

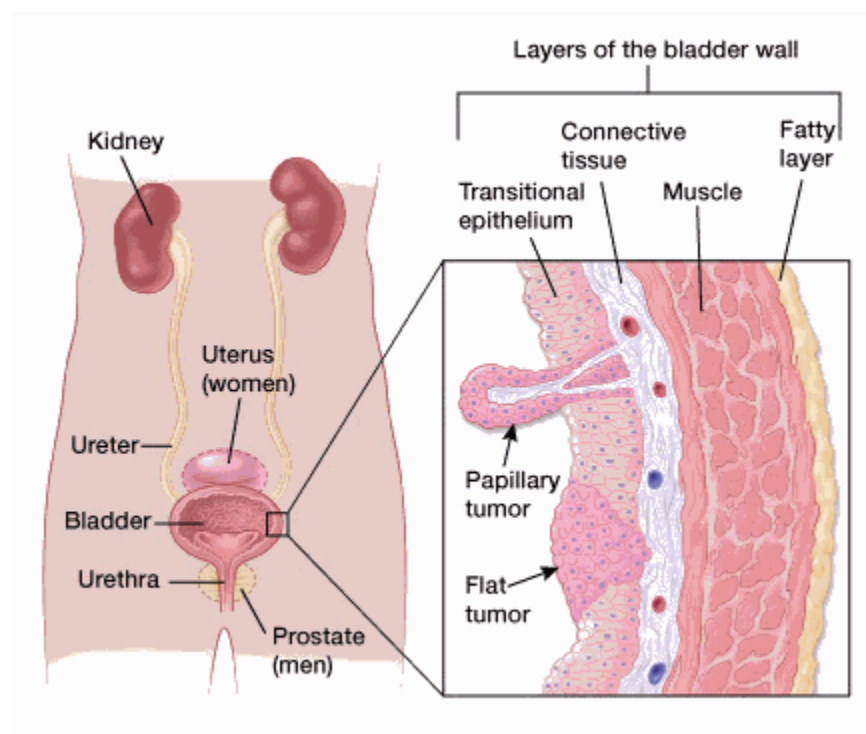
Bladder Cancer

What Is Bladder Cancer?

Bladder cancer starts when cells in the urinary bladder start to grow out of control. As more cancer cells develop, they can form a tumor and, with time, might spread to other parts of the body.

The bladder

The bladder is a hollow organ in the lower pelvis. Its main job is to store urine. Urine is liquid waste made by the kidneys and then carried to the bladder through tubes called **ureters**. The wall of the bladder is made up of several layers (see image). When you urinate, the muscles in the wall of the bladder contract, and urine is forced out of the bladder through a tube called the **urethra**.



Types of bladder cancer

Different types of cancer can start in the bladder.

Urothelial carcinoma (transitional cell carcinoma)

Urothelial carcinoma, also known as transitional cell carcinoma (TCC), starts in the urothelial cells that line the inside of the bladder. This is by far the most common type of

bladder cancer. If you're told you have bladder cancer, it's very likely to be a urothelial carcinoma.

Urothelial cells also line the inside of other parts of the urinary tract, such as the part of the kidney that connects to the ureter (called the **renal pelvis**), the ureters, and the urethra. People with bladder cancer sometimes have tumors in these places, too, so all of the urinary tract needs to be checked for tumors.

There are different subtypes of urothelial carcinoma, which are based on how the cancer cells look under a microscope. Most often the subtype doesn't affect how the cancer is treated, although some subtypes might be more likely to have gene changes that could affect treatment options.

Urothelial carcinoma with divergent differentiation

Sometimes urothelial cancers contain very small areas that look like some of the other cancer types below (known as **divergent differentiation**). For example, the cancer may contain areas of squamous or glandular differentiation. Most often, this doesn't affect treatment options.

Other cancers that start in the bladder

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

Squamous cell carcinoma

In the US, only about 3% to 5% of bladder cancers are squamous cell carcinomas (SCCs). Seen with a microscope, the cells look much like the flat cells that are found on the surface of the skin.

Adenocarcinoma

Only about 1% to 2% of bladder cancers are adenocarcinomas. These cancers start in gland-forming cells.

Small cell carcinoma

Less than 1% of bladder cancers are small cell carcinomas. These cancers start in nerve-like cells called neuroendocrine cells. These cancers often grow quickly and usually need to be treated with chemotherapy like that used for [small cell lung cancer](#).

Sarcoma

Sarcomas are cancers that start in connective tissues in the body. In the bladder, sarcomas can start in the muscle cells of the bladder, although these cancers are very rare. More information on sarcomas can be found in [Soft Tissue Sarcoma](#) and [Rhabdomyosarcoma](#).

Start and spread of bladder cancer

The wall of the bladder has several layers. Each layer is made up of different kinds of cells (see the image above).

Most bladder cancers start in the innermost lining of the bladder, which is called the **urothelium** or **transitional epithelium**. As the cancer grows, it can invade into or through the deeper layers of the bladder wall. As the cancer becomes more advanced, it can be harder to treat.

Over time, the cancer might grow outside the bladder and into nearby structures. It might spread to nearby lymph nodes, or to other parts of the body. When bladder cancer spreads, it tends to go to the lymph nodes, the bones, the lungs, or the liver.

Muscle invasive vs. non-muscle invasive bladder cancer

Bladder cancers are often grouped for treatment purposes based on if they have invaded into the main muscle layer of the bladder wall (see the image above):

- **Non-muscle invasive bladder cancer (NMIBC)** has *not* grown into the muscle layer. This is also sometimes described as **superficial bladder cancer**. Included in this group are both non-invasive (stage 0) bladder tumors (see below), as well as some early invasive (stage I) cancers.
- **Muscle invasive bladder cancer (MIBC)** has grown into the muscle layer of the bladder wall, and possibly deeper. These cancers are more likely to spread, and they tend to be harder to treat.

Flat vs. papillary non-invasive bladder tumors

In non-invasive bladder cancer, the cancer cells are still only in the inner layer (the transitional epithelium) of the bladder wall and have not grown into the deeper layers. These tumors are divided into 2 subtypes, flat and papillary, based on how they grow (see the image above).

Non-invasive flat carcinomas do not grow toward the hollow part of the bladder. These tumors are also known as **carcinoma in situ (CIS)**.

Non-invasive papillary carcinomas grow in thin, finger-like projections from the inner wall of the bladder toward the hollow center. Different terms might be used to describe these tumors, based on how they look under a microscope:

- **Papillary urothelial neoplasm of low-malignant potential (PUNLMP):** These are very low-grade (slow growing) tumors. They are very unlikely to become invasive, and they tend to have very good outcomes. However, they can sometimes come back after treatment.
- **Non-invasive low-grade papillary urothelial carcinoma (LGPUC):** The cells in these tumors look a little more abnormal. While these tumors rarely become invasive, they are more likely to come back after treatment.
- **Non-invasive high-grade papillary urothelial carcinoma (HGPUC):** In these tumors, the cells look very abnormal. These tumors have a high risk of becoming invasive, and sometimes they can be a sign that there's an invasive cancer nearby.

Bladder Cancer Risk Factors

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

What is a risk factor?

A risk factor is anything that raises your chance of getting a disease such as cancer. Different cancers have different risk factors. You can change some risk factors, like smoking. Others, like your age or family history, can't be changed.

But having a risk factor, or even many, doesn't mean that you will get the disease. Many people with risk factors never get bladder cancer, while others with this disease may have few or no known risk factors.

Still, it's 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're at higher risk of bladder cancer because of certain factors, there might be things you can do that could help [find it early](#), when treatment is most likely to be effective.

Smoking

Smoking is a major risk factor for bladder cancer. People who smoke are at least 3 times as likely to get bladder cancer as people who don't. Smoking causes about half of all bladder cancers.

If you or someone you know smokes and would like help quitting, see our [Guide to Quitting Smoking](#), or call us at 1-800-227-2345 for 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 have a higher risk of bladder cancer.

Industries carrying higher risks include 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, [firefighters](#), hairdressers (probably 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. So, people who smoke and also work with cancer-causing chemicals have an especially high risk of bladder cancer.

Certain medicines or herbal supplements

Some research has suggested that the use of the diabetes medicine **pioglitazone** might be linked with an increased risk of bladder cancer. The risk seems to get higher when higher doses are used.

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 a higher 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 low arsenic content. For most Americans, drinking water isn't a major source of arsenic.

Not drinking enough fluids

People who drink a lot of fluids each day tend to have lower rates of bladder cancer. This might be because they empty their bladders more often, which could keep chemicals from lingering in their bladder.

Race and ethnicity

White people are about twice as likely to develop bladder cancer as African American and Hispanic people. Asian American people have slightly lower rates of bladder cancer. The reasons for these differences are not well understood.

Older age

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

Being born male

Bladder cancer is 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 (ongoing) bladder irritation have been linked to bladder cancer (especially squamous cell carcinoma of the bladder). But it's not clear if they cause bladder cancer.

Schistosomiasis (also known as bilharziasis), an infection with a parasitic worm 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 much more common. This infection is an extremely rare cause of bladder cancer in the United States.

Personal history of bladder or other urothelial cancer

Urothelial carcinomas can sometimes start in different areas in the bladder, as well as in the lining of the kidney, the ureters, and urethra. Having cancer in the lining of any part of the urinary tract puts you at higher risk of having another cancer, either in the same spot as before, or in another part of the urinary tract. This is true even when the first tumor is removed completely.

For this reason, people who have had bladder cancer (or other urothelial cancers) need careful follow-up to look for new cancers.

Bladder birth defects

Before birth, there's a connection between the belly button and the bladder. This is called the **urachus**. If part of this connection remains after birth, it could develop into cancer. Cancers that start in the urachus are usually adenocarcinomas, which are made up of cancerous gland cells. Some adenocarcinomas of the bladder start here. But this is still rare, accounting for less than 1% of all bladder cancers.

Another rare birth defect called **exstrophy** greatly increases a person's risk of bladder cancer. In bladder exstrophy, both the bladder and the abdominal wall in front of the bladder don't close completely during fetal 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 a higher risk of getting it themselves. Sometimes this may be because the family members are exposed to the same cancer-causing chemicals (like those in tobacco smoke). They may also share changes in some genes (like *GSTM1* and *NAT2*) that make it hard for their bodies to break down certain toxins, which can make them more likely to get 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** (*RB1*) gene can cause [cancer of the eye](#) in infants, and also increases the risk of bladder cancer.
- **Cowden disease**, caused by mutations in the *PTEN* gene, 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 might also have an increased risk of bladder cancer, as well as other cancers of the urinary tract.

For information on testing for inherited gene changes that increase cancer risk, see [Understanding Genetic Testing for Cancer Risk](#).

Chemotherapy or radiation therapy

Taking the chemotherapy drug cyclophosphamide for a long time can irritate the bladder and increase the risk of bladder cancer. Those taking this drug are often told to drink plenty of fluids to help protect the bladder from irritation.

People who get radiation to the pelvis to treat other types of cancer are more likely to develop bladder cancer.

Bladder Cancer Signs and Symptoms

Bladder cancer can often be found early because it can cause signs or symptoms that lead a person to see a health care provider.

Blood in the urine

Most often, blood in the urine (**hematuria**) is the first sign of bladder cancer. There may be enough blood to change the color of the urine to orange, pink, or, less often, dark 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 symptoms a person is having or as part of a general medical check-up.

Blood might not be visible in the urine every day if a person has bladder cancer. It might go away and then come back at some point.

Usually, early bladder cancer (cancer that is small and still only in the bladder) causes bleeding but little or no pain or other symptoms.

Most often, having blood in your urine doesn't mean you have bladder cancer. It's more likely to be due to something else like an infection, a benign (not cancer) tumor, a stone in the kidney or bladder, or some other benign kidney disease. Still, it's important to have it checked by a doctor so the cause can be found and treated, if needed.

Changes in bladder habits or symptoms of irritation

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

- Having to go more often than usual
- Pain or burning during urination
- Feeling as if you need to go right away, even when your bladder isn't full
- Having trouble going or having a weak urine stream
- Having to get up to go many times during the night

These symptoms are more likely to be caused by something other than cancer, such as a urinary tract infection (UTI), bladder stones, an overactive bladder, or an enlarged prostate (in men). Still, it's 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 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
- Feeling tired or weak
- Swelling in the feet
- Bone pain

Again, many of these symptoms are more likely to be caused by something other than bladder cancer, but it's important to have them checked.

If there's a reason to suspect you might have bladder cancer, the doctor will use one or more [exams or tests](#) to find out if it's cancer or something else.

Tests for Bladder Cancer

Bladder cancer is often found because of [signs or symptoms](#) a person is having. Sometimes it might be found because of the results of a lab test a person gets for another reason.

If bladder cancer is suspected, exams and tests will be needed to confirm the diagnosis. If cancer is found, more tests will be done to help find out the extent ([stage](#)) of the cancer.

Medical history and physical exam

Your doctor will ask about your medical history to learn more about your symptoms. The doctor might also ask about possible [risk factors for bladder cancer](#), including your family history.

A physical exam can provide information about possible signs of bladder cancer and other health problems. The doctor might do a digital rectal exam (DRE), during which a gloved, lubricated finger is put into your rectum. If you are a woman, the doctor might do a pelvic exam as well. During these exams, the doctor can sometimes feel a bladder tumor, determine its size, and feel if and how far it has spread.

If the results of the history and exam suggest bladder cancer might be the cause, the doctor will order lab tests to help find out for sure.

If you're seeing your primary care doctor, you might also be referred to a **urologist** for further tests and treatment. A urologist is a doctor who specializes in diseases of the urinary system and male reproductive system.

Urine lab tests

Urinalysis

This is a simple lab test to check for blood and other substances in a sample of urine.

Urine cytology

For this test, a sample of urine is looked at with a microscope to see if there are any cancer or pre-cancer cells in it. Cytology is also done on any bladder washings taken during a cystoscopy (see below). Cytology can help find some cancers, but it isn't perfect. Not finding cancer on this test doesn't always mean you are cancer free.

Urine culture

If you're having urinary symptoms, this test may be done to see if they're from an infection. Urinary tract infections (UTIs) and bladder cancers can cause many of the same 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 (biomarker) tests

Different urine tests can be used to look for specific substances made by bladder cancer cells (known as **tumor markers** or **biomarkers**). One or more of these tests may be used, often along with urine cytology, to help see if you have 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 antigen (BTA), also known as CFHrp, 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 the NMP22 protein in the urine. People who have bladder cancer often have higher levels of this protein.

Other biomarker tests might be used as well, and many new biomarker tests are now being developed.

Some doctors find urine biomarker tests to be useful in looking for bladder cancers, but these tests may not always be helpful. Most doctors feel that cystoscopy is still the best way to find bladder cancer.

Some of these tests might be more helpful for looking for bladder cancer that has come back in someone who has already had it, rather than for first diagnosing it.

Cystoscopy

If bladder cancer is suspected, your doctor will likely recommend a cystoscopy, which is a procedure done by a urologist.

For this test, a **cystoscope**, which is a long, thin, flexible tube with a light and a lens or a small video camera on the end, is inserted through the urethra and up into the bladder. This lets the doctor look at the inner lining of the bladder, as well as take **biopsy** samples from abnormal areas, if needed (see “Biopsy results” below). For details on how this procedure is done, see [Cystoscopy](#).

Fluorescence cystoscopy (also known as **blue light cystoscopy**) may be done along with routine cystoscopy. For this exam, a light-activated drug is put into the bladder during cystoscopy. This drug is taken up by cancer cells. When the doctor shines a blue light through the cystoscope, any cells containing the drug will glow (fluoresce). This can help the doctor see abnormal areas that might have been missed by the white light normally used.

Bladder cancer can sometimes start in more than one area of the bladder (or in other parts of the urinary tract). Because of this, the doctor may take samples from different parts of the bladder, especially if cancer is strongly suspected but no tumor can be seen. Salt-water washings of the inside the bladder may also be collected and tested for cancer cells.

Transurethral resection of bladder tumor (TURBT)

A cystoscopy can often be used to make the initial diagnosis of bladder cancer, but this typically needs to be confirmed with a **transurethral resection of bladder tumor** (TURBT), also known as just a **transurethral resection** (TUR).

During this procedure, the doctor removes any tumors from the bladder lining, as well as some of the bladder muscle around the tumors. The removed samples are then sent to a lab to look for cancer. If cancer is found, testing can also show if it has invaded (spread into) the muscle layer of the bladder wall. This is important in determining the [stage](#) (extent) of the cancer, which can help determine the best treatment options.

As with cystoscopy, the doctor might use a special light source to find tumors in the bladder:

- **Fluorescence endoscopy** is much like fluorescence cystoscopy, which is described above.
- For **narrow band imaging (NBI)**, a special wavelength of light is used to help show tumors and nearby blood vessels in the bladder lining.

TURBT can also be thought of as part of the treatment for most early-stage bladder cancers (see [Treatment of Bladder Cancer, by Stage](#)).

For more on how this procedure is done, see [Bladder Cancer Surgery](#).

Biopsy results

Biopsy samples (from a cystoscopy or TURBT) are sent to a lab, where they are looked at and tested by a **pathologist**, a doctor trained in diagnosing diseases such as cancer with lab tests. If bladder cancer is found, 2 important features are its invasiveness (part of the stage) and grade.

Invasiveness

The biopsy can show how deeply the cancer has grown into the bladder wall. This is very important in deciding treatment options.

Bladder cancers are often grouped based on if they have invaded into the main muscle layer of the bladder wall:

Non-muscle invasive bladder cancer (NMIBC) has *not* grown into the muscle layer. This is also sometimes described as **superficial bladder cancer**. Included in this group are:

- **Non-invasive (stage 0) bladder tumors:** These tumors have not grown deeper than the layer of cells they started in.
- **Early invasive (stage I) bladder cancers:** These tumors have grown into the layer of connective tissue under the lining layer of the bladder, but have not reached the muscle layer in the bladder wall.

Muscle invasive bladder cancer (MIBC) has grown into the muscle layer of the bladder wall, and possibly deeper. These cancers are more likely to spread, and they tend to be harder to treat.

For more on how bladder cancers might be described on a biopsy, see [What Is Bladder Cancer?](#)

Grade

Bladder cancers are also assigned a grade, based on how the cancer cells look under a microscope.

- **Low-grade cancers** (also called **well-differentiated cancers**) look more like normal bladder tissue. These cancers tend to grow slowly.
- **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 spread outside the bladder. In fact, most invasive bladder cancers are high grade. These cancers tend to be harder to treat.

Testing bladder cancer cells for gene or protein changes

If you have advanced bladder cancer, your cancer cells might be tested for certain gene or protein changes that could affect your treatment options. This type of testing might go

by different names, such as **molecular, genomic, or biomarker testing**. It might be done on cells from a biopsy sample or from a sample of your blood.

For example, testing might be done to check the cancer cells for changes in the *FGFR3* gene. Cancers with changes in this gene are more likely to be helped by treatment with a [targeted drug](#). Tests might also be done to look for other gene or protein changes that could affect your treatment.

To learn more about this type of testing, see [Biomarker Tests and Cancer Treatment](#).

Genetic testing for some people with bladder cancer

Not everyone with bladder cancer might need genetic testing. But some people might have an inherited gene change that greatly increased their risk of bladder cancer. This is more likely in people who:

- Are diagnosed with bladder cancer at a younger age (typically before age 45)
- Also have a family history of colon or bladder cancer (and therefore might have [Lynch syndrome](#))

For many people with bladder cancer, genetic counseling and/or testing might be recommended to look for certain [inherited gene changes](#). Before being tested, it's important to understand what genetic testing might or might not tell you, as well as what the results might mean for you (and possibly your family members). This is why it's important to speak with your doctor or a genetic counselor before being tested.

For more on genetic testing in general, see [Understanding Genetic Testing for Cancer Risk](#).

Imaging tests

[Imaging tests](#) use x-rays, magnetic fields, sound waves, or radioactive substances to make pictures of the inside of your body.

If your doctor thinks you might have bladder cancer, one or more of these tests might be done to look for tumors in the bladder (or in other parts of the urinary tract), which can then be biopsied to find out for sure.

If you've been diagnosed with bladder cancer, your doctor may order some of these tests to see if the cancer has spread to tissues and organs near the bladder, to nearby lymph nodes, or to distant parts of your body.

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.

Computed tomography (CT) scan

A [CT scan](#) uses x-rays to make detailed cross-sectional pictures of your body. A CT scan of the kidney, ureters, and bladder is called 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 can also help show enlarged lymph nodes that might contain cancer, as well as other organs in the abdomen (belly) and pelvis.

A CT scan of the chest might also be done to look for tumors in the lungs, especially for bladder cancers that are at higher risk of spreading.

CT-guided needle biopsy: CT scans can also be used to guide a biopsy needle into a suspected tumor. This is not done to biopsy tumors in the bladder, but it can be used to take samples from areas where the cancer may have spread, such as a lymph node. To do this, you lie on the CT scanning table while the doctor advances a biopsy needle through your skin and into the tumor.

Before having a CT scan, it's important to tell your doctor if you have any allergies or have ever had a reaction to CT or x-ray dyes, or if you have any type of kidney problems, such as chronic kidney disease or an elevated creatinine blood test.

Magnetic resonance imaging (MRI)

Like CT scans, [MRIs](#) show detailed images of soft tissues in the body. But MRIs use radio waves and strong magnets instead of x-rays to make the images.

MRI images are very useful in showing cancer that 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**, might be used instead of a CT urogram to look at the upper part of the urinary system, especially in people with poor kidney function or who have had reactions to x-ray contrast dyes in the past.

Ultrasound

[Ultrasound](#) uses sound waves and their echoes 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 usually an easy test to have, and it uses no radiation.

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

Intravenous pyelogram (IVP)

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. X-rays are done while this is happening. The dye outlines these organs on the x-rays and helps show urinary tract tumors.

This test isn't done as much as it was in the past, as often a CT scan (see above) can be done to provide the same information.

Before having an IVP, it's important to tell your doctor if you have any allergies or have ever had a reaction to CT scan or x-ray dyes, or if you have any type of kidney problems. If so, your doctor might choose to do another test instead.

Retrograde pyelogram

For this test, a catheter (thin tube) is put in 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 often, 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.

Chest x-ray

A [chest x-ray](#) may be done to see if the bladder cancer has spread to the lungs. This test is not needed if a CT scan of the chest has been done.

Positron emission tomography (PET) scan

A [PET scan](#) is not commonly done in people with bladder cancer, but it might be used to see if the cancer has spread to lymph nodes or other parts of the body. It is more likely to be useful in people whose cancer is at higher risk for spreading.

For this test, you are injected with a slightly radioactive form of sugar (known as FDG), which collects mainly in cancer cells. A special camera is then used to create a picture of areas of radioactivity in the body. A PET scan doesn't show as much detail as an MRI or CT scan, but it can often show cancer spread in any part of the body.

PET/CT scan: Many centers have special machines that do both a PET and CT scan at the same time (PET/CT scan). This lets the doctor compare areas of higher radioactivity on the PET scan with the more detailed appearance of that area on the CT scan.

Bone scan

A [bone scan](#) can help look for cancer that has spread to bones. This test usually isn't done unless you have symptoms such as bone pain, or if blood tests show the cancer might have spread to your bones.

For this test, you get an injection of a small amount of low-level radioactive material that settles in areas of damaged bone throughout your body. A special camera detects the radioactivity and creates a picture of your skeleton.

A bone scan may suggest cancer in the bone, but to be sure, other imaging tests such as plain x-rays, MRI scans, or even a bone biopsy might be needed.

Biopsies to look for cancer spread

If imaging tests suggest the cancer might have spread outside of the bladder, a [biopsy](#) might be needed to be sure.

In some cases, biopsy samples of suspicious areas are taken during surgery to remove the bladder cancer.

Another way to get a biopsy sample is to use a long, 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 surgery. Sometimes a CT scan or ultrasound is used to help guide the biopsy needle into the abnormal area.

Can Bladder Cancer Be Prevented?

There is no sure way to prevent bladder cancer. Some [risk factors](#), like your age and family history, can't be controlled. But there might be things you can do that could help lower your risk.

Don't smoke

Smoking is thought to cause about half of all bladder cancers. If you're 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

Workers in industries that use certain chemicals have a higher risk of bladder cancer. This includes the rubber, leather, printing materials, textiles, and paint industries. Other workers with an increased risk of developing bladder cancer include painters and [firefighters](#). If your work might expose you to chemicals that could raise your risk of bladder cancer, be sure to follow good work safety practices.

Some chemicals found in certain hair dyes might also increase risk, so it's 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 on this, see [Hair Dyes](#).

Some research has suggested that people exposed to [diesel](#) fumes at work might also have a higher risk of bladder cancer (as well as some other cancers), so limiting this exposure might be helpful.

Drink plenty of liquids

Some research suggests that drinking a lot of fluids, mainly water, might lower a person's risk of bladder cancer.

Limit arsenic intake

[Arsenic](#) in drinking water has been linked with a higher risk of bladder cancer in some parts of the world. Arsenic levels in water are higher in some parts of the US than in others.

Arsenic occurs naturally, so it can't be avoided completely, but there may be things you can do to lower your exposure. If your drinking water comes from a public source, you can find out about the levels of arsenic in your drinking water by contacting your local water system. If you get your water from a private source such as a well, you may want to have your water tested for arsenic levels by a reputable lab. People who live in areas with high levels of arsenic in the water may consider using alternative sources of drinking water, such as bottled water.

Limiting consumption of foods known to contain high levels of arsenic, such as seafood, rice and rice products, and fruit juice, might also help lower exposure.

Eat plenty 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 a healthy diet has been shown to have many health benefits, including lowering the risk of some other types of cancer.

Studies to date have not found that taking vitamins or other dietary supplements can help prevent bladder cancer.