker levels are normal, your options are:

- **Chemotherapy:** You'll get either 4 cycles of EP (etoposide and cisplatin) or 3 cycles of BEP (bleomycin, etoposide, and cisplatin) may be used. Your next treatment may be surgery to take out all enlarged nodes if your tumor marker levels are normal.
- **Retroperitoneal lymph node dissection (RPLND):** In few select cases, where the

cancer has spread only to these lymph nodes, surgery may be done to take them out. You may get chemo as listed above after surgery.

If your tumor markers are still higher than normal you'll get chemo as listed above.

## Stage III seminomas and non-seminomas

Even though stage III tumors have spread by the time they are found, most of them can still be cured.

Both stage III seminomas and non-seminomas are treated with [radical inguinal orchiectomy](#) followed by [chemo](#) with either 4 cycles of EP (etoposide and cisplatin) or 3 or 4 cycles of BEP (bleomycin, etoposide, and cisplatin).

You may get 4 cycles of BEP if you have an intermediate or poor risk non-seminoma. (This depends on the spread to distant areas and [tumor marker](#)<sup>8</sup> levels.) If you have medical reasons that make treatment with bleomycin unsafe, then you may be get VIP (vinblastine, ifosfamide, and cisplatin) instead.

If the cancer is seminoma that has spread to your bones, liver, or brain, it's intermediate risk and you'll get VIP (etoposide, mesna, ifosfamide, and cisplatin).

If you have very high levels of the tumor marker HCG, distant spread of cancer is seen on scans, and there's a high suspicion that you might have a testicular choriocarcinoma, chemo may be started without a biopsy or surgery to remove the testicle.

If the cancer has spread to your brain, you will get either surgery (if there are only 1 or 2 tumors in the brain), radiation therapy aimed at the brain, or both. If the tumors in the brain are not bleeding or causing symptoms, some doctors may choose to start the chemo first.

Once chemo is complete, the doctor looks for any cancer that's left. If you have normal scans and normal tumor marker levels, you'll be watched carefully and may not need further treatment.

Sometimes a few tumors are left. These are most often in the lung or in the retroperitoneal lymph nodes. Further treatment at this point depends on the [type](#)<sup>9</sup> of cancer:

- A **stage III seminoma** that's still there after chemo or doesn't "light up" on a PET

scan, will be watched with CT scans to see if it grows. If it does, more treatment is needed. If the tumors do light up on a PET scan, they could be cancer, and treatment is needed. Treatment may be surgery (such as a retroperitoneal lymph node dissection) or chemo (using a different combination of drugs).

- A **stage III non-seminoma** tumor that remains after treatment is usually removed surgically, which may result in a cure. If cancer is found in the tumors removed, you might need more chemo, maybe with different drugs. After this, surgery might be done to take out any tumors that remain.

If the cancer is resistant to chemo or has spread to many organs, the usual doses of chemo may not always be enough. Your doctor might recommend high-dose chemo followed by a stem cell transplant. You might also want to consider enrolling in a [clinical trial](#)<sup>10</sup> of newer chemo regimens.

## Recurrent testicular cancer

If the cancer goes away with treatment and then comes back, it's said to have recurred or relapsed. If this happens, it's usually within the first 2 years after treatment. In general, if the [cancer recurs](#)<sup>11</sup>, it's probably best to get a [second opinion](#)<sup>12</sup> from a center with extensive experience in treating relapsed testicular cancer before starting treatment.

Treatment of recurrent germ cell tumors depends on the initial treatment and where the cancer recurs. Cancer that comes back in the retroperitoneal lymph nodes can be treated by surgery to remove the nodes (RPLND) if the recurrence is small and if the only surgical treatment given before was orchiectomy. Depending on the results of the surgery, chemo may be recommended as well.

If it looks as if cancer has recurred in a lot of the retroperitoneal lymph nodes or if the cancer has returned elsewhere, chemo is usually recommended. This may be followed by surgery.

If a man's cancer recurs after chemo or if treatment is no longer working, he will be treated with different chemo, which typically includes ifosfamide, cisplatin, and either etoposide, paclitaxel, or vinblastine.

The treatment of testicular cancer that has come back after chemo is not always as effective as doctors would like, so some doctors may advise high-dose chemo followed by a stem cell transplant. This may be a better option for some men with recurrent disease, rather than standard chemo. [Clinical trials](#)<sup>13</sup> of newer treatments may also be



good options.

## Sertoli cell and Leydig cell tumors

Typically, [radical inguinal orchiectomy](#) is the treatment for Sertoli cell and Leydig cell tumors. Radiation therapy and chemo generally don't work for these rare types of testicular tumors. If the doctor suspects the tumor has spread beyond the testicle, the retroperitoneal lymph nodes may be surgically removed.

## More treatment information for testicular cancer

For more details on treatment options – including some that may not be addressed here – the National Comprehensive Cancer Network (NCCN) and the National Cancer Institute (NCI) are good sources of information.

The NCCN is made up of experts from many of the nation's leading cancer centers. It develops cancer treatment guidelines for doctors to use when treating patients. They're available on the NCCN website ([www.nccn.org](http://www.nccn.org)<sup>14</sup>).

The NCI provides treatment information by phone (1-800-4-CANCER) and on its website ([www.cancer.gov](http://www.cancer.gov)<sup>15</sup>). More detailed information intended for use by cancer care professionals is also available on [www.cancer.gov](http://www.cancer.gov)<sup>16</sup>.

## Hyperlinks

1. [www.cancer.org/cancer/testicular-cancer/about/what-is-testicular-cancer.html](http://www.cancer.org/cancer/testicular-cancer/about/what-is-testicular-cancer.html)
2. [www.cancer.org/cancer/testicular-cancer/detection-diagnosis-staging/staging.html](http://www.cancer.org/cancer/testicular-cancer/detection-diagnosis-staging/staging.html)
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Last Medical Review: May 17, 2018 Last Revised: May 17, 2018

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## After Testicular Cancer Treatment

### Living as a Cancer Survivor

For many people, cancer treatment often raises questions about next steps as a survivor.

- [Living As A Testicular Cancer Survivor](#)
- [Fertility and Hormone Concerns in Boys and Men With Testicular Cancer](#)

### Cancer Concerns After Treatment

Treatment may remove or destroy the cancer, but it's very common to have questions about cancer coming back or treatment no longer working.

- [Second Cancers After Testicular Cancer](#)
- 

## Living As A Testicular Cancer Survivor

For most men with testicular cancer, treatment can remove or destroy the cancer. The end of treatment can be both stressful and exciting. You may be relieved to finish treatment, but yet it's hard not to worry about cancer coming back. These feelings are very common if you've had cancer. Life after cancer means returning to some familiar things and also making some new choices.

## Follow-up care

After you've completed treatment, your doctors will still want to watch you closely. It's very important to go to all of your follow-up appointments. During these visits, your doctors will examine you and ask questions about any problems you're having. Lab tests and/or [imaging tests](#)<sup>1</sup> (such as chest x-rays and CT scans) will be done to look for signs of cancer or treatment side effects. Radiation treatment and some of the chemo drugs commonly used for testicular cancer have side effects. Some may last for a few weeks to months, but others can last the rest of your life. Talk to your doctor about long-term side effects you should watch for. This is also the time for you to talk to your cancer care team about any changes or problems you notice and any questions or concerns you have.

Follow-up care is extremely important after treatment of testicular cancer because even if it comes back, it's still often curable. This is why finding it early is so important.

Your health care team will explain what tests you need and how often they should be done. If you had a non-seminoma, follow-up testing will include blood tests of [tumor markers](#)<sup>2</sup>, such as alpha-fetoprotein (AFP), human chorionic gonadotropin (HCG), and lactate dehydrogenase (LDH). Tumor markers aren't as helpful for patients with seminoma, so they aren't always checked. Imaging tests (such as CT scans and chest X-rays) are also done to help find relapse as early as possible. As time goes on, these visits and tests will be done less often. Depending on the type of treatment you've had, you may also need follow-up for the possible complications of treatment.

Make a special effort to keep all appointments with your cancer care team and follow their instructions carefully. Report any new or recurring symptoms to your doctor right away. Most of the time, if the cancer comes back, it does so in the first 2 years. Still, there's always an outside chance the cancer can come back later. There's also a small chance that you'll develop a new cancer in the other testicle, so report any changes in your remaining testicle to your doctor.

### Ask your doctor for a survivorship care plan

Talk with your doctor about developing a [survivorship care plan](#)<sup>3</sup> for you. This plan might include:

- A suggested schedule for follow-up exams and tests
- A schedule for other tests you might need in the future, such as early detection (screening) tests for other types of cancer, or tests to look for long-term health effects from your cancer or its treatment

- A list of possible late- or long-term side effects from your treatment, including what to watch for and when you should contact your doctor
- Diet and physical activity suggestions
- Reminders to keep your appointments with your primary care provider (PCP), who will monitor your general health care

## Keeping health insurance and copies of your medical records

Even after treatment, it's very important to keep health insurance. Tests and doctor visits cost a lot, and even though no one wants to think of their cancer coming back, this could happen.

At some point after your cancer treatment, you might find yourself seeing a new doctor who doesn't know about your medical history. It's important to keep copies of your medical records to give your new doctor the details of your diagnosis and treatment. Learn more in [Keeping Copies of Important Medical Records](#)<sup>4</sup>.

## Can I lower my risk of the testicular cancer progressing or coming back?

If you have (or have had) testicular cancer, you probably want to know if there are things you can do that might lower your risk of the cancer growing or coming back, such as exercising, eating a certain type of diet, or taking nutritional supplements. Unfortunately, it's not yet clear if there are things you can do that will help.

Adopting healthy behaviors such as [not smoking](#)<sup>5</sup>, [eating well](#)<sup>6</sup>, [getting regular physical activity](#)<sup>7</sup>, and [staying at a healthy weight](#)<sup>8</sup> might help, but no one knows for sure. However, we do know that these types of changes can have positive effects on your health that can extend beyond your risk of testicular cancer or other cancers.

## About dietary supplements

So far, no [dietary supplements](#)<sup>9</sup> (including vitamins, minerals, and herbal products) have been shown to clearly help lower the risk of testicular cancer progressing or coming back. This doesn't mean that no supplements will help, but it's important to know that none have been proven to do so.

Dietary supplements are not regulated like medicines in the United States – they do not have to be proven effective (or even safe) before being sold, although there are limits

on what they're allowed to claim they can do. If you're thinking about taking any type of nutritional supplement, talk to your health care team. They can help you decide which ones you can use safely while avoiding those that might be harmful.

### **If the cancer comes back**

If the cancer does recur at some point, your treatment options will depend on where the cancer is located, what treatments you've had before, and your health. For more information on how recurrent cancer is treated, see [Treatment Options for Testicular Cancer, by Type and Stage](#)<sup>10</sup>.

For more general information on recurrence, you may also want to see [Understanding Recurrence](#)<sup>11</sup>.

### **Could I get a second cancer after treatment?**

Men who've had testicular cancer can still get other cancers. In fact, testicular cancer survivors are at higher risk for getting some other types of cancer. Learn more in [Second Cancers After Testicular Cancer](#).

### **Getting emotional support**

Some amount of feeling depressed, anxious, or worried is normal when cancer is a part of your life. Some people are affected more than others. But everyone can benefit from help and support from other people, whether friends and family, religious groups, support groups, professional counselors, or others. Learn more in [Life After Cancer](#)<sup>12</sup>.

### **Hyperlinks**

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Last Medical Review: January 20, 2015 Last Revised: February 12, 2016

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# Second Cancers After Testicular Cancer

Cancer survivors can be affected by a number of health problems, but often their greatest concern is facing cancer again. If a cancer comes back after treatment it's called a recurrence. **But some cancer survivors may develop a new, unrelated cancer later. This is called a second cancer.**

Unfortunately, being treated for cancer doesn't mean you can't get cancer again. People who have had cancer can still get the same types of cancers that other people get. In fact, certain types of cancer and cancer treatments are linked to a higher risk of certain second cancers.

## Common second cancers after testicular cancer

Survivors of testicular cancer can get any second cancer, but they have an increased risk of:



- A second testicular cancer (this is different than the first cancer coming back)
- [Rectal cancer](#)<sup>1</sup>
- [Pancreas cancer](#)<sup>2</sup>
- [Bladder cancer](#)<sup>3</sup>
- [Kidney cancer](#)<sup>4</sup>
- [Thyroid cancer](#)<sup>5</sup>
- [Acute myeloid leukemia \(AML\)](#)<sup>6</sup>

The most common cancer seen in testicular cancer survivors is a second testicular cancer.

Compared with most men in the general population, testicular cancer survivors are up to twice as likely to develop a new cancer outside the testicle. The chance of a second cancer changes over time and depends on which treatments were used and how old the patient was when he was treated.

### **If you had radiation therapy**

Treatment with radiation is linked to some second cancers after testicular cancer. The risk is highest for cancers in organs in or near the area that was treated (the radiation field) -- the abdomen (belly) and pelvis, and include:

- [Bladder cancer](#)<sup>7</sup>
- [Colon cancer](#)<sup>8</sup>
- [Rectal cancer](#)<sup>9</sup>
- [Pancreas cancer](#)<sup>10</sup>
- [Stomach cancer](#)<sup>11</sup>
- [Kidney cancer](#)<sup>12</sup>
- [Prostate cancer](#)<sup>13</sup>

If the radiation field includes the chest, there's an increased risk of:

- [Lung cancer](#)<sup>14</sup>
- [Esophagus cancer](#)<sup>15</sup>
- [Mesothelioma](#)<sup>16</sup> (cancer of the outer lining of the lung)
- [Thyroid cancer](#)<sup>17</sup>

Radiation treatments also increase the risk of [melanoma skin cancer](#)<sup>18</sup> and [connective](#)

[tissue cancer \(sarcoma\)](#)<sup>19</sup>.

The risks of these cancers starts going up within 5 years and doubles after 10 years in those men who were treated with radiation alone. This risk remains high and doesn't seem to go down with time. This is why long-term follow-up is so important. The risks are generally greater with higher radiation doses or if the patient got both chemotherapy and radiation.

In recent years, radiation therapy for testicular cancer has changed. Lower doses of radiation are used, and preventive radiation treatment to the chest has been stopped. Long-term follow-up studies are needed to see if these changes have lowered second cancer risks.

### **If you had chemotherapy**

Chemotherapy is also linked to an increased risk of second cancers, but it's slightly less than what's seen after radiation. Treatment with chemo has been linked to increased risk for these cancers:

- Kidney
- Thyroid
- Soft tissue

There's also an increased risk of [leukemia](#)<sup>20</sup> and [myelodysplastic syndrome \(MDS\)](#)<sup>21</sup> after chemotherapy for testicular cancer. Use of the chemo drug cisplatin is linked most often to leukemia and MDS, though high doses of etoposide (VP-16, Etopophos<sup>®</sup>, or Vepesid<sup>®</sup>) are sometimes also a factor. (The doses were higher in the past than those normally used today.) Radiation given with chemotherapy seems to increase risk even more. Leukemia and MDS are both uncommon cancers normally, so even though the risk of these cancers is higher than average, very few patients develop them from their treatment.

### **Follow-up after treatment**

After completing treatment for testicular cancer, you should still see your doctor regularly. You may have tests for a number of years to look for signs the cancer has come back or spread. Experts don't recommend any other testing to look for second cancers in people without symptoms. But let your doctor know about any new symptoms or problems, because they could be caused by the cancer coming back or by a new disease or second cancer.

Survivors can do regular testicular self-exams to look for cancer in the remaining testicle.

All patients should follow the [American Cancer Society guidelines for the early detection of cancer](#)<sup>22</sup>, such as those for colorectal cancer.

The Children's Oncology Group has guidelines for the follow-up of patients treated for cancer as a child, teen, or young adult, including screening for second cancers. These can be found at [www.survivorshipguidelines.org](http://www.survivorshipguidelines.org)<sup>23</sup>.

All survivors of testicular cancer should not use tobacco and [avoid tobacco smoke](#).<sup>24</sup> Smoking increases the risk of many cancers.

To help maintain good health, survivors should also:

- Get to and stay at a [healthy weight](#)<sup>25</sup>
- Adopt a [physically active lifestyle](#)<sup>26</sup>
- Consume a [healthy diet](#)<sup>27</sup>, with an focus on plant foods
- Limit [alcohol](#)<sup>28</sup> use to no more than 2 drinks per day

These steps may help lower the risk of other cancers, too.

See [Second Cancers in Adults](#)<sup>29</sup> for more information about causes of second cancers.

## Hyperlinks

1. [www.cancer.org/cancer/colon-rectal-cancer.html](http://www.cancer.org/cancer/colon-rectal-cancer.html)
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Last Medical Review: May 17, 2018 Last Revised: May 17, 2018

See all references for Testicular Cancer ([www.cancer.org/cancer/testicular-cancer/references.html](http://www.cancer.org/cancer/testicular-cancer/references.html))

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