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## About Prostate Cancer

Get an overview of prostate cancer and the latest key statistics in the US.

### Overview

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

- [What Is Prostate Cancer?](#)

### Research and Statistics

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

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

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## What Is Prostate Cancer?

Prostate cancer begins when cells in the prostate gland start to grow out of control. The prostate is a gland found only in males. It makes some of the fluid that is part of semen.

- [The prostate](#)
- [Types of prostate cancer](#)

- [Possible pre-cancerous conditions of the prostate](#)

## The prostate

The prostate is below the bladder (the hollow organ where urine is stored) and in front of the rectum (the last part of the intestines). Just behind the prostate are glands called **seminal vesicles**, which make most of the fluid for semen. The **urethra**, which is the tube that carries urine and semen out of the body through the penis, goes through the center of the prostate.



### [What Is Cancer?](#) <sup>1</sup>

Cancer starts when cells in the body begin to grow out of control. Cells in nearly any part of the body can become cancer cells. Learn more here.

### [Anatomy Gallery: Male Genitourinary System](#) <sup>2</sup>

Explore our 3D interactive tour of the male genitourinary system.

The prostate tends to grow as a man ages. In younger men, it is about the size of a walnut, but it can be much larger in older men.

## Types of prostate cancer

Almost all prostate cancers are **adenocarcinomas**. These cancers develop from the gland cells in the prostate (the cells that make the prostate fluid that is added to the semen).

Other types of cancer that can start in the prostate include:

- **Small cell carcinoma (small cell neuroendocrine carcinoma)**
- **Other neuroendocrine tumors (including large cell carcinoma)**
- **Transitional cell carcinoma**
- **Sarcomas**

These other types of cancer are rare. If you are told you have prostate cancer, it is very likely to be an adenocarcinoma.

Some prostate cancers can grow and spread quickly, but most tend to grow slowly. To learn more, see the information on prostate cancer grades in [Tests to Diagnose and Stage Prostate Cancer](#)<sup>3</sup>.

## **Possible pre-cancerous conditions of the prostate**

Some research suggests that prostate cancer might start out as a pre-cancerous condition in some cases. These conditions are sometimes found when a man has a [prostate biopsy](#)<sup>4</sup> (removal of small pieces of the prostate to look for cancer).

### **Prostatic intraepithelial neoplasia (PIN)**

In PIN, the prostate cells don't look normal when seen with a microscope, but the abnormal cells don't look like they are invading into other parts of the prostate (like cancer cells would). PIN is not cancer, but it can sometimes lead to a higher risk of prostate cancer.

Based on how the patterns of cells look, PIN is classified as either:

- **Low-grade PIN** if the patterns of prostate cells appear almost normal, or
- **High-grade PIN** if the patterns of cells look more abnormal

Low-grade PIN is not thought to be related to a man's risk of prostate cancer.

If you have high-grade PIN, you may have a higher risk of developing prostate cancer over time. However, most often high-grade PIN does *not* turn into cancer.



# Key Statistics for Prostate Cancer

Other than skin cancer, prostate cancer is the most common cancer in men in the United States.

- [How common is prostate cancer?](#)
- [Risk of getting prostate cancer](#)
- [Deaths from prostate cancer](#)

## How common is prostate cancer?

The American Cancer Society's estimates for prostate cancer in the United States for 2024 are:

- About 299,010 new cases of prostate cancer
- About 35,250 deaths from prostate cancer

The number of prostate cancers diagnosed each year declined sharply from 2007 to 2014, coinciding with fewer men being screened because of changes in screening recommendations. Since 2014, however, the incidence rate has increased by 3% per year overall and by about 5% per year for advanced-stage prostate cancer.

## Risk of getting prostate cancer

About 1 in 8 men will be diagnosed with prostate cancer during their lifetime. But each man's risk of prostate cancer can vary, based on his age, race/ethnicity, and other factors.

For example, prostate cancer is more likely to develop in older men. About 6 in 10 prostate cancers are diagnosed in men who are 65 or older, and it is rare in men under 40. The average age of men when they are first diagnosed is about 67.

Prostate cancer risk is also higher in African American men and in Caribbean men of African ancestry than in men of other races.

To learn more, see [Risk Factors for Prostate Cancer](#)<sup>1</sup>.

## Deaths from prostate cancer

Prostate cancer is the second-leading cause of cancer death in American men, behind only lung cancer. About 1 in 44 men will die of prostate cancer.

Prostate cancer can be a serious disease, but most men diagnosed with prostate cancer do not die from it. In fact, more than 3.3 million men in the United States who

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# What's New in Prostate Cancer Research?

Research into the causes, prevention, detection, testing, and treatment of prostate cancer is being done in many medical centers throughout the world.

- [Genetics](#)
- [Prevention](#)
- [Early detection](#)
- [Diagnosis](#)
- [Staging](#)
- [Treatment](#)

## Genetics

New research on [gene changes](#)<sup>1</sup> in prostate cancer cells is helping scientists better understand how prostate cancer develops. This could also help design medicines to target these changes. Learning more about these gene changes might be helpful in other ways as well, such as:

- Identifying which men are most likely to develop (or to already have) prostate cancer
- Determining which men might need a second prostate biopsy, even if an initial biopsy doesn't find cancer
- Determining which prostate cancers are [most likely to grow and spread](#)<sup>2</sup> (and therefore should be treated)
- Determining if specific treatments such as newer [targeted therapy drugs](#)<sup>3</sup> might be helpful
- Identifying which men might benefit from [genetic testing](#)<sup>4</sup> to see if they inherited a gene change (and therefore might have a higher risk for other cancers as well)

Some of these uses are discussed in more detail below.





likely a man is to have prostate cancer that might need treatment

- Tests (such as **ProgenSA**) that look at the level of **prostate cancer antigen 3 (PCA3)** in the urine after a digital rectal exam (DRE). The DRE pushes some of the prostate cells into the urine. The higher the level, the more likely that prostate cancer is present.
- Tests that look for an abnormal gene change called ***TMPRSS2:ERG*** in prostate cells in urine collected after a DRE. This gene change is found in some prostate cancers, but it is rarely found in the cells of men without prostate cancer.
- **ExoDx Prostate(IntelliScore)**, or **EPI**, a test that looks at levels of 3 biomarkers in a urine sample to help determine a man's risk of having aggressive (high-grade) prostate cancer
- **SelectMDx**, which looks at the levels of certain forms of RNA (linked to certain cancer-related genes) in the urine. This test can be used along with other factors to help determine a man's risk of having aggressive (high-grade) prostate cancer.
- **Mi-Prostate Score (MiPS)**, which takes into account total blood PSA, as well as PCA3 levels and *TMPRSS2:ERG* gene changes in the urine (see above), to help determine a man's risk of prostate cancer
- **Sentinel PCa Test**, which looks for certain pieces of RNA in the urine to help determine a man's risk of prostate cancer
- **IsoPSA**, which looks at different forms of PSA in the blood to help determine a man's risk of having high-grade prostate cancer
- **ConfirmMDx**, which is a test that looks at certain genes in the cells from a prostate biopsy sample

These tests aren't likely to replace the PSA test any time soon, but they might be helpful in certain situations. For example:

- Some of these tests might be useful in men with a slightly elevated PSA, to help determine whether they should have a [prostate biopsy](#)<sup>7</sup>.
- Some of these tests might be helpful in determining if men who have already had a prostate biopsy that didn't find cancer should have another biopsy.

Doctors and researchers are trying to determine the best way to use each of these tests.

## Diagnosis





Benefits of this approach include quicker recovery times and less pain after surgery.

In a newer approach, known as **single-incision robotic prostatectomy**, the operation is done through only one small cut near a man's belly button. The hope is that using only one incision might cut down on pain and recovery times even further, although this still needs to be proven in studies.

## Radiation therapy

As described in [Radiation Therapy for Prostate Cancer](#)<sup>17</sup>, advances in technology are making it possible to aim radiation more precisely than in the past.

Current treatment methods, such as **intensity-modulated radiation therapy (IMRT)** and **proton beam radiation**, help doctors avoid giving radiation to normal tissues as much as possible.

In many centers, doctors are now using image-guided approaches to help aim radiation more precisely as well. Because the prostate might be in a slightly different position in the body each day, getting an imaging test (such as MRI) before each treatment (or even during treatment) can help ensure the radiation is aimed exactly where the doctor wants it to go.

These newer methods may increase the effectiveness of radiation therapy while reducing the side effects.

Technology is making other forms of radiation therapy more effective as well. New computer programs allow doctors to better plan the radiation doses and approaches for both external radiation therapy and brachytherapy. Planning for brachytherapy can now even be done during the procedure (intraoperatively).

## Newer treatments for early-stage cancers

Researchers are looking at newer forms of treatment for early-stage prostate cancer. These new treatments might be used either as the first treatment or if cancer remains after radiation therapy.

For example, doctors are now looking at whether ablative treatments can be helpful for these cancers. These treatments use extreme heat, cold, or other methods to destroy (ablate) tumors. Examples include **cryotherapy**, **high-intensity focused ultrasound (HIFU)**, **photodynamic therapy (PDT)**, and **focal laser ablation (FLA)**.

The safety and effectiveness of these treatments are now being studied. While some of these are now available, most doctors in the United States don't consider them to be proven first-line treatments for prostate cancer at this time. To learn more, see [Cryotherapy, HIFU, and Other Ablative treatments for Prostate Cancer](#)<sup>18</sup>.

## **Nutrition and lifestyle changes**

Many studies have looked at the possible benefits of specific nutrients (often as supplements) in helping to treat prostate cancer, although so far none have shown a clear benefit. Some compounds being studied include extracts from pomegranate, green tea, broccoli, turmeric, flaxseed, and soy.

It's important for men thinking about taking any type of nutritional supplement to talk to their health care team first. They can help you decide which ones you can use safely while avoiding those that might be harmful.

## **Hormone therapy**

Several newer forms of hormone therapy have been developed in recent years. Some of these may be helpful when standard forms of hormone therapy are no longer working.

Some examples include abiraterone (Zytiga), enzalutamide (Xtandi), apalutamide (Erleada), and darolutamide (Nubeqa), which are described in [Hormone Therapy for Prostate Cancer](#)<sup>19</sup>. Others are now being studied as well.

## **Chemotherapy**

Studies in recent years have shown that many chemotherapy drugs can affect prostate cancer. Some, such as docetaxel (Taxotere) and cabazitaxel (Jevtana), have been shown to help men live longer.

Other new chemo drugs and combinations of drugs are being studied as well.

## **Immunotherapy**

The goal of [immunotherapy](#)<sup>20</sup> is to boost the body's immune system to help fight off or destroy cancer cells.

## **Vaccines**

Unlike vaccines against infections like measles or mumps, prostate cancer vaccines are designed to help treat, not prevent, prostate cancer. One possible advantage of these types of treatments is that they seem to have very limited side effects. An example of this type of vaccine is **sipuleucel-T (Provenge)**.

Several other types of vaccines to treat prostate cancer are being tested in clinical trials.

### ***Immune checkpoint inhibitors***

An important part of the immune system is its ability to keep itself from attacking other normal cells in the body. To do this, it uses “checkpoint” proteins 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 these checkpoints (known as **checkpoint inhibitors**) have been shown to be useful in treating many types of cancer, including prostate cancers in which the cells have certain types of gene changes.

### ***Chimeric antigen receptor (CAR) T-cell therapy***

In this treatment, immune cells called **T cells** are removed from the patient’s blood and altered in the lab so they have **chimeric antigen receptors (CARs)** on their surface. These receptors can be made to attach to proteins on the surface of prostate cells. The altered T cells are then multiplied in the lab and put back into the patient’s blood. The hope is that they can then find the prostate cancer cells in the body and launch a precise immune attack against them.

This technique has shown some encouraging results against prostate cancer in early clinical trials, but more research is needed to see how useful it can be. CAR T-cell therapy is a complex treatment with potentially serious side effects, and it is only available in clinical trials at this time.

### **Targeted therapy drugs**

Newer drugs are being developed that target specific parts of cancer cells or their surrounding environments. Each type of [targeted therapy](#)<sup>21</sup> works differently, but they all alter the way a cancer cell grows, divides, repairs itself, or interacts with other cells.

### ***PARP inhibitors***

In some men with prostate cancer, the cancer cells have mutations in DNA repair genes

(such as *BRCA2*) that make it hard for cancer cells to fix damaged DNA. Drugs called **PARP inhibitors** work by blocking a different DNA repair pathway. Cancer cells are more likely to be affected by these drugs than normal cells.

PARP inhibitors, such as olaparib, rucaparib, niraparib, and talazoparib, can now be used along with hormone therapy to treat advanced prostate cancers if the cells have changes in a DNA repair gene.

### ***Monoclonal antibodies***

These are manmade versions of immune proteins that can be designed to attach to very specific targets on cancer cells (such as the PSMA protein on prostate cancer cells).

For prostate cancer, most of the monoclonal antibodies being studied are linked to chemo drugs or to small radioactive molecules. The hope is that once injected into the body, the antibody will act like a homing device, bringing the drug or radioactive molecule directly to the cancer cells, which might help them work better. Several monoclonal antibodies are now being studied in clinical trials.

### **Treating prostate cancer that has spread to the bones**

Doctors are studying the use of several newer approaches to treating prostate cancer that has spread to one or more areas in the bones, especially if radiation therapy isn't working.

Several of these are **ablative treatments**, in which extreme heat or cold is used on bone tumors to help ablate (destroy) them. Examples include:

- High-intensity focused ultrasound (HIFU)
- Radiofrequency ablation (RFA)
- Cryoablation (cryotherapy)

To learn more, see [Treatments for Prostate Cancer Spread to Bones<sup>22</sup>](#).

### [Prostate Cancer Research Highlights<sup>23</sup>](#)

Get the latest research highlights from our prostate cancer research conducted and funded through ACS grants.

## Hyperlinks

1. [www.cancer.org/cancer/types/prostate-cancer/causes-risks-prevention/what-causes.html](http://www.cancer.org/cancer/types/prostate-cancer/causes-risks-prevention/what-causes.html)  
[www.cancer.org/cancer/types/prostate-cancer/detection-diagnosis-staging/risk-](http://www.cancer.org/cancer/types/prostate-cancer/detection-diagnosis-staging/risk-)  
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