Testicular Cancer Overview

This overview is based on the more detailed information in our document *Testicular Cancer*. You can get this document and other information by calling 1-800-227-2345 or you can read it on our website at www.cancer.org.

What is cancer?

The body is made up of trillions of living cells. Normal body cells grow, divide into new cells, and die in an orderly way. During the early years of a person's life when they are growing, normal cells divide faster. 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 normal cells cannot do. Being able to grow out of control and invade other tissues is 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.

Sometimes cancer cells travel to other parts of the body. There they begin to grow and form new tumors. This process is called *metastasis*.

No matter where a cancer spreads, it is named (and treated) based on the place where it started. For instance, breast cancer that has spread to the liver is still breast cancer, not liver cancer. Likewise, prostate cancer that has spread to the bones is still prostate cancer, not bone cancer.

Different types of cancer can behave very differently. 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*. 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 but can occur at any age. This type of cancer can be treated successfully and very often cured.

The testicles

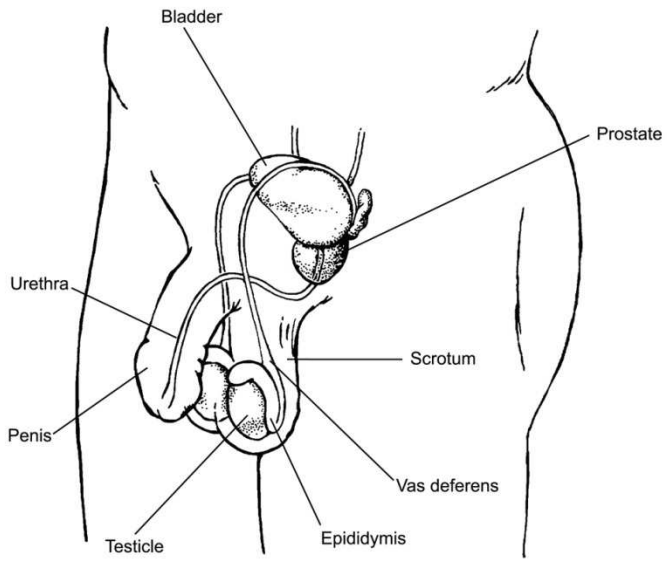
The testicles (or testes) are part of the male reproductive system. In adult men, each one is normally a little smaller than a golf ball. They are held in a sac of skin called the *scrotum*. The scrotum hangs beneath the base of the penis.

The testicles have 2 main functions:

- They make the male hormones such as testosterone.
- They make sperm, the male cells that combine with a female egg cell to start a pregnancy.

Once they're made in the testicles, the sperm cells are stored in the epididymis, a small coiled tube behind each testicle, where they mature.

During ejaculation, the sperm cells are carried from the epididymis through small tubes (the vas deferens) to the seminal vesicles. Here they mix with fluid from the vesicles and from the prostate and other glands to form semen. This fluid travels through a tube (the urethra) in the center of the penis and out of the body. See the picture below.



Testicles are made of several kinds of cells, each of which can develop into one or more types of cancer. It is important to know which kind of cell the cancer started from because each type of cancer is treated differently. They also differ in the chance of survival for the patient (prognosis).

Main types of testicular tumors

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. Germ cell tumors start in the cells that make sperm.

There are 2 main types of germ cell tumors in men, which occur about equally:

Seminomas: These tumors tend to grow and spread more slowly than most other testicular cancers. There are different types of seminomas. They usually develop in men between 25 and 45.

Non-seminomas: These tumors 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 types of non-seminomas:

- Embryonal carcinoma
- Yolk sac carcinoma
- Choriocarcinoma
- Teratoma

Most tumors are a mix of 2 or more of these different types. But all non-seminoma cancers are treated the same way.

Mixed germ cell tumors: These cancers have both seminoma and non-seminoma cells. They are treated as non-seminomas because they grow and spread like non-seminomas.

Carcinoma in situ: Testicular germ cell cancers may begin as a non-invasive form of the disease called *carcinoma in situ* (CIS). The cells don't look normal under the microscope, but they have not yet spread beyond the seminiferous tubules (where sperm cells are formed). Carcinoma in situ may not always go on to become invasive cancer.

Experts don't agree about the best treatment for CIS. Since CIS doesn't always become an invasive cancer, many doctors feel that observation (watching and waiting) is the best course of action.

Stromal tumors

These tumors start in the cells that make hormones and in the supportive tissues (the *stroma*) of the testicles. They make up less than 1 in 20 adult testicular tumors but up to 1 in 5 testicular tumors in boys. The 2 main types of stromal tumors are:

- Leydig cell tumors
- Sertoli cell tumors

Stromal cell tumors are often benign (not cancer). They usually do not spread beyond the testicle and can be cured by surgery. But a few stromal cell tumors spread to other parts of the body (metastasize). Tumors that have spread tend to have a poor outlook because they do not respond well to chemotherapy or radiation treatment.

Secondary testicular tumors

Tumors start in another organ and then spread to the testicle are called *secondary testicular tumors*. These are not true testicular cancers – they are named and treated based on where they started.

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 tends to be poor because very often these cancers have spread widely to other organs, too. Treatment depends on the type of cancer.

How many men get testicular cancer?

The American Cancer Society's estimates for testicular cancer in the United States for 2013 are:

- About 8,820 new cases of testicular cancer
- About 380 deaths from testicular cancer

The lifetime chance of having testicular cancer is about 1 in 270. This is largely a disease of young and middle-aged men, but about 6% of cases occur in children and teens.

Testicular cancer is one of the most curable forms of cancer. Because treatment is usually successful, the risk of dying from this cancer is very low: about 1 in 5,000. If you would like to know more about survival, see the section, "Survival rates for testicular cancer."

What are the risk factors for testicular cancer?

We don't know exactly what causes most cases of testicular cancer, but 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 changed. 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.

Even if someone 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 boys and men with testicular cancer do not have any known risk factors. Research is being done in this area.

Risk factors for testicular cancer

Undescended testicle (cryptorchidism): In about 3% of boys, one or both testicles do not move from the belly down into the scrotum before birth like they should. Most testicles will move down on their own in the child's first year. Sometimes surgery (called *orchiopexy*) is needed to bring the testicle down into the scrotum.

Men who have had cryptorchidism are more likely to get testicular cancer than those who did not have the problem. Most cancers start in the testicle that has not moved down, but about 1 out of 4 occurs in the normal testicle.

Family history: A family history of testicular cancer increases the risk. But very few men with testicular cancer have a family history of it.

HIV infection: Men infected with HIV (human immunodeficiency virus) seem to have an increased risk of testicular cancer. This may be especially true for men who have AIDS.

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.

Cancer of the other testicle: Men who have been cured of cancer in one testicle have an increased risk 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 more likely to get testicular cancer than other groups. The reason for this is not known.

Body size: Several studies have that the risk of testicular cancer is somewhat higher in tall men, but some 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 changed. 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.

We don’t know how much correcting an undescended testicle might affect cancer risk, but most experts agree that it should be done during childhood for other reasons, such as fertility and body image.

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 see their doctor. Most of the time a lump on the testicle is the first sign, or the testicle might be swollen or larger than normal. But some testicular cancers don’t cause symptoms until they reach an advanced stage.

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.

It is not clear if doing regular self-exams of the testicles lowers the death rate from this cancer. Because of this, the ACS does not does not have a recommendation about regular

testicular self-exams for all men. But some doctors may advise their patients to do self-exams every month, especially if they have certain risk factors that increase their chance of getting testicular cancer.

If you choose to examine your testicles routinely, you probably will become familiar with what is normal and what is different. Always report any changes to your doctor without delay. For more information, see our document *Do I Have Testicular Cancer?*

Signs and symptoms of testicular cancer

Many symptoms of testicular cancer are more likely to be caused by something else. But if a tumor is the cause, the sooner it is found, the sooner you can start treatment and the more effective it is likely to be.

Lump or swelling in the testicle

Most often, the first symptom of testicular cancer is a lump on the testicle, or a 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 do not. Some men with testicular cancer might also have a feeling of heaviness or aching in the lower belly or scrotum.

Breast growth or soreness

Rarely, some tumors can make hormones that can make the breasts grow or become sore.

Early signs of puberty in boys

Some tumors can make androgens (male sex hormones). This might not cause any symptoms in men, but in boys it can cause signs of early puberty, such as a deepening of the voice and the growth of facial and body hair.

Symptoms of advanced testicular cancer

Even when the cancer has spread to other organs, many men might not have symptoms right away. Some possible symptoms of testicular cancer spread can include:

- Lower back pain
- Shortness of breath
- Chest pain
- Cough, sometimes with blood

- Belly pain
- Headache

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. 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 to learn more about your 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 is often the first test done if the doctor thinks you might have testicular cancer. The test uses sound waves to make pictures of internal organs. The computer shows the picture on a screen. An ultrasound can help doctors tell if a lump (or mass) is solid or filled with fluid. If the lump is solid, it is more likely to be cancer.

This is a very easy test to have, 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, the skin on your scrotum 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 also be used to help tell which type of testicular cancer it might be, how much cancer is present, how well treatment is working, and whether the cancer has 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 lump because it might risk spreading the cancer and because the doctor can often get a good idea of whether it is cancer based on the ultrasound and blood tumor marker tests.

Instead, if the doctor sees a solid tumor on ultrasound, surgery will most likely be done to remove it as soon as possible. Surgeons try to remove the entire tumor, the testicle, and the spermatic cord. The spermatic cord, which includes part of the vas deferens, can act as a pathway for cancer cells to spread. For this reason, the cord is tied off early in the operation. Doctors usually operate through a cut (incision) just above the pubic area.

All of the tissue removed will be sent to the lab and looked at for cancer cells.

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 a suspicious area is seen, part of that area is removed and looked at for cancer cells 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 will use imaging tests on other parts of the body to see how advanced it is.

Imaging tests

Imaging tests create pictures of the inside of your body. Ultrasound of the testicles, described above, is a type of imaging test. Other imaging tests might be done after cancer is found to learn how far it has spread, to help show if treatment is working, or to check for signs of cancer coming back after treatment.

Chest x-ray: This is a plain x-ray of your chest to see if 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 if 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 might be asked to drink a liquid that contains a dye to help outline structures 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 have any allergies.

The CT scanner is like a large donut, with a narrow table that slides in and out of the middle opening. You will need to lie still on the table while the scan is being done. The test is painless, but you might find it hard to hold still for minutes at a time.

CT scans are sometimes used to guide a biopsy needle into a mass that might be cancer. You stay on the CT scanning table while the doctor moves the needle through the skin toward the mass. The needle removes a sample of tissue to be looked at under a microscope. This is not used to biopsy a lump in a testicle, but it 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 make 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 on a table that slides inside a narrow tube, which can upset some people. There are special, more open MRI machines that can help with this if needed. The machine makes buzzing and clicking noises, so some places have earplugs or headphones with music to block this out. You might also get a dye as you would for a CT scan, but this is done less often.

PET (positron emission tomography) scan: For a PET scan, a type of radioactive sugar is put into your vein. The sugar collects in cancer tissue, and a scanner can spot these areas. This test is 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.

Bone scan: This test can help show if cancer has spread to the bones. It might be done if a person is having symptoms like bone pain and other test results aren’t clear.

For this test, a small amount of a radioactive substance is put into your vein. The substance settles in areas of bone changes. You then lie on a table while a special scanner creates a picture of your skeleton.

Staging of testicular cancer

The stage of a cancer describes how far it has spread. Your treatment options and the outlook for your recovery depend on the stage of the cancer. The stage is based on the results of the surgery to diagnose the cancer, blood tests for tumor markers, and imaging tests, all of which are described in the section, “How is testicular cancer found?”

The stages of testicular cancer are labeled using Roman numerals I through III (1 to 3), sometimes followed by a letter. As a rule, the lower the number, the less the cancer has spread. A higher stage means a more advanced cancer.

If you have testicular cancer, ask your doctor or nurse to explain its stage in a way that you can understand. Knowing about the stage of your cancer can help you take a more active role in making decisions about your treatment.

Survival rates for testicular cancer

Some people with cancer want to know the survival rates for their type of cancer. Others might not find the numbers helpful, or might 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 an 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 (and many are cured).

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 2003 and 2009.

Testicular cancer is one of the most curable forms of cancer. If the cancer hasn't spread outside the testicle, the 5-year relative survival rate is 99%. Even if the cancer has grown into nearby structures or 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 74%.

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. Many other factors can affect a person's outlook, such as your age, the type of testicular cancer, and how well the cancer responds to treatment. Talk with your cancer care team if you have questions about your own chances of a cure, or how long you might survive. 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, a lot of progress has been made in treating testicular cancer. Surgery has improved, and doctors know more about the best way to use chemo and radiation to treat different types of testicular cancer.

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 health. Based on these and other factors, treatment options for testicular cancer can include:

- Surgery
- Radiation therapy
- Chemotherapy (chemo)
- High-dose chemotherapy and stem cell transplant

Sometimes, more than one of type of treatment might be used.

You might have different types of doctors on your treatment team, depending on your treatment. Many other specialists might be involved in your care as well. See *Health Professionals Associated With Cancer Care* for more on this.

It's important to discuss all of your treatment options as well as their possible side effects with your doctors to help decide what best fits your needs. (See the section "What are some questions I can ask my doctor about testicular cancer?")

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.

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

Surgery for testicular cancer

Surgery is most often the first treatment for testicular cancer.

Radical inguinal orchiectomy

All stages of testicular cancer are treated with this surgery. The testicle (or testicles) with cancer are taken out of the scrotum through a cut (incision) made just above the pubic area. The surgeon cuts through the spermatic cord that attaches the testicle to the belly (abdomen).

Retroperitoneal lymph node dissection (RPLND)

Depending on the type and stage of your cancer, some lymph nodes at the back of the belly (abdomen) may also be removed. This can be done at the same time as the orchiectomy or during a second operation. Not all patients with testicular cancer need to have lymph nodes removed, so it's important to discuss this with your doctor.

This is a complex and long operation. A large cut (incision) down the middle of the belly is often needed to remove the lymph nodes. It should be done by a surgeon who does this often.

In some cases, the surgeon can remove lymph nodes through very small cuts in the belly. A narrow lighted tube with a small video 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 this type of surgery has advantages — for example, the patient recovers much more quickly — doctors are not sure if it is as good as the standard operation. So if the removed lymph nodes have cancer cells, 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.

Possible risks and side effects of surgery

The short-term risks of surgery include problems with anesthesia, bleeding, blood clots, and infections. Most men have some pain after the operation, which can often be helped with pain medicines, if needed.

Effects of orchiectomy: Losing a testicle usually does not affect a man's ability to have sex. But if both testicles are removed, the man can't make sperm cells and becomes infertile. Also, without testicles, a man can't make enough testosterone, which can lower sex drive and the ability to have erections. Other effects could include feeling tired, hot flashes, and loss of muscle mass. These side effects can be avoided by taking testosterone, either in the form of a gel, a patch, or a shot.

Most men with testicular cancer are young, and they might be concerned about their appearance after the loss of a testicle. To restore a more natural look, a man can have a testicular implant filled with saline (salt water) put in his scrotum. When in place, it can look like a normal testicle.

Effects of RPLND: Surgery to remove the lymph nodes is a major operation. Serious problems are not common, but they can happen. Some patients have bowel problems or infections after surgery. The standard approach for an RPLND uses a large cut in the abdomen. This leaves a scar and can take some time to heal. This is less likely to be an issue if the surgery is done with a laparoscope, which uses smaller cuts.

This type of surgery does not affect a man's ability to have sex. But it might damage some of the nerves that control the release of semen, which can make it hard to father

children. Some surgeons do a type of lymph node surgery called *nerve-sparing surgery* that can often help with this. Men who might want to have children at some point 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 our document *Fertility and Men With Cancer* to find out more about this.

Radiation therapy for testicular cancer

This treatment uses high-energy rays 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 focused beams 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 beams 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.

Possible side effects

Radiation therapy can affect nearby healthy tissue along with the cancer cells.

Possible side effects include tiredness (fatigue), nausea, or loose bowels (diarrhea). It isn’t common, but some men get a skin reaction like sunburn. This slowly fades away. There is also a very small chance of a new cancer in the future. Radiation can also have some long-term effects, such as damage to nearby blood vessels or other organs and an increase the risk of getting a second cancer (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 on radiation therapy can be found in the Radiation section of our website, or in our document *Understanding Radiation Therapy: A Guide for Patients and Families*

Chemotherapy for testicular cancer

Chemotherapy (chemo) is the use of drugs to treat cancer. 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 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

The side effects of chemo 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
- Easy bruising or bleeding
- Tiredness

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. 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.

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. These can include:

- Kidney or bladder 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)

- Heart problems

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.

For more about chemo and its side effects, please see our document, *Understanding Chemotherapy: A Guide for Patients and Families*. If you'd like more information on a drug used in your treatment, see our Guide to Cancer Drugs, ask a member of your health care team, or call us with the names of the medicines you're taking.

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 lets doctors use higher doses of chemo. In this treatment, blood-forming cells called *stem cells* are taken out of the blood 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.

Today transplant is mostly used for testicular cancer that has come back after regular chemo. Studies are also looking to see if stem cell transplant may be useful as part of the first treatment for some people with advanced cancers.

A stem cell transplant is a complex and intense treatment. Be sure you understand the possible benefits and risks. If your doctors think you might be helped by a transplant, it should be done at a hospital where the staff is experienced doing stem cell transplants.

Stem cell transplants can cost a lot and often mean a long hospital stay. Before you decide on a transplant, it is important to find out what your health insurance will cover to get an idea of what you might have to pay.

To learn more about stem cell transplants see our document *Stem Cell Transplant (Peripheral Blood, Bone Marrow, and Cord Blood Transplants)*.

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 is deciding which treatment is best for you. You may have

heard about clinical trials 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.

Clinical trials are one way to get state-of-the art cancer treatment. Sometimes they may be the only way to get access to some newer treatments. They are also the only way for doctors to learn better methods to treat cancer. Still, they are not right for everyone.

If you would like to learn more about clinical trials that might be right for you, 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 website 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 website at www.cancer.gov/clinicaltrials.

You'll have to meet some requirements to take part in any clinical trial. But if you do qualify for a clinical trial, it is up to you whether or not to enter (enroll in) it.

You can get a lot more information on clinical trials in our document *Clinical Trials: What You Need to Know*. You can read it on our website or call our toll-free number (1-800-227-2345) to 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 websites may offer ideas to 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 along with regular treatment to help you feel

better. Some examples 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 might lose the chance to be helped by standard medical treatment. Delays or interruptions in your medical treatments could give cancer more time to grow and make it less likely that treatment will help.

Finding out more

It's 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. You can also read about them in the Complementary and Alternative Medicine section of our website.

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.

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. Ask any question, no matter how small it might seem. Here are some questions you might want to ask. Be sure to add your own 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. You can also find more information about communicating with your health care team in our document *Talking With Your Doctor*.

- Would you please write down the exact type of testicular cancer I have?
- Has my cancer spread beyond the testicle?
- What is my cancer's stage? What does this mean?
- 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? What do you recommend? Why?
- Do I need surgery to remove lymph nodes? 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 side effects should I expect?
- 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? Should I bank sperm?
- What are the chances of the cancer coming back after treatment?
- What will we do if this happens?
- Does one type of treatment reduce the risk of the cancer coming back more than another?
- Would a second opinion be helpful?
- What type of follow-up will I need after treatment?

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. (When cancer comes back, it is called a *recurrence*.) This is a very common concern for those who have had cancer.

It may take a while before 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. They may get regular 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

If you have finished treatment, 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 tumor markers to see if the cancer has come back. You might 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. As time goes on, these visits and tests will not have to be done as often.

Almost any cancer treatment can have side effects. Some may last for a few weeks to several months, but others can last the rest of your life. Be sure to tell your cancer care team about any symptoms or side effects that bother you so they can help you manage them.

Most of the time, if the cancer comes back, it does so in the first 2 years. Still, there is always an outside chance the cancer can come back later. Also, there is a small chance that you will develop a cancer in the other testicle.

Should your cancer come back, our document *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 us at 1-800-227-2345.Seeing a new doctor

At some point after your cancer diagnosis and treatment, you may find yourself seeing a new doctor who does not know anything about your medical history. It is important that you be able to give your new doctor the details of your diagnosis and treatment. Gathering these details soon after treatment may be easier than trying to get them at some point in the future. 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

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.

Fertility and hormone concerns with testicular cancer

Most boys and men get cancer in only one testicle. The other testicle usually can make enough testosterone (the male hormone) to keep you healthy. If the other testicle has to be removed because the cancer is in both testicles or if a new cancer develops, you will need to take testosterone the rest of your life. Most often this is in the form of a gel or patch that is put on 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 affect whether you can father children. (In some cases, if one testicle is left, fertility returns after the cancer has been treated.) Before treatment starts, men who might wish to father children should think about banking sperm for later use. But sometimes cancer can cause low sperm counts, which may make it hard to get a good sample.

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 a female partner is fertilized by your sperm cells in a lab and then returned to her uterus.

Fertility can also be an issue later in life for boys who have had testicular cancer. If a boy has already gone through puberty, sperm banking before treatment is often a good option, since the frozen samples can be stored for many years. Researchers are also looking at new ways to allow younger boys to someday father children.

Be sure to discuss any fertility concerns with your doctor before your treatment begins. For more information, see our document *Fertility and Men With Cancer*.

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. But 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 often 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's OK to rest when you need to. To learn more about fatigue, please see our documents, *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's 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 heart fitness.
- It makes your muscles stronger.
- It helps you have more energy.
- It can help lower anxiety and depression.
- It can make you feel 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.

Can I lower my risk of testicular cancer coming back?

Most people want to know if there are things they can do to lower their risk of cancer coming back. Unfortunately, for most cancers there isn't much research to guide people. This doesn't mean that nothing will help – it's just that for the most part this hasn't been well studied.

At this time, not enough is known about testicular cancer to say for sure if there are things you can do that will be helpful. Doing things like not smoking, eating well, being active, and staying at a healthy weight might help, but no one knows for sure. Still, these types of changes can have positive effects on your health that can extend beyond your risk of testicular cancer or other cancers.

How might having testicular cancer affect your emotional health?

During and after treatment, you may find you have many different emotions. 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 relationships with those around you. Men with testicular cancer are often younger and might have concerns about other issues as well, such as dating, having sex, or fathering children. 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 often 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 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 also read our document *Distress in People with Cancer* or see the Emotional Side Effects section of our website for more information.

If treatment for testicular cancer stops working

If cancer keeps growing or comes back after one kind of treatment, another treatment plan might still cure the cancer, or at least shrink it enough to help you live longer and feel better. But when a person has had many different treatments and the cancer has not been cured, even newer treatments might no longer be helpful. At this time you may have to weigh the possible benefits of trying 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 might offer you new options, 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, you should feel as good as possible. Make sure you are asking for and getting treatment for pain, nausea, or any other problems you have. This type of treatment is called *palliative care*. It helps relieve symptoms but is not meant to cure the cancer.

You can learn more about the changes that occur when treatment stops working, and about planning ahead for yourself and your family, in our documents *Advanced Cancer* and *Nearing the End of Life*.

At some point you may want to think about hospice care. Most of the time, this type of care 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 might 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 world. Each year, scientists find out more about what causes the disease, how to prevent it, and how to improve treatment.

Genetics

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.

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.

Treatment

Clinical trials have improved the way doctors treat these cancers. 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.

New drugs and new drug combinations are being tested for people with cancer that comes back. Doctors are looking at different doses and combinations of chemo drugs that reduce side effects but still work well to kill the cancer. Stem cell transplant is being studied as a way to help those who need high doses of chemo. 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

Here is more information you might find helpful. You also can order free copies of our documents from our toll-free number, 1-800-227-2345, or read them on our website, www.cancer.org.

Dealing with diagnosis and treatment

Health Professionals Associated With Cancer Care

Talking With Your Doctor (also in Spanish)

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

Nutrition for the Person With Cancer During Treatment: A Guide for Patients and Families (also in Spanish)

Coping With Cancer in Everyday Life (also in Spanish)

Distress in People With Cancer

Anxiety, Fear, and Depression

Family and caregiver concerns

Talking With Friends and Relatives About Your Cancer (also in Spanish)

Helping Children When a Family Member Has Cancer: Dealing With Diagnosis (also in Spanish)

What It Takes to Be a Caregiver

Insurance and financial issues

In Treatment: Financial Guidance for Cancer Survivors and Their Families (also in Spanish)

Health Insurance and Financial Assistance for the Cancer Patient (also in Spanish)

More on cancer treatments

Understanding Cancer Surgery: A Guide for Patients and Families (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)

Stem Cell Transplant (Peripheral Blood, Bone Marrow, and Cord Blood Transplants)

Clinical Trials: What You Need to Know

Cancer treatment side effects

Caring for the Patient With Cancer at Home: A Guide for Patients and Families (also in Spanish)

Nausea and Vomiting

Pain Control: A Guide for People With Cancer and Their Families (also in Spanish)

Anemia in People With Cancer

Fatigue in People With Cancer

Sexuality for the Man With Cancer (also in Spanish)

Fertility and Men With Cancer

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 websites*

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

LIVESTRONG
Toll-free number: 1-866-235-7205
Website: www.livestrong.org

> Provides support, care plans, and a Guidebook Planner to track the cancer journey. Fertile Hope is a national LIVESTRONG initiative dedicated to providing reproductive information, support, and hope to cancer patients and survivors, and can be found online at www.fertilehope.org

National Cancer Institute (NCI)
Toll-free number: 1-800-4-CANCER (1-800-422-6237)
Website: www.cancer.gov

> Offers a wide variety of free, accurate, up-to-date information about cancer to patients, their families, and the general public; also can help people find clinical trials in their area.

The Testicular Cancer Resource Center
Website: http://tcrc.acor.org/

> Has free information on testicular cancer, an email support group, and research opportunity updates

**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
1-800-227-2345 or www.cancer.org