



Testicular Cancer Overview

The information that follows is an overview of this type of cancer. It is based on the more detailed information in our document, *Testicular Cancer*. This document and other information can be obtained by calling 1-800-227-2345 or visiting our Web site at www.cancer.org.

What is cancer?

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

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

Cancer cell growth is different from normal cell growth. Instead of dying, cancer cells keep on growing and form new cancer cells. These cancer cells can grow into (invade) other tissues, something that normal cells cannot do. Being able to grow out of control and invade other tissues are what makes a cell a cancer cell.

In most cases the cancer cells form a tumor. But some cancers, like leukemia, rarely form tumors. Instead, these cancer cells are in the blood and bone marrow.

When cancer cells get into the bloodstream or lymph vessels, they can travel to other parts of the body. There they begin to grow and form new tumors that replace normal tissue. This process is called *metastasis* (muh-**tas**-tuh-sis).

No matter where a cancer may spread, it is always named for the place where it started. For instance, breast cancer that has spread to the liver is still called breast cancer, not liver cancer. Likewise, prostate cancer that has spread to the bone is called metastatic prostate cancer, not bone cancer.

Different types of cancer can behave very differently. For example, lung cancer and breast cancer are very different diseases. They grow at different rates and respond to different treatments. That is why people with cancer need treatment that is aimed at their own kind of cancer.

Not all tumors are cancerous. Tumors that aren't cancer are called *benign* (be-**nine**). Benign tumors can cause problems-- they can grow very large and press on healthy organs and tissues. But they cannot grow into other tissues. Because of this, they also can't spread to other parts of the body (metastasize). These tumors are almost never life threatening.

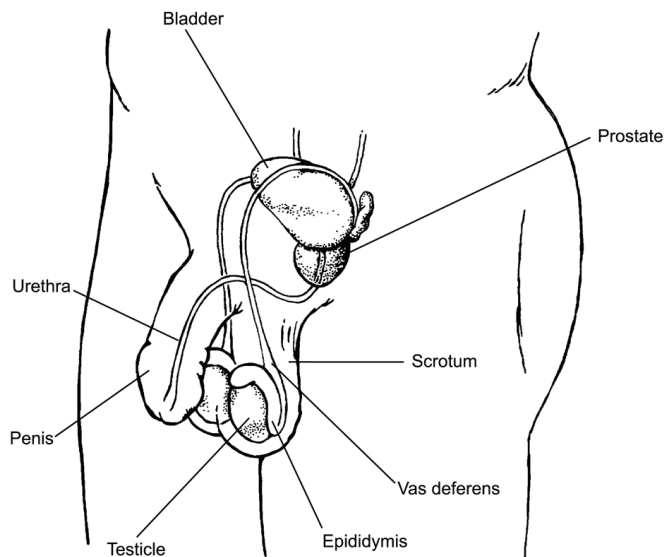
What is testicular cancer?

Testicular cancer can start in one or both testicles. It is most often found in young men. This type of cancer can be treated and very often cured.

The testicles

The testicles (or testes) are part of the male reproductive system. In adult men, each one is normally a little smaller than a golf ball. They are held in a sac of skin called the *scrotum*. The scrotum hangs beneath the base of the penis.

The testicles make the male hormones testosterone. They also make sperm. Sperm cells are carried from the testicles through small tubes (the vas deferens) to the seminal vesicles. Fluid from the vesicles and from the prostate gland is added. During ejaculation (orgasm), this fluid, now called semen, travels through a tube (the urethra) in the center of the penis and out of the body. See the picture below.



The testicles are made up of several kinds of cells and each may develop into one or more types of cancer. It is important to know which kind of cell the cancer started from

because these types of cancer are treated differently. They also differ in the chance of survival for the patient (prognosis).

Main types of testicular tumors

- Germ cell tumors are the most common type of testicular tumors. Germ cell tumors start in the cells that make sperm.
- Stromal tumors start in the cells that make hormones and the cells that support the cells that make sperm.
- Secondary testicular tumors are from cancer that has spread to the testicles from other parts of the body.

Each of the 3 types is explained in more detail below.

Germ cell tumors

More than 9 out of 10 of cancers of the testicles start in the germ cells. As used here, the term "germ" means seed. These are the cells that make sperm.

The 2 main types of germ cell tumors are *seminomas* and *nonseminomas*.

Seminomas start from germ cells of the testicle that make sperm. Within this group there are also subtypes. Seminomas usually happen in men when they are between 25 and 45.

Nonseminomas tend to develop earlier in life than seminomas. They are often found in men between their late teens and early 30s. There are 4 main subtypes. Most tumors are mixed, having at least 2 different subtypes. But all nonseminoma germ cell cancers are treated the same way, so the exact type is not that important.

Carcinoma in situ: Testicular germ cell cancers may begin as a non-invasive form of the disease called *carcinoma in situ* (CIS). Carcinoma in situ may not always go on to become invasive cancer, but if it does, it can take about 5 years.

It is hard to find CIS because it often causes no symptoms and may not form a lump that you or the doctor can feel. Some cases are found by chance in men who have a testicular biopsy for some other 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 this country feel that observation (watching and waiting) is the best course of action.

Stromal tumors

Tumors can also grow in the cells that make hormones and in the supportive tissues (the *stroma*) of the testicles. Stromal cell tumors are often benign (not cancer). They usually do not spread beyond the testicle and can be cured by taking them out. But a few stromal cell tumors spread to other parts of the body (metastasize). Metastatic stromal cell tumors

have a poor outlook because they do not respond well to chemotherapy or radiation treatment. The 2 main types of stromal tumors are Leydig cell tumors and Sertoli cell tumors.

Secondary testicular tumors

Secondary testicular tumors start in another organ and then spread to the testicle. Lymphoma is the most common cancer that does this. In boys with acute leukemia, the leukemia cells can sometimes form a tumor in the testicle.

Cancers of the prostate, lung, skin, kidney, and other organs can also spread to the testicles. The outlook for these cancers is usually poor. That's because very often these cancers have spread widely to other organs, too. Treatment depends on the exact type of cancer.

How many men get testicular cancer?

The American Cancer Society's most recent estimates for testicular cancer in the United States are for 2012:

- About 8,590 new cases of testicular cancer
- About 360 deaths from testicular cancer

A man's lifetime chance of having testicular cancer is about 1 in 270. Testicular cancer is one of the most curable forms of cancer. Because treatment is so successful, the risk of dying from this cancer is very low: about 1 in 5,000.

What are the risk factors for testicular cancer?

While we do not know the exact cause of most cases of testicular cancer, we do know some of the *risk factors* linked to testicular cancer.

A risk factor is something that affects a person's chance of getting a disease. Different cancers have different risk factors. Some risk factors, such as smoking, can be controlled. Others, like a person's age or race, can't be changed. But having a risk factor, or even several, does not mean that a person will get the disease. And not having any risk factors doesn't mean you won't get the disease.

Scientists have found a few risk factors that make a man more likely to get testicular cancer. Even if a man has one or more risk factors for this disease, there's no way to know for sure what part those factors played in causing the cancer. Also, most men with testicular cancer do not have any of the known risk factors. Research in this area is going on.

Risk factors for testicular cancer

Undescended testicle: One of the main risk factors for testicular cancer is a problem called *cryptorchidism*, or undescended testicle(s). Before birth, the testicles normally develop in the belly of the fetus and then move down (descend) into the scrotum before birth. But in about 3% of boys, the testicles do not move into the scrotum. Sometimes the testicle stays inside the belly. In other cases, the testicle starts to come down, but gets stuck in the groin.

Men who have had cryptorchidism are several times more likely to get testicular cancer than those who did not have the problem. The risk is higher for men with a testicle in the belly as opposed to one that has moved down at least part way. Among men with a history of this problem, most cancers start in the testicle that has not moved down. But about 1 out of 4 occurs in the normal testicle. Because of this, some doctors think that cryptorchidism is not the direct cause of testicular cancer. They believe that some other problem causes both the cancer risk and the cryptorchidism.

Most testicles will descend on their own in the child's first year. Sometimes surgery (called orchiopexy) is needed to bring the testicle down into the scrotum. Surgery done when a child is younger may be more likely to reduce the risk of testicular cancer than surgery done when the child is older, but the best time to do this surgery is not clear.

Family history: A family history of testicular cancer increases the risk. If a man has the disease, there is a higher risk that his brothers or sons may also get it. But very few cases of testicular cancer are actually found in families.

HIV infection: There is some evidence that men infected with HIV (human immunodeficiency virus) have an increased risk of testicular cancer. This may be especially true for men who have AIDS. No other infections have been shown to increase testicular cancer risk.

CIS (carcinoma in situ): CIS is described in "What is testicular cancer?" It isn't clear how often CIS in the testicles becomes cancer. It is sometimes found when a man is tested for infertility. It may also be found when a man has a testicle removed because of cryptorchidism. Radiation or surgery (to remove the testicle) is used to treat CIS. Since we don't know how often CIS becomes true (invasive) cancer, it isn't clear that 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.

Cancer of the other testicle: Men who have been cured of cancer in one testicle have an increased risk (about a 3% to 4% chance) of getting 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 older men

Race and ethnicity: White American men are about 5 times more likely to get testicular cancer than are African-American men. Whites have more than 3 times the risk of Asian-

American and American Indian men. The risk for Hispanics falls between that of Asians and non-Hispanic whites. The reason for these differences is not known.

Body size: Some studies have that the risk of testicular cancer is somewhat higher in tall men but other studies have not shown a link.

Can testicular cancer be prevented?

Cryptorchidism, white race, and a family history of the disease are some of the known risk factors for this cancer. None of these factors can be prevented because they are present at birth. Also, many men with testicular cancer have no known risk factors. For these reasons, there is no way to prevent most cases of this disease.

Although we don't know what is the best age to correct an undescended testicle to prevent cancer, experts agree that it should be done during childhood for reasons related to fertility and body image. And knowing he has a risk factor like undescended testicle may cause a young man to be more watchful and to check his testicles, making it more likely a cancer will be found early.

How is testicular cancer found?

Most testicular cancers can be found at an early stage. In some men, early testicular cancers cause symptoms that prompt them to call their doctor. Most of the time a lump on the testicle is the first sign. But some testicular cancers don't cause symptoms until they have reached an advanced stage.

Sometimes testicular cancer is found during testing for other problems. For instance, fertility tests sometimes find testicular cancer.

Most doctors agree that an exam of a man's testicles should be part of his general physical exam. The American Cancer Society (ACS) recommends a testicular exam as part of a routine cancer-related check-up.

Regular self-exams of the testicles have not been studied enough to show that the practice lowers the death rate from this cancer. Because of this, the ACS does not have a recommendation about regular testicular self-exams for all men. But some doctors think otherwise, and may advise their patients to do self-exams every month. If you have certain risk factors that increase your chance of getting testicular cancer, you should talk about it with your doctor.

Signs and symptoms of testicular cancer

In most cases of testicular cancer, the man has a lump on a testicle or notices that the testicle is swollen or larger. Most of the time there is no pain. Men with testicular cancer may also notice a feeling of heaviness or aching in the lower belly or scrotum.

In rare cases, men with germ cell cancer notice their breasts are sore or have gotten bigger. This happens because some germ cell tumors give off high levels of a hormone called human chorionic gonadotropin (HCG), which causes the breasts to grow. Blood tests can measure HCG levels. These tests are important in finding, staging, and follow-up of some testicular cancers.

Some stromal tumors can make hormones. If the tumor makes male hormones (androgens), it can cause the growth of facial and body hair at a very early age in boys. The extra androgens are not likely to cause any symptoms in men. Some stromal tumors make female hormones (estrogens) and not male hormones. The female hormones can cause a man to grow breasts and/or lose his sex drive.

Signs of advanced testicular cancer

Even when the cancer has spread to other organs, few men have any symptoms. Lower back pain is a symptom of later-stage testicular cancer. Signs that the cancer has spread to the lungs can include:

- Shortness of breath
- Chest pain
- Cough
- Spitting up blood

A number of problems other than cancer, such as an injury to the testicle, infection, or inflammation, can cause symptoms like those of testicular cancer. If you have any of the signs or symptoms above, see a doctor right away. Remember, the sooner cancer is found the sooner you can start treatment. And the earlier you get treatment, the better it is likely to work. For more details, see our document *Do I Have Testicular Cancer?*

Medical history and physical exam

If you have signs or symptoms that suggest testicular cancer, your doctor will want to take a complete medical history to check for risk factors and symptoms. Then the doctor will do a physical exam. During the exam, the doctor will feel the testicles for any swelling, tenderness, or lumps. The doctor will also feel your belly for swollen lymph nodes which could be a sign that the cancer has spread.

Ultrasound

This test uses sound waves to make pictures of internal organs. The computer shows the picture on a screen. An ultrasound can help doctors tell whether a lump (or mass) is solid or filled with fluid. If the lump is solid, then it is more likely to be cancer.

This is a very easy test to have done, and it uses no x-rays. You just lie on a table while a flat wand is moved over the skin of the scrotum. Usually, your skin is coated with gel first.

Blood tests

Certain blood tests can help diagnose testicular cancer. Many cancers make proteins (called tumor markers) that can be found in the blood. The levels of these tumor markers might be used to tell the doctor how much cancer is present, how well treatment is working, and whether the cancer has come back.

Surgery to diagnose testicular cancer

If the doctor sees a solid tumor on ultrasound, it is likely to be cancer, so surgery will most likely be done to remove it as soon as possible. Whenever they can, surgeons try to remove the entire tumor, the testicle, and the spermatic cord. The spermatic cord carries sperm, blood, and lymph. It can act as a pathway for cancer cells to spread. For this reason, the cord is tied off early in the operation. Doctors usually do this operation through a cut (incision) in the groin. This is the same operation that is done for cancer in the testicle.

All of the tissue removed will be sent to the lab. A doctor with special training (called a pathologist) will look at it under a microscope. If cancer cells are present, the pathologist sends back a report describing the type and extent cancer.

In rare cases, the doctor may take a tissue sample (biopsy) before removing the testicle. This is done when doctors are not sure if the tumor is cancer. In surgery the doctor makes a cut in the groin, takes the testicle out of the scrotum, and looks at it without cutting the spermatic cord. If an area of concern is seen, part of that area is removed and sent to be looked at by the pathologist right away. If it is cancer, the doctor removes the testicle and spermatic cord. If the tissue is not cancer, the testicle can often be returned to the scrotum.

If testicular cancer is found, doctors use imaging tests to see how advanced it is.

Imaging tests

Chest x-ray: This is a plain x-ray of your chest to see whether the cancer has spread to your lungs or to lymph nodes around the chest. If the x-ray is normal, you probably don't have cancer in your lungs. But most doctors feel a CT scan can better show whether the cancer has spread to the chest.

CT scan (computed tomography): A CT scan is helpful in finding out whether the cancer has spread to your lungs, liver, or other organs. The scan uses x-rays to make detailed pictures of your body. Instead of taking just one picture, a CT scanner takes many as it rotates around you. A computer then combines these into a picture of a slice of your body.

Before the scan, you may be asked to drink a liquid that contains a dye to help outline tissue in your body. Or the dye may be put into a vein. The dye may make you feel warm and flushed. A few people are allergic and get hives. Rarely, there can be more serious problems, like trouble breathing and low blood pressure. Be sure to tell the doctor if you

have ever had a problem with a dye used for x-rays or if you are allergic to shellfish. Medicine can be given to prevent and treat these reactions.

CT scans take longer than regular x-rays. You need to lie still on a table. The part of your body being checked is placed inside the scanner. The test is painless, but you may find it hard to hold still for minutes at a time.

CT scans are sometimes used to guide a biopsy needle mass that might be cancer. You stay on the CT scanning table while the doctor moves needle through the skin toward the .A thin needle (or a larger needle) removes a sample of tissue to be looked at under a microscope. This is not used to biopsy a testicular lump, but may be used to check for cancer spread.

MRI (magnetic resonance imaging): MRI scans use radio waves and strong magnets instead of x-rays to take pictures. MRI pictures show a lot of detail. They are very helpful when looking at the brain and spinal cord.

MRI scans can be a little more uncomfortable than CT scans because they take longer, often up to an hour. Also, you must lie still inside a tube, which can upset some people. The machine makes a thumping noise as the magnet switches on and off. Some places have earplugs or headphones with music to block this out. Special, more open MRI machines can help with this if needed. You may also get a dye like you would for a CT scan, but this is done less often.

PET scan (positron emission tomography): For a PET scan, a type of radioactive sugar is put into a vein. The sugar collects in cancer tissue, and a scanner can spot these areas. This test is useful for finding cancer that has spread beyond the testicles. It is also helpful in telling whether swollen lymph nodes contain scar tissue or cancer. Often the PET scan is combined with a CT scan. This helps the doctor decide whether changes on the CT are cancer or something else. PET scans are often more useful for seminoma than for the non-seminoma type of testicular cancer, and so are less often used in patients with non-seminoma.

Staging of testicular cancer

Staging is the process of finding out how far the cancer has spread. This is very important because the type of treatment and the outlook for your recovery depend on the stage of the cancer. Staging testicular cancer can be a complex process. Many factors are involved. If you have testicular cancer, ask your cancer care team to explain staging in a way that you can understand.

Stages may be labeled using Roman numerals I through III (1-3). As a rule, the lower the number, the less the cancer has spread. A higher number, such as stage III (3), means a more advanced cancer. Knowing all you can about staging lets you take a more active role in making decisions about your treatment.

Another use of the TNM system for more advanced disease takes into account tumor markers (substances made by cancer cells) and groups the cancer as good, intermediate,

or poor outlook. Some doctors give stronger chemotherapy to patients who are in a higher-risk category.

Survival rates for testicular cancer

Some people with cancer may want to know the survival rates for their type of cancer. Others may not find the numbers helpful, or may even not want to know them. If you do not want to know them, stop reading here and skip to the next section.

Survival rates are a way for doctors and patients to get a general idea of the outlook for people with a certain type and stage of cancer. The 5-year survival rate refers to the percentage of patients who live at least 5 years after their cancer is found. Of course, many people live much longer than 5 years. Five-year relative survival rates compare the number of people who are still alive 5 years after their cancer was found to the survival of others the same age who don't have cancer. This is a better way to see the impact that cancer can have on survival.

These survival statistics come from the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) database, and are based on patients who were diagnosed with testicular cancer between 2001 and 2007.

Testicular cancer is one of the most curable forms of cancer. According to the National Cancer Institute, the 5-year relative survival rate for all men with this cancer is 95%. If the cancer hasn't spread outside the testicle, the 5-year relative survival rate is 99%. Even if the cancer has spread to nearby lymph nodes, the rate is 96%. If it has spread to organs or lymph nodes away from the tumor, the 5-year relative survival rate is around 72%.

These numbers give you an overall picture, but keep in mind that every person's situation is unique and the statistics can't predict exactly what will happen in your case. Talk with your cancer care team if you have questions about your own chances of a cure, or how long you might survive your cancer. They know your situation best.

How is testicular cancer treated?

This information represents the views of the doctors and nurses serving on the American Cancer Society's Cancer Information Database Editorial Board. These views are based on their interpretation of studies published in medical journals, as well as their own professional experience.

The treatment information in this document is not official policy of the 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.

In recent years, much progress has been made in treating testicular cancer. Surgery has been improved, and doctors know more about the best way to use chemo and radiation to treat different types of testicular cancer.

Making treatment decisions

After the cancer is found and staged, your doctor will talk to you about treatment choices. You should take time and think about all of the options. In choosing a treatment plan, things to take into account include the type and stage of the cancer as well as your overall physical health. When time permits, getting a second opinion is often a good idea. This can give you more information and help you feel good about the choice you make. Some insurance companies even require a second opinion before they will agree to pay for treatments.

Where you are treated is important. There is no substitute for experience; you will have the best chance for a good outcome if you go to a hospital that treats many testicular cancer patients.

The 3 main methods of treatment for testicular cancer are surgery, radiation therapy, and chemotherapy.

Surgery for testicular cancer

Surgery is most often the first treatment for testicular cancer.

Radical inguinal orchiectomy

For most cancers, a biopsy is done before surgery to remove a tumor (a biopsy is when a sample of the tumor is removed and looked at under a microscope to see if it is cancer or something else). But since a tumor in the testicle is likely to be a cancer, biopsies are rarely done for testicular cancer. If a solid mass (tumor) is seen on ultrasound, it is treated like a cancer and removed with surgery.

All stages of testicular cancer are treated with surgery. The testicle (or testicles) with cancer are taken out of the scrotum through a cut (incision) in the groin. The surgeon also cuts through the spermatic cord that attaches the testicle to the belly (abdomen). This is known as a *radical inguinal orchiectomy*. If both testicles are removed, the man can no longer make sperm cells and can no longer father children (he becomes infertile).

Retroperitoneal lymph node dissection

Depending on the type and stage of your cancer, some lymph nodes behind the belly (abdomen) may also be removed. This can be done at the same time or during a second operation. This operation is called a *retroperitoneal lymph node dissection*. A large cut (incision) is often needed to remove these lymph nodes. This is a difficult and long operation. It should be done by a surgeon who does them often.

In some cases, the surgeon can remove lymph nodes through very small cuts in the belly. A narrow lighted tube with a camera (called a laparoscope) is used so the surgeon can see inside. Long, thin tools are put in the cuts to do the surgery. The surgeon's hands are not inside the patient's body during surgery. Although there are advantages to this type of surgery-- for example, the patient recovers much more quickly-- there is not yet

agreement about whether it is as good as the standard operation. That is why if the lymph nodes removed contain cancer, the patient is often treated with chemotherapy, as well. This approach should only be used if the surgeon has a lot of experience with this surgery.

How treatment can affect sexuality

Surgery to remove lymph nodes behind the belly can damage nearby nerves that control sexual climax (ejaculation). If these nerves are damaged, when a man has a climax the sperm do not go out of the body. Instead, they go into the bladder. Damage to these nerves does not affect a man's being able to have an erection but can make it harder for him to father children. To avoid this problem, surgeons use a nerve-sparing approach to this surgery that has a very high rate of success when done by a doctor with a lot of experience.

If both testicles are removed a man cannot make sperm cells and he becomes infertile. Also his body will no longer make enough testosterone. He will need to take supplements, either in the form of a gel, patches, or a shot. As a rule, testosterone pills don't work.

Testicular cancer often affects men at an age when they are trying to have children. These men may wish to talk about nerve-sparing surgery with their doctors. They may also want to talk about storing frozen sperm cells before treatment (sperm banking). Men with testicular cancer often have lower than normal sperm counts, which may make sperm banking hard. You should talk about this with your doctor when making treatment choices.

When a testicle is removed, that side of the scrotum can look and feel empty. Men with testicular cancer are usually young. They may be single and dating. Or they may be athletic and feel embarrassed by the missing testicle when in locker rooms. A man can have an artificial testicle (prosthesis) placed in his scrotum to give a more natural look. The prosthesis approved for use in the United States is filled with salt water (saline). It comes in many sizes to match the other testicle. It can look much like a normal testicle. There may be a scar after the surgery, but it is often partly hidden by pubic hair. Some men want to have prosthesis and others do not. You should discuss your wishes with your surgeon as you think about this surgery. It may also help to talk with someone who has had a testicular prosthesis, to see what their experience was like.

Losing a testicle usually has no effect on a man's ability to get an erection and have sex. Men who have had both testicles removed are also still able to have sex as long as they are getting enough testosterone.

Radiation therapy for testicular cancer

This treatment uses high-energy radiation to kill cancer cells or slow their growth. In testicular cancer, radiation is mainly used to kill cancer cells that have spread to lymph nodes.

Radiation for testicular cancer uses a focused beam from a machine outside the body. The treatment is much like getting an x-ray, but the radiation is stronger. Doctors figure out the exact dose you need. Then they aim the beam very carefully at the cancer to reduce the risk of side effects. Special shields are used to protect the healthy testicle. Each treatment lasts only a few minutes, but the setup time -- getting you into place for treatment -- usually takes longer.

Radiation therapy is mainly used for patients with seminomas since it does not seem to work well for non-seminomas. Sometimes it is used after the testicle has been removed (orchiectomy) and is aimed at the lymph nodes at the back of the belly. This is to kill any tiny bits of cancer in those lymph nodes that can't be seen. It may also be used to treat cancer spread to the brain.

Possible side effects

Radiation therapy can affect nearby healthy tissue along with the cancer cells. It isn't common, but some men get a skin reaction like sunburn. This slowly fades away. Other possible side effects include tiredness (fatigue), nausea, or loose bowels (diarrhea). There is also a very small chance of a new cancer in the future. Radiation can also increase the risk of getting a second cancer (outside of the testicle). This risk was higher in the past when higher doses were used and more tissue was exposed to radiation. To reduce the risk of side effects, doctors carefully figure out the exact dose you need and aim the beam as accurately as they can. Special shields are placed over the other testicle to help preserve fertility.

Chemotherapy for testicular cancer

Chemotherapy (chemo) is the use of drugs to kill cancer cells. The drugs can be taken in pill form or through a needle into a vein or muscle. Once the drugs enter the bloodstream, they spread throughout the body. Chemo is a good way to destroy any cancer cells that break off from the main tumor and travel in the bloodstream to lymph nodes or distant organs. It is often used to cure testicular cancer when it has spread outside the testicle or to decrease the risk of cancer coming back after the testicle is removed.

Doctors give chemo in cycles, with each round of treatment followed by a rest period to allow the body time to recover. Chemo cycles often last about 3 to 4 weeks. Using 2 or more chemo drugs together often works better than using one drug alone.

Side effects

Chemo can have some side effects. These side effects will depend on the type of drugs given, the amount taken, and how long the treatment lasts. Side effects could include:

- Hair loss (hair grows back after treatment)
- Mouth sores
- Loss of appetite

- Nausea and vomiting
- Increased chance of infection (from low white blood cell counts)
- Easy bruising or bleeding (from low blood platelet counts)
- Tiredness (from low red blood cell counts)

If you have side effects, your doctor or nurse can suggest steps to ease them. For instance, there are drugs to help control and prevent nausea and vomiting. The good news is that most side effects will go away when your treatment ends.

Long-term side effects of chemo

Some of the drugs used to treat testicular cancer can also cause long-term side effects. These can include:

- Kidney damage
- Nerve damage (which can cause numbness and tingling)
- Hearing loss (from nerve damage)
- Lung damage (which can cause shortness of breath and reduce your ability to exercise)

Some of the drugs used to treat testicular cancer can have side effects other than those mentioned above. Most side effects are short-term and go away after treatment is finished, but some can last a long time and may never go away completely. You should report any side effects or changes you notice while getting chemo to your doctor so that you can get prompt treatment for them.

Getting a second cancer (usually leukemia) is another very serious, but rare, side effect. It happens in less than 1% of testicular cancer patients treated with chemo. Men who have had chemo for testicular cancer also seem to have a higher risk of heart problems later in life. Several studies have also suggested that chemo treatment can sometimes cause high blood cholesterol over time, which may later need treatment.

To find out more about chemo and its side effects, please see our document, *Understanding Chemotherapy: A Guide for Patients and Families*.

High-dose chemo and stem cell transplant for testicular cancer

For the most part, testicular cancers respond well to chemotherapy (chemo), but not all cancers are cured. Even though higher doses of chemo drugs might work better, giving them could damage the bone marrow, which is where new blood cells are made. This could lead to life-threatening infections, bleeding, and other problems because of low blood cell counts.

A stem cell transplant allows doctors to use these higher doses of chemo. In this treatment, blood-forming cells called stem cells are taken out of the bloodstream using a special machine. (In the past the bone marrow was used, but this is done less often now.) These stem cells are frozen and saved while the patient gets high-dose chemo. After treatment, the frozen stem cells are given back to the patient much like a blood transfusion. This is called a transplant, but it does not involve surgery – the cells are put into a vein.

Current studies are looking at whether stem cell transplant may be useful as part of the first treatment for some patients with advanced germ cell cancer. Today transplant is mostly used for testicular cancer that has come back after regular chemo.

This is a complex and intense treatment. It should be done at a hospital where the staff has experience with stem cell transplant and with managing the recovery phase. Stem cell transplants can cost a lot and often involve a long hospital stay. It is important to find out what your health insurance will cover before you decide on a transplant to get an idea of what you might have to pay.

To learn more about stem cell transplantation see our document, *Bone Marrow and Peripheral Blood Stem Cell Transplant*.

Clinical trials for testicular cancer

You may have had to make a lot of decisions since you've been told you have cancer. One of the most important decisions you will make is deciding which treatment is best for you. You may have heard about clinical trials being done for your type of cancer. Or maybe someone on your health care team has mentioned a clinical trial to you.

Clinical trials are carefully controlled research studies that are done with patients who volunteer for them. They are done to get a closer look at promising new treatments or procedures.

If you would like to take part in a clinical trial, you should start by asking your doctor if your clinic or hospital conducts clinical trials. You can also call our clinical trials matching service for a list of clinical trials that meet your medical needs. You can reach this service at 1-800-303-5691 or on our Web site at www.cancer.org/clinicaltrials. You can also get a list of current clinical trials by calling the National Cancer Institute's Cancer Information Service toll-free at 1-800-4-CANCER (1-800-422-6237) or by visiting the NCI clinical trials Web site at www.cancer.gov/clinicaltrials.

There are requirements you must meet to take part in any clinical trial. If you do qualify for a clinical trial, it is up to you whether or not to enter (enroll in) it.

Clinical trials are one way to get state-of-the-art cancer treatment. They are the only way for doctors to learn better methods to treat cancer. Still, they are not right for everyone.

You can get a lot more information on clinical trials, in our document called *Clinical Trials: What You Need to Know*. You can read it on our Web site or call our toll-free number and have it sent to you.

Complementary and alternative therapies for testicular cancer

When you have cancer you are likely to hear about ways to treat your cancer or relieve symptoms that your doctor hasn't mentioned. Everyone from friends and family to Internet groups and Web sites may offer ideas for what might help you. These methods can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few.

What are complementary and alternative therapies?

It can be confusing because not everyone uses these terms the same way, and they are used to refer to many different methods. We use *complementary* to refer to treatments that are used *along with* your regular medical care. *Alternative* treatments are used *instead of* a doctor's medical treatment.

Complementary methods: Most complementary treatment methods are not offered as cures for cancer. Mainly, they are used to help you feel better. Some examples of methods that are used along with regular treatment are meditation to reduce stress, acupuncture to help relieve pain, or peppermint tea to relieve nausea. Some complementary methods are known to help, while others have not been tested. Some have been proven not to be helpful, and a few are even harmful.

Alternative treatments: Alternative treatments may be offered as cancer cures. These treatments have not been proven safe and effective in clinical trials. Some of these methods may be harmful, or have life-threatening side effects. But the biggest danger in most cases is that you may lose the chance to be helped by standard medical treatment. Delays or interruptions in your medical treatments may give the cancer more time to grow and make it less likely that treatment will help.

Finding out more

It is easy to see why people with cancer think about alternative methods. You want to do all you can to fight the cancer, and the idea of a treatment with few or no side effects sounds great. Sometimes medical treatments like chemotherapy can be hard to take, or they may no longer be working. But the truth is that most of these alternative methods have not been tested and proven to work in treating cancer.

As you think about your options, here are 3 important steps you can take:

- Look for "red flags" that suggest fraud. Does the method promise to cure all or most cancers? Are you told not to have regular medical treatments? Is the treatment a "secret" that requires you to visit certain providers or travel to another country?
- Talk to your doctor or nurse about any method you are thinking of using.
- Contact us at 1-800-227-2345 to learn more about complementary and alternative methods in general and to find out about the specific methods you are looking at.

The choice is yours

Decisions about how to treat or manage your cancer are always yours to make. If you want to use a non-standard treatment, learn all you can about the method and talk to your doctor about it. With good information and the support of your health care team, you may be able to safely use the methods that can help you while avoiding those that could be harmful.

The Lance Armstrong story

No one better shows how far we have come in treating testicular cancer than Lance Armstrong. In 1996, this world-famous bicycle racer began having symptoms. He had low energy levels, started coughing blood, and had a pain in a testicle. He was found to have testicular cancer that had spread throughout his body to his lungs and brain.

After the testicle was removed, Lance was given chemo. He also had surgery to remove 2 tumors that had spread to the brain. (He didn't get any radiation because of the concern that it would affect his balance or coordination.)

Lance finished his treatment by the end of 1996. By 1998, he was competing again. In 1999, he won the Tour de France, which some believe is the toughest athletic event in the world. He went on to win this event a record 7 times in a row between 1999 and 2005. He has founded **LIVESTRONG** (formerly the Lance Armstrong Foundation), which focuses on the cure of cancer and helping people with the disease. You can read more on the **LIVESTRONG** Web site at www.livestrong.org.

What are some questions I can ask my doctor about testicular cancer?

As you cope with cancer, we encourage you to have honest, open talks with your doctor. Feel free to ask any question that's on your mind, no matter how small it might seem. Here are some questions you might want to ask. Be sure to add your own questions as you think of them. Nurses, social workers, and other members of the treatment team may also be able to answer many of your questions.

- Would you please write down the exact type of testicular cancer I have?
- Has my cancer spread beyond the testicle?
- What is the stage of my cancer? What does the staging mean in my case?
- Are there other tests that need to be done before we can decide on treatment?
- How much experience do you have treating this type of cancer?
- What treatment choices do I have?
- How many lymph node surgeries have you done?

- What treatment do you suggest and why?
- What is the goal of this treatment?
- How long will treatment last? What will it involve? Where will it be done?
- What are the risks or side effects that I should expect?
- How long will it take me to recover from treatment?
- When can I go back to work or other activities after treatment?
- How soon after treatment can I have sex?
- What are the chances I will become infertile? Should I bank sperm?
- What are the chances of the cancer coming back after treatment?
- What would we do if that happens?
- Does one type of treatment reduce the risk of the cancer coming back more than another?
- What should I do to be ready for treatment?
- Based on what you've learned about my cancer, how long do you think I'll survive?
- Would a second opinion be helpful to me?

Add your own questions below:

Moving on after treatment for testicular cancer

For most men with testicular cancer, treatment removes or destroys the cancer. While it can feel good to be done with treatment, it can also be stressful. You may find that you now worry about the cancer coming back. This is a very common concern among those who have had cancer. (When cancer comes back, it is called a *recurrence*.)

It may take a while before your recovery begins to feel real and your fears are somewhat relieved. You can learn more about what to look for and how to learn to live with the chance of cancer coming back in *Living With Uncertainty: The Fear of Cancer Recurrence*.

For a few people, the cancer may never go away completely. These people may get regular treatments with chemo, radiation, or other treatments to try to help keep the cancer in check. Learning to live with cancer that does not go away can be hard and very stressful. Our document, *When Cancer Doesn't Go Away*, talks more about this.

Follow-up care

When treatment ends, your doctors will still want to watch you closely. There is still a good chance for cure even if the tumor comes back, so finding it early is important.

Your doctor will explain what tests you need and how often they should be done. You will need blood tests to measure levels of certain protein markers to see if the cancer has come back. You will also need x-rays, CT scans, and other tests to see whether the cancer has come back, has spread, or whether there is a new tumor. After a few years these visits and tests will not have to be done as often.

Most of the time, if the cancer comes back, it does so in the first 5 years. Still, there is always an outside chance the cancer can come back later. Also, there is about a 3% chance that men who have had cancer in one testicle will develop a cancer in the other. Usually this is a new cancer and is not spread (metastasis) from the first tumor. Should your cancer come back, the American Cancer Society document called *When Your Cancer Comes Back: Cancer Recurrence* can help you learn how to cope with this phase of your treatment. You can get a copy by calling 1-800-227-2345.

Most men get cancer in only one testicle. The other testicle usually can make enough testosterone (the male hormone) to keep the man healthy. If the other testicle needs to be removed because a new cancer develops, that man will need to take some form of testosterone the rest of his life. Most often this is in the form of a gel or patch that is applied to the skin or a monthly shot (given in a doctor's office). If you need to take testosterone, talk to your doctor about what form is best for you.

Testicular cancer or its treatment can make a man infertile. Before treatment starts, men who wish to father children may want to think about storing sperm in a sperm bank for later use. But the disease can cause low sperm counts, which may make it hard to get a good sample. In some cases, if one testicle is left, fertility returns (for a short time or for good) after the cancer has been treated.

Even when sperm counts in semen are very low, men have options for fathering children. One of these options is *in vitro* fertilization. An egg cell that has been removed from your partner's ovary is fertilized by your sperm cells in a lab and then returned to her uterus. Be sure to discuss any fertility concerns with your doctor before your treatment begins.

Almost any cancer treatment has side effects. Some may last for a few weeks to several months, but others can be permanent. Be sure to tell your cancer care team about any symptoms or side effects that bother you so they can help you manage them. It is also important to keep health insurance. While you hope your cancer won't come back, it could happen. If it does, you don't want to have to worry about paying for treatment.

Should your cancer come back, our document called *When Your Cancer Comes Back: Cancer Recurrence* can give you information on how to manage and cope with this phase of your treatment.

Seeing a new doctor

At some point after your cancer is found and treated, you may find yourself in the office of a new doctor. It is important that you be able to give your new doctor the exact details of your diagnosis and treatment. Make sure you have this information handy and always keep copies for yourself:

- A copy of your pathology report from any biopsy or surgery
- If you had surgery, a copy of your operative report
- If you were in the hospital, a copy of the discharge summary that the doctor wrote when you were sent home from the hospital
- If you had radiation treatment, a copy of the treatment summary
- If you had chemo or targeted therapies, a list of your drugs, drug doses, and when you took them
- Copies of your CT scans (or other imaging tests) – these can often be placed on a DVD

The doctor may want copies of this information for his records, but always keep copies for yourself.

Lifestyle changes after treatment for testicular cancer

Having cancer and dealing with treatment can take a lot of time and energy, but it can also be a time to look at your life in new ways. Maybe you are thinking about how to improve your health over the long term.

Make healthier choices

Think about your life before you learned you had cancer. Were there things you did that might have made you less healthy? Maybe you drank too much alcohol, ate more than you needed, used tobacco, or didn't exercise very often.

Now is not the time to feel guilty or blame yourself. You can start making changes today that can have positive effects for the rest of your life. Not only will you feel better but you will also be healthier.

You can start by working on those things that worry you most. Get help with those that are harder for you. For instance, if you are thinking about quitting smoking and need help, call us at 1-800-227-2345.

Eating better

Eating right is hard for many people, but it can be even harder to do during and after cancer treatment. If you are still in treatment and are having eating problems related to your treatment, please call us for a copy of *Nutrition for the Person With Cancer During Treatment*. We also have *Nutrition and Physical Activity During and After Cancer Treatment: Answers to Common Questions*.

One of the best things you can do after treatment is to put healthy eating habits into place. You may be surprised at the long-term benefits of some simple changes. Getting to and staying at a healthy weight, eating a healthy diet, and limiting your alcohol intake may lower your risk for a number of types of cancer, as well as having many other health benefits.

Rest, fatigue, and exercise

Feeling tired (fatigue) is a very common problem during and after cancer treatment. This is not a normal type of tiredness but a "bone-weary" exhaustion that doesn't get better with rest. For some people, fatigue lasts a long time after treatment and can keep them from staying active. But exercise can actually help reduce fatigue and the sense of depression that sometimes comes with feeling so tired.

If you are very tired, though, you will need to balance activity with rest. It is OK to rest when you need to. To learn more about fatigue, please see our document, *Fatigue in People With Cancer* and *Anemia in People With Cancer*.

If you were very ill or weren't able to do much during treatment, it is normal that your fitness, staying power, and muscle strength declined. You need to find an exercise plan that fits your own needs. Talk with your health care team before starting. Get their input on your exercise plans. Then try to get an exercise buddy so that you're not doing it alone.

Exercise can improve your physical and emotional health.

- It improves your cardiovascular (heart and circulation) fitness.
- It makes your muscles stronger.
- It reduces fatigue.
- It lowers anxiety and depression.
- It can make you feel generally happier.
- It helps you feel better about yourself.

Long term, getting regular physical activity plays a role in helping to lower the risk of some cancers, as well as having other health benefits.

How does having testicular cancer affect your emotional health?

Once your treatment ends, you may be surprised by the flood of emotions you go through. This happens to a lot of people. You may find that you think about the effect of your cancer on things like your family, friends, and career. Money may be a concern as the medical bills pile up. Or you may begin to think about the changes that cancer has brought to your relationship with your spouse or partner. Unexpected issues may also cause concern -- for instance, as you get better and need fewer doctor visits, you will see your health care team less often. This can be hard for some people.

This is a good time to look for emotional and social support. You need people you can turn to. Support can come in many forms: family, friends, cancer support groups, church or spiritual groups, online support communities, or private counselors.

The cancer journey can feel very lonely. You don't need to go it alone. Your friends and family may feel shut out if you decide not to include them. Let them in -- and let in anyone else who you feel may help. If you aren't sure who can help, call your American Cancer Society at 1-800-227-2345 and we can put you in touch with a group or resource that may work for you.

You can't change the fact that you have had cancer. What you can change is how you live the rest of your life -- making healthy choices and helping your body and mind feel well.

If treatment for testicular cancer stops working

When a person has had many different treatments and the cancer has not been cured, over time the cancer tends to resist all treatment. At this time you may have to weigh the possible benefits of a new treatment against the downsides, like treatment side effects and clinic visits.

This is likely to be the hardest time in your battle with cancer -- when you have tried everything within reason and it's just not working anymore. Your doctor may offer you new treatment, but you will need to talk about whether the treatment is likely to improve your health or change your outlook for survival.

No matter what you decide to do, it is important for you to feel as good as possible. Make sure you are asking for and getting treatment for pain, nausea, or any other problems you may have. This type of treatment is called "palliative" treatment. It helps relieve symptoms but is not meant to cure the cancer.

At some point you may want to think about hospice care. Most of the time it is given at home. Your cancer may be causing symptoms or problems that need to be treated. Hospice focuses on your comfort. You should know that having hospice care doesn't mean you can't have treatment for the problems caused by your cancer or other health issues. It just means that the purpose of your care is to help you live life as fully as possible and to feel as well as you can. You can learn more about this in our document, *Hospice Care*.

Staying hopeful is important, too. Your hope for a cure may not be as bright, but there is still hope for good times with family and friends -- times that are filled with joy and meaning. Pausing at this time in your cancer treatment gives you a chance to focus on the most important things in your life. Now is the time to do some things you've always wanted to do and to stop doing the things you no longer want to do. Though the cancer may be beyond your control, there are still choices you can make.

What's new in testicular cancer research and treatment?

Research into testicular cancer is going on right now around the country. Each year, scientists find out more about what causes the disease, how to prevent it, and how to improve treatment.

Researchers have found inherited changes in several genes that seem to increase a man's risk of getting testicular cancer. These findings may help doctors figure out which men are at higher risk, but they need to be studied much more. And certain other changes in the genes have been linked to resistance to chemo and predict poor outcomes. These findings may help doctors choose the best treatment for each man.

Clinical trials have improved doctors' approaches to treating these cancers. Studies are expected to answer other questions, too. For example, studies have found ways to predict which men may not need lymph node surgery or radiation therapy. Studies have also found other factors that suggest certain men may need stronger treatment.

A large amount of work is being done to try to limit long-term problems of treatment while still curing patients. Doctors want to be able to better predict whose cancer is more likely to come back and then base the amount of treatment on this. Thus men would get the exact amount of treatment they need. One study reported good results of this approach in men with testicular cancer that had spread to other parts of the body.

New drugs and new drug combinations are being tested for people with cancer that comes back. Stem cell transplant is being studied as a way to help those who need high doses of chemo. Chemo treatments are also getting better. Doctors are looking at different doses and combinations of drugs that reduce side effects but still work well to kill the cancer. Doctors are also studying new ways to help men be able to father children after treatment.

To learn more about testicular cancer

From your American Cancer Society

The following related information may also be helpful to you. These materials may be ordered from our toll-free number, 1-800-227-2345.

Testicular Cancer: Detailed Guide (also in Spanish)

After Diagnosis: A Guide for Patients and Families (also in Spanish)

Bone Marrow and Peripheral Blood Stem Cell Transplants

Sexuality for the Man with Cancer (also in Spanish)

Do I Have Testicular Cancer?

Sexuality for the Man With Cancer (also in Spanish)

Understanding Chemotherapy: A Guide for Patients and Families (also in Spanish)

Understanding Radiation Therapy: A Guide for Patients and Families (also in Spanish)

Books

Your American Cancer Society also has books that you might find helpful. Call us at 1-800-227-2345 or visit our bookstore online to find out about costs or to place an order.

National organizations and Web sites*

Along with the American Cancer Society, other sources of information and support include:

LIVESTRONG (formerly Lance Armstrong Foundation)

Toll-free number: 1-866-235-7205

Web site: www.livestrong.org

National Cancer Institute

Toll-free number: 1-800-4-CANCER (1-800-422-6237)

Web site: www.cancer.gov

The Testicular Cancer Resource Center

Web site: <http://tcrc.acor.org/>

**Inclusion on this list does not imply endorsement by the American Cancer Society.*

No matter who you are, we can help. Contact us anytime, day or night, for information and support. Call us at **1-800-227-2345** or visit www.cancer.org.

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For additional assistance please contact your American Cancer Society
1 · 800 · ACS-2345 or www.cancer.org