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Prostate Cancer Causes, Risk Factors, and Prevention

Learn about the risk factors for prostate cancer and what you might be able to do to help lower your risk.

Risk Factors

A risk factor is anything that increases your chances of getting a disease such as cancer. Learn more about the risk factors for prostate cancer.

- [Prostate Cancer Risk Factors](#)
- [What Causes Prostate Cancer?](#)
- [Genetic Counseling and Testing for Prostate Cancer Risk](#)

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 Risk Factors

All men are at risk for developing prostate cancer, but there are factors that can

Dietary vegetable intake, soy products, coffee, and multivitamin use have also been studied. However, none of these factors has consistently been linked to prostate cancer risk.

Obesity

[Obesity](#)² does not seem to increase the overall risk of getting prostate cancer.

Some studies have found that men with obesity have a lower risk of getting a low-grade (slower-growing) form of the disease, but a higher risk of getting more aggressive (faster-growing) prostate cancer. The reasons for this are not clear.

Some studies have also found that men with obesity may be at higher 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](#)³ and **getting** prostate cancer. Some research has linked smoking to a small increased risk of dying from prostate cancer, but this finding needs to be confirmed by other studies. Importantly, smoking is clearly linked with many other health effects, including an increased risk of many other types of cancer.

Chemical exposures

Research has suggested that exposure to some chemicals might increase prostate cancer risk. For example:

Some studies have suggested a link between exposure to **arsenic** and a higher risk of prostate cancer. To learn more, see [Arsenic and Cancer Risk](#)⁴.

There is some evidence that **firefighters** can be exposed to chemicals that may increase their risk of prostate cancer. To learn more, see [Firefighters and Cancer Risk](#)⁵.

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 National Academies of Science, Engineering, and 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](#)⁶.

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 this 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 had conflicting results, and no firm conclusions have been reached.

Vasectomy

Some studies have suggested that men who have a vasectomy (minor surgery to make men infertile) have a slightly increased risk for prostate cancer, but other studies have found no increase in risk. Research on this possible link is still underway.

Hyperlinks

1. www.cancer.org/cancer/risk-prevention/genetics.html
2. www.cancer.org/cancer/risk-prevention/diet-physical-activity/body-weight-and-cancer-risk.html
3. www.cancer.org/cancer/risk-prevention/tobacco.html
4. www.cancer.org/cancer/risk-prevention/chemicals/arsenic.html
5. www.cancer.org/cancer/risk-prevention/chemicals/firefighting.html
6. www.cancer.org/cancer/risk-prevention/chemicals/agent-orange-and-cancer.html

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What Causes Prostate Cancer?

prostate cancers. Cancer caused by inherited genes is called **hereditary cancer**.

Inherited mutations in several genes have been linked to hereditary prostate cancer, including:

- **BRCA1 and BRCA2:** These 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 either of these genes greatly increase the risk of breast and ovarian cancer in women. They are also linked to some other cancers. For example, changes in these genes (especially *BRCA2*) are linked to an increased risk of prostate cancer.
- **CHEK2, ATM, PALB2, and RAD51:** Mutations in these other DNA repair genes might also be responsible for some hereditary prostate cancers.
- **DNA mismatch repair genes (such as MSH2, MSH6, MLH1, and PMS2):** These genes normally help fix mistakes (mismatches) in DNA that can happen 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 one of 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.
- **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.
- **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. This mutation is rare.

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

(and therefore if it's in all of your cells). This might help you learn more about your risk of other cancers, and possibly the risks among other members of your family. To learn more, see [Genetic Counseling and Testing for Prostate Cancer Risk](#).

Acquired gene mutations

Some genes can change during a person's lifetime. This type of mutation is not passed on to children, and it's found only in cells that come from the original mutated cell. These are called **acquired** mutations. Most gene mutations linked to prostate cancer develop during a man's life, rather than having been inherited.

Every time a cell prepares to divide into 2 cells, it needs to make a copy of its DNA for the new cell. This process isn't 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 might make prostate cancer more likely.

For example, androgens (male hormones), such as testosterone, can promote prostate cell growth. Having higher levels of androgens might contribute to prostate cancer risk in some men, although studies so far have not found a consistent link.

Some research has found that men with high levels of another hormone, insulin-like growth factor-1 (IGF-1), might be 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 might be linked to prostate cancer. One theory is that inflammation might lead to cell DNA damage, which could contribute to a normal cell becoming a cancer cell. More research is needed in this area.

Exposure to [radiation](#)⁴ or [cancer-causing chemicals](#)⁵ can cause DNA mutations in many organs, but so far these factors haven't been shown to be important causes of mutations in prostate cells.

Hyperlinks

1. www.cancer.org/cancer/understanding-cancer/genes-and-cancer/oncogenes-tumor-suppressor-genes.html
2. www.cancer.org/cancer/types/prostate-cancer/detection-diagnosis-staging/how-diagnosed.html
3. www.cancer.org/cancer/types/prostate-cancer/treating/targeted-therapy.html
4. www.cancer.org/cancer/risk-prevention/radiation-exposure.html
5. www.cancer.org/cancer/risk-prevention/understanding-cancer-risk.html

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Genetic Counseling and Testing for Prostate Cancer Risk

Some people inherit changes (mutations) in certain genes that increase their risk of prostate cancer (and possibly other cancers).

Genetic testing can look for mutations in some of these genes. Genetic testing can be helpful in some situations. But not everyone needs to be tested, and it's important to understand what genetic testing can and can't tell you before these tests are done.

- [Inherited gene changes that can increase prostate cancer risk](#)
- [Why might genetic counseling and testing be helpful?](#)
- [Who might be advised to get genetic testing?](#)
- [Considering genetic counseling and testing for prostate cancer risk](#)
- [How genetic testing is done](#)
- [Getting the results of genetic testing](#)

Inherited gene changes that can increase prostate cancer risk

Inherited mutations in several genes have been linked to an increased risk of prostate cancer, including:

- ***BRCA1*** and ***BRCA2***
- ***CHEK2***
- ***ATM***
- ***PALB2***
- **DNA mismatch repair genes (such as *MSH2*, *MSH6*, *MLH1*, and *PMS2*)** (linked with **Lynch syndrome**, also known as hereditary non-polyposis colorectal cancer, or HNPCC)
- ***HOXB13***

Other inherited gene mutations may account for some hereditary prostate cancers as well. To learn more about these genes, see [What Causes Prostate Cancer?](#)

Why might genetic counseling and testing be helpful?

The main benefit of genetic testing is that it can help you better understand your risk for

a certain disease, such as prostate cancer. Genetic testing isn't perfect, but it can often help you make decisions about your health. Here are some ways in which the results of genetic testing might be helpful:

If testing shows you have a gene mutation that raises your risk of prostate cancer (and possibly other cancers, depending on the gene change), it might lead you to:

- Take steps that could lower your risk.
- Start getting screening tests at a younger age, which might help find cancer early.
- Be aware of possible signs and symptoms of cancer, so you can see your health care provider earlier if you have them.
- Inform your family members about the gene mutation, so they can decide if they want to be tested for it as well.

If you have prostate cancer and genetic testing shows you have an inherited mutation, this might affect your treatment options. For example, some [targeted drugs](#)¹ are only likely to be helpful if your cancer cells have certain gene mutations. The test result might also lead you to inform your family members, who can then decide if they want to be tested.

If testing does not find a gene mutation, it can help reassure you and might help lessen your anxiety about your prostate cancer risk (as well as that of your family members). At the same time, it's important to know that genetic testing has limits. For example, not all tests look for the same gene changes. Tests often look for the most common gene mutations, but they don't look for every gene change that might affect your risk. This means it's possible you might still have an inherited gene mutation even if testing doesn't find one.

And of course, not having an inherited gene mutation doesn't mean your prostate cancer risk is zero. It means you have about the same risk as most other men, and you can decide what steps you want to take based on this information.

The results of genetic testing aren't always straightforward. This is why genetic counseling is an important part of the genetic testing process. Before testing, a health care provider trained in genetic counseling can explain what the tests can tell you, which can help you decide if testing is right for you. Then, if testing is done, they can

Not all men need genetic testing for prostate cancer risk. Genetic counseling and testing is more likely to be recommended if there's reason to think you could have an inherited

Getting the results of genetic testing

Genetic test results are usually available within 2 to 3 weeks. The results might come back as:

- **Positive for a mutation that was tested for.** If the test does find an important mutation, there might be [steps you can take to help lower your risk of prostate cancer](#)⁵ (or other cancers), or to find it early, when treatment is most likely to be successful. If you've already been diagnosed with prostate cancer, a positive result might affect your cancer treatment options. A positive result might also have implications for your family members.
- **Negative for the mutation(s) tested for.** It can be reassuring to find out that the test didn't find a mutation that increases your risk. But it's important to know that genetic test results can't always guarantee that you're not at increased risk. For instance, you might have a gene change that was not tested for.
- **Inconclusive.** In some cases, the test might not be able to tell for sure if you have a gene mutation.
- **Positive for a variant of unknown significance (VUS).** This means that the test found a gene change (variant), but it's not known if this particular change affects your risk.

The results of genetic testing can sometimes be complex or confusing, which is why it's important to go over them with a genetic counselor or another health care professional trained in genetic counseling. They can explain what the results might mean for you (and possibly other family members).

To learn more about the process of genetic testing and the different types of test results, see [What Happens During Genetic Testing for Cancer Risk?](#)⁶

Hyperlinks

1. www.cancer.org/cancer/types/prostate-cancer/treating/targeted-therapy.html
2. www.cancer.org/cancer/types/prostate-cancer/detection-diagnosis-staging/risk-groups.html
3. www.cancer.org/cancer/diagnosis-staging/tests/biopsy-and-cytology-tests/understanding-your-pathology-report/prostate-pathology/high-grade-

[prostatic-intraepithelial-neoplasia.html](#)

4. www.cancer.org/cancer/risk-prevention/genetics/genetic-testing-for-cancer-risk.html
5. www.cancer.org/cancer/types/breast-cancer/risk-and-prevention/can-i-lower-my-risk.html
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Can Prostate Cancer Be Prevented?

have a slightly higher risk of prostate cancer.

Soy and isoflavones: Some early research has suggested possible benefits from soy proteins (called isoflavones) in lowering prostate cancer risk. Several studies are now looking more closely at the possible effects of these proteins.

Taking any supplement could have 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

5-alpha reductase is an enzyme in the body that changes testosterone into dihydrotestosterone (DHT), the main hormone that causes the prostate to grow. Drugs called **5-alpha reductase inhibitors**, such as **finasteride** and **dutasteride**, block this enzyme from making DHT. These drugs are used to treat benign prostatic hyperplasia (BPH), a non-cancerous growth of the prostate.

Large studies of both of these drugs have tested if they might also be useful in lowering prostate cancer risk. In these studies, men taking either drug were less likely to develop prostate cancer after several years than men getting an inactive placebo.

When the results were looked at more closely, the men who took these drugs had fewer low-grade prostate cancers, but they had about the same risk of higher-grade prostate cancers, which are more likely to grow and spread. It's not clear if these drugs can lower the risk of dying from prostate cancer, as men in these studies had similar survival rates whether or not they took one of these drugs.

These drugs can cause sexual side effects such as lowered sexual desire and erectile dysfunction (impotence), as well as the growth of breast tissue in some men. But they can help with urinary problems from BPH, such as trouble urinating and leaking urine (incontinence).

These drugs aren't approved by the FDA specifically to help lower prostate cancer risk, although doctors can prescribe them "[off label](#)" for this use. Men who want to know more about these drugs should discuss them with their doctors.

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. Long-term aspirin use can have side effects, including an increased risk of bleeding in the digestive tract. While aspirin can also have other health benefits, at this time most doctors don't recommend taking it just to try to lower prostate cancer risk.

Other drugs

Other drugs and dietary supplements that might help lower prostate cancer risk are now being studied. But so far, no drug or supplement has been found to be helpful in studies large enough for experts to recommend them.

Hyperlinks

1. www.cancer.org/cancer/risk-prevention/diet-physical-activity/acs-guidelines-nutrition-physical-activity-cancer-prevention.html
2. www.cancer.org/cancer/managing-cancer/treatment-types/off-label-drug-use.html

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