



Bladder Cancer

What is cancer?

The body is made up of trillions of living cells. Normal body cells grow, divide to make new cells, 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 or dying cells or to repair injuries.

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 out-of-control growth of abnormal cells.

Cancer cell growth is different from normal cell growth. Instead of dying, cancer cells continue to grow and form new, abnormal cells. In most cases the cancer cells form a tumor. Cancer cells can also invade (grow into) other tissues, something that normal cells cannot do. Growing out of control and invading other tissues are what makes a cell a cancer cell.

Cells become cancer cells because of damage to DNA. DNA is in every cell and directs all its actions. In a normal cell, when DNA is damaged the cell either repairs the damage or the cell dies. In cancer cells, the damaged DNA is not repaired, but the cell doesn't die like it should. Instead, this cell goes on making new cells that the body does not need. These new cells will all have the same damaged DNA as the first abnormal cell does.

People can inherit damaged DNA, but most often the DNA damage is caused by mistakes that happen while the normal cell is reproducing or by something in our environment. Sometimes the cause of the DNA damage is something obvious, like cigarette smoking. But often no clear cause is found.

Cancer cells often travel to other parts of the body, where they begin to grow and form new tumors that replace normal tissue. This process is called *metastasis*. It happens when the cancer cells get into the bloodstream or lymph vessels of our body.

No matter where a cancer may spread, it is named (and treated) based on the place where it started. For example, 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 particular 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 (invade) other tissues. Because they can't invade, they also can't spread to other parts of the body (metastasize). These tumors are almost never life threatening.

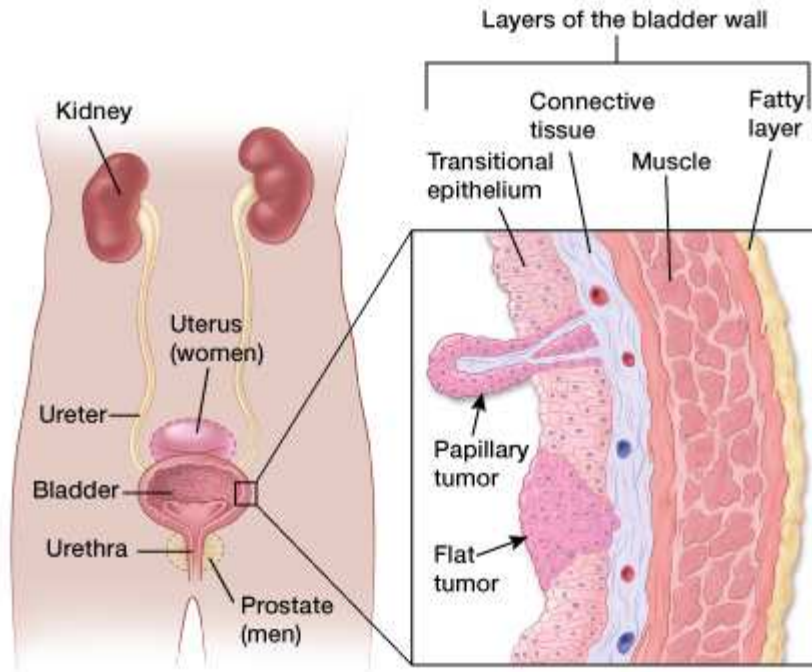
What is bladder cancer?

To understand bladder cancer, it helps to know about the normal structure and function of the bladder.

The normal bladder

The bladder is a hollow organ in the pelvis with flexible, muscular walls. Its main function is to store urine before it leaves the body. The average adult bladder holds about 2 cups of urine. Urine is made by the kidneys and is then carried to the bladder through tubes called *ureters*.

When you urinate, the muscles in the bladder contract, and urine is forced out of the bladder through a tube called the *urethra*. In women, the urethra is very short and opens just in front of the vagina. In men, the urethra is longer. It passes through the prostate gland and the penis, and opens at the tip of the penis.



The wall of the bladder has 4 main layers.

- The innermost lining is made up of cells called *urothelial* or *transitional* cells, so this layer is called the *urothelium* or *transitional epithelium*.
- Beneath the urothelium is a thin layer of connective tissue, blood vessels, and nerves, which is called the *lamina propria*.
- Next is a thick layer of muscle called the *muscularis propria*.
- Outside of this muscle, a layer of fatty connective tissue separates the bladder from other nearby organs.

Knowing about these layers is important in understanding how bladder cancer grows. Most bladder cancers start in the urothelium. As the cancer grows into or through the other layers in the bladder, it becomes more advanced (see “How is bladder cancer staged?”) and harder to treat.

Types of bladder cancer

Bladder cancers are divided into several types based how their cells look under a microscope. Different types can respond differently to treatments.

Transitional cell (urothelial) carcinoma

This is by far the most common type of bladder cancer. More than 9 out of 10 bladder cancers are this type. The cells from transitional cell carcinomas (TCCs) look like the urothelial cells that line the inside of the bladder.

Urothelial cells also line other parts of the urinary tract, such as the lining of the kidneys (called the *renal pelvis*), the ureters, and the urethra, so TCCs can also occur in these places. In fact, patients with bladder cancer sometimes have other tumors in the lining of the kidneys, ureters, or urethra. If someone has a cancer in one part of their urinary system, the entire urinary tract needs to be checked for tumors.

Bladder cancers are often described based on how far they have invaded into the wall of the bladder:

- **Non-invasive** bladder cancers are still in the inner layer of cells (the transitional epithelium) but have not grown into the deeper layers.
- **Invasive** cancers grow into the lamina propria or even deeper into the muscle layer. Invasive cancers are more likely to spread and are harder to treat.

A bladder cancer can also be described as *superficial* or *non-muscle invasive*. These terms include both non-invasive tumors as well as any invasive tumors that have not grown into the main muscle layer of the bladder.

Transitional cell carcinomas are also divided into 2 subtypes, papillary and flat, based on how they grow (see image above).

- **Papillary carcinomas** grow in slender, finger-like projections from the inner surface of the bladder toward the hollow center. Papillary tumors often grow toward the center of the bladder without growing into the deeper bladder layers. These tumors are called *non-invasive papillary cancers*. Very low-grade, non-invasive papillary cancer is sometimes called *papillary neoplasm of low-malignant potential* and tends to have a very good outcome.
- **Flat carcinomas** do not grow toward the hollow part of the bladder at all. If a flat tumor is only in the inner layer of bladder cells, it is known as a *non-invasive flat carcinoma* or a *flat carcinoma in situ (CIS)*.

If either a papillary or flat tumor grows into deeper layers of the bladder, it is called an *invasive transitional cell (or urothelial) carcinoma*.

Other cancers that start in the bladder

Several other types of cancer can start in the bladder, but these are all much less common than transitional cell (urothelial) cancer.

Squamous cell carcinoma: In the United States, only about 1% to 2% of bladder cancers are squamous cell carcinomas. Under a microscope, the cells look much like the flat cells that are found on the surface of the skin. Nearly all squamous cell carcinomas are invasive.

Adenocarcinoma: Only about 1% of bladder cancers are adenocarcinomas. The cancer cells have a lot in common with gland-forming cells of colon cancers. Nearly all adenocarcinomas of the bladder are invasive.

Small cell carcinoma: Less than 1% of bladder cancers are small-cell carcinomas, which start in nerve-like cells called neuroendocrine cells. These cancers often grow quickly and typically need to be treated with chemotherapy like that used for small cell carcinoma of the lung.

Sarcoma: Sarcomas start in the muscle cells of the bladder, but they are rare. More information about sarcomas can be found in our documents *Sarcoma - Adult Soft Tissue Cancer* and *Rhabdomyosarcoma*.

These less common types of bladder cancer (other than sarcoma) are treated similar to transitional cell cancers, especially for early stage tumors, but different drugs may be needed if chemotherapy is required.

The rest of this document focuses on transitional cell (urothelial) cancers of the bladder.

What are the key statistics about bladder cancer?

The American Cancer Society's estimates for bladder cancer in the United States for 2015 are:

- About 74,000 new cases of bladder cancer diagnosed (about 56,320 in men and 17,680 in women).
- About 16,000 deaths from bladder cancer (about 11,510 in men and 4,490 in women).

The rates of new cancers and of cancer deaths and have been dropping slightly in women in recent years. In men, incidence rates have been decreasing and death rates have been stable. More than 500,000 people in the United States are bladder cancer survivors.

Bladder cancer occurs mainly in older people. About 9 out of 10 people with this cancer are over the age of 55. The average age at the time of diagnosis is 73.

Men are about 3 to 4 times more likely to get bladder cancer during their lifetime than women. Overall, the chance men will develop this cancer during their life is about 1 in 26. For women, the chance is about 1 in 90. (See the next section for risk factors that can affect these chances.) Bladder cancer is the fourth most common cancer in men.

Whites are diagnosed with bladder cancer almost twice as often as blacks.

In about half of all cases, patients are first diagnosed with bladder cancer while it is still confined to the inner layer of the bladder (non-invasive or in situ cancer). About 35% have bladder cancer that has invaded into deeper layers but is still contained in the bladder. In most of the remaining cases, the cancer has spread to nearby tissues outside the bladder. Rarely (in about 4% of cases), it has spread to distant sites. Black patients are slightly more likely to have more advanced disease when they are diagnosed, compared to whites.

Survival rates for bladder cancer are discussed in the section “Survival rates for bladder cancer by stage.”

What are the risk factors for bladder cancer?

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

But having a risk factor, or even several, does not mean that you will get the disease. Many people with risk factors never develop bladder cancer, while others with this disease may have few or no known risk factors.

Still, it is important to know about the risk factors for bladder cancer because there may be things you can do that might lower your risk of getting it. If you are at higher risk because of certain factors, you might be helped by tests that could find it early, when treatment is most likely to be effective.

Several risk factors make a person more likely to develop bladder cancer.

Smoking

Smoking is the most important risk factor for bladder cancer. Smokers are at least 3 times as likely to get bladder cancer as nonsmokers. Smoking causes about half of the bladder cancers in both men and women.

When smokers inhale, some of the carcinogens (cancer-causing chemicals) in tobacco smoke are absorbed from the lungs and get into the blood. From the blood, they are filtered by the kidneys and concentrated in the urine. These chemicals in urine can damage the cells that line the inside of the bladder, which increases the chance of cancer developing. If you or someone you know smokes and would like help quitting, please see our online *Guide to Quitting Smoking*, or call us at 1-800-227-2345 for a copy and more information.

Workplace exposures

Certain industrial chemicals have been linked with bladder cancer. Chemicals called *aromatic amines*, such as benzidine and beta-naphthylamine, which are sometimes used in the dye industry, can cause bladder cancer.

Workers in other industries that use certain organic chemicals also may be at risk for bladder cancer if exposure is not limited by good workplace safety practices. The industries carrying highest risks include the makers of rubber, leather, textiles, and paint products as well as printing companies. Other workers with an increased risk of developing bladder cancer include painters, machinists, printers, hairdressers (likely because of heavy exposure to hair dyes), and truck drivers (likely because of exposure to diesel fumes).

Cigarette smoking and workplace exposures can act together to cause bladder cancer. Smokers who work with the cancer-causing chemicals noted above have an especially high risk of developing bladder cancer.

Race and ethnicity

Whites are about twice as likely to develop bladder cancer as African Americans. Hispanics, Asian Americans, and American Indians have slightly lower rates of bladder cancer. The reasons for these differences are not well understood.

Age

The risk of bladder cancer increases with age. About 9 out of 10 people with bladder cancer are older than 55.

Gender

Bladder cancer is much more common in men than in women.

Chronic bladder irritation and infections

Urinary infections, kidney and bladder stones, bladder catheters left in place a long time, and other causes of chronic bladder irritation have been linked with bladder cancer (especially squamous cell carcinoma of the bladder), but it is not clear if they actually cause bladder cancer.

Schistosomiasis (also known as *bilharziasis*), an infection with a parasitic worm called *Schistosoma hematobium* that can get into the bladder, is also a risk factor for bladder cancer. In countries where this parasite is common (mainly in Africa and the Middle East), squamous cell cancers of the bladder are seen much more often. This is an extremely rare cause of bladder cancer in the United States.

Personal history of bladder or other urothelial cancer

Urothelial carcinomas can form in many areas in the bladder as well as in the lining of the kidney, the ureters, and urethra. Having a cancer in the lining of any part of the urinary tract puts you at higher risk of having another tumor. The tumor can form in the same area as before, or in another part of the urothelium (lining). This is true even when the first tumor is removed completely. For this reason, people who have had bladder cancer need close, routine medical follow-up.

Bladder birth defects

Before birth, there is a connection between the belly button and the bladder. This connection, called the *urachus*, normally goes away before birth. If part of this connection remains after birth, it could become cancerous. Cancers that start in the urachus are usually *adenocarcinomas*, which are made up of malignant gland cells. About one-third of the adenocarcinomas of the bladder start here. However, this is still rare, accounting for less than a half of 1% of all bladder cancers.

Another rare birth defect called *exstrophy* greatly increases a person's risk of developing bladder cancer. In bladder exstrophy, both the bladder and the abdominal wall in front of the bladder fail to close completely during development and are fused together. This leaves the inner lining of the bladder exposed outside the body. Surgery soon after birth can close the bladder and abdominal wall (and repair other related defects), but people who have this still have a higher risk for urinary infections and bladder cancer.

Genetics and family history

People who have family members with bladder cancer have an increased risk of getting it themselves. In some cases, these family members may all be exposed to the same cancer-causing chemical. They may also share changes in some genes (like *GST* and *NAT*) that cause their bodies to be slow to break down certain toxins, which can make them more likely to develop bladder cancer.

A small number of people inherit a gene syndrome that increases their risk for bladder cancer. For example:

- A mutation of the retinoblastoma (*RBI*) gene can cause cancer of the eye in infants, and also increases the risk of bladder cancer.
- Cowden disease, caused by mutations in a gene called *PTEN*, is linked mainly to cancers of the breast and thyroid. People with this disease also have a higher risk of bladder cancer.

- Lynch syndrome (also known as hereditary non-polyposis colorectal cancer, or HNPCC) is linked mainly to colon and endometrial cancer. People with this syndrome also have an increased risk of bladder cancer, as well as cancer of the ureters.

For information on being tested for inherited genetic changes that increase cancer risk, see our online document *Genetic Testing: What You Need to Know*, or call us for a free copy.

Chemotherapy and radiation therapy

Long-term use of the chemotherapy drug cyclophosphamide (Cytoxan) can irritate the bladder and increase the risk of bladder cancer. People taking this drug are often told to drink plenty of fluids to help protect the bladder from irritation and decrease the risk of bladder cancer.

People who are treated with radiation to the pelvis are more likely to develop bladder cancer.

Certain medicines or herbal supplements

According to the US Food and Drug Administration (FDA), use of the diabetes medicine pioglitazone (Actos) for more than one year may be linked with an increased risk of bladder cancer.

Dietary supplements containing aristolochic acid (mainly in herbs from the *Aristolochia* family) have been linked with an increased risk of urothelial cancers, including bladder cancer.

Arsenic in drinking water

Arsenic in drinking water has been linked with an increased risk of bladder cancer in some parts of the world. The chance of being exposed to arsenic depends on where you live and whether you get your water from a well or from a public water system that meets the standards for arsenic content. For most Americans, drinking water is not a major source of arsenic.

Low fluid consumption

Not drinking enough fluids may increase the risk of bladder cancer. People who drink a lot of fluids each day have a lower rate of bladder cancer. This is thought to be because they empty their bladders often. By doing this, they keep chemicals from lingering in their bodies.

Do we know what causes bladder cancer?

We do not know exactly what causes most bladder cancers. But researchers have found some risk factors (see the section “What are the risk factors for bladder cancer?”) and are starting to understand how they cause cells in the bladder to become cancerous.

Certain changes in the DNA inside normal bladder cells can make them grow abnormally and form cancers. DNA is the chemical in each of our cells that makes up our *genes* – the instructions for how our cells function. We usually look like our parents because they are the source of our DNA, but DNA affects more than just how we look.

Some genes control when cells grow, divide into new cells, and die. Genes that help cells grow, divide, and stay alive are called *oncogenes*. Genes that slow down cell division or cause cells to die at the right time are called *tumor suppressor genes*. Cancers can be caused by DNA changes that turn on oncogenes or turn off tumor suppressor genes. Several different gene changes are usually needed for a cell to become cancerous.

Some people inherit DNA changes (mutations) from their parents that increase their risk for developing certain cancers. But bladder cancer does not often run in families, and inherited gene mutations are not thought to be a major cause of this disease.

DNA changes related to bladder cancer usually develop during a person’s life rather than having been inherited before birth. Some of these *acquired* DNA mutations result from exposure to cancer-causing chemicals or radiation. For example, chemicals in tobacco smoke can be absorbed into the blood, filtered by the kidneys, and end up in the urine, where they can affect bladder cells. Other chemicals may reach the bladder in a similar way. But in some cases, gene changes may just be random events that sometimes happen inside a cell, without having an outside cause.

The gene changes that lead to bladder cancer are not the same in all cases. Acquired changes in certain genes, such as the *TP53* or *RB1* tumor suppressor genes and the *FGFR* and *RAS* oncogenes, are thought to be important in the development of some bladder cancers. Changes in these and similar genes may also make some bladder cancers more likely to grow and invade the bladder wall than others. Research in this field is aimed at developing tests that can find bladder cancers at an early stage by finding their DNA changes.

Bladder cancers are not usually caused by inherited mutations in oncogenes or tumor suppressor genes, but some people seem to inherit a reduced ability to detoxify (break down) and get rid of certain types of cancer-causing chemicals. These people are more sensitive to the cancer-causing effects of tobacco smoke and certain industrial chemicals. Researchers are developing tests to identify such people, but these tests are not routinely done. It is not certain how these test results would be used since doctors recommend that all people avoid tobacco smoke and hazardous industrial chemicals.

Can bladder cancer be prevented?

There is no sure way to prevent bladder cancer, but there may be things you can do that could lower your risk.

Don't smoke

Smoking is believed to cause about half of bladder cancer cases among men and women. If you are thinking about quitting smoking and need help, call the American Cancer Society for information and support at 1-800-227-2345.

Limit exposure to certain chemicals in the workplace

If you work with a class of chemicals called *aromatic amines*, be sure to follow good work safety practices. Industries where these chemicals are commonly used include the makers of rubber, leather, printing materials, textiles, and paint products.

Aromatic amines are also found in many hair dyes, so it is important for hairdressers and barbers who are exposed to these products regularly to use them safely. (Most studies have not found that personal use of hair dyes increases bladder cancer risk.) For more information, see our document *Hair Dyes*.

Drink plenty of liquids

There is some evidence that drinking a lot of fluids – mainly water – might lower a person's risk of bladder cancer.

Eat lots of fruits and vegetables

Some studies have suggested that a diet high in fruits and vegetables might help protect against bladder cancer, but other studies have not found this. Still, eating such a diet has been shown to have many health benefits, including lowering the risk of several other types of cancer.

Can bladder cancer be found early?

Bladder cancer can sometimes be found early. Finding it early improves your chances that it can be treated successfully.

Screening

Screening tests or exams are used to look for a disease in people who have no symptoms (and who have not had that disease before). No major professional organizations recommend routine screening of the general public for bladder cancer at this time. This is because no screening test has been shown to lower the risk of dying from bladder cancer in people who are at average risk.

Some doctors may recommend bladder cancer screening for people at very high risk. This includes people who were previously diagnosed with bladder cancer or had certain birth defects of the bladder. People with a lot of work-related exposure to certain chemicals might also be screened.

Tests that might be used to screen for bladder cancer

Screening tests for bladder cancer look for different substances or cancer cells in the urine.

Urinalysis: One way to test for bladder cancer is to check for blood in the urine (called *hematuria*). This can be done during a urinalysis, which is a simple test to check for blood and other substances in the urine. This test is sometimes done as a routine part of a general health checkup.

Blood in the urine is usually caused by benign (non-cancerous) conditions such as infections, but it also can be the first sign of bladder cancer. Large amounts of blood in the urine can be seen if the urine turns pink or red, but a urinalysis is needed to find small amounts.

Urinalysis can help find some bladder cancers early, but it has not been shown to be useful as a routine screening test.

Urine cytology: In this test, the doctor looks for bladder cancer by examining urine under a microscope for cancer cells. Urine cytology does find some cancers, but it is not reliable enough to make a good screening test.

Urine tests for tumor markers: Several newer tests look for substances in the urine that might indicate bladder cancer:

- UroVysion™: This test looks for chromosome changes that are often seen in bladder cancer cells.
- BTA tests: These tests look for a substance called *bladder tumor-associated antigen* (BTA) in the urine.
- Immunocyt™: This test looks at cells in the urine for the presence of substances such as mucin and carcinoembryonic antigen (CEA), which are often found on cancer cells.
- NMP22 BladderChek®: This test looks for a protein called *NMP22* in the urine, which is often found at higher levels in people who have bladder cancer.

These tests might find some bladder cancers early, but they can miss some cancers as well. In other cases, the test result may be abnormal even in some people who do not have cancer. At this time the tests are used mainly to look for bladder cancer in people who already have signs or symptoms of cancer, or in patients who have had a bladder cancer removed to check for cancer recurrence. Further research is needed before they are proven useful as screening tests.

Watching for possible symptoms of bladder cancer

No screening tests are recommended for people at average risk, but bladder cancer can often be found early because it causes blood in the urine or other urinary symptoms (see “Signs and symptoms of bladder cancer”). Many of these symptoms often have less serious causes, but it’s important to have them checked by a doctor right away so the cause can be found and treated, if needed. If the symptoms are caused by bladder cancer, finding it early offers the best chance for successful treatment.

Signs and symptoms of bladder cancer

Bladder cancer can often be found early because it causes blood in the urine or other urinary symptoms.

Blood in the urine

In most cases, blood in the urine (called *hematuria*) is the first warning sign of bladder cancer. Sometimes, there is enough blood to change the color of the urine. Depending on the amount of blood, the urine may be orange, pink, or, less often, darker red. Sometimes, the color of the urine is normal but small amounts of blood are found when a urine test (urinalysis) is done because of other symptoms or as part of a general medical checkup.

Blood may be present one day and absent the next, with the urine remaining clear for weeks or months. If a person has bladder cancer, blood eventually reappears. Usually, the early stages of bladder cancer cause bleeding but little or no pain or other symptoms.

Blood in the urine does not always mean you have bladder cancer. More often it is caused by other things like an infection, benign (non-cancerous) tumors, stones in the kidney or bladder, or other benign kidney diseases. But it is important to have it checked by a doctor so the cause can be found.

Changes in bladder habits or symptoms of irritation

Bladder cancer can sometimes cause changes in urination, such as:

- Having to urinate more often than usual

- Pain or burning during urination
- Feeling as if you need to go right away, even when the bladder is not full

These symptoms are also more likely to be caused by a benign condition such as infection, bladder stones, an overactive bladder, or an enlarged prostate (in men). Still, it is important to have them checked by a doctor so that the cause can be found and treated, if needed.

Symptoms of advanced bladder cancer

Bladder cancers that have grown large enough or have spread to other parts of the body can sometimes cause other symptoms, such as:

- Being unable to urinate
- Lower back pain on one side
- Loss of appetite and weight loss
- Swelling in the feet
- Bone pain

If there is a reason to suspect you might have bladder cancer, the doctor will use one or more exams or tests to find out if it is cancer or something else.

How is bladder cancer diagnosed?

Bladder cancer is often found because of signs or symptoms a person is having, or it might be found because of lab tests a person is getting for another reason. If bladder cancer is suspected, exams and tests will be needed to confirm the diagnosis. If cancer is found, further tests will be done to help determine the extent (stage) of the cancer.

Medical history and physical exam

If you have any signs or symptoms that suggest you might have bladder cancer, your doctor will want to take a complete medical history to check for risk factors and to learn more about your symptoms.

A physical exam provides other information about possible signs of bladder cancer and other health problems. The doctor might examine the rectum and vagina (in women) to feel for a bladder tumor, determine its size, and to see if and how far it has spread.

If the results of the exam are abnormal, your doctor will probably do lab tests such as a urinalysis (see “Can bladder cancer be found early?”) and might refer you to a urologist (a

doctor specializing in diseases of the urinary system and male reproductive system) for further tests and treatment.

Cystoscopy

If bladder cancer is suspected, doctors will recommend a cystoscopy. For this exam, a urologist places a cystoscope – a slender tube with a light and a lens or a small video camera on the end – through the opening of the urethra and advances it into the bladder. Sterile salt water is then injected through the scope to expand the bladder and allow the doctor to look at the inner lining of the bladder.

Cystoscopy can be done in a doctor's office or in an operating room. Usually the first cystoscopy will be done in the doctor's office using a small, flexible fiber-optic device. Some sort of local anesthesia may be used to numb the urethra and bladder for the procedure. If the cystoscopy is done using general anesthesia (you are asleep) or spinal anesthesia (numbing the lower part of your body), the procedure is done in the operating room.

If an abnormal area or a growth is seen, it will be biopsied. A thin instrument will be threaded through the cystoscope to remove a small piece of tissue, which is then sent to a lab and looked at under the microscope. Salt water washings of the inside the bladder may also be collected to look for cancer cells. (Read further for more about biopsies.)

Fluorescence cystoscopy may be done along with routine cystoscopy. For this exam, drugs called *porphyrins* are put into the bladder during cystoscopy. They are taken up by cancer cells. When the doctor then shines a blue light through the cystoscope, any cells containing the porphyrins will glow (fluoresce). This can help the doctor see areas with cancer cells that might have been missed by the white light normally used.

Lab tests

Urine cytology

For this test, a sample of urine is looked at under a microscope to see if it contains any cancer or pre-cancer cells. Cytology is also done on any bladder washings taken when the cystoscopy was done. Cytology can help find some cancers, but this test is not perfect. Not finding cancer on this test doesn't always mean you are cancer free.

Urine culture

If you are having urinary symptoms, this test may be done to see if an infection (rather than cancer) is the cause. Infections and bladder cancers can cause similar symptoms. For a urine culture, a sample of urine is put into a dish in the lab to allow any bacteria that are present to grow. It can take time for the bacteria to grow, so it may take a few days to get the results of this test.

Urine tumor marker tests

Different urine tests look for specific substances released by bladder cancer cells. These tests may be used along with urine cytology to help determine if a person has bladder cancer. They include the tests for NMP22 and BTA, the Immunocyt test, and the UroVysion test (discussed in the section “Can bladder cancer be found early?”).

Some doctors find these urine tests useful in looking for bladder cancers, but they may not help in all cases. Most doctors feel that cystoscopy is still the best way to find bladder cancer. Some of these tests are more helpful when looking for possible recurrence of bladder cancer in someone who has already had it, rather than finding it in the first place.

Biopsy

A biopsy is the removal of a small sample of body tissue to see if it is cancer. The tissue that is removed is sent to the lab, where it is looked at by a pathologist, a doctor who specializes in diagnosing diseases with lab tests. If bladder cancer is suspected, a biopsy is needed to confirm the diagnosis.

Bladder biopsies

Bladder biopsy samples are most often obtained during cystoscopy. A biopsy can show whether cancer is present and what type of bladder cancer it is. If bladder cancer is found, two important features are its invasiveness and grade.

Invasiveness: The biopsy can show how deeply the cancer has invaded (grown into) the bladder wall, which is very important in deciding treatment. If the cancer stays in the inner layer of cells without growing into the deeper layers, it is called *non-invasive*. If the cancer grows into the deeper layers of the bladder, it is called *invasive*. Invasive cancers are more likely to spread and are harder to treat.

You may also see a bladder cancer described as *superficial* or *non-muscle invasive*. These terms include both non-invasive tumors as well as any invasive tumors that have not grown into the main muscle layer of the bladder.

Grade: Bladder cancers are also assigned a grade, based on how they look under the microscope.

- Low-grade cancers look more like normal bladder tissue. They are also called *well-differentiated* cancers. Patients with these cancers usually have a good prognosis (outlook).
- High-grade cancers look less like normal tissue. These cancers may also be called *poorly differentiated* or *undifferentiated*. High-grade cancers are more likely to grow into the bladder wall and to spread outside the bladder. These cancers can be harder to treat.

People with bladder cancer may develop more cancers in other areas of the bladder or in the urinary system. For this reason, during the biopsy the doctor may take tissue samples from several different areas of the bladder lining.

Biopsies to look for cancer spread

If imaging tests (see the next section) suggest the cancer might have spread outside of the bladder, a biopsy is the only way to be sure. In some cases, biopsy samples of suspicious areas are obtained during surgery to remove the bladder cancer.

Another way to get a biopsy sample is to use a thin, hollow needle to take a small piece of tissue from the abnormal area. This is known as a *needle biopsy*, and by using it the doctor can take samples without an operation. Needle biopsies are sometimes done using a CT scan or ultrasound to help guide the biopsy needle into the abnormal area.

Imaging tests

Imaging tests use x-rays, magnetic fields, sound waves, or radioactive substances to create pictures of the inside of your body. If you have bladder cancer, your doctor may order some of these tests to see if the cancer has spread to tissues near the bladder, nearby lymph nodes, or to distant organs. If an imaging test shows enlarged lymph nodes or other possible signs of cancer spread, some type of biopsy might be needed to confirm the findings.

Intravenous pyelogram

An intravenous pyelogram (IVP), also called an *intravenous urogram* (IVU), is an x-ray of the urinary system taken after injecting a special dye into a vein. This dye is removed from the bloodstream by the kidneys and then passes into the ureters and bladder. The dye outlines these organs on x-rays and helps show urinary tract tumors.

Some people have allergic reactions to the dye, so it's important to tell your doctor if you have any allergies or have ever had any reactions to x-ray dyes.

Retrograde pyelogram

For this test, a catheter (thin tube) is placed through the urethra and up into the bladder or into a ureter. Then a dye is injected through the catheter to make the lining of the bladder, ureters, and kidneys easier to see on x-rays.

This test isn't used as often as IVP, but it may be done (along with ultrasound of the kidneys) to look for tumors in the urinary tract in people who can't have an IVP because they are allergic to x-ray dyes.

Computed tomography (CT) scan

The CT scan uses x-rays to produce detailed cross-sectional images of your body. A CT scan of the kidney, ureters, and bladder is known as a *CT urogram*. It can provide detailed information about the size, shape, and position of any tumors in the urinary tract, including the bladder. It may be used instead of an IVP to look at the upper part of the urinary system. It can also help show enlarged lymph nodes that might contain cancer, as well as other organs in the abdomen and pelvis.

Instead of taking one picture, like a standard x-ray, a CT scanner takes many pictures as it rotates around you. A computer then combines these pictures into an image of a slice of your body.

A CT scanner has been described as 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. CT scans take longer than regular x-rays, and you might feel a bit confined by the ring while the pictures are being taken.

Before the test, you might be asked to drink 1 to 2 pints of a liquid called *oral contrast*. This helps outline the intestine so that certain areas are not mistaken for tumors. You might also receive an IV line through which a different kind of contrast dye (IV contrast) is injected. This helps better outline structures such as blood vessels in your body.

The injection can cause some flushing (redness and warm feeling). A few people are allergic to the dye and get hives or, rarely, have more serious reactions like trouble breathing and low blood pressure. Be sure to tell the doctor if you have any allergies or have ever had a reaction to any contrast material used for x-rays.

CT-guided needle biopsy: CT scans can also be used to guide a biopsy needle into a suspected tumor. This is not used to biopsy tumors within the bladder, but it can be used to take tissue samples from areas where the cancer may have spread. For this procedure, you remain on the CT scanning table while the doctor advances a biopsy needle through the skin and toward the tumor. CT scans are repeated until the needle is within the mass. A needle biopsy sample is then removed to be looked at under a microscope.

Magnetic resonance imaging (MRI) scan

Like CT scans, MRI scans provide detailed images of soft tissues in the body. But MRI scans use radio waves and strong magnets instead of x-rays. The energy from the radio waves is absorbed and then released in a pattern formed by the type of body tissue and by certain diseases. A computer translates the pattern into very detailed images of parts of the body. A contrast material called *gadolinium* is often injected into a vein before the scan to see details more clearly.

MRI scans take longer than CT scans – often up to an hour – and are a little more uncomfortable. You may be placed on a table that slides inside a narrow tube, which is

confining and can upset people with a fear of enclosed spaces. Newer, open MRI machines can sometimes be used instead. The MRI machine also makes buzzing and clicking noises that you may find disturbing. Some places will provide earplugs to help block these noises out.

MRI images are particularly useful in finding signs that the cancer has spread outside of the bladder into nearby tissues or lymph nodes. A special MRI of the kidneys, ureters, and bladder, known as an *MRI urogram*, can be used instead of an IVP to look at the upper part of the urinary system.

Ultrasound

Ultrasound (ultrasonography) uses sound waves to create pictures of internal organs. It can be useful in determining the size of a bladder cancer and whether it has spread beyond the bladder to nearby organs or tissues. It can also be used to look at the kidneys.

This is an easy test to have. It uses no radiation, which is why it is often used to look at developing fetuses. For the exam, you simply lie on a table while a transducer (which is shaped like a wand) is placed on the skin over the part of your body being looked at. Usually, the skin is first lubricated with gel. The transducer gives off sound waves and picks up the echoes as they bounce off organs in the body. The echoes are converted by a computer into a black-and-white image.

Ultrasound-guided needle biopsy: Ultrasound can also be used to guide a biopsy needle into a suspected area of cancer spread in the abdomen or pelvis.

Chest x-ray

A chest x-ray may be done to look for spread of bladder cancer to the lungs. This test is not needed if a CT scan of the chest has been done.

Bone scan

A bone scan can help look for cancer that has spread to bones. Doctors don't usually order this test unless you have symptoms such as bone pain, or if blood tests show the cancer might have spread to your bones.

For this test, a small amount of low-level radioactive material is injected into a vein (intravenously, or IV). The substance settles in areas of damaged bone throughout the entire skeleton over the course of a couple of hours. You then lie on a table for about 30 minutes while a special camera detects the radioactivity and creates a picture of the skeleton. The picture is not detailed like an MRI or CT scan, but it shows possible areas of cancer spread to all of the bones in the body at once.

Areas of active bone changes attract the radioactivity and appear as “hot spots” on the skeleton. These areas may suggest the presence of cancer, but other bone diseases can also cause the same pattern. To distinguish among these conditions, other imaging tests such as plain x-rays, MRI scans, or even a bone biopsy might be needed.

How is bladder cancer staged?

The stage of a bladder cancer is a standard summary of how far the cancer has spread. It is one of the most important factors in choosing treatment options and predicting a person’s prognosis (outlook). If you have bladder cancer, ask your cancer care team to explain its stage. This can help you make informed choices about your treatment.

There are actually 2 types of stages for bladder cancer.

The **clinical stage** is the doctor’s best estimate of the extent of the cancer, based on the results of physical exams, cystoscopy, biopsies, and any imaging tests that are done (such as CT scans). These exams and tests are described in the section “How is bladder cancer diagnosed?” Doctors looking at biopsy samples are especially interested in whether any cancer cells have spread into the bladder’s muscle layers.

If surgery is done, the **pathologic stage** can be determined using the same factors as the clinical stage, plus what is found during surgery to remove the bladder and nearby lymph nodes.

The clinical stage is used to help plan treatment. Sometimes, though, the cancer has spread further than the clinical stage estimates. Pathologic staging is likely to be more accurate, because it gives your doctor a firsthand impression of the extent of your disease.

AJCC TNM staging system for bladder cancer

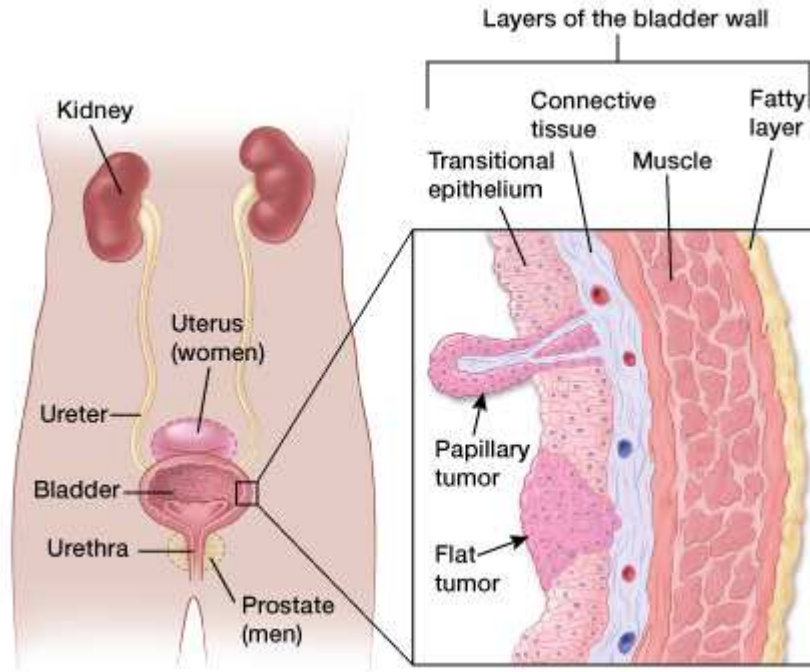
A staging system is a standard way for members of the cancer care team to describe the extent of cancer spread. The staging system most often used for bladder cancer is that of the American Joint Committee on Cancer (AJCC). This is also called the **TNM** system.

The TNM staging system is based on 3 key pieces of information:

- **T** describes how far the main (primary) **tumor** has grown through the bladder wall and whether it has grown into nearby tissues.
- **N** indicates any cancer spread to lymph **nodes** near the bladder. Lymph nodes are bean-sized collections of immune system cells, to which cancers often spread first.
- **M** indicates whether or not the cancer has spread (**metastasized**) to distant sites, such as other organs or lymph nodes that are not near the bladder.

T categories for bladder cancer

The T category describes the main tumor. (See “What is bladder cancer?” for a description of papillary and flat carcinomas and the different layers of the bladder.)



TX: Main tumor cannot be assessed due to lack of information

T0: No evidence of a primary tumor

Ta: Non-invasive papillary carcinoma

Tis: Non-invasive flat carcinoma (flat carcinoma in situ, or CIS)

T1: The tumor has grown from the layer of cells lining the bladder into the connective tissue below. It has not grown into the muscle layer of the bladder.

T2: The tumor has grown into the muscle layer.

- **T2a:** The tumor has grown only into the inner half of the muscle layer.
- **T2b:** The tumor has grown into the outer half of the muscle layer.

T3: The tumor has grown through the muscle layer of the bladder and into the fatty tissue layer that surrounds it.

- **T3a:** The spread to fatty tissue can only be seen by using a microscope.

- **T3b:** The spread to fatty tissue is large enough to be seen on imaging tests or to be seen or felt by the surgeon.

T4: The tumor has spread beyond the fatty tissue and into nearby organs or structures. It may be growing into any of the following: the stroma (main tissue) of the prostate, the seminal vesicles, uterus, vagina, pelvic wall, or abdominal wall.

- **T4a:** The tumor has spread to the stroma of the prostate (in men), or to the uterus and/or vagina (in women).
- **T4b:** The tumor has spread to the pelvic wall or the abdominal wall.

Bladder cancer can sometimes affect many areas of the bladder at the same time. If more than one tumor is found, the letter **m** is added to the appropriate T category.

N categories for bladder cancer

The N category describes spread only to the lymph nodes near the bladder (in the true pelvis) and those along the blood vessel called the *common iliac artery*. These lymph nodes are called *regional lymph nodes*. Any other lymph nodes are considered distant lymph nodes. Spread to distant nodes is considered metastasis (described in the M category). Surgery is usually needed to find cancer spread to lymph nodes, since it is not often seen on imaging tests.

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

N0: There is no regional lymph node spread.

N1: The cancer has spread to a single lymph node in the true pelvis.

N2: The cancer has spread to 2 or more lymph nodes in the true pelvis.

N3: The cancer has spread to lymph nodes along the common iliac artery.

M categories for bladder cancer

M0: There are no signs of distant spread.

M1: The cancer has spread to distant parts of the body. (The most common sites are distant lymph nodes, the bones, the lungs, and the liver).

Stages of bladder cancer

Once the T, N, and M categories have been determined, this information is combined to find the overall cancer stage. Bladder cancer stages are defined using 0 and the Roman numerals I to IV (1 to 4). Stage 0 is the earliest stage, while stage IV is the most advanced.

Stage 0a (Ta, N0, M0)

The cancer is a non-invasive papillary carcinoma (Ta). It has grown toward the hollow center of the bladder but has not grown into the connective tissue or muscle of the bladder wall. It has not spread to lymph nodes (N0) or distant sites (M0).

Stage 0is (Tis, N0, M0)

The cancer is a flat, non-invasive carcinoma (Tis), also known as flat carcinoma in situ (CIS). The cancer is growing in the inner lining layer of the bladder only. It has neither grown inward toward the hollow part of the bladder nor has it invaded the connective tissue or muscle of the bladder wall. It has not spread to lymph nodes (N0) or distant sites (M0).

Stage I (T1, N0, M0)

The cancer has grown into the layer of connective tissue under the lining layer of the bladder but has not reached the layer of muscle in the bladder wall (T1). The cancer has not spread to lymph nodes (N0) or to distant sites (M0).

Stage II (T2a or T2b, N0, M0)

The cancer has grown into the thick muscle layer of the bladder wall, but it has not passed completely through the muscle to reach the layer of fatty tissue that surrounds the bladder (T2). The cancer has not spread to lymph nodes (N0) or to distant sites (M0).

Stage III (T3a, T3b, or T4a, N0, M0)

The cancer has grown into the layer of fatty tissue that surrounds the bladder (T3a or T3b). It might have spread into the prostate, uterus, or vagina, but it is not growing into the pelvic or abdominal wall (T4a). The cancer has not spread to lymph nodes (N0) or to distant sites (M0).

Stage IV

One of the following applies:

T4b, N0, M0: The cancer has grown through the bladder wall and into the pelvic or abdominal wall (T4b). The cancer has not spread to lymph nodes (N0) or to distant sites (M0).

OR

Any T, N1 to N3, M0: The cancer has spread to nearby lymph nodes (N1-N3) but not to distant sites (M0).

OR

Any T, any N, M1: The cancer has spread to distant lymph nodes or to sites such as the bones, liver, or lungs (M1).

Survival rates for bladder cancer by stage

Survival rates are often used by doctors as a standard way of discussing a person's prognosis (outlook). Some people with cancer may want to know the survival statistics for people in similar situations, while others may not find the numbers helpful, or may even not want to know them. If you would rather not read the survival rates for bladder cancer, skip to the next section.

The 5-year survival rate refers to the percentage of patients who live *at least* 5 years after their cancer is diagnosed. Of course, many people live much longer than 5 years (and many are cured).

Five-year *relative* survival rates assume that some people will die of other causes and compare the observed survival with that expected for people without the cancer. This is a more accurate way to describe the chances of dying from a particular type and stage of cancer.

In order to get 5-year survival rates, doctors have to look at people who were treated at least 5 years ago. Improvements in treatment since then may result in a better outlook for people now being diagnosed with bladder cancer.

The numbers below are based on thousands of people diagnosed with bladder cancer from 1988 to 2001. These numbers come from the National Cancer Institute's SEER database.

Stage	Relative 5-year Survival Rate
0	98%
I	88%
II	63%
III	46%
IV	15%

Survival rates are often based on previous outcomes of large numbers of people who had the disease, but they can't predict what will happen. Knowing the type and the stage of a person's cancer is important in estimating their outlook. But many other factors can also affect a person's outlook, such as other health problems, the grade of the cancer, and how well the cancer responds to treatment. Your doctor can tell you how the numbers above apply to you.

How is bladder 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.

General treatment information

Once your cancer has been diagnosed and staged, there is a lot to think about before you and your doctor choose a treatment plan. You may feel that you must make a decision quickly, but it is important to give yourself time to absorb the information you have just learned. Ask your cancer care team questions. You can find some good questions to ask in the section "What should you ask your doctor about bladder cancer?"

You will want to weigh the benefits of each treatment option against the possible risks and side effects. The best treatment for you will depend on the type and stage of your bladder cancer as well as your general health, age, and personal preferences.

If time permits, you might want to get a second opinion about your best treatment option. This can be especially helpful if you have several treatment choices. A second opinion can provide more information and help you feel more confident about the treatment plan you choose.

The main types of treatment for cancer of the bladder are:

- Surgery
- Intravesical therapy
- Chemotherapy
- Radiation therapy

Sometimes, more than one of type of treatment might be used. Surgery, alone or with other treatments, is used in nearly all cases.

Surgery can often remove early stage bladder tumors. But a major concern in people with early-stage bladder cancer is that new cancers often form in other parts of the bladder over time. Removing the entire bladder (known as a *radical cystectomy*) is one way to avoid this, but it can have major side effects. If the entire bladder is not removed, other treatments may be given to try to reduce the risk of new cancers. Whether or not other treatments are given, close follow-up is needed to look for signs of new cancers in the bladder.

Depending on your options, you can have different types of doctors on your treatment team. The types of doctors who treat bladder cancers include:

- Urologists: surgeons who specialize in treating diseases of the urinary system and male reproductive system
- Radiation oncologists: doctors who treat cancer with radiation therapy
- Medical oncologists: doctors who treat cancer with medicines such as chemotherapy

Other specialists might be part of your treatment team as well, including physician assistants, nurse practitioners, nurses, psychologists, social workers, rehabilitation specialists, and other health professionals. See [Health Professionals Associated With Cancer Care](#) for more on this.

The next few sections describe the different types of treatment for bladder cancer. This is followed by a discussion of the most common treatment options based on the stage of the cancer.

Surgery for bladder cancer

Surgery is part of the treatment for most bladder cancers. The type of surgery done for bladder cancer will depend on its stage.

Transurethral surgery

For early-stage or superficial (non-muscle invasive) bladder cancers, a transurethral resection (TUR), also known as a transurethral resection of the bladder tumor (TURBT), is the most common treatment. Most patients have superficial cancer when they are first diagnosed, so this is usually the first treatment they receive.

This surgery is done using an instrument passed up the urethra, so it does not require cutting into the abdomen. You will get either general anesthesia (where you are asleep) or regional anesthesia (where the lower part of your body is numbed).

For this operation, a type of rigid cystoscope called a *resectoscope* is placed into the bladder through the urethra. The resectoscope has a wire loop at its end to remove any abnormal tissues or tumors. The removed tissue is sent to a lab to be looked at by a pathologist.

After the tumor is removed, more steps may be taken to try to ensure that it has been destroyed completely. Any remaining cancer may be treated by fulguration (burning the base of the tumor) while looking at it with the cystoscope. Cancer can also be destroyed using a high-energy laser through the cystoscope.

The side effects of transurethral bladder surgery are generally mild and do not usually last long. You might have some bleeding and pain when you urinate after surgery. You can usually return home the same day or the next day and can resume your usual activities in less than 2 weeks.

Unfortunately, even with successful treatment, bladder cancer often recurs (comes back) in other parts of the bladder. If transurethral resection needs to be repeated many times, the bladder can become scarred and lose its capacity to hold much urine. Some people may have side effects such as frequent urination, or even incontinence (loss of control of urination).

In patients with a long history of recurrent, non-invasive low-grade tumors, the surgeon may sometimes just use fulguration to burn small tumors that are seen during cystoscopy (rather than removing them). This can often be done using local anesthesia (numbing medicine) in the doctor's office. It is safe but can be mildly uncomfortable.

Cystectomy

When bladder cancer is invasive, all or part of the bladder may need to be removed. This operation is called a *cystectomy*.

Partial cystectomy: If the cancer has invaded the muscle but is not very large and only in one place, it can sometimes be removed along with part of the bladder wall without taking out the whole bladder. The hole in the bladder wall is then closed. Nearby lymph nodes are also removed and examined for cancer spread. Only a small portion of people with cancer that has invaded the muscle can have this surgery.

The main advantage of this surgery is that a person keeps their bladder and does not need reconstructive surgery (see below). But the remaining bladder may not hold as much urine, which means the person will have to urinate more frequently. The main concern with this type of surgery is that bladder cancer can still recur in another part of the bladder wall.

Radical cystectomy with extended lymph node dissection: If the cancer is larger or is in more than one part of the bladder, a radical cystectomy with extended lymph node dissection will be needed. This operation removes the entire bladder and nearby lymph nodes. In men, the prostate is also removed. In women, the ovaries, fallopian tubes (tubes that connect the ovaries and uterus), the uterus (womb), and a small portion of the vagina are often removed along with the bladder.

General anesthesia (where you are in a deep sleep) is used for either type of cystectomy.

Typically, these procedures are done through a cut (incision) in the abdomen. You will need to stay in the hospital for about a week after the surgery. You can usually go back to your normal activities in 4 to 6 weeks.

In some cases, the surgeon may operate through several smaller incisions using special long, thin instruments, one of which has a tiny video camera on the end to see inside the pelvis. This is known as laparoscopic, or “keyhole” surgery. The surgeon may either hold the instruments directly or may sit at a control panel in the operating room and maneuver robotic arms to do the surgery. Laparoscopic surgery may result in less pain and quicker recovery because of the smaller incisions. But it has not been around as long as the standard type of surgery and it’s not yet clear if it is equally as effective.

It is important that any type of cystectomy be done by a surgeon with experience in treating bladder cancer. If the surgery is not done well, the cancer is more likely to come back.

Reconstructive surgery after radical cystectomy

If your whole bladder is removed, you will need another way to store and remove urine. Several types of reconstructive surgery can be done depending on your medical situation and personal preferences.

Incontinent diversion: One option may be to remove a short piece of your intestine and connect it to the ureters. This creates a passageway, known as an *ileal conduit*, for urine to pass from the kidneys to the outside of the body. Urine flows from the kidneys through the ureters into the ileal conduit. One end of the conduit is connected to the skin on the front of the abdomen by an opening called a *stoma* (also known as a *urostomy*).

After this procedure, a small bag is placed over the stoma to collect the urine, which comes out continuously in small amounts. The bag then needs to be emptied once it is full. This approach is sometimes called an *incontinent diversion*, because you no longer control the flow of urine out of the body.

Continent diversion: Another way for urine to drain is called a *continent diversion*. A valve is created in a pouch made from the piece of intestine attached to the ureters. The valve allows urine to be stored in the pouch. You then empty the pouch several times each day by placing a drainage tube (catheter) into the stoma through the valve. Some people prefer this method because there is no bag on the outside.

Neobladder: A newer method routes the urine back into the urethra, restoring urination. One way to do this is to create a *neobladder* – basically a new bladder made of a piece of intestine. As with the incontinent and continent diversion, the ureters are connected to the neobladder. The difference is that the neobladder is also sewn to the urethra. This lets the patient urinate normally. Over several months, most people regain the ability to urinate normally during the day, although many people might still have some incontinence at night.

If the cancer has spread or can't be removed with surgery, a diversion may be made without removing the bladder. In this case, the purpose of the surgery is to prevent or relieve blockage of urine flow, rather than try to cure the cancer.

Side effects of cystectomy

Cystectomy is a major operation, and the complications and side effects can be serious. Short-term risks include reactions to anesthesia, excess bleeding, blood clots, and infections. Most people will have at least some pain after the operation, which is usually helped with pain medicines, if needed.

Aside from changes in how urine leaves the body, the possible side effects of urinary diversion and urostomy may include infections, incontinence (urine leaks), pouch stones, and blockage of urine flow. Radical cystectomy can also have sexual side effects, as described in the next section. The physical changes that come from removing the bladder and having a urostomy can have a major emotional and psychological impact as well. You should discuss your feelings and concerns with your health care team.

More about urostomies can be found in our document *Urostomy: A Guide*.

Sexual effects of radical cystectomy in men: Radical cystectomy removes the prostate gland and seminal vesicles. Since these glands make most of the seminal fluid, removing them means that a man will no longer produce semen. He can still have an orgasm, but it will be “dry” – that is, without semen.

After surgery, many men have nerve damage that affects their ability to have erections. In some men this may improve over time. Generally, the younger a man is, the more likely he is to regain the ability to have full erections. If this issue is important to you, discuss it with your doctor before surgery. Newer surgical techniques may lower the chance of impotence.

To read more about sexual issues and ways to cope with them, see our document *Sexuality for the Man With Cancer*.

Sexual effects of radical cystectomy in women: This surgery often removes the front part of the vagina. This can make sex less comfortable for some women, although most of the time intercourse is still possible. One option is to have the vagina rebuilt, which is known as *vaginal reconstruction*. There is more than one way to do this, so talk with your surgeon about the pros and cons of each. Whether or not you have reconstruction, there are many ways to make sex more comfortable.

Radical cystectomy can also affect a woman's ability to have an orgasm if the nerve bundles that run along each side of the vagina are damaged. Talk with your doctor about whether these nerves can be left in place during surgery.

If the surgeon takes out the end of the urethra where it opens outside the body, the clitoris can lose some of its blood supply, which might affect sexual arousal. Talk with your surgeon about whether the end of the urethra can be spared.

To read more about ways to cope with these and other sexual issues, see our document *Sexuality for the Woman With Cancer*.

Sexual effects of urostomy: It is normal for both men and women to be concerned about having a sex life with a urostomy. Having your ostomy pouch fit correctly and emptying it before sex reduces the chances of a major leak. A pouch cover or small ostomy pouch can be worn with a sash to keep the pouch out of the way. Wearing a snug fitting shirt may be even more comfortable. Choose sexual positions that keep your partner's weight from rubbing against the pouch. For more information, see our document *Urostomy: A Guide*.

For more general information about surgery as a treatment for cancer, see our document [*Understanding Cancer Surgery: A Guide for Patients and Families*](#).

Intravesical therapy for bladder cancer

With intravesical therapy, the doctor puts a liquid drug directly into the bladder (through a catheter) rather than giving it by mouth or injecting it into a vein. This could be either immunotherapy, which causes the body's own immune system to attack the cancer cells, or chemotherapy.

Medicines given this way mainly affect the cells lining the inside of the bladder, with little to no effect on cells elsewhere. This means that any cancer cells outside of the bladder lining, including those that have grown deeply into the bladder wall, are not treated. Drugs put into the bladder also can't reach cancer cells in the kidneys, ureters, and urethra, or those that have spread to other organs.

For this reason, intravesical therapy is used only for non-invasive (stage 0) or minimally invasive (stage I) bladder cancers.

Intravesical immunotherapy

Bacillus Calmette-Guerin therapy: Bacillus Calmette-Guerin (BCG) is the most effective intravesical immunotherapy for treating early-stage bladder cancer. BCG is a bacterium that is related to the germ that causes tuberculosis (TB), but it does not usually cause serious disease. BCG is put directly into the bladder through a catheter. The body's immune system cells are attracted to the bladder and activated by BCG, which in turn affects the bladder cancer cells. Treatment is usually started a few weeks after a transurethral resection of the tumor and is given once a week for 6 weeks. Sometimes long-term maintenance BCG therapy is given.

Treatment with BCG can cause symptoms that feel like having the flu, such as fever, chills, and fatigue. It can also cause a burning feeling in the bladder. Rarely, BCG can spread through the body, leading to a serious infection. One sign of this can be a high fever that does not get better when you take a pain reliever (such as aspirin, ibuprofen, or acetaminophen). In such cases, you should see a doctor right away. These infections can be treated with the antibiotics used to treat TB.

Interferon: Interferons are substances naturally made by several types of cells in the body that stimulate the immune system. They can also be made in the lab and given as medicine. Interferon-alpha is the type most often used to treat cancer. It can be helpful in the intravesical treatment of bladder cancer.

Possible side effects include muscle aches, bone pain, headaches, problems with thinking and concentration, fatigue, nausea, and vomiting. These problems are usually temporary and improve after treatment is completed. Other drugs may be given along with interferon to lessen these side effects.

Intravesical chemotherapy

For this treatment, chemotherapy (chemo) drugs are put directly into the bladder through a catheter. These drugs kill actively growing cancer cells. Many of these same drugs can also be given systemically (usually into a vein) to treat more advanced stages of bladder cancer.

Mitomycin and thiotepa are the drugs used most often for intravesical chemotherapy. Other drugs that can be used include valrubicin, doxorubicin, and gemcitabine. Delivery of mitomycin into the bladder along with heating the inside of the bladder, a treatment called *electromotive mitomycin therapy*, may work even better than giving intravesical mitomycin the usual way.

A major advantage of giving chemo directly into the bladder instead of injecting it into the bloodstream is that the drugs usually do not reach other parts of the body. This helps people avoid many of the side effects that can occur with systemic chemo. An exception to this is the drug thiotepa, which rarely is absorbed from the bladder and can cause side effects in the rest of the body.

The main side effects of intravesical chemo are irritation and a burning feeling in the bladder.

Chemotherapy for bladder cancer

Chemotherapy (chemo) is the use of drugs to treat cancer. Chemotherapy is given in different ways.

When the drug is put directly into the area to be treated, it is called *local* chemotherapy. Intravesical therapy, where the drug is put inside the bladder, is a form of local chemo. It was described in the previous section.

When chemo drugs are given in pill form or injected into a vein (IV) or muscle (IM), the drugs enter the bloodstream and travel throughout the body. This is called *systemic* chemotherapy. Systemic chemo can affect cancer cells far away from the main tumor. It can be used in different situations:

- It is sometimes given before surgery to try to shrink a large tumor so that it can be removed more easily and to lower the chance the cancer will come back. Giving chemo before surgery is known as *neoadjuvant therapy*.
- Chemo can be given after surgery (or sometimes after radiation therapy). This is called *adjuvant therapy*. The goal of adjuvant therapy is to kill any cancer cells that remain after other treatments but are too small to be seen. This can lower the chance that the cancer will come back later.
- Sometimes chemotherapy is given with radiation therapy to help the radiation work better.
- Chemotherapy is usually the main treatment for advanced bladder cancers, such as those that have spread to distant parts of the body.

Chemo drugs may be used alone or in combination, depending in part on what they're being used for. For example, when chemo is given with radiation, the most common drugs used include:

- Cisplatin
- Cisplatin plus fluorouracil (5-FU)
- Mitomycin with 5-FU

When chemo is used without radiation, the combinations used include:

- Gemcitabine and cisplatin
- Methotrexate, vinblastine, doxorubicin (Adriamycin), and cisplatin (called MVAC)
- Carboplatin and either paclitaxel or docetaxel (for patients with poor kidney function)

Chemotherapy for bladder cancer can be hard to tolerate, especially for older patients who have other serious medical conditions. Older age itself, however, doesn't mean that you can't get chemo. Many older patients can be helped by treatment. The decision to get chemo is up to you and your doctor, and should be based on your health, social support, and personal and family wishes.

For some people, the side effects of getting more than one chemo drug might be too much to handle. For those people, treatment with a single drug, such as gemcitabine or cisplatin, may be a good option. Other drugs sometimes used alone for bladder cancer include carboplatin, docetaxel, paclitaxel, doxorubicin, 5-FU, methotrexate, vinblastine, ifosfamide, and pemetrexed.

Doctors give chemo in cycles, with each period of treatment followed by a rest period to allow the body time to recover. Each chemotherapy cycle typically lasts for a few weeks.

Most bladder cancers are transitional cell (urothelial) cancers, but there are other types as well, including squamous cell carcinoma, adenocarcinoma, and small cell carcinoma. Chemo for these rare types of bladder cancer may use drugs different from those listed above. Often, they are treated with the same drugs used to treat these types of tumors when they are found elsewhere in the body.

Side effects of chemotherapy

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

Side effects of chemo depend on the drugs used, the amount taken, and the length of treatment. When chemo and radiation are given at the same time, side effects tend to be worse. Common side effects seen with chemo include:

- Nausea and vomiting
- Loss of appetite
- Hair loss
- Mouth sores
- Diarrhea or constipation
- Increased risk of infection (because of a shortage of white blood cells)
- Bleeding or bruising after minor cuts or injuries (due to a shortage of blood platelets)
- Fatigue (because of low red blood cell counts)

These side effects usually go away after treatment is finished. There are often ways to lessen these side effects. For example, drugs can be given to help prevent or reduce nausea and vomiting. Ask your health care team about the side effects your chemo drugs may cause.

Along with the risks above, some chemo drugs can cause other, less common side effects. For example, drugs such as cisplatin, carboplatin, docetaxel, and paclitaxel can damage nerves. This can sometimes lead to symptoms (mainly in the hands and feet) such as pain, burning or tingling sensations, sensitivity to cold or heat, or weakness. This is called *peripheral neuropathy*. Some of the drugs used in chemotherapy have been linked to an increased risk of leukemia later in life, but this is very rare.

You should report any side effects to your medical team so that they can be treated promptly. In some cases, the doses of the chemo drugs may need to be reduced or treatment may need to be delayed or stopped to prevent the effects from getting worse.

For more information about chemotherapy, please see the [Chemotherapy](#) section of our website, or our document *A Guide to Chemotherapy*. You can also call us at 1-800-227-2345 to ask for a free copy of this or any other of our documents.

If you'd like more information on a drug used in your treatment or a specific drug mentioned in this section, see our Guide to Cancer Drugs, or call us with the names of the medicines you're taking.

Radiation therapy for bladder cancer

Radiation therapy uses high-energy radiation to kill cancer cells. The type of radiation most often used to treat bladder cancer, known as *external beam radiation therapy*, focuses radiation from a source outside of the body on the cancer.

Before your treatments start, the radiation team will take careful measurements to determine the correct angles for aiming the radiation beams and the proper dose of radiation. Radiation therapy is much like getting an x-ray, but the radiation is stronger. The procedure itself is painless. Each treatment lasts only a few minutes, but the setup time – getting you into place for treatment – usually takes longer. Most often, radiation treatments are given 5 days a week for several weeks.

Radiation therapy can be used:

- As part of the treatment for earlier stage bladder cancer, after limited surgery
- As the main treatment for people with earlier stage cancers who can't have surgery
- As part of the initial treatment for advanced bladder cancers
- To help prevent or treat symptoms caused by advanced bladder cancers

Radiation therapy is often combined with chemotherapy to make the radiation more effective. The combination of radiation therapy and chemotherapy after transurethral bladder surgery can sometimes destroy cancers that would otherwise need to be treated with cystectomy. This approach can be used to treat smaller tumors (about an inch or less in size) as long as there are no signs of kidney blockage. If the treatment doesn't work or the cancer comes back, you will need a cystectomy.

Side effects of radiation therapy

Side effects of radiation depend on the dose given and the area being treated. They may be worse if chemotherapy is given with the radiation. Side effects can include:

- Skin changes in areas getting radiation, ranging from redness to severe irritation with blistering
- Nausea and vomiting
- Bladder symptoms, like burning or pain when you urinate, feeling the need to go often, or blood in urine
- Diarrhea
- Fatigue
- Low blood counts, which can lead to fatigue, easy bruising or bleeding, or increased risk of infection

These effects are usually temporary, although long-term problems sometimes occur. In some people radiation treatments can lead to incontinence (problems holding urine) later on. Radiation can also damage the lining of the bladder. This is known as *radiation cystitis* and can cause long-term problems such as blood in the urine or painful urination.

If you have side effects from radiation therapy, discuss them with your health care team. They can suggest ways to ease many of them. More information can be found in the Radiation section of our website, or in our document *Understanding Radiation Therapy: A Guide for Patients and Families*.

Clinical trials for bladder cancer

You may have had to make a lot of decisions since you've been told you have bladder cancer. One of the most important decisions you will make is choosing which treatment is best for you. You may have heard about clinical trials being done for bladder 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 learn more about promising new treatments or procedures.

Clinical trials are one way to get state-of-the-art cancer treatment. In some cases they may be the only way to get access to newer treatments. They are also the only way for doctors to learn better ways 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 studies 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 at 1-800-4-CANCER (1-800-422-6237) or by visiting the NCI clinical trials website at www.cancer.gov/clinicaltrials.

You must meet certain requirements to take part in any clinical trial. If you do qualify for a clinical trial, you still get to decide if you want 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 us at 1-800-227-2345 to have it sent to you.

Complementary and alternative therapies for bladder cancer

When you have bladder 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 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 exactly are complementary and alternative therapies?

Not everyone uses these terms the same way, and they are used to refer to many different methods, so it can be confusing. 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 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 have even been found 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 pose danger, 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 might 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 consider 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 about using.
- Contact us at 1-800-227-2345 or read our document, *Complementary and Alternative Methods and Cancer* to learn more about complementary and alternative methods. You can also find out about the specific methods you’re looking at by calling us or going to 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 discuss it with your doctor. 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.

Treatment of bladder cancer by stage

Most of the time, initial treatment of bladder cancer is based on the tumor’s clinical stage, which is how deep it is thought to have grown into the bladder wall and whether it has spread beyond the bladder. Other factors, such as the size and grade of the tumor, may also affect treatment options. All of these are based on the results of exams, cystoscopy, and imaging tests.

Stage 0

Stage 0 bladder cancer includes non-invasive papillary carcinoma (Ta) and flat non-invasive carcinoma (Tis). In either case, the cancer has not invaded the bladder wall beyond the inner layer.

This early stage of bladder cancer is most often treated with transurethral resection (TUR). This may be followed either by observation (close follow-up without further treatment) or by intravesical therapy to try to keep the cancer from coming back.

Of the intravesical treatments, Bacille-Calmette Guerin (BCG) seems to be better at both keeping cancers from coming back and from getting worse. But it also tends to have more side effects. For this reason, doctors usually reserve BCG for cancers that are more likely to come back as invasive cancer or spread within the bladder.

Stage 0a: For low-grade non-invasive papillary (Ta) tumors, the options after TUR include observation, a single dose of intravesical chemotherapy (usually mitomycin) within a day of surgery, or weekly intravesical chemo, starting a few weeks after surgery. If the cancer comes back, the treatments can be repeated.

High-grade non-invasive papillary (Ta) tumors are more likely to come back after treatment, so intravesical BCG is often recommended after surgery. Another option is intravesical chemotherapy with mitomycin. As with BCG, this is usually started several weeks after surgery and is given every week for several weeks. A third option is close observation without intravesical treatment.

Stage 0is: For flat non-invasive (Tis) tumors, BCG is the treatment of choice after surgery. Patients with these tumors often get 6 weekly treatments of intravesical BCG, starting a few weeks after TUR. Some doctors recommend repeating BCG treatment every 3 to 6 months. BCG treatment reduces the recurrence rate by at least half.

Stage 0 bladder cancers rarely need to be treated with partial or radical cystectomy. Cystectomy is considered only when there are many superficial cancers or when a superficial cancer continues to grow (or seems to be spreading) despite treatment.

Following treatment for any stage 0 cancer, close follow-up is recommended, with cystoscopy about every 3 to 6 months for at least a couple of years to look for signs of the cancer coming back or for new bladder tumors.

The outlook for people with stage 0a (non-invasive papillary) bladder cancer is excellent. These cancers are nearly always cured with the right treatment. During long-term follow-up care, more superficial cancers are often found in the bladder or elsewhere in the urinary system. Although these new cancers do need to be treated, they rarely are deeply invasive or life threatening.

The long-term outlook for stage 0is (flat non-invasive) bladder cancer is not quite as good as for stage 0a cancers. These cancers have a higher risk of coming back, and may return as a

more serious cancer, one that is growing into deeper layers of the bladder or has spread to other tissues.

Stage I

Stage I bladder cancers have grown into the connective tissue layer of the bladder wall but have not reached the muscle layer.

Transurethral resection (TUR) is typically the initial treatment for these cancers. Over half of these patients later get a new bladder cancer. In many cases, the new cancer will invade the bladder muscle and be a higher stage. This is more likely to happen if the first cancer is high grade.

Even if the cancer is found to be low grade, a second TUR may be recommended several weeks later. If the doctor feels that all of the cancer has been removed, intravesical BCG or mitomycin is given. If the doctor was not able to remove all of the cancer, options include either intravesical BCG or cystectomy (removal of part or all of the bladder).

If the cancer is high grade, if many tumors are present, or if the tumor is very large when it is first found, radical cystectomy may be recommended. This is done to try to keep the cancer from coming back and spreading elsewhere. Another option for some high-grade tumors may be a repeat transurethral resection (TUR) followed by intravesical BCG.

For people who can't have a cystectomy, radiation therapy (often along with chemo) may be an option as the main treatment, although the chances for cure may not be as good.

Stage II

These cancers have invaded the muscle layer of the bladder wall. Transurethral resection (TUR) is typically the first treatment for these cancers, but it is done to help determine the extent of the cancer rather than to try to cure it.

When the cancer has invaded the muscle, radical cystectomy is the standard treatment. Lymph nodes near the bladder are often removed as well. If cancer is in only one part of the bladder, some patients can be treated with a partial cystectomy instead. Only a small number of patients are good candidates for this.

Although at this stage cancer cells have not been detected outside the bladder, in some cases there may already be tiny deposits of cancer, called *micrometastases*, growing elsewhere in the body. These are too small to see on imaging tests but may eventually grow and become life threatening. This risk is greater with more deeply invasive cancers and higher-grade cancers. For this reason, chemotherapy is often given either before surgery (neoadjuvant chemo) or after surgery (adjuvant chemo) to lower the chance the cancer will come back in a distant site.

Many doctors prefer to give chemo before surgery because it has been shown to help patients live longer than surgery alone. When chemo is given first, surgery is delayed. This is not a problem if the chemotherapy causes the bladder cancer to shrink, but it might be harmful if the tumor continues to grow during chemotherapy.

Another option for some patients may be transurethral resection (TUR), followed by radiation and chemotherapy. Some people may prefer this because it lets them keep their bladder, but it's not clear if the outcomes are as good as they are after cystectomy, so not all doctors agree with this approach. If this treatment is used you will need frequent and careful follow-up exams. Some experts recommend a repeat cystoscopy and biopsy during treatment with chemo and radiation. If cancer is found in the biopsy sample, a cystectomy will likely be needed.

For patients who cannot have a major operation because of other serious medical conditions, TUR, radiation, or chemotherapy may be used as the only treatment. If the patient is well enough, chemotherapy may be given along with radiation therapy to help it work better.

Stage III

These cancers have reached the outside of the bladder and might have grown into nearby tissues or organs.

Transurethral resection (TUR) is typically done first to help determine the extent of the cancer. Radical cystectomy and removal of nearby lymph nodes is then the standard treatment. Partial cystectomy is seldom an option for stage III cancers.

Neoadjuvant chemotherapy is often given before surgery. It can shrink the tumor, which may make surgery easier. This can be especially useful for T4a tumors, which have grown outside the bladder. The chemotherapy may also kill any cancer cells that could already have spread to other areas of the body. This approach helps patients live longer than cystectomy alone. When chemotherapy is given first, surgery to remove the bladder is delayed. The delay is not a problem if the chemotherapy causes the bladder cancer to shrink, but it can be harmful if the tumor continues to grow during chemotherapy.

Some patients get chemotherapy after surgery (*adjuvant* treatment) to kill any areas of cancer cells left after surgery that are too small to see. Chemotherapy given after cystectomy may help patients stay cancer-free longer, but so far it's not clear if it helps them live longer.

Some patients with single, small T3a tumors can be treated with a transurethral resection (TUR) of the tumor followed by a combination of chemotherapy and radiation. If this isn't successful and cancer is found when cystoscopy is repeated, the patient might need cystectomy.

For patients who cannot have a major operation because of other serious medical conditions, TUR, radiation, or chemotherapy may be used as the only treatment. If the patient is well enough, chemotherapy may be given along with radiation therapy to help it work better.

Stage IV

These cancers have reached the abdominal or pelvic wall (T4b tumors) or have spread to nearby lymph nodes or distant parts of the body.

In most cases surgery (even radical cystectomy) cannot remove all of the cancer at this stage, so these cancers are very hard to get rid of completely. Treatment is usually aimed at slowing the cancer's growth and spread to help you live longer and feel better. If you and your doctor discuss surgery as treatment option, be sure you understand the goal of the operation – whether it is to try to cure the cancer, to help you live longer, or to help prevent or relieve symptoms from the cancer – before deciding on treatment.

For stage IV bladder cancers that have not spread to distant sites, chemotherapy (with or without radiation) is usually the first treatment. If the cancer shrinks in response to treatment, a cystectomy might be an option. Patients who can't tolerate chemotherapy (because of other health problems) are often treated with radiation therapy.

For stage IV bladder cancers that have spread to distant areas, chemotherapy is usually the first treatment, sometimes along with radical cystectomy or radiation therapy. Patients who can't tolerate chemotherapy (because of other health problems) are often treated with radiation therapy. Urinary diversion without cystectomy is sometimes done to prevent or relieve a blockage of urine that could otherwise cause severe kidney damage.

Because treatment is unlikely to cure these cancers, taking part in a clinical trial may offer you access to newer forms of treatment that might help you live longer or relieve symptoms.

Recurrent bladder cancer

When a cancer comes back after treatment, it is called *recurrent*. Recurrence can be local (in or near the place it started) or distant (spread to organs such as the lungs or bone). The outlook and treatment of recurrent bladder cancer depends on the location and extent of the recurrent cancer and the type of prior treatment. If cancer continues to grow during treatment or comes back, further treatment will depend on the extent of the cancer, what treatments have been used, and a person's health and desire for further treatment.

For example, non-invasive bladder cancers often recur locally in the bladder. The new cancer may be found either in the same site as the original cancer or at other sites in the bladder. These tumors are often treated the same way as the first tumor. But if the tumor keeps coming back, the patient may need a cystectomy at some point.

Cancers that recur in distant sites can be harder to remove with surgery and may require other treatments, such as chemotherapy or radiation therapy. For more information on recurrence, see our document *When Cancer Comes Back: Cancer Recurrence*.

At some point, it may become clear that standard treatments are no longer controlling the cancer. If you want to continue getting treatment, you might think about taking part in a

clinical trial of newer bladder cancer treatments. While these are not always the best option for every person, they may benefit you as well as future patients.

More treatment information about bladder cancer

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

The NCCN, made up of experts from many of the nation’s leading cancer centers, develops cancer treatment guidelines for doctors to use when treating patients. These are available on the NCCN website (www.nccn.org).

The NCI, part of the US National Institutes of Health, provides treatment information by phone (1-800-4-CANCER) and on its website (www.cancer.gov). More detailed information intended for use by cancer care professionals is also available on www.cancer.gov.

What should you ask your doctor about bladder cancer?

It is important for you to have honest, open discussions with your cancer care team. Ask any question, no matter how small it might seem. Some questions to consider:

- What type of bladder cancer do I have?
- Do you think my cancer has spread beyond the bladder?
- What is the stage and grade of my cancer, and what does that mean?
- Do 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 options?
- What do you recommend and why?
- What is the goal of each treatment?
- What are the chances my cancer can be cured?
- What risks or side effects should I expect? How long are they likely to last?

- If my bladder is removed, what are my options for urinary diversion? What are the pros and cons of each?
- How soon do I need to start treatment?
- What should I do to prepare for treatment?
- How long will treatment last? What will it be like? Where will it be done?
- How likely is it that the cancer will come back? Is there anything I can do to lower this risk?
- What will we do if the treatment doesn't work or if the cancer comes back?
- What type of follow-up will I need after treatment?

Along with these sample questions, be sure to write down some of your own. For instance, you might want to ask about getting a second opinion or about clinical trials for which you may qualify.

Keep in mind, too, that doctors are not the only ones who can give you information. Other health care professionals, such as nurses and social workers, may have the answers to some of your questions. You can find more information about communicating with your health care team in our document [Talking With Your Doctor](#).

What will happen after treatment for bladder cancer?

For some people with bladder cancer, treatment can remove or destroy the cancer. Completing treatment can be both stressful and exciting. You may be relieved to finish treatment, but find it hard not to worry about cancer coming back. (When cancer comes back after treatment, it is called *recurrence*.) This is a very common concern in people who have had cancer.

It may take a while before your fears lessen. But it may help to know that many cancer survivors have learned to live with this uncertainty and are living full lives. Our document *Living With Uncertainty: The Fear of Cancer Recurrence* gives more detailed information on this.

For other people, bladder cancer might never go away completely. They might get regular treatments with chemotherapy, radiation therapy, or other therapies to help keep the cancer in check. Learning to live with cancer as more of a chronic disease can be difficult and very stressful. It has its own type of uncertainty. Our document [When Cancer Doesn't Go Away](#) talks more about this.

Follow-up care

If you have completed treatment, your doctors will still want to watch you closely. People who have had bladder cancer are at high risk of developing a second bladder cancer, so it's very important to go to all of your follow-up appointments. During these visits, your doctors will ask questions about any problems you are having and may do exams (such as cystoscopy), lab tests (such as urine cytology), and imaging tests. These tests are described in the section "How is bladder cancer diagnosed?"

In people with no signs of cancer remaining, most experts recommend repeat exams every 3 to 6 months to see if the cancer is growing back or if there is a new cancer within the urinary system. Your schedule of exams and tests will depend on the original extent and grade of the cancer, what treatments you've had, and other factors. Be sure to follow your doctor's advice about follow-up tests. A typical follow-up plan includes urine cytology, a general physical exam, imaging tests, and routine blood tests. If your bladder hasn't been removed, regular cystoscopy exams will be part of the plan as well. The time between doctor visits may be extended after a few years if no new cancers are seen.

Some doctors recommend other lab tests as well, such as those discussed in the section "Can bladder cancer be found early?" Many different kinds of urine tests can help see if the cancer is coming back, but so far none of these can take the place of cystoscopy.

Follow-up is needed to check for cancer recurrence or spread, as well as possible side effects of certain treatments. This is the time for you to talk to your cancer care team about any changes or problems you notice and any questions or concerns you have.

Almost any cancer treatment can have side effects. Some can last for weeks or months, but others can last the rest of your life. Don't hesitate to tell your cancer care team about any symptoms or side effects that bother you so they can help you manage them.

If cancer does come back, treatment will depend on the location of the cancer and what treatments you've had before. It may be surgery, intravesical therapy, radiation therapy, chemotherapy, or some combination of these. For more information on how recurrent cancer is treated, see the section "Treatment of bladder cancer by stage." For more general information on dealing with a recurrence, you might also want to see our document *When Your Cancer Comes Back: Cancer Recurrence*.

For patients with a urostomy

If you had a radical cystectomy and now have a urostomy, you might worry even about everyday activities at first. You might have to alter some of your daily (and nightly) routines because of changes in how you urinate. Other issues such as having sex might also cause concerns. (See "Surgery for bladder cancer" for more on this and other possible side effects.)

It's normal to have worries and concerns when adjusting to such a major change, but it's important to know there are health care professionals who are specially trained to help people

with their urostomies. They can teach you to take care of your urostomy and help you cope with the changes it brings. You can also ask the American Cancer Society about programs offering information and support in your area. For more information, see our document *Urostomy: A Guide*.

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's important to 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(s) from any biopsies or surgeries
- Copies of imaging tests (CT or MRI scans, etc.), which can usually be stored digitally (on a DVD, etc.)
- If you had surgery, a copy of your operative report(s)
- If you stayed in the hospital, a copy of the discharge summary that the doctor prepared when you were sent home
- If you had radiation therapy, a summary of the type and dose of radiation and when and where it was given
- If you had chemotherapy or other treatments, a list of the drugs, drug doses, and when you took them

It is also very important to keep your health insurance. Tests and doctor visits cost a lot, and even though no one wants to think of their cancer coming back, this could happen.

Lifestyle changes after bladder cancer

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 choices to help you stay healthy and feel as well as you can. This can 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. Some people even start during cancer treatment.

Making healthier choices

For many people, a diagnosis of cancer helps them focus on their health in ways they may not have thought much about in the past. Are there things you could do that might make you healthier? Maybe you could try to eat better or get more exercise. Maybe you could cut down on alcohol, or give up tobacco. Even things like keeping your stress level under control may

help. Now is a good time to think about making changes that can have positive effects for the rest of your life. You will feel better and 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 the American Cancer Society for information and support at 1-800-227-2345.

Eating better

Eating right can be hard for anyone, but it can get even tougher during and after cancer treatment. Treatment may change your sense of taste. Nausea can be a problem. You may not feel like eating and lose weight when you don't want to. Or you may have gained weight that you can't seem to lose. All of these things can be very frustrating.

If treatment caused weight changes or eating or taste problems, do the best you can and keep in mind that these problems usually get better over time. You may find it helps to eat small portions every 2 to 3 hours until you feel better. You may also want to ask your cancer team about seeing a dietitian, an expert in nutrition who can give you ideas on how to deal with these treatment side effects.

One of the best things you can do after cancer treatment is put healthy eating habits into place. You may be surprised at the long-term benefits of some simple changes, like increasing the variety of healthy foods you eat. 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. You can get more information in our document [*Nutrition and Physical Activity During and After Cancer Treatment: Answers to Common Questions.*](#)

Rest, fatigue, and exercise

Extreme tiredness, called *fatigue*, is very common in people treated for cancer. This is not a normal 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 make it hard for them to exercise and do other things they want to do. But exercise can help reduce fatigue. Studies have shown that patients who follow an exercise program tailored to their personal needs feel better physically and emotionally and can cope better, too.

If you were sick and not very active during treatment, it is normal for your fitness, endurance, and muscle strength to decline. Any plan for physical activity should fit your own situation. A person who has never exercised will not be able to take on the same amount of exercise as someone who plays tennis twice a week. If you haven't been active in a few years, you will have to start slowly – maybe just by taking short walks.

Talk with your health care team before starting anything. Get their opinion about your exercise plans. Then, try to find an exercise buddy so you're not doing it alone. Having

family or friends involved when starting a new activity program can give you that extra boost of support to keep you going when the push just isn't there.

If you are very tired, you will need to balance activity with rest. It's OK to rest when you need to. Sometimes it's really hard for people to allow themselves to rest when they are used to working all day or taking care of a household, but this is not the time to push yourself too hard. Listen to your body and rest when you need to. (For more information on dealing with fatigue, please see *Fatigue in People With Cancer* and *Anemia in People With Cancer*.)

Keep in mind exercise can improve your physical and emotional health.

- It improves your cardiovascular (heart and circulation) fitness.
- Along with a good diet, it will help you get to and stay at a healthy weight.
- It makes your muscles stronger.
- It reduces fatigue and 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.

And long term, we know that 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 the cancer progressing or coming back?

Most people want to know if there are specific lifestyle changes they can make to reduce their risk of cancer progressing or coming back. Unfortunately, for most cancers there isn't much solid evidence to guide people. This doesn't mean that nothing will help – it's just that for the most part this is an area that hasn't been well studied. Most studies have looked at lifestyle changes as ways of preventing cancer in the first place, not slowing it down or preventing it from coming back.

Not enough is known about bladder cancer to say for sure if there are things you can do that will help. But because bladder cancer often comes back or new bladder cancers develop, this is an active area of study. Clinical trials are now looking to see if certain vitamins, minerals, dietary supplements, or medicines might lower the risk of bladder cancer returning (see "What's new in bladder cancer research and treatment?"). Adopting healthy behaviors such as not smoking, eating well, and staying at a healthy weight might help as well, but no one knows for sure. However, we do know that these types of changes can have positive effects on your health that can extend beyond your risk of cancer.

How might having bladder cancer affect your emotional health?

During and after treatment, you may find yourself overcome with many different emotions. This happens to a lot of people.

You may find yourself thinking about death and dying. Or maybe you're more aware of the effect the cancer has on your family, friends, and career. You may take a new look at your relationships with those around you. Unexpected issues may also cause concern. For instance, you might be stressed by financial concerns resulting from your treatment. You might also see your health care team less often after treatment and have more time on your hands. These changes can make some people anxious.

Almost everyone who is going through or has been through cancer can benefit from getting [some type of support](#). You need people you can turn to for strength and comfort. Support can come in many forms: family, friends, cancer support groups, church or spiritual groups, [online support communities](#), or one-on-one counselors. What's best for you depends on your situation and personality. Some people feel safe in peer-support groups or education groups. Others would rather talk in an informal setting, such as church. Others may feel more at ease talking one-on-one with a trusted friend or counselor. Whatever your source of strength or comfort, make sure you have a place to go with your concerns.

The cancer journey can feel very lonely. It's not necessary or good for you to try to deal with everything on your own. And your friends and family may feel shut out if you don't include them. Let them in, and let in anyone else who you feel can 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.

What if bladder cancer treatment is no longer working?

If cancer keeps growing or comes back after one kind of treatment, it's possible that another treatment plan that might still cure the cancer, or at least shrink it enough to help you live longer and feel better. But when a person has tried many different treatments and the cancer has not gotten any better, even newer treatments might not be helpful. If this happens, it's important to weigh the possible limited benefits of a new treatment against the possible downsides, including treatment side effects. Everyone has their own way of looking at this.

This is likely to be the hardest part of your battle with cancer – when you have been through many medical treatments and nothing's working anymore. Your doctor might offer you new

options, but at some point you may need to consider that treatment is not likely to improve your health or change your outcome or survival.

If you want to continue to get treatment for as long as you can, you need to think about the odds of treatment having any benefit and how this compares to the possible risks and side effects. Your doctor can estimate how likely it is the cancer will respond to treatment you are considering. For instance, the doctor may say that more treatment might have about a 1 in 100 chance of working. Some people are still tempted to try this. But it's important to have realistic expectations if you do choose this plan.

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*.

Palliative care

No matter what you decide to do, it is important that you feel as good as you can. Make sure you are asking for and getting treatment for any symptoms you might have, such as nausea or pain. This type of treatment is called *palliative care*.

Palliative care helps relieve symptoms, but is not expected to cure the disease. It can be given along with cancer treatment, or can even be cancer treatment. The difference is its purpose – the main goal is to improve the quality of your life, or help you feel as good as you can for as long as you can. Sometimes this means giving you drugs to help with symptoms like pain or nausea. Sometimes, though, the treatments used to control your symptoms are the same as those used to treat cancer. For instance, radiation might be used to help relieve pain caused by cancer that has spread to the bones. Or chemo might be used to help shrink a tumor and keep it from blocking the bowels. But this is not the same as treatment to try to cure the cancer. You can read more about this in the Palliative care section of our website, or call us at 1-800-227-2345 for a copy of our document *Palliative or Supportive Care*.

Hospice care

At some point, you may benefit from hospice care. This is special care that treats the person rather than the disease; it focuses on quality rather than length of life. Most of the time, it's given at home. Your cancer may be causing problems that need to be managed, and hospice focuses on your comfort. You should know that while getting hospice care often means the end of treatments such as chemo and radiation, it doesn't mean you can't have treatment for the problems caused by your cancer or other health conditions. In hospice the focus of your care is on living life as fully as possible and feeling as well as you can at this difficult time. You can learn more about hospice in our documents *Hospice Care* and *Nearing the End of Life*.

Staying hopeful is important, too. Your hope for a cure may not be as bright, but there's still hope for good times with family and friends – times that are filled with happiness and

meaning. Pausing at this time in your cancer treatment gives you a chance to refocus 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 bladder cancer research and treatment?

Important research into bladder cancer is being done right now in many university hospitals, medical centers, and other institutions around the world.

Understanding genetic changes in bladder cancer

Scientists have made great progress in learning about the differences between normal cells and bladder cancer cells. They are also finding out how these differences make cells grow too much and spread to other parts of the body.

Several changes in the DNA (genetic material) of bladder cancer cells have been found. Researchers are now trying to determine if tests that identify these DNA changes can help predict the prognosis (outlook) of bladder cancer patients (which might affect treatment) or if they are useful in finding bladder cancers that recur (come back) after treatment.

Researchers also hope to use this knowledge to develop new ways to treat bladder cancer.

Urine tests to look for bladder cancer

Several newer tests look for substances in the urine that might help show if a person has bladder cancer. These tests are used mainly to help diagnose bladder cancer or to look for recurrence in people who have already been treated. Researchers are now looking to see if these tests might be helpful even earlier, to screen for bladder cancer in people without symptoms (see "Can bladder cancer be found early?").

For example, one new test looks for a substance called *telomerase* in urine. Telomerase is an enzyme that is often found in abnormal amounts in cancer cells. Early results with this test have been promising, and more studies are now under way.

Reducing the risk of bladder cancer coming back

A major concern for people who have had bladder cancer is that they are at risk for developing a new cancer in the bladder or other parts of the urinary tract (including the lining of the kidneys, ureters, and urethra).

Studies are now looking to see if certain foods, vitamins (such as vitamin E), minerals (such as selenium), dietary supplements (such as green tea extract and broccoli sprout extract), chemotherapy drugs, or other drugs can reduce the risk of the cancer coming back or developing a second bladder cancer. Researchers are also looking to see if newer types of vaccines can boost the body's immune system and help lower the risk of a second cancer.

Bladder cancer treatment

Several newer types of treatment are now being studied for use against bladder cancer.

Surgery

Some surgeons are using a newer approach to cystectomy in which they sit at a control panel in the operating room and maneuver robotic arms to do the surgery. This approach, known as *robotic-assisted surgery*, lets the surgeon operate through several small incisions instead of one large one. This may help patients recover more quickly from surgery. This type of surgery is already used to treat some other cancers, such as prostate cancer, but it's not yet clear if it's as good as standard surgery for removing the bladder. This approach is being studied to see if this is the case.

Intravesical therapy

Researchers are looking at a number of new medicines to see if putting them into the bladder after surgery can help lower the risk of the cancer coming back. The hope is to find some that are better and/or safer than currently used drugs such as BCG and mitomycin.

Photodynamic therapy

Photodynamic therapy (PDT) is a newer treatment method that is now being studied to see if it is useful in treating early stage bladder cancers. A light-sensitive drug is injected into the blood and allowed to collect in the cancer cells for a few days. Then a special type of laser light is focused on the inner lining of the bladder through a cystoscope. The light changes the drug in the cancer cells into a new chemical that can kill them.

The advantage of PDT is that it can kill cancer cells with very little harm to nearby normal cells. One drawback is that the chemical must be activated by light, so only cancers near the surface of the bladder lining can be treated in this way. The light can't reach cancers that have grown deeper into the bladder wall or have spread to other organs.

The main side effect of PDT is an intense sensitivity to the sun that can last for a few weeks after therapy. Even small amounts of sunlight can cause severe burns in a short time, so it is very important to take precautions while getting this treatment.

You can read more about this kind of treatment in our document *Photodynamic Therapy*.

Targeted therapies

As researchers have learned more about some of the changes in bladder cells that cause them to become cancerous, they have begun to develop drugs that target these changes. These new targeted drugs work differently from standard chemo drugs. They may work in some cases when chemo drugs don't, and they tend to have different (and often less severe) side effects.

Many targeted drugs are already being used to treat other types of cancer. Some of these drugs are now being studied for use against bladder cancer as well, including sunitinib (Sutent[®]), lapatinib (Tykerb[®]), erlotinib (Tarceva[®]), trastuzumab (Herceptin[®]), and panitumumab (Vectibix[®]).

Other drugs target the blood vessels that allow tumors to grow. These are known as *anti-angiogenesis drugs*. Examples include bevacizumab (Avastin[®]), sorafenib (Nexavar[®]), cabozantinib (Cometriq[®]), and pazopanib (Votrient[®]), which are already used for some other types of cancer. They are now being studied for use against bladder cancer, usually combined with chemotherapy.

Many other new targeted drugs are being studied in clinical trials as well.

Gene therapy

Gene therapy – adding or changing the actual genes inside cancer cells or other cells in the body – is another new treatment method being tested for bladder cancer. One of these approaches uses special viruses that have been modified in the lab. The modified virus is put into the bladder and infects the bladder cancer cells. When this infection occurs, the virus injects a gene into the cells for GM-CSF, an immune system hormone (cytokine) that may help immune system cells to attack the cancer. This and other approaches to gene therapy are still in the early stages of development.

Additional resources for bladder cancer

More information 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

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

[Talking With Your Doctor](#) (also in Spanish)

[Health Professionals Associated With Cancer Care](#)

[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)

[A Guide to Chemotherapy](#) (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 and treatment side effects

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

[Nausea and Vomiting](#)

[Guide to Controlling Cancer Pain](#) (also in Spanish)

[Anemia in People With Cancer](#)

[Fatigue in People With Cancer](#)

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

National organizations and websites

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

Urology Care Foundation

Toll-free number: 1-800-828-7866

Website: www.urologyhealth.org

Information about bladder cancer and other cancers of the urological system. Some available in Spanish.

Bladder Cancer Advocacy Network (BCAN)

Website: www.bcan.org

Toll-free number: 1-888 901 2226

Offers information on bladder cancer, dealing with diagnosis, resources for patients and families, online support group and a quarterly e-newsletter.

Bladder Cancer Webcafe

Website: www.blcwebcafe.org

Internet-only information and support for people with bladder cancer; discussion forum, tips for the newly diagnosed, survival guide for hospitalizations for patients and caregivers. Also in Japanese.

National Cancer Institute

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

Website: www.cancer.gov

Offers free, accurate, up-to-date information about many types of cancer to patients, their families, and the general public; has information about coping and family; and can also help people find clinical trials in their area.

United Ostomy Associations of America, Inc. (UOAA)

Toll-free number: 1-800-826-0826

Website: www.ostomy.org

A network of support groups committed to quality of life for people with ostomies; online support for teens and others, discussion boards, conferences.

International Ostomy Association

Website: www.ostomyinternational.org

Dedicated to improving the quality of life of people with ostomies, offers help in forming new associations, lists regional associations on their website.

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