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# Bladder Cancer Causes, Risk Factors, and Prevention

## Risk Factors

A risk factor is anything that affects your chance of getting a disease such as cancer. Learn more about the risk factors for bladder cancer.

- [Bladder Cancer Risk Factors](#)
- [What Causes Bladder Cancer?](#)

## Prevention

There's no way to completely prevent cancer. But there are things you can do that might help lower your risk. Learn more.

- [Can Bladder Cancer Be Prevented?](#)

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# Bladder Cancer Risk Factors

A risk factor is anything that affects your chance of getting a disease such as cancer. Different cancers have different risk factors. You can change some risk factors, like smoking or weight ; others, like your age or family history, you can't.

But having a risk factor, or even many, does not 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 because of certain factors, you might be helped by tests that could [find it early](#)<sup>1</sup>, when treatment is most likely to be effective.

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

## **Risk factors you can change**

### **Smoking**

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

If you or someone you know smokes and would like help quitting, see our [Guide to Quitting Smoking](#)<sup>2</sup>, 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, hairdressers (probably because of heavy exposure to [hair dyes](#)<sup>3</sup>), and truck drivers (likely because of exposure to [diesel](#)<sup>4</sup> fumes).

Cigarette smoking and workplace exposures can act together to cause bladder cancer. So, smokers who also work with cancer-causing chemicals have an especially high risk of bladder cancer.

### **Certain medicines or herbal supplements**

According to the US Food and Drug Administration (FDA), use of the diabetes medicine pioglitazone (Actos<sup>®</sup>) is linked with an increased risk of bladder cancer. The risk seems to 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](#)<sup>5</sup> 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, especially water, 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.

### **Risk factors you cannot change**

#### **Race and ethnicity**

Whites are about twice as likely to develop bladder cancer as African Americans and 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 (ongoing) bladder irritation have been linked to bladder cancer (especially squamous cell carcinoma of the bladder). But it's not clear if they actually 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 is an extremely rare cause of bladder cancer in the United States.

### **Personal history of bladder or other urothelial cancer**

Urothelial carcinomas can sometimes form 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 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 become cancer. Cancers that start in the urachus are usually adenocarcinomas, which are made up of cancerous gland cells. About one-third of the adenocarcinomas of the bladder start here. But this is still rare, accounting for less than half of 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 *GST* and *NAT*) 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](#)<sup>6</sup> 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](#)<sup>7</sup> and [thyroid](#)<sup>8</sup>. 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](#)<sup>9</sup> and [endometrial](#)<sup>10</sup> 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](#)<sup>11</sup>.

## Chemotherapy or radiation therapy

Taking the chemotherapy drug cyclophosphamide (Cytosan<sup>®</sup>) for a long time 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.

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

## Hyperlinks

1. [www.cancer.org/cancer/bladder-cancer/detection-diagnosis-staging/detection.html](http://www.cancer.org/cancer/bladder-cancer/detection-diagnosis-staging/detection.html)
2. [www.cancer.org/healthy/stay-away-from-tobacco/guide-quitting-smoking.html](http://www.cancer.org/healthy/stay-away-from-tobacco/guide-quitting-smoking.html)
3. [www.cancer.org/cancer/cancer-causes/hair-dyes.html](http://www.cancer.org/cancer/cancer-causes/hair-dyes.html)
4. [www.cancer.org/cancer/cancer-causes/diesel-exhaust-and-cancer.html](http://www.cancer.org/cancer/cancer-causes/diesel-exhaust-and-cancer.html)
5. [www.cancer.org/cancer/cancer-causes/arsenic.html](http://www.cancer.org/cancer/cancer-causes/arsenic.html)
6. [www.cancer.org/cancer/retinoblastoma.html](http://www.cancer.org/cancer/retinoblastoma.html)
7. [www.cancer.org/cancer/breast-cancer.html](http://www.cancer.org/cancer/breast-cancer.html)
8. [www.cancer.org/cancer/thyroid-cancer.html](http://www.cancer.org/cancer/thyroid-cancer.html)
9. [www.cancer.org/cancer/colon-rectal-cancer.html](http://www.cancer.org/cancer/colon-rectal-cancer.html)
10. [www.cancer.org/cancer/endometrial-cancer.html](http://www.cancer.org/cancer/endometrial-cancer.html)

11. [www.cancer.org/cancer/cancer-causes/genetics/understanding-genetic-testing-for-cancer.html](http://www.cancer.org/cancer/cancer-causes/genetics/understanding-genetic-testing-for-cancer.html)

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Yan H, Xie H, Ying Y, et al. Pioglitazone use in patients with diabetes and risk of bladder cancer: a systematic review and meta-analysis. *Cancer Manag Res*. 2018;10:1627-1638.

See all references for Bladder Cancer ([www.cancer.org/cancer/bladder-cancer/references.html](http://www.cancer.org/cancer/bladder-cancer/references.html))

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# What Causes Bladder Cancer?

Researchers do not know exactly what causes most bladder cancers. But they have found some risk factors (see [Bladder Cancer Risk Factors](#)) and are starting to understand how they cause cells in the bladder to become cancer.

Certain changes in the DNA inside normal bladder cells can make them grow abnormally and form cancers. DNA is the chemical in our cells that makes up our genes, which control 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](#)<sup>1</sup> control when cells grow, divide into new cells, and die:

- Genes that help cells grow, divide, and stay alive are called **oncogenes**.
- Genes that normally help control cell division, repair mistakes in DNA, or cause cells to die at the right time are called **tumor suppressor genes**.

Cancers can be caused by DNA changes (gene mutations) that turn on oncogenes or turn off tumor suppressor genes. Several different gene changes are usually needed for a cell to become cancer.

## Acquired gene mutations

Most gene mutations related to bladder cancer develop during a person's life rather than having been inherited before birth. Some of these acquired gene 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 urine, where they can affect bladder cells. Other chemicals may reach the bladder the same way. But sometimes, 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 people. 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 spread into 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.

## Inherited gene mutations

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

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 have developed tests to identify such people, but these tests are not routinely done. It's not certain how helpful the results of such tests might be, since doctors already recommend that all people avoid tobacco smoke and hazardous industrial chemicals.

## Hyperlinks

1. [www.cancer.org/cancer/cancer-causes/genetics/genes-and-cancer.html](http://www.cancer.org/cancer/cancer-causes/genetics/genes-and-cancer.html)

## References

Genetics Home Reference. Bladder Cancer. Causes. Accessed at [https://ghr.nlm.nih.gov/condition/bladder-cancer?\\_ga=2.149580150.1343795506.1544189895-158363511.1543433756#genes](https://ghr.nlm.nih.gov/condition/bladder-cancer?_ga=2.149580150.1343795506.1544189895-158363511.1543433756#genes) on December 7, 2018.

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See all references for Bladder Cancer ([www.cancer.org/cancer/bladder-cancer/references.html](http://www.cancer.org/cancer/bladder-cancer/references.html))

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# Can Bladder Cancer Be Prevented?

There is no sure way to prevent bladder cancer. Some [risk factors](#), like age, gender,



race, 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. (This includes any type of smoking -- cigarettes, cigars, or pipes. ) If you're thinking about [quitting smoking](#)<sup>1</sup> 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 organic chemicals have a higher risk of bladder cancer. Workplaces where these chemicals are commonly used include the rubber, leather, printing materials, textiles, and paint industries. If you work in a place where you might be exposed to such chemicals, 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](#)<sup>2</sup>.

Some research has suggested that people exposed to [diesel](#)<sup>3</sup> fumes in the workplace 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**

There's 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 a healthy diet has been shown to have many benefits, including lowering the risk of some other types of cancer.

Studies to date have not found that any vitamins or supplements help prevent

bladder cancer. In fact, beta-carotene supplements have been found to slightly increase risk.

## Hyperlinks

1. [www.cancer.org/healthy/stay-away-from-tobacco/guide-quitting-smoking.html](http://www.cancer.org/healthy/stay-away-from-tobacco/guide-quitting-smoking.html)
2. [www.cancer.org/cancer/cancer-causes/hair-dyes.html](http://www.cancer.org/cancer/cancer-causes/hair-dyes.html)
3. [www.cancer.org/cancer/cancer-causes/diesel-exhaust-and-cancer.html](http://www.cancer.org/cancer/cancer-causes/diesel-exhaust-and-cancer.html)

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