



# Prostate 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 prostate cancer.

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

## Prevention

There is no sure way to prevent prostate cancer. But there are things you can do that might lower your risk. Learn more.

- [Can Prostate Cancer Be Prevented?](#)
- [Prostate Cancer Prevention and Early Detection](#)

## Prostate 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. 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 one or more risk factors never get cancer, while others who get cancer may have had few or no known risk factors.

Researchers have found several factors that might affect a man's risk of getting prostate cancer.

## Age

Prostate cancer is rare in men younger than 40, but the chance of having prostate cancer rises rapidly after age 50. About 6 in 10 cases of prostate cancer are found in men older than 65.

## Race/ethnicity

Prostate cancer occurs more often in African-American men and in Caribbean men of African ancestry than in men of other races. African-American men are also more than twice as likely to die of prostate cancer as white men. Prostate cancer occurs less often in Asian-American and Hispanic/Latino men than in non-Hispanic whites. The reasons for these racial and ethnic differences are not clear.

## Geography

Prostate cancer is most common in North America, northwestern Europe, Australia, and on Caribbean islands. It is less common in Asia, Africa, Central America, and South America.

The reasons for this are not clear. More intensive screening in some developed countries probably accounts for at least part of this difference, but other factors such as lifestyle differences (diet, etc.) are likely to be important as well. For example, Asian Americans have a lower risk of prostate cancer than white Americans, but their risk is higher than that of men of similar backgrounds living in Asia.

## Family history

Prostate cancer seems to run in some families, which suggests that in some cases there may be an inherited or [genetic factor](#). (Still, most prostate cancers occur in men without a family history of it.)

Having a father or brother with prostate cancer more than doubles a man's risk of developing this disease. (The risk is higher for men who have a brother with the disease than for those who have a father with it.) The risk is much higher for men with several affected relatives, particularly if their relatives were young when the cancer was found.

## Gene changes

Several [inherited gene changes](#) seem to raise prostate cancer risk, but they probably account for only a small percentage of cases overall. For example:

- Inherited mutations of the *BRCA1* or *BRCA2* genes raise the risk of breast and ovarian cancers in some families. Mutations in these genes (especially in *BRCA2*) may also increase prostate cancer risk in some men.
- Men with Lynch syndrome (also known as *hereditary non-polyposis colorectal cancer*, or HNPCC), a condition caused by inherited gene changes, have an increased risk for a number of cancers, including prostate cancer.

Other inherited gene changes can also raise a man's risk of prostate cancer. For more on some of these gene changes, see [What Causes Prostate Cancer?](#)

## Factors with less clear effect on prostate cancer risk

### Diet

The exact role of [diet](#) in prostate cancer is not clear, but several factors have been studied.

Men who eat a lot of red meat or high-fat dairy products appear to have a slightly higher chance of getting prostate cancer. These men also tend to eat fewer fruits and vegetables. Doctors aren't sure which of these factors is responsible for raising the risk.

Some studies have suggested that men who consume a lot of calcium (through food or supplements) may have a higher risk of developing prostate cancer. Dairy foods (which are often high in calcium) might also increase risk. But most studies have not found such a link with the levels of calcium found in the average diet, and it's important to note that calcium is known to have other important health benefits.

### Obesity

Being [obese](#) (very overweight) does not seem to increase the overall risk of getting prostate cancer.

Some studies have found that obese men have a lower risk of getting a low-grade (less dangerous) form of the disease, but a higher risk of getting more aggressive prostate

cancer. The reasons for this are not clear.

Some studies have also found that obese men may be at greater risk for having more advanced prostate cancer and of dying from prostate cancer, but not all studies have found this.

## **Smoking**

Most studies have not found a link between [smoking](#) and *getting* prostate cancer. Some research has linked smoking to a possible small increased the risk of dying from prostate cancer, but this finding needs to be confirmed by other studies.

## **Chemical exposures**

There is some evidence that firefighters can be exposed to chemicals that may increase their risk of prostate cancer.

A few studies have suggested a possible link between exposure to Agent Orange, a chemical used widely during the Vietnam War, and the risk of prostate cancer, although not all studies have found such a link. The Institute of Medicine considers there to be “limited/suggestive evidence” of a link between Agent Orange exposure and prostate cancer. To learn more, see [Agent Orange and Cancer](#).

## **Inflammation of the prostate**

Some studies have suggested that *prostatitis* (inflammation of the prostate gland) may be linked to an increased risk of prostate cancer, but other studies have not found such a link. Inflammation is often seen in samples of prostate tissue that also contain cancer. The link between the two is not yet clear, and is an active area of research.

## **Sexually transmitted infections**

Researchers have looked to see if sexually transmitted infections (like gonorrhea or chlamydia) might increase the risk of prostate cancer, because they can lead to inflammation of the prostate. So far, studies have not agreed, and no firm conclusions have been reached.

## **Vasectomy**

Some studies have suggested that men who have had a vasectomy (minor surgery to

make men infertile) have a slightly increased risk for prostate cancer, but other studies have not found this. Research on this possible link is still under way.

- [References](#)

[See all references for Prostate Cancer](#)

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## What Causes Prostate Cancer?

Researchers do not know exactly what causes prostate cancer. But they have found some [risk factors](#) and are trying to learn just how these factors cause prostate cells to become cancer.

On a basic level, prostate cancer is caused by changes in the DNA of a normal prostate cell. DNA is the chemical in our cells that makes up our [genes](#). Our genes 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 control when our cells grow, divide into new cells, and die:

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

Cancer can be caused in part by DNA changes (mutations) that turn on oncogenes or turn off tumor suppressor genes.

DNA changes can either be inherited from a parent or can be acquired during a person's lifetime.

### Inherited gene mutations

Some gene mutations can be passed from generation to generation and are found in all cells in the body. These mutations are *inherited*. Inherited gene changes cause about

5% to 10% of prostate cancers. Cancer caused by inherited genes is called *hereditary cancer*. Several inherited mutated genes have been linked to hereditary prostate cancer, including:

***RNASEL (formerly HPC1)***: The normal function of this tumor suppressor gene is to help cells die when something goes wrong inside them. Inherited mutations in this gene might let abnormal cells live longer than they should, which can lead to an increased risk of prostate cancer.

***BRCA1 and BRCA2***: These tumor suppressor genes normally help repair mistakes in a cell's DNA (or cause the cell to die if the mistake can't be fixed). Inherited mutations in these genes more commonly cause breast and ovarian cancer in women. But changes in these genes (especially *BRCA2*) also account for a small number of prostate cancers.

**DNA mismatch repair genes (such as *MSH2* and *MLH1*)**: These genes normally help fix mistakes (mismatches) in DNA that are made when a cell is preparing to divide into 2 new cells. (Cells must make a new copy of their DNA each time they divide.) Men with inherited mutations in these genes have a condition known as *Lynch syndrome* (also known as *hereditary non-polyposis colorectal cancer*, or HNPCC), and are at increased risk of colorectal, prostate, and some other cancers.

***HOXB13***: This gene is important in the development of the prostate gland. Mutations in this gene have been linked to early-onset prostate cancer (prostate cancer diagnosed at a young age) that runs in some families. Fortunately, this mutation is rare.

Other inherited gene mutations may account for some hereditary prostate cancers, and research is being done to find these genes.

## Acquired gene mutations

Some gene mutations happen during a person's lifetime and are not passed on to children. These changes are found only in cells that come from the original mutated cell. These are called *acquired* mutations. Most gene mutations related to prostate cancer seem to develop during a man's life rather than having been inherited.

Every time a cell prepares to divide into 2 new cells, it must copy its DNA. This process is not perfect, and sometimes errors occur, leaving defective DNA in the new cell. It's not clear how often these DNA changes might be random events, and how often they are influenced by other factors (such as diet, hormone levels, etc.). In general, the more quickly prostate cells grow and divide, the more chances there are for mutations to occur. Therefore, anything that speeds up this process may make prostate cancer more

likely.

For example, androgens (male hormones), such as testosterone, promote prostate cell growth. Having higher levels of androgens might contribute to prostate cancer risk in some men.

Some research has found that men with high levels of another hormone, insulin-like growth factor-1 (IGF-1), are more likely to get prostate cancer. However, other studies have not found such a link. Further research is needed to make sense of these findings.

As mentioned in [Prostate Cancer Risk Factors](#), some studies have found that inflammation in the prostate may contribute to prostate cancer. One theory is that inflammation might lead to cell DNA damage, which may contribute to a normal cell becoming a cancer cell. More research is needed in this area.

Exposure to [radiation](#) or [cancer-causing chemicals](#) can cause DNA mutations in many organs, but these factors have not been proven to be important causes of mutations in prostate cells.

- [References](#)

[See all references for Prostate Cancer](#)

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## Can Prostate Cancer Be Prevented?

There is no sure way to prevent prostate cancer. Many [risk factors](#) such as age, race, and family history can't be controlled. But there are some things you can do that might lower your risk of prostate cancer.

### Body weight, physical activity, and diet

The effects of body weight, physical activity, and diet on prostate cancer risk are not clear, but there are things you can do that might lower your risk, such as:

- Eating at least 2½ cups of a wide variety of vegetables and fruits each day.
- Being physically active.
- Staying at a healthy weight.

To learn more, see our [American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention](#).

## Vitamin, mineral, and other supplements

Some earlier studies suggested that taking certain vitamin or mineral supplements, such as vitamin E or selenium, might lower prostate cancer risk. But in a large study, neither vitamin E nor selenium was found to lower prostate cancer risk.

Several studies are now looking at the possible effects of soy proteins (called *isoflavones*) on prostate cancer risk. The results of these studies are not yet available.

Any supplement has the potential for both risks and benefits. Before starting vitamins or other supplements, talk with your doctor.

## Medicines

Some drugs might help reduce the risk of prostate cancer.

### 5-alpha reductase inhibitors

The drugs finasteride (Proscar) and dutasteride (Avodart) have been studied to see if they can lower prostate cancer risk, but it's not clear if the benefits outweigh the risks for most men. Still, men who want to know more about these drugs should discuss them with their doctors. These drugs are currently used to treat benign prostatic hyperplasia (BPH), a non-cancerous growth of the prostate.

### Aspirin

Some research suggests that men who take a daily aspirin might have a lower risk of getting and dying from prostate cancer. But more research is needed to show if the possible benefits outweigh the risks, such as an increased risk of bleeding.

### Other drugs



Other drugs and dietary supplements that might help lower prostate cancer risk are now being tested in clinical trials. But so far, none have been proven to do so.

For more on these topics, see [Prostate Cancer Prevention and Early Detection](#).

- [References](#)

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