The prognosis for most men with testicular cancer is very good. This form of cancer is treated successfully in more than 95 percent of cases. While a man’s risk of developing it is one in 300, his chance of dying from the disease is only approximately one in 5,000.

Cleveland Clinic testicular cancer specialists tailor treatment to their patients’ needs. This guide provides an overview of the testicular cancer treatment options offered at Cleveland Clinic.

**CHOOSING Your Testicular Cancer Care**

While you have many options for the treatment of your testicular cancer, you should consider the experience of the program when selecting where to seek care. Cleveland Clinic specialists in the Taussig Cancer Institute work with urologists in the Glickman Urological & Kidney Institute to explore all medical and surgical options to ensure that our testicular cancer treatment program will result in a successful outcome for each patient. Cleveland Clinic’s urology program has been named one of the top two in the nation for the past nine years in *U.S. News & World Report*. Cleveland Clinic’s cancer program is the highest rated in Ohio and in the top 10 in the country according to the same survey.

Please use this guide as a resource as you examine your treatment options. Remember, it is your right as a patient to ask questions, and to seek a second opinion.
What is Testicular Cancer?

Testicular cancer is a disease that occurs when cancerous (malignant) cells develop in the tissues of a testicle. The development of cancerous cells in both testicles can occur, but is very rare. Testicular cancer is possible at any age, but it is most commonly found in young men between the ages of 20 and 35. White men are five times more likely than black men to get testicular cancer, and three times more likely than Asian-Americans or Native Americans.

The testicles are male sex glands that produce sperm and the hormone testosterone. The testicles are two egg-shaped glands inside the scrotum, or sac of skin that lies below the penis. The most common symptoms of testicular cancer include a lump in the testis which may or may not be painful. More advanced but still curable cancers may present with swelling of the breast tissue or a mass in the abdomen or neck.

HOW IS TESTICULAR CANCER DIAGNOSED?

Testicular cancer is usually diagnosed after the man notices a lump or other change in a testicle. The diagnosis involves physical examination and ultrasound of the scrotum. Ultrasound is a painless medical test that helps the doctor look for problems that might be related to testicular cancer. Tests to help diagnose testicular cancer can include:

- A physical examination and history – A physical exam and medical history can help the doctor look for problems that might be related to testicular cancer.
- Ultrasound – This is a procedure that uses high-energy sound waves to form pictures of body tissues.
- A serum tumor marker test – This procedure examines a blood sample to measure the amounts of certain substances linked to specific types of cancers. These substances are called tumor markers. The tumor markers that may be elevated in testicular cancer are alpha-fetoprotein (AFP), human chorionic gonadotropin (HCG) or beta-HCG and lactate dehydrogenase (LDH).
- Inguinal orchiectomy and biopsy – This procedure involves the removal of the entire testicle through an incision in the groin. A tissue sample from the testicle is then checked for cancer cells.

CT scans and X-rays – A CT scan is a medical test that uses X-rays to form pictures of the inside of the body. When a cancer is diagnosed or suspected, a CT scan (also referred to as a CAT scan) is performed to see whether cancer can be seen elsewhere in the body. In testicular cancer, a CT scan is performed of the abdomen and pelvis. Images of the chest are taken using either a CT scan or a regular X-ray.

PET scans – A positron emission tomography (PET) scan is a unique type of imaging test that helps doctors see how the organs and tissues inside your body are actually functioning. A PET scan can measure such vital functions as blood flow, oxygen use and glucose metabolism, which helps doctors identify abnormal from normal functioning organs and tissues. PET scans are used for seminomas after chemotherapy.

Stages and Treatment of Testicular Cancer

Once testicular cancer is diagnosed, doctors will perform tests and surgery to learn more about the cancer. They will investigate the type of testicular cancer you have and check to see if it has spread. During this process, called staging, the doctors will determine the most appropriate treatment plan for you.

WHAT ARE THE TYPES OF TESTICULAR CANCER?

Nearly all testicular cancers start in the germ cells (those that become sperm or eggs). The main types of testicular germ cell tumors are seminomas and non-seminomas. Seminomas are often slow-growing and usually stay within the testicle. Non-seminomas tend to grow and spread faster. Seminomas are more sensitive to radiation, and both kinds are very sensitive to chemotherapy. If a testicular tumor has both seminoma and non-seminoma cells, it is treated as a non-seminoma.

Treatment is determined by the extent of disease, the type of testicular cancer and the patient’s preference, whenever possible.

HOW IS TESTICULAR CANCER TREATED?

The three main kinds of treatment for testicular cancer are:

- Surgical treatment – This treatment includes removing the testicle (inguinal orchiectomy) and sometimes removing associated lymph nodes (lymphadenectomy). Orchiectomy is performed for both seminoma and non-seminoma testicular cancers, whereas lymph node removal usually is used only for non-seminomas. Surgery may also be performed in certain situations to remove tumors from the lungs, liver or other organs if they have not disappeared following chemotherapy. Cleveland Clinic surgeons have extensive experience in nerve-sparing retroperitoneal lymphadenectomy (RPLND). This technique preserves ejaculatory function in virtually 100 percent of testicular cancer patients with low-stage disease and selected patients with more advanced stages or after chemotherapy.

CLINICAL TRIALS PROVIDE TREATMENT

Because of Tausig Cancer Institute’s extensive experience, patients with resistant testicular cancer often are referred to Cleveland Clinic oncologists. Some of these patients can be treated on phase I or phase II clinical trials.
Radiation therapy – This treatment uses high-dose X-rays. Radiation might be used after surgery for patients with seminomas to prevent the tumor from returning. Usually, radiation is limited to the treatment of seminomas.

Chemotherapy – This treatment uses drugs to kill cancer cells or stop them from dividing. Chemotherapy has improved the survival rate for people with both seminomas and non-seminomas. While chemotherapy drugs kill cancer cells, they also damage some normal cells, which leads to side effects. Side effects depend on the type of drugs used, the amount given and the length of treatment. Your physician will decide which chemotherapy agent is best for you after a careful discussion of the benefits and potential side effects these drugs may cause.

Surveillance – Sometimes called "watchful waiting," is used for low stage seminomas and non-seminomas.

TREATMENT BY STAGE

STAGE 0
Abnormal cells have developed but are still confined within the tubules where sperm cells start to develop. This also is called carcinoma in-situ or CIS.

Treatment
Low-dose radiation can sometimes be given to kill the cancer.

STAGE I
This stage is further broken down into stages IA, IB and IS.

In stage IA, the cancer is confined to the testicle and the epididymis, and all tumor marker levels are normal. The cancer has not spread to the outer layer of the membrane that surrounds the testicle and has not grown into the blood or lymph vessels.

In stage IB, at least one of the following applies: The cancer has invaded the blood vessels or lymphatics within the testicle; the cancer has spread to the outer layer of the membrane around the testicle; and/or the cancer has invaded the spermatic cord or the scrotum. In stage IB, all tumor marker levels are normal.

In stage IS, the cancer is anywhere within the testicle, spermatic cord or scrotum, and one or more of the tumor markers is elevated.

Treatment
Treatment includes surgery to remove the testicle. For stage I seminomas, the standard treatment is surveillance, or "watchful waiting." In some centers, radiation to the lymph nodes in the abdomen or chemotherpay may be offered. For non-seminomas, observation, surgery to remove lymph nodes in the abdomen, or occasionally chemotherapy is used.

Men who are undergoing surveillance must follow a strict schedule of blood tests, CT scans and other tests to ensure that the cancer has not returned. If it does, it usually is still curable.

STAGE II
This stage consists of stages IIA, IIB and IIC, and refers to patients whose cancer has spread to the lymph nodes in the back of the abdomen (this part of the body is referred to as the retroperitoneum) but not to anywhere else. If a patient with cancer in his lymph nodes has moderately or highly elevated tumor markers, he is stage III rather than stage II.

In stage IIA, the cancer has spread to a maximum of five lymph nodes in the abdomen. None of the lymph nodes is larger than 2 cm. Tumor markers must be normal.

In stage IIB, the cancer has spread to more than five nodes, none of which is larger than 5 cm, or the cancer has spread to five or fewer nodes and there is a lymph node mass measuring between 2 cm and 5 cm. Tumor markers may be either normal or mildly elevated.

In stage IIC, the cancer has spread to at least one lymph node in the abdomen that is larger than 5 cm in diameter. Tumor markers may be either normal or elevated.

Treatment
Seminoma tumors are divided into bulky and nonbulky disease. Bulky disease is generally defined as tumors greater than 5 cm. The treatment of stage II seminomas includes surgery to remove the testicle followed by radiation to the lymph nodes in the case of nonbulky disease. In cases of bulky disease, the treatment involves surgery to remove the testicle followed by chemotherapy.

The treatment of Stage II non-seminomas is similarly divided into bulky and nonbulky disease, but the cutoff is lower at 2 cm to 3 cm. For non-bulky disease, treatment is usually surgery to remove the testicle and lymph nodes in the abdomen, possibly followed by chemotherapy. For bulky disease, surgery is performed to remove the testicle followed by chemotherapy. After chemotherapy, surgery often is performed to remove any remaining enlarged lymph nodes in the back of the abdomen.

STAGE III
This stage is divided into stages IIA, IIB and stage IIC and is determined after an inguinal orchidectomy is performed.

In stage IIA, the cancer has spread to lymph nodes beyond the abdomen (such as lymph nodes in the chest) and/or to the lungs. Tumor markers must be normal or only mildly elevated.

In stage IIB, the cancer has moderately elevated tumor markers.

In stage IIC, either the cancer has spread to an organ other than the lungs (such as the liver, the bones or the brain) or the tumor markers are highly elevated and the cancer has spread to at least one lymph node or organ.
Treatment
The treatment for stage III disease is surgery to remove the testicle followed by multi-drug chemotherapy. Treatment is the same for stage III seminomas and non-seminomas, except that after chemotherapy, surgery is often performed to remove any residual tumors in non-seminomas. In seminomas, residual tumors usually do not require any additional treatment, as most patients are cured with this approach.

Relapsed or Recurrent Cancer
If the cancer is a recurrence of a previous testicular cancer, the treatment usually consists of chemotherapy, occasionally followed by a bone marrow or stem cell transplant. Recurrences occurring more than two years after initial treatment are usually treated surgically.

Can I Become a Father After Testicular Cancer?
Thinking about your future family may not be top of mind when you are diagnosed with testicular cancer. But Cleveland Clinic fertility experts say it’s important to be educated about your options before undergoing treatment. With proper planning, most men can remain fertile, and sperm banking before treatment begins provides an insurance plan for those in whom the ability to make sperm may be destroyed.

Once testicular cancer is diagnosed, doctors will remove the cancerous testicle. The other testicle, however, usually remains healthy and is often able to produce enough sperm to father a child. Radiation and chemotherapy are threats to a man’s fertility, but there are several steps your doctor can take to preserve fertility. For example, doctors can adjust doses of radiation and use special devices to shield the healthy testicle. Even when treatment includes chemotherapy, fertility problems afterward.

When treatment requires removal of the lymph nodes from the back of the abdomen, nerves responsible for ejaculation can be severed. Cleveland Clinic offers nerve-sparing retroperitoneal lymph node dissection, a delicate procedure that allows doctors to operate around the nerves. As many as 95 percent of men who undergo this nerve-sparing procedure report no problems afterward.

SPERM BANKING
Sperm banking involves harvesting and freezing sperm for later use. Frozen sperm can last for decades. Given the fact that testicular cancer peaks in men ages 18 to 40, sperm banking can save emotional distress later, when becoming a father may seem more important. When the time is right, your partner can undergo artificial insemination to conceive a child.
Contacting Cleveland Clinic

Still have questions? Call our Cancer Answer Line.

We are here to help you get the cancer information you need. Please contact Cleveland Clinic Cancer Answer Line at 216.444.7923 or toll-free at 866.223.8100. Two oncology clinical nurse specialists and their staff provide information and answer questions about cancer. The Cancer Answer Line operates from 8:30 a.m. to 4:30 p.m., Monday-Friday.

Ready to schedule an appointment with a specialist? If you would like to set up a consultation with a Cleveland Clinic specialist, please call the Cancer Answer Line at 216.444.7923 or toll-free at 866.223.8100.

Making Your Care Easier

Patient Resource Center

If your care brings you to Cleveland Clinic Taussig Cancer Institute, please visit the Patient Resource Center in the northeast corner of the building. It is a place for patients, their friends and families to come for cancer information. The Patient Resource Center is open from 8 a.m. to 5 p.m., Monday-Friday.

Medical Concierge

If you are traveling from out of state and need any assistance, call the complimentary Medical Concierge at 800.223.2273, ext. 55580, or email medicalconcierge@ccf.org.

Global Patient Services

Complimentary assistance for national and international patients and families is available at 001.216.444.8184, or visit clevelandclinic.org/gps.

MyChart

This secure online tool connects patients to their own health information from the privacy of their home anytime, day or night. Some features include renewing prescriptions, reviewing test results and viewing medications, all online. For the convenience of physicians and patients across the country, MyChart now offers a secure connection to Google™ Health. Google Health users can securely share personal health information with Cleveland Clinic, and record and share the details of their Cleveland Clinic treatment with the physicians and healthcare providers of their choice. To establish a MyChart account, visit clevelandclinic.org/mychart.

Testicular Cancer Specialists

Anthony Avalone, MD  Glickman Urological & Kidney Institute  Fairview Hospital, Westlake Family Health Center

Ryan Berglund, MD  Glickman Urological & Kidney Institute  Cleveland Clinic Main Campus, Hillcrest Hospital, Willoughby Hills Family Health Center

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Robert Dreicer, MD  Chairman, Department of Solid Tumor Oncology  Taussig Cancer Institute  Cleveland Clinic Main Campus

Jorge Garcia, MD  Taussig Cancer Institute  Cleveland Clinic Main Campus

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Gaurang Shah, MD  Glickman Urological & Kidney Institute  Marymount Hospital, Westlake Family Health Center

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Kevin Stephans, MD  Taussig Cancer Institute  Cleveland Clinic Main Campus

Andrew J. Stephenson, MD  Glickman Urological & Kidney Institute  Cleveland Clinic Main Campus

Rahul Tendulkar, MD  Taussig Cancer Institute  Cleveland Clinic Main Campus

Fertility Specialist

Edmund Sabanegh, MD  Chairman, Department of Urology  Glickman Urological & Kidney Institute  Cleveland Clinic Main Campus

For more information about our staff, including complete profiles, visit clevelandclinic.org/staff.
# Locations

<table>
<thead>
<tr>
<th>Location</th>
<th>Address</th>
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<tbody>
<tr>
<td>Taussig Cancer Institute</td>
<td>Cleveland Clinic (Main Campus) 9500 Euclid Ave. / R35 Cleveland, OH 44195</td>
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<tr>
<td>Glickman Urological &amp; Kidney Institute</td>
<td>Cleveland Clinic (Main Campus) 9500 Euclid Ave. / Q1-1 Cleveland, OH 44195</td>
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<tr>
<td>Cleveland Clinic Florida</td>
<td>2950 Cleveland Clinic Blvd. Weston, FL 33331</td>
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<tr>
<td>Avon Lake</td>
<td>Family Health Center 36901 American Way Avon, OH 44011</td>
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<tr>
<td>Beachwood</td>
<td>Family Health &amp; Surgery Center 26900 Cedar Road Beachwood, OH 44122</td>
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<tr>
<td>Euclid Hospital</td>
<td>18901 Lake Shore Blvd. Euclid, OH 44119</td>
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<td>Fairview Hospital</td>
<td>18101 Lorain Ave. Cleveland, OH 44111</td>
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<td>Hillcrest Hospital</td>
<td>6770 Mayfield Road Mayfield Heights, OH 44124</td>
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<td>Huron Hospital</td>
<td>13951 Terrace Road East Cleveland, OH 44112</td>
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<td>Independence Cancer Center</td>
<td>6100 West Creek Road Independence, OH 44131</td>
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<tr>
<td>Lakewood Hospital</td>
<td>14701 Detroit Ave. Lakewood, OH 44107</td>
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<tr>
<td>Lorain Family Health &amp; Surgery Center</td>
<td>5700 Cooper Foster Park Road Lorain, OH 44035</td>
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<tr>
<td>Lutheran Hospital</td>
<td>1730 West 25th Street Cleveland, OH 44113</td>
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<tr>
<td>Marymount Hospital</td>
<td>12300 McCracken Road Garfield Heights, OH 44125</td>
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<tr>
<td>Medina Hospital</td>
<td>1000 East Washington Street Medina, OH 44256</td>
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<tr>
<td>Parma Cancer Center</td>
<td>6525 Powers Blvd. Parma, OH 44129</td>
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<tr>
<td>South Pointe Hospital</td>
<td>20000 Harvard Road Warrensville Heights, OH 44136</td>
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<tr>
<td>Twinsburg Medical Offices</td>
<td>2365 Edison Blvd. Twinsburg, OH 44087</td>
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<tr>
<td>Westlake Family Health Center</td>
<td>30033 Clemens Road Westlake, OH 44145</td>
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<tr>
<td>Willoughby Hills Family Health Center</td>
<td>2570 SOM Center Road Willoughby Hills, OH 44094</td>
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<tr>
<td>Wooster Specialty Center</td>
<td>721 East Milltown Road Wooster, OH 44691</td>
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