



About Bladder Cancer

Overview and Types

If you have been diagnosed with bladder cancer or are worried about it, you likely have a lot of questions. Learning some basics is a good place to start.

- [What Is Bladder Cancer?](#)

Research and Statistics

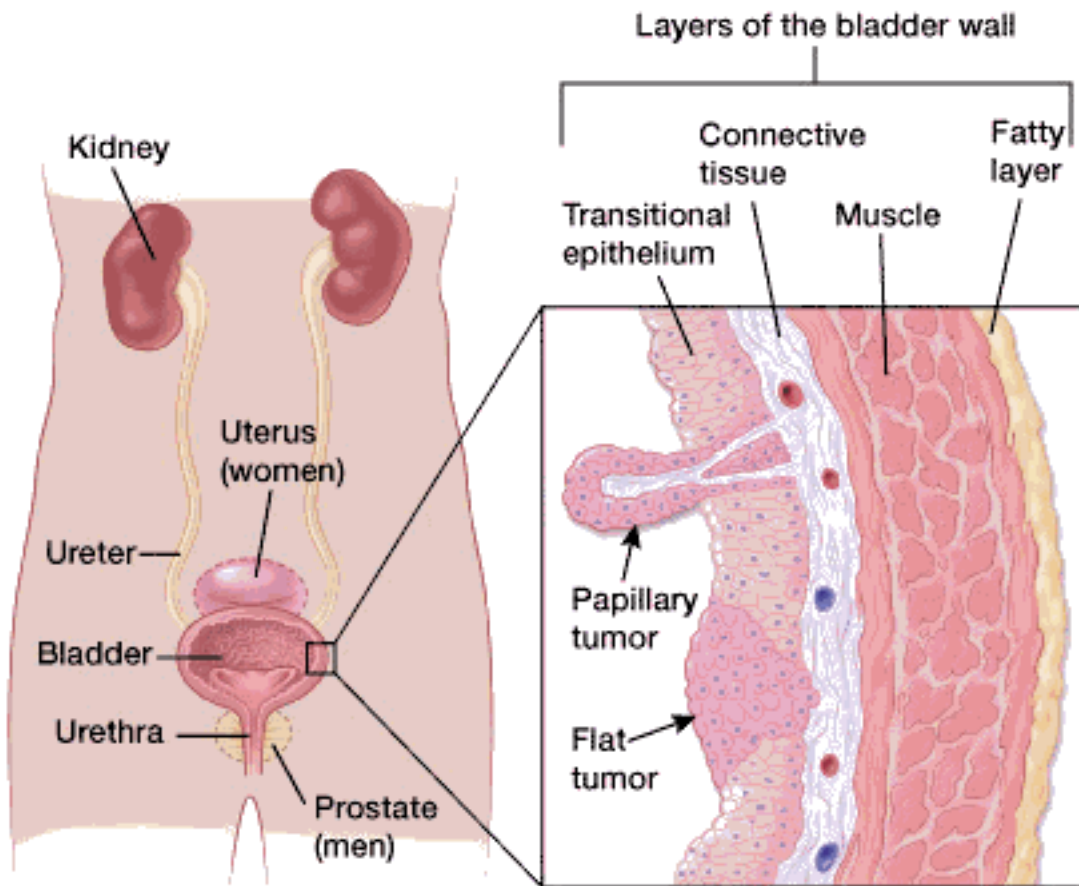
See the latest estimates for new cases of bladder cancer and deaths in the US and what research is currently being done.

- [Key Statistics for Bladder Cancer](#)
- [What's New in Bladder Cancer Research?](#)

What Is Bladder Cancer?

Bladder cancer begins when cells in the urinary bladder start to grow uncontrollably. As more cancer cells develop, they can form a tumor and spread to other areas of the body. (To learn more about how cancers start and spread, see [What Is Cancer?](#))

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. 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*.



Start and spread of bladder cancer

The wall of the bladder has several layers, which are made up of different types of cells (see [How is bladder cancer staged?](#) for descriptions of the different layers).

Most bladder cancers start in the innermost lining of the bladder, which is called the *urothelium* or *transitional epithelium*. As the cancer grows into or through the other layers in the bladder wall, it becomes more advanced and 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. (If bladder cancer spreads, it often goes first to distant lymph nodes, the bones, the lungs, or the liver.)

Types of bladder cancer

Several types of cancer can start in the bladder.

Urothelial carcinoma (transitional cell carcinoma)

Urothelial carcinoma, also known as *transitional cell carcinoma* (TCC), is by far the most common type of bladder cancer. In fact, if you are told you have bladder cancer it is almost certain to be a urothelial carcinoma. These cancers start in the urothelial cells that line the inside of the bladder.

Urothelial cells also line 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. Patients with bladder cancer sometimes have other tumors in these places, so the entire urinary tract needs to be checked for tumors.

Invasive versus non-invasive bladder cancer

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

- **Non-invasive** cancers are still in the inner layer of cells (the transitional epithelium) but have not grown into the deeper layers.
- **Invasive** cancers have grown into deeper layers of the bladder wall. These 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.

Papillary versus flat cancer

Bladder cancers 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 (slow growing), non-invasive papillary cancer is sometimes called *papillary urothelial neoplasm of low-malignant potential* (PUNLMP) 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 urothelial (or transitional cell) 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 urothelial (transitional cell) 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 can be found in [Soft Tissue Sarcoma](#) and [Rhabdomyosarcoma](#).

These less common types of bladder cancer (other than sarcoma) are treated similar to TCCs, especially for early stage tumors, but if chemotherapy is needed, different drugs might be used.

- [References](#)

[See all references for Bladder Cancer](#)

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Key Statistics for Bladder Cancer

How common is bladder cancer?

The American Cancer Society's estimates for bladder cancer in the United States for 2017 are:

- About 79,030 new cases of bladder cancer (about 60,490 in men and 18,540 in women)
- About 16,870 deaths from bladder cancer (about 12,240 in men and 4,630 in women)

The rates of new bladder 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.

Bladder cancer accounts for about 5% of all new cancers in the US. It is the fourth most common cancer in men, but it is less common in women.

Risk of bladder cancer

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 88. (But each person's chances of getting bladder cancer can be affected by certain [risk factors](#).)

Whites are diagnosed with bladder cancer about twice as often as African Americans or Hispanic Americans.

Extent of cancer at the time of diagnosis

About half of all bladder cancers are first found while the cancer is still confined to the inner layer of the bladder wall. (These are called *non-invasive* or *in situ* cancers.) About 1 in 3 bladder cancers have invaded into deeper layers but are still only in the bladder. In most of the remaining cases, the cancer has spread to nearby tissues or lymph

nodes outside the bladder. Rarely (in about 4% of cases), it has spread to distant parts of the body. Black patients are slightly more likely to have more advanced disease when they are diagnosed, compared to whites.

Survival statistics are discussed in [Survival rates for bladder cancer, by stage](#).

Visit the American Cancer Society's [Cancer Statistics Center](#) for more key statistics.

- [References](#)

[See all references for Bladder Cancer](#)

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What's New in Bladder Cancer Research?

Important research into causes, prevention, detection, and treatment of bladder cancer is being done right now in many medical centers 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 learning how these differences help cancer cells grow too much and spread to other parts of the body.

Researchers are now trying to determine if tests that identify genetic changes in bladder cancer cells can help predict a person's prognosis (outlook), 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 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?](#)).

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 being done.

Reducing the risk of bladder cancer coming back

A major concern for people who have had bladder cancer is that they have a high risk of 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 or 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 studying 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 a *robotic cystectomy*, 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 now being studied to see if it's 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.

An 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.

A major 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's very important to take precautions while getting this treatment.

You can read more about this kind of treatment in [Photodynamic Therapy](#).

Immunotherapy

[Immunotherapy](#) is treatment that uses the body's own immune system to fight the cancer.

Intravesical immunotherapy: One form of immunotherapy already used to treat some early bladder cancers is BCG, which is a type of [intravesical therapy](#). When this germ is put into the bladder (in liquid form), it attracts immune cells to the bladder lining, which then attack cancer cells.

Immune checkpoint inhibitors: An important part of the immune system is its ability to keep itself from attacking the body's normal cells. It does this by using "checkpoints" – molecules on immune cells that need to be turned on (or off) to start an immune response. Cancer cells sometimes use these checkpoints to avoid being attacked by the immune system.

Newer [drugs that target checkpoint molecules](#) such as PD-1 and PD-L1 hold a lot of promise as bladder cancer treatments. Examples include **atezolizumab (Tecentriq)**, **durvalumab (Imfinzi)**, and **avelumab (Bavencio)**, which target PD-L1, as well as **nivolumab (Opdivo)** and **pembrolizumab (Keytruda)**, which target PD-1. These drugs have been shown to shrink some bladder cancers, and several of them have now been approved to treat advanced bladder cancer.

Other types of immunotherapy are now being studied as well.

Targeted therapies

As researchers have learned more about some of the changes in bladder cells that cause them to become cancer, 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 used to treat other types of cancer. Some of these drugs are now being studied for use against bladder cancer as well, including lapatinib (Tykerb) and erlotinib (Tarceva).

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 approach to gene therapy 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 that can help immune system cells to attack the cancer. This and other approaches to gene therapy are still in the early stages of development.

- [References](#)

[See all references for Bladder Cancer](#)

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