



cancer.org | 1.800.227.2345

Prostate Cancer Early Detection, Diagnosis, and Staging

Learn about the signs and symptoms of prostate cancer. Find out how prostate cancer is tested for, diagnosed, and staged.

Finding Prostate Cancer Early

Catching cancer early often allows for more treatment options. Some early cancers

It's not clear from studies if benefits of screening outweigh the risks

Doctors are still studying if screening will lower the risk of death from prostate cancer. The results from 2 large studies have been conflicting, and they have not offered clear answers.

- Results from a large study done in the United States found that annual screening with PSA and DRE did detect more prostate cancers than in men not screened, but this screening did not lower the death rate from prostate cancer. However, questions have been raised about this study, because some men in the non-screening group actually were screened during the study, which might have affected the results.
- A large European study did find a lower risk of death from prostate cancer with PSA screening (done about once every 4 years), but the researchers estimated that about 570 men would need to be invited to be screened (and 18 cancers would need to be detected) to prevent one death from prostate cancer.
- So far, neither of these studies has shown that PSA screening helps men live longer overall (that is, that it lowers the overall death rate).

Both of these studies are being continued to see if longer follow-up will give clearer results. Prostate cancer screening is being explored in several other large studies as well.

For now, the American Cancer Society recommends that men thinking about getting screened for prostate cancer learn as much as they can so they can make an informed decision based on available information, discussions with their health care provider, and their own views on the possible benefits, risks, and limits of screening. (To learn more, see [American Cancer Society Recommendations for Prostate Cancer Early Detection](#).)

Until more information is available, you and your health care provider should decide whether you should be screened for prostate cancer. There are many factors to take into account, including your age, health, and family history. For example, you might feel it's more important to be screened if prostate cancer runs in your family.

If you're younger and develop prostate cancer, it may shorten your life if it's not caught early. Screening men who are much older or in poor health is less likely to be helpful. This is because most prostate cancers are slow-growing, and men who are older or have major health problems are often more likely to die from other causes before their prostate cancer grows enough to cause problems.

[Know Your Cancer Risk](#) ²

Take the ACS CancerRisk360™ assessment to learn more about what you can change to improve your health. By taking 5 minutes to answer a few questions, we will give you a personalized roadmap of actions with helpful resources you can use to lower your risk of cancer.

Hyperlinks

1. www.cancer.org/cancer/types/prostate-cancer/treating/watchful-waiting.html
2. acscancerrisk360.cancer.org/

References

Hugosson J, Roobol MJ, Månsson M, et al. A 16-yr follow-up of the European Randomized Study of Screening for Prostate Cancer. *Eur Urol*. 2019;76(1):43-51.

National Comprehensive Cancer Network (NCCN). Practice Guidelines in Oncology: Prostate Cancer Early Detection. Version 1.2023. Accessed at https://www.nccn.org/professionals/physician_gls/pdf/prostate_detection.pdf on July 10, 2023.

National Cancer Institute. Physician Data Query (PDQ). Prostate Cancer Screening. 2023. Accessed at <https://www.cancer.gov/types/prostate/hp/prostate-screening-pdq> on July 10, 2023.

Pinsky PF, Miller E, Prorok P, et al. Extended follow-up for prostate cancer incidence and mortality among participants in the Prostate, Lung, Colorectal and Ovarian randomized cancer screening trial. *BJU Int*. 2019;123(5):854-860.

Preston MA. Screening for prostate cancer. UpToDate. 2023. Accessed at <https://www.uptodate.com/contents/screening-for-prostate-cancer> on July 10, 2023.

Last Revised: November 22, 2023

Screening Tests for Prostate Cancer

Screening is testing to find cancer in people before they have symptoms. At this time, it's not clear if the benefits of prostate cancer screening outweigh the risks for most men. Still, after discussing the pros and cons of screening with their doctors, some men might reasonably choose to be screened.

- [Prostate-specific antigen \(PSA\) blood test](#)
- [Digital rectal exam \(DRE\)](#)
- [If screening test results aren't normal](#)

The screening tests discussed here can be used to look for possible signs of prostate cancer. But these tests can't tell for sure if you have cancer. If the result of one of these tests is abnormal, you will probably need a **prostate biopsy** (discussed below) to know for sure if you have cancer.

Prostate-specific antigen (PSA) blood test

Prostate-specific antigen (PSA) is a protein made by cells in the prostate gland (both normal cells and cancer cells). PSA is mostly in semen, but a small amount is also found in the blood.

The PSA level in blood is measured in units called nanograms per milliliter (ng/mL). The chance of having prostate cancer goes up as the PSA level goes up, but **there is no set cutoff point that can tell for sure if a man does or doesn't have prostate cancer**.

Many doctors use a PSA cutoff point of 4 ng/mL or higher when deciding if a man might need further testing, while others might recommend it starting at a lower level, such as 2.5 or 3. And some doctors might use age-specific cutoffs (see "Special types of PSA tests," below).

- **Most men *without* prostate cancer have PSA levels under 4 ng/mL of blood.** When prostate cancer develops, the PSA level often goes above 4. Still, a level below 4 is not a guarantee that a man doesn't have cancer. About 15% of men with a PSA below 4 will have prostate cancer if a biopsy is done
- **Men with a PSA level between 4 and 10 (often called the "borderline range") have about a 1 in 4 chance of having prostate cancer.**
- **If the PSA is more than 10, the chance of having prostate cancer is over 50%.**

If your PSA level is high, you might need further tests to look for prostate cancer (see “If screening test results aren’t normal,” below).

Other factors that might affect PSA levels

One reason it’s hard to use a set cutoff point with the screening PSA test is that factors other than cancer can also affect PSA levels.

Factors that might **raise PSA levels** include:

- **Older age:** PSA levels normally go up slowly as you get older, even if your prostate is normal.
- **Having an enlarged prostate:** Conditions such as

to use these tests. If your PSA test result isn't normal, ask your doctor about what it means for your prostate cancer risk and your need for further tests.

Percent-free PSA: PSA occurs in 2 major forms in the blood. One form is attached ("complexed") to blood proteins, while the other circulates free (unattached). The percent-free PSA (%fPSA), also known as the free/total PSA ratio (f/t PSA), is the ratio of how much PSA circulates free compared to the total PSA level. The percent-free PSA is lower in men who have prostate cancer than in men who do not.

If your PSA test result is in the borderline range (between 4 and 10), the percent-free PSA might be used to help decide if you should have a prostate biopsy. A *lower* percent-free PSA means that your chance of having prostate cancer is higher and you should probably have a biopsy.

Many doctors recommend a prostate biopsy for men whose percent-free PSA is 10% or less, and advise that men consider a biopsy if it is between 10% and 25%. Using these cutoffs detects most cancers and helps some men avoid unnecessary biopsies. This test is widely used, but not all doctors agree that 25% is the best cutoff point to decide on a biopsy, and the cutoff may change depending on the overall PSA level.

Complexed PSA: This test directly measures the amount of PSA that is attached to other proteins (the portion of PSA that is not "free"). This test could be done instead of checking the total and free PSA, and it could give the same amount of information, but it is not widely used.

Tests that combine different types of PSA: Some newer tests combine the results of different types of PSA to get an overall score that reflects the chance a man has prostate cancer (particularly cancer that might need treatment). These tests include:

- The **Prostate Health Index (PHI)**, which combines the results of total PSA, free PSA, and proPSA
- The **4Kscore test**, which combines the results of total PSA, free PSA, intact PSA, and human kallikrein 2 (hK2), along with some other factors
- The **IsoPSA test**, which looks at different forms of PSA proteins in the blood to help determine if they came from cancer cells

These tests might be useful in men with a slightly elevated PSA, to help determine if they should have a prostate biopsy. Some of these tests might also be used to help determine if a man who has already had a prostate biopsy that didn't find cancer should have another biopsy.

PSA velocity: The PSA velocity is not a separate test. It is a measure of how fast the PSA rises over time. Normally, PSA levels go up slowly with age. Some research has found that these levels go up faster if a man has cancer, but studies have not shown that the PSA velocity is more helpful than the PSA level itself in finding prostate cancer. For this reason, most doctors do not use PSA velocity as part of screening for prostate cancer.

PSA density: PSA levels are higher in men with larger prostate glands. The PSA density (PSAD) is sometimes used for men with large prostate glands to try to adjust for this. The doctor measures the volume (size) of the prostate gland with transrectal ultrasound (TRUS, discussed in [Tests to Diagnose and Stage Prostate Cancer](#)) and divides the PSA number by the prostate volume. A higher PSA density indicates a greater likelihood of cancer. PSA density appears to be about as accurate as the percent-free PSA test, although a drawback is that it requires that an ultrasound is done.

Age-specific PSA ranges: PSA levels are normally higher in older men than in younger men, even when there is no cancer. A PSA result within the borderline range might be more worrisome in a 50-year-old man than in an 80-year-old man. For this reason, some doctors have suggested comparing PSA results with results from other men of the same age. But the usefulness of age-specific PSA ranges is not well proven, so most doctors and professional organizations do not recommend their use at this time.

Digital rectal exam (DRE)

For a digital rectal exam (DRE), the doctor inserts a gloved, lubricated finger into the rectum to feel for any bumps or hard areas on the prostate that might be cancer. As shown in the picture below, the prostate is just in front of the rectum. Prostate cancers often begin in the back part of the gland, and can sometimes be felt during a rectal exam. This exam can be uncomfortable (especially for men who have hemorrhoids), but it usually isn't painful and only takes a short time.



DRE is less effective than the PSA blood test in finding prostate cancer, but it can sometimes find cancers in men with normal PSA levels. For this reason, it might be included as a part of prostate cancer screening.

If screening test results aren't normal

If you are screened for prostate cancer and your initial blood PSA level is higher than normal, it doesn't always mean that you have prostate cancer. Many men with higher-than-normal PSA levels do not have cancer. Still, further testing will be needed to help find out what is going on. Your doctor may advise one of these options:

- Waiting a while and having a second PSA test
- Getting another type of test to get a better idea of if you might have cancer (and therefore should get a prostate biopsy)
- Getting a prostate biopsy to find out if you have cancer

It's important to discuss your options, including their possible pros and cons, with your doctor to help you choose one you are comfortable with. Factors that might affect which option is best for you include:

- Your age and overall health
- The likelihood that you have prostate cancer (based on tests done so far)

For more details on the prostate biopsy and how it is done, see [Tests to Diagnose and Stage Prostate Cancer](#)

Hyperlinks

1. www.cancer.org/cancer/types/prostate-cancer/causes-risks-prevention/prevention.html
2. www.cancer.org/cancer/types/prostate-cancer/about/new-research.html

References

Chang SL, Harshman LC, Presti JC Jr. Impact of common medications on serum total prostate-specific antigen levels: Analysis of the National Health and Nutrition Examination Survey. *J Clin Oncol*. 2010;28:3951-3957.

Freedland S. Measurement of prostate-specific antigen. UpToDate. 2023. Accessed at <https://www.uptodate.com/contents/measurement-of-prostate-specific-antigen> on July 10, 2023.

National Comprehensive Cancer Network (NCCN). Practice Guidelines in Oncology: Prostate Cancer Early Detection. Version 1.2023. Accessed at https://www.nccn.org/professionals/physician_gls/pdf/prostate_detection.pdf on July 10, 2023.

National Cancer Institute. Physician Data Query (PDQ). Prostate Cancer Screening. 2023. Accessed at <https://www.cancer.gov/types/prostate/hp/prostate-screening-pdq> on July 10, 2023.

Last Revised: November 22, 2023

American Cancer Society

Recommendations for Prostate Cancer Early Detection

The American Cancer Society recommends that men have a chance to make an informed decision with their health care provider about whether to be screened for prostate cancer. The decision should be made after getting information about the possible [benefits, risks, and uncertainties of prostate cancer screening](#). The discussion about screening should take place at:

- **Age 50 for men who are at average risk** of prostate cancer and are expected to live at least 10 more years
- **Age 45 for men at high risk** of developing prostate cancer. This includes African American men and men who have a first-degree relative (father or brother) diagnosed with prostate cancer at an early age (younger than age 65).
- **Age 40 for men at even higher risk** (those with more than one first-degree relative who had prostate cancer at an early age)

After this discussion, men who want to be screened should get the prostate-specific antigen (PSA) blood test. The digital rectal exam (DRE) may also be done as a part of screening. (See [Screening Tests for Prostate Cancer](#).)

If, after this discussion, a man is unable to decide if testing is right for him, the screening decision can be made by the health care provider, who should take into account the man's general health, preferences, and values.

If no prostate cancer is found as a result of screening, the time between future screenings depends on the results of the PSA blood test:

- Men who choose to be tested who have a PSA of less than 2.5 ng/mL may only need to be retested every 2 years.
- Screening should be done yearly for men whose PSA level is 2.5 ng/mL or higher.

Because prostate cancer often grows slowly, men without symptoms of prostate cancer who have less than a 10-year life expectancy should not be offered prostate cancer screening, because they aren't likely to benefit from it. Overall health status, and not age alone, is important when making decisions about screening.

Even after a decision about testing has been made, the discussion about the pros and cons of testing should be repeated as new information about the benefits and risks of testing becomes available. Further discussions are also needed to take into account changes in a man's health, preferences, and values.

References

Smith RA, Andrews KS, Brooks D, et al. Cancer screening in the United States, 2019: A review of current American Cancer Society guidelines and current issues in cancer screening. *CA Cancer J Clin.* 2019;69(3):184-210.

Wolf A, Wender RC, Etzioni RB, et al. American Cancer Society guideline for the early detection of prostate cancer: Update 2010. *Ca Cancer J Clin.* 2010;60:70-98.

Last Revised: November 22, 2023

Insurance Coverage for Prostate Cancer Screening

The American Cancer Society (ACS) supports legislation assuring that men have insurance coverage for prostate screening exams.

- [Men should have the option of screening](#)
- [State efforts to ensure prostate cancer screening coverage](#)
- [Medicare coverage](#)
- [Medicaid coverage](#)

Men should have the option of screening

ACS recognizes that it's not yet clear whether screening lowers the risk of dying from prostate cancer. Until such time when studies are conclusive, men and their doctors

should be free to determine if testing is right for them. Men shouldn't be prevented from getting prostate cancer screening because of testing costs, lack of health insurance coverage, or lack of access to testing.

ACS doesn't recommend [routine screening for prostate cancer](#) for all men at this time, because we believe proper guidance and education is needed before testing is done. Doctors and other health care providers should help men understand the potential risks and benefits of prostate-specific antigen (PSA) testing, allowing them to make an informed decision on testing.

State efforts to ensure prostate cancer screening coverage

Many states have laws requiring private health insurers to cover tests to detect prostate cancer, including the PSA test and digital rectal exam (DRE). Some states also assure that public employee benefit health plans provide coverage for prostate cancer screening tests.

Most state laws assure annual coverage for men ages 50 and over and for high-risk men, ages 40 and over. "High-risk men" typically refers to African American men and/or men with a family history of prostate cancer. Some states have slightly different coverage requirements.

Laws on coverage vary from state to state, so check with your insurer or with your state insurance commissioner's office to learn what's covered.

Medicare coverage

Medicare covers a PSA blood test and a DRE once a year for all men with Medicare age 50 and over.

PSA test: You pay nothing for a yearly PSA blood test. If you get the test from a doctor who doesn't accept assignment, you may have to pay a fee for the doctor's services, but not for the test itself.

Digital rectal exam: If your doctor does this test, you pay 20% of the Medicare-approved amount for a yearly DRE and for your doctor's services related to the exam. The Part B deductible applies. If the DRE is done in a hospital outpatient setting, there is a copayment.

Medicaid coverage

Medicaid coverage of prostate cancer screening varies by state.

People who qualify for Medicaid based on their state's decision to expand Medicaid under the [Affordable Care Act \(ACA\)](#)¹ are entitled to the same screening services as people covered by private insurance.

For people who qualify for Medicaid based on other pathways, prostate cancer screening coverage is determined by the state. Most Medicaid programs do cover screening.

To learn more about prostate cancer screening coverage in your state, contact [your state's Medicaid office](#)².

Hyperlinks

1. www.cancer.org/cancer/financial-insurance-matters/health-insurance-laws/the-health-care-law.html
2. www.medicaid.gov/state-overviews/index.html

References

US Centers for Medicare & Medicaid Services. Your Medicare Coverage: Prostate Cancer Screenings. Accessed at <https://www.medicare.gov/coverage/prostate-cancer-screenings> on July 11, 2023.

Last Revised: November 22, 2023

Signs and Symptoms of Prostate Cancer

diagnosis-of-prostate-cancer on July 12, 2023.

Last Revised: November 22, 2023

Tests to Diagnose and Stage Prostate Cancer

Most prostate cancers are first found as a result of screening. (See [Screening Tests for Prostate Cancer](#).) Early prostate cancers usually don't cause [symptoms](#), but more advanced cancers are sometimes first found because of symptoms they cause.

If prostate cancer is suspected based on results of screening tests or symptoms, tests will be needed to be sure. If you're seeing your primary care doctor, you might be referred to a **urologist**, a doctor who treats diseases of the genital and urinary tract, including prostate cancer.

The actual diagnosis of prostate cancer can only be made with a prostate biopsy (discussed below).

- [Medical history and physical exam](#)
- [PSA blood test](#)
- [Prostate biopsy](#)
- [Testing prostate cancer cells for gene or protein changes](#)
- [Genetic testing for some men with prostatic cancer](#)
- [Imaging tests for prostate cancer](#)
- [Lymph node biopsy](#)

Medical history and physical exam

If your doctor suspects you might have prostate cancer, you will be asked about any symptoms you are having, such as urinary or sexual problems, and how long you have had them. You might also be asked about possible [risk factors](#)¹, including your family history.

Your doctor will also examine you. This might include a [digital rectal exam \(DRE\)](#), during which the doctor inserts a gloved, lubricated finger into your rectum to feel for

any bumps or hard areas on the prostate that might be cancer. If you do have cancer, the DRE can sometimes help tell if it's only on one side of the prostate, if it's on both sides, or if it's likely to have spread beyond the prostate to nearby structures. Your doctor may also examine other areas of your body.

After the exam, your doctor might order some tests.

PSA blood test

Prostate-specific antigen (PSA) is a protein made by cells in the prostate gland (both normal cells and cancer cells). PSA is mostly in semen, but a small amount is also in the blood.

Use in men who might have prostate cancer

The PSA blood test can be used to screen for prostate cancer in men without symptoms. It's also one of the first tests done in men who have symptoms that might be caused by prostate cancer.

PSA in the blood is measured in units called nanograms per milliliter (ng/mL). The chance of having prostate cancer goes up as the PSA level goes up, but **there is no set cutoff point that can tell for sure if a man does or doesn't have prostate cancer.**

Many doctors use a PSA cutoff point of 4 ng/mL or higher when deciding if a man might

To learn more about how the PSA test is used to look for prostate cancer, including factors that can affect PSA levels, special types of PSA tests, and what the next steps might be if you have an abnormal PSA level, see [Screening Tests for Prostate Cancer](#).

Use in men already diagnosed with prostate cancer

The PSA test can also be useful if you have already been diagnosed with prostate cancer.

- In men just diagnosed with prostate cancer, the PSA level can be used together with physical exam results and tumor grade (determined on the biopsy, described further on) to help decide if other tests (such as CT scans or bone scans) are needed.
- The PSA level is used to help determine the [stage](#) (extent) of your cancer. If the cancer hasn't spread, the PSA level can also help decide which [risk group](#) the cancer falls into. This can affect which [treatment options](#)² might be best for you.
- PSA tests are often an important part of determining how well treatment is working, as well as in watching for a possible recurrence of the cancer after treatment. (See [Following PSA Levels During and After Treatment](#)³.)

Prostate biopsy

If the results of a PSA blood test, DRE, or other tests suggest that you might have prostate cancer, you will most likely need a prostate biopsy.

A biopsy is a procedure in which small samples of the prostate are removed and looked at with a microscope. A **core needle biopsy** is the main method used to diagnose prostate cancer. It is usually done by a urologist.

During the biopsy, the doctor usually looks at the prostate with an imaging test, such as transrectal ultrasound (TRUS) or MRI, or a 'fusion' of the two (all discussed below). The doctor quickly inserts a thin, hollow needle into the prostate. This is done either through the wall of the rectum (a **transrectal** biopsy) or through the skin between the scrotum and anus (a **transperineal** biopsy). When the needle is pulled out it removes a small cylinder (core) of prostate tissue. This is repeated several times. Most often the doctor will take about 12 core samples from different parts of the prostate.

Though the procedure sounds painful, each biopsy usually causes only some brief discomfort because it is done with a special spring-loaded biopsy instrument. The

device inserts and removes the needle in a fraction of a second. Most doctors who do the biopsy will numb the area first by injecting a local anesthetic alongside the prostate. You might want to ask your doctor if there are plans to do this.

The biopsy itself takes about 10 minutes and is usually done in the doctor's office. You will likely be given antibiotics to take before the biopsy and possibly for a day or 2 after to reduce the risk of infection.

For a few days after the procedure, you may feel some soreness in the area and might notice blood in your urine. You may also have some light bleeding from your rectum, especially if you have hemorrhoids. Many men notice blood in their semen or have rust-colored semen, which can last for several weeks after the biopsy, depending on how often you ejaculate.

Getting the results of the biopsy

Your biopsy samples will be sent to a lab, where a doctor with special training, called a **pathologist**, will look at them with a microscope to see if they contain cancer cells. Getting the results (in the form of a pathology report) usually takes 1 to 3 days, but it

the Prostate Health Index (PHI), 4Kscore test, PCA3 tests (such as ProgenSA), and ConfirmMDx. These tests are discussed in [What's New in Prostate Cancer Research?](#)⁴

- Getting an **MRI** of the prostate (described below) – if it hasn't been done already) – which might show suspicious areas in the prostate that should be biopsied
- Getting a **repeat prostate biopsy**. This might include getting samples of parts of the prostate not biopsied the first time, or using imaging tests such as MRI to look more closely for abnormal areas to target.

Prostate cancer grade (Gleason score or Grade Group)

If prostate cancer is found on a biopsy, it will be assigned a **grade**. The grade of the cancer is based on how abnormal the cancer looks under the microscope. Higher-grade cancers look more abnormal, and they're more likely to grow and spread quickly. There are 2 main ways to describe the grade of a prostate cancer.

Gleason score

The Gleason system, which has been in use for many years, assigns grades using the numbers 1 through 5, based on how much the cancer looks like normal prostate tissue.

- A grade of 1 is assigned if the cancer looks a lot like normal prostate tissue.
- A grade of 5 is assigned if the cancer looks very abnormal.
- Grades 2 through 4 have features in between these extremes.

Almost all prostate cancers are given a grade 3 or higher; grades 1 and 2 are not often used.

Since prostate cancers often have areas with different grades, a grade is assigned to the 2 areas that make up most of the cancer. These grades are then added to yield the **Gleason score** (also called the **Gleason sum**).

The first number assigned is the grade that is most common in the tumor. For example, if the Gleason score is written as 3+4=7, it means most of the tumor is grade 3 and less is grade 4, and they are added for a Gleason score of 7.

Although most often the Gleason score is based on the 2 areas that make up most of the cancer, there are some exceptions. For example, when a biopsy sample has either a lot of high-grade cancer or there are 3 grades, including high-grade cancer, the way

the Gleason score is determined is modified to reflect the aggressive (fast-growing) nature of the cancer.

In theory, the Gleason score can be between 2 and 10, but scores below 6 are not often used.

Based on the Gleason score, prostate cancers are often divided into 3 groups:

- Cancers with a **Gleason score of 6 or less** may be called **well-differentiated** or **low-grade**. These cancers tend to grow slowly and are unlikely to spread. (In fact, some doctors have questioned whether these should even be called cancers.) Cancers with a **Gleason score of 7** may be called **moderately differentiated** or **intermediate-grade**.

- Grade Group 3 = Gleason 4+3=7
- Grade Group 4 = Gleason 8
- Grade Group 5 = Gleason 9-10

The Grade Groups will likely replace the Gleason score over time, but currently you might see either one (or both) on a biopsy pathology report.

Other information in a pathology report if cancer is found

Along with the grade of the cancer (if it is present), the pathology report often contains other information about the cancer, such as:

- The number of biopsy core samples that contain cancer (for example, “7 out of 12”)
- The percentage of cancer in each of the cores
- Whether the cancer is on one side (left or right) of the prostate or on both sides (bilateral)

Suspicious, atypical, or other results

Sometimes a biopsy sample might not look like prostate cancer, but it doesn't look quite normal, either.

Prostatic intraepithelial neoplasia (PIN): In PIN, there are changes in how the prostate cells look, but the abnormal cells don't look like they've grown into other parts of the prostate (like cancer cells would). PIN is often divided into 2 groups:

- **Low-grade PIN:** The patterns of prostate cells appear almost normal.
- **High-grade PIN:** The patterns of cells look more abnormal.

Many men begin to develop **low-grade PIN** at an early age, but low-grade PIN is not thought to be related to prostate cancer risk. If low-grade PIN is reported on a prostate biopsy, your follow-up is usually the same as if nothing abnormal was seen.

If **high-grade PIN** is found on a biopsy, you might have a higher chance of developing prostate cancer over time. This is why doctors often watch men with high-grade PIN carefully and may advise another prostate biopsy (or lab tests to help determine the risk of having cancer, such as the Prostate Health Index [PHI] to other parts

different parts of the prostate (known as **multifocal high-grade PIN**), or if the original biopsy didn't take samples from all parts of the prostate.

Intraductal carcinoma: In intraductal carcinoma, prostate cancer (carcinoma) cells can be seen growing into pre-existing prostate ducts. This condition is often seen next to high-grade (fast-growing) prostate cancer.

If intraductal carcinoma is found on a prostate biopsy, there's a strong chance that there is high-grade prostate cancer near where the biopsy was taken from. Because of this, doctors often recommend treating the prostate with surgery or radiation therapy.

Atypical small acinar proliferation (ASAP): This might also be called **glandular atypia** or **atypical glandular proliferation**. It might also just be reported as "suspicious for cancer." All of these terms mean that there are cells in the biopsy sample that look like they might be cancer, but there are too few of them to be sure. If one of these terms is used, there's a high chance that there is also cancer in the prostate, which is why many doctors recommend getting another biopsy within a few months.

Proliferative inflammatory atrophy (PIA): In PIA, the prostate cells look smaller than normal, and there are signs of inflammation in the area. PIA is not cancer, and it's not yet clear if it leads to high-grade PIN or to prostate cancer directly.

Testing prostate cancer cells for gene or protein changes

If you have prostate cancer, the cancer cells from your biopsy might be tested for certain gene or protein changes that could affect your treatment options. For example:

If your cancer hasn't spread, your doctor might recommend a **molecular or genomic test** of your cancer cells to help determine how quickly the cancer is likely to grow and spread. Tests such as Decipher, Oncotype DX Prostate, Prolaris, and Promark can help you and your doctor decide if [active surveillance](#)⁵ might be right for you, or if treatment such as surgery or radiation therapy might be a better option. For more on these tests, see [Risk Groups and Lab Tests to Help Determine Risk for Localized Prostate Cancer](#).

If your cancer has spread, tests might be done to look for specific gene or protein changes in the cancer cells, which can show if certain [targeted therapy drugs](#)⁶ are likely to be helpful in treating the cancer. For example, the cancer cells might be tested for changes (mutations) in the *BRCA* genes or in other genes involved in repairing damaged DNA. If the cells have changes in one of these genes, targeted drugs called PARP inhibitors might be helpful for you.

Genetic testing for some men with prostate cancer

Doctors recommend that some men with prostate cancer consider genetic counseling and testing to look for certain [inherited gene changes](#)⁷. This typically includes men who:

- Have family members with a known inherited gene change that affects prostate cancer risk (such as a *BRCA* gene mutation or Lynch syndrome)
- Have a strong family history of prostate cancer (or certain other cancers)
- Have had another type of cancer (especially breast cancer)
- Are of Ashkenazi Jewish descent
- Have prostate cancer that has spread to other parts of the body
- Have prostate cancer with high-risk features or that includes intraductal carcinoma
- Have been found to have a gene change in their prostate cancer cells (such as a *BRCA* gene change) that might have been inherited

To learn more, see [Genetic Counseling and Testing for Prostate Cancer Risk](#)⁸.

Imaging tests for prostate cancer

Imaging tests use x-rays, magnetic fields, sound waves, or radioactive substances to create pictures of the inside of your body. One or more imaging tests might be used to:

- Look for cancer in the prostate.
- Help the doctor see the prostate during certain procedures (such as a prostate biopsy or certain types of prostate cancer treatment).
- Look for spread of prostate cancer to other parts of the body.

Which tests you might need will depend on the situation. For example, a prostate biopsy is typically done with transrectal ultrasound (TRUS) and/or MRI to help guide the biopsy. If you are found to have prostate cancer, you might need imaging tests of other parts of your body to look for possible cancer spread. (Men with a normal digital rectal exam (DRE), a low blood PSA level, and a low Gleason score may not need any other tests because the chance that the cancer has spread is so low.)

The imaging tests used most often to look for prostate cancer include:

Transrectal ultrasound (TRUS)

For this test, a small probe about the width of a finger is lubricated and placed in your

rectum. The probe gives off sound waves that enter the prostate and create echoes. The probe picks up the echoes, and a computer turns them into a black-and-white image of the prostate.

The test often takes less than 10 minutes and is usually done in a doctor's office or outpatient clinic. You will feel some pressure when the probe is inserted, but it is usually not painful. The area may be numbed before the procedure.

TRUS might be used in different situations:

- It is sometimes used to look for suspicious areas in the prostate in men who have an abnormal DRE or PSA test result (although it can miss some cancers).
- It can be used during a **prostate biopsy** to guide the needles into the correct areas of the prostate.
- It can be used to measure the size of the prostate, which can help determine the **PSA density** (described in [Screening Tests for Prostate Cancer](#)).
- It can be used as a guide during some forms of **treatment**, such as [brachytherapy](#)⁹ (internal radiation therapy) or [cryotherapy](#)¹⁰.

Newer forms of TRUS, such as color Doppler ultrasound and micro-ultrasound, might be even more helpful in some situations. (See [What's New in Prostate Cancer Research?](#)¹¹)

Magnetic resonance imaging (MRI)

[MRI scans](#)¹² create detailed images of soft tissues in the body using radio waves and strong magnets. MRIs can give doctors a very clear picture of the prostate and nearby areas. A contrast material called gadolinium might be injected into a vein before the scan to better see details.

MRI might be used in different situations:

- It can be used to help determine if a man with an abnormal screening test or with symptoms that might be from prostate cancer should get a prostate biopsy. (The type of MRI often used for this, known as **multiparametric MRI**, is described below.)
- If a prostate biopsy is planned, an MRI might be done to help locate and target areas of the prostate that are most likely to contain cancer. This is often done as an **MRI/ultrasound fusion biopsy**, which is described below.
- MRI can be used **during** a prostate biopsy to help guide the needles into the

For this test, you are injected with a small amount of low-level radioactive material, which settles in damaged areas of bone throughout the body. A special camera detects the radioactivity and creates a picture of your skeleton.

A bone scan might suggest cancer in the bone, although other non-cancerous conditions such as arthritis can sometimes look similar on the scan. To be sure, other tests, such as plain x-rays, CT or MRI scans, or even a bone biopsy, might be needed.

Positron emission tomography (PET) scan

A [PET scan](#)¹⁴ is similar to a bone scan, in that a slightly radioactive substance (known as a **tracer**) is injected into the blood, which can then be detected with a special camera. But PET scans use different tracers that collect mainly in cancer cells.

The most common tracer for standard PET scans is FDG, which is a type of sugar. Unfortunately, this type of PET scan isn't very useful in finding prostate cancer cells in the body. However, newer types of tracers can often be helpful in looking for prostate cancer.

PET scans using newer tracers: Newer tracers that have been found to be better at detecting prostate cancer cells include:

- Fluciclovine F18
- Sodium fluoride F18
- Choline C11

PSMA PET scans: Other newer tracers attach to prostate-specific membrane antigen (PSMA), a protein that is often found in large amounts on prostate cancer cells. These tracers include:

- Ga 68 PSMA-11 (also known as Ga 68 gozetotide, Locametz, and Illuccix)
- 18F-DCFPyl (also known as piflufolastat F 18 or Pylarify)
- 18F-rhPSMA-7.3 (also known as flotufolastat F 18 or Posluma)

These newer types of PET scans are most often used if it's not clear if (or exactly where) prostate cancer has spread. For example, one of these tests might be done if the results of a bone scan aren't clear, or if a man has a rising PSA level after treatment but it's not clear where the cancer is in the body. PSMA PET scans can also be used to help determine if the cancer can be treated with a [radiopharmaceutical that targets PSMA](#)¹⁵.

The pictures from a PET scan aren't as detailed as MRI or CT scan images, but they can often show areas of cancer anywhere in the body. Some machines can do a PET scan and either an MRI (PET-MRI) or a CT scan (PET-CT) at the same time, which can give more detail about areas that show up on the PET scan.

Doctors are still learning about the best ways to use these newer types of PET scans, and some of them might not be available yet in all imaging centers.

Computed tomography (CT) scan

A [CT scan](#)¹⁶ uses x-rays to make detailed, cross-sectional images of your body. This test isn't often needed for newly diagnosed prostate cancer if the cancer is likely to be confined to the prostate based on other findings (DRE result, PSA level, and Gleason score). Still, it can sometimes help tell if prostate cancer has spread into nearby lymph nodes. If your prostate cancer has come back after treatment, a CT scan can often tell if

A lymph node biopsy is rarely done as a separate procedure. It's sometimes used when a radical prostatectomy isn't planned (such as for some men who choose treatment with [radiation therapy](#)¹⁹), but when it's still important to know if the lymph nodes contain cancer.

Most often, this is done as a **needle biopsy**. To do this, the doctor uses an imaging test (such as an MRI or CT scan) to guide a long, hollow needle through the skin in the lower abdomen and into an enlarged lymph node. The skin is numbed with local anesthesia before the needle is inserted. The sample removed by the needle is then sent to the lab and looked at for cancer cells.

Hyperlinks

1. www.cancer.org/cancer/types/prostate-cancer/causes-risks-prevention/risk-factors.html
2. www.cancer.org/cancer/types/prostate-cancer/treating.html
3. www.cancer.org/cancer/types/prostate-cancer/treating/psa-levels-after-treatment.html
4. www.cancer.org/cancer/types/prostate-cancer/about/new-research.html
5. www.cancer.org/cancer/types/prostate-cancer/treating/watchful-waiting.html
6. www.cancer.org/cancer/types/prostate-cancer/treating/targeted-therapy.html
7. www.cancer.org/cancer/types/prostate-cancer/causes-risks-prevention/what-causes.html
8. www.cancer.org/cancer/types/prostate-cancer/causes-risks-prevention/genetic-testing-and-counseling-for-prostate-cancer-risk.html
9. www.cancer.org/cancer/types/prostate-cancer/treating/radiation-therapy.html
10. www.cancer.org/cancer/types/prostate-cancer/treating/cryosurgery.html
11. www.cancer.org/cancer/types/prostate-cancer/about/new-research.html
12. www.cancer.org/cancer/diagnosis-staging/tests/imaging-tests/mri-for-cancer.html
13. www.cancer.org/cancer/diagnosis-staging/tests/imaging-tests/nuclear-medicine-scans-for-cancer.html
14. www.cancer.org/cancer/diagnosis-staging/tests/imaging-tests/nuclear-medicine-scans-for-cancer.html
15. www.cancer.org/cancer/types/prostate-cancer/treating/radiation-therapy.html
16. www.cancer.org/cancer/diagnosis-staging/tests/imaging-tests/ct-scan-for-cancer.html

VT, Lawrence TS, Rosenberg SA, eds. *DeVita, Hellman, and Rosenberg's Cancer: Principles and Practice of Oncology*. 11th ed. Philadelphia, Pa: Lippincott Williams & Wilkins; 2019.

Last Revised: November 22, 2023

Prostate Cancer Stages

If you've been diagnosed with prostate cancer, your doctors will try to figure out if it has spread, and if so, how far. This process is called **staging**.

- [Determining the stage of prostate cancer](#)
- [Stages of prostate cancer](#)

Determining the stage of prostate cancer

The stage of a prostate cancer describes how much cancer is in the body. It's one of the factors used to help determine how best to [treat](#)¹ the cancer. Doctors also use a cancer's stage when talking about [survival statistics](#).

The stage is based on tests described in [Tests to Diagnose and Stage Prostate Cancer](#), including the blood PSA level and prostate biopsy results, as well as imaging tests if they are done.

The AJCC TNM staging system

A staging system is a standard way for the cancer care team to describe how far a cancer has spread. The most widely used staging system for prostate cancer is the **AJCC** (American Joint Committee on Cancer) **TNM** system, which was 71.97 Tm 0 0 0 rg /GS1434 gy

category)

- The **PSA level** at the time of diagnosis

[Redacted]

[Redacted]

I	OR	
	<p>cT2a, N0, M0</p> <p>Grade Group 1 (Gleason score 6 or less)</p> <p>PSA less than 10</p>	<p>The tumor can be felt by digital rectal exam or seen with imaging, such as transrectal ultrasound, and is in one half or less of only one side (left or right) of the prostate [cT2a]. The cancer has not spread to nearby lymph nodes [N0] or elsewhere in the body [M0]. The Grade Group is 1, and the PSA level is less than 10.</p>
	OR	
	<p>pT2, N0, M0</p> <p>Grade Group 1 (Gleason score 6 or less)</p> <p>PSA less than 10</p>	<p>The prostate has been removed with surgery, and the tumor was still only in the prostate [pT2]. The cancer has not spread to nearby lymph nodes [N0] or elsewhere in the body [M0]. The Grade Group is 1, and the PSA level is less than 10.</p>
IIA	<p>cT1, N0, M0</p> <p>Grade Group 1 (Gleason score 6 or less)</p> <p>PSA at least 10 but less than 20</p>	<p>The doctor can't feel the tumor or see it with imaging such as transrectal ultrasound. (It was either found during a transurethral resection of the prostate (TURP)⁴ or was diagnosed by needle biopsy done for a high PSA level [cT1].) The cancer has not spread to nearby lymph nodes [N0] or elsewhere in the body [M0]. The Grade Group is 1. The PSA level is at least 10 but less than 20.</p>
	OR	
	<p>cT2a or pT2, N0, M0</p> <p>Grade Group 1 (Gleason score 6 or less)</p> <p>PSA at least 10 but less than 20</p>	<p>The tumor can be felt by digital rectal exam or seen with imaging such as transrectal ultrasound and is in one half or less of only one side (left or right) of the prostate [cT2a]. OR the prostate has been removed with surgery, and the tumor was still only in the prostate [pT2]. The cancer has not spread to nearby lymph nodes [N0] or elsewhere in the body [M0]. The Grade Group is 1. The PSA level is at least 10 but less than 20.</p>
	OR	
	<p>cT2b or cT2c, N0, M0</p> <p>Grade Group 1</p>	<p>The tumor can be felt by digital rectal exam or seen with imaging such as transrectal ultrasound. It is in more than half of one side of the prostate [cT2b] or it is in both sides of the prostate [cT2c]. The cancer has not spread</p>

IVA	Any T, N1, M0 Any Grade Group Any PSA	The tumor might or might not be growing into tissues near the prostate [any T]. The cancer has spread to nearby lymph nodes [N1] but has not spread elsewhere in the body [M0]. The Grade Group can be any value, and the PSA can be any value.
IVB	Any T, any N, M1 Any Grade Group Any PSA	The cancer might or might not be growing into tissues near the prostate [any T] and might or might not have spread to nearby lymph nodes [any N]. It has spread to other parts of the body, such as distant lymph nodes, bones, or other organs [M1]. The Grade Group can be

2023. Accessed at <https://www.uptodate.com/contents/localized-prostate-cancer-risk-stratification-and-choice-of-initial-treatment> on July 26, 2023.

National Comprehensive Cancer Network (NCCN). Practice Guidelines in Oncology: Prostate Cancer. Version 2.2023. Accessed at https://www.nccn.org/professionals/physician_gls/pdf/prostate.pdf on July 26, 2023.

Taplin ME, Smith JA. Initial staging and evaluation of males with newly diagnosed prostate cancer. UpToDate. 2023. Accessed at <https://www.uptodate.com/contents/initial-staging-and-evaluation-of-males-with-newly-diagnosed-prostate-cancer> on July 26, 2023.

Last Revised: November 22, 2023

Risk Groups and Lab Tests to Help Determine Risk from Localized Prostate Cancer

The [stage](#) of a prostate cancer can give an idea of how serious the cancer is likely to be. However, for localized prostate cancer (cancer that is still just in or around the prostate), doctors also use other ways to determine the risk that the cancer will grow and spread. Knowing this might help a man and his doctor when deciding if the cancer needs to be treated right away, as well as which treatment options might be best.

- [Prostate cancer risk groups](#)
- [Lab tests to help determine if localized prostate cancer needs to be treated](#)

Ways to help determine the risk from localized prostate cancer include:

- Risk groups
- Molecular lab tests of biopsy samples

Prostate cancer risk groups

For prostate cancer that has not spread (stage I to III cancers), many doctors now use information about the cancer (such as the [T category](#), initial [PSA level](#), [Grade Group](#), and [prostate biopsy results](#)) to place it into a **risk group**. This risk group can then be used to help determine treatment options.

Several expert groups have created risk classification systems for localized prostate cancer. One of the most commonly used systems, developed by the National Comprehensive Cancer Network (NCCN), divides localized prostate cancer into 6 risk groups:

Very-low-risk group

These prostate cancers are small, not felt on exam, can only be found in a small area of the prostate, and have not grown outside the prostate (cT1c). They have a Grade Group of 1 (Gleason score of 6 or less), a low PSA level (less than 10), and few other classification criteria. These cancers usually grow very slowly and almost never cause any [symptoms](#) or other health problems.

Low-risk group

Prostate cancers in this group have not yet grown outside of the prostate, have a Grade Group of 1 (Gleason score of 6 or less) and a low PSA level (less than 10), but they are slightly larger (cT1 to cT2a) than very-low-risk cancers. They are unlikely to cause symptoms or other health problems.

Intermediate-risk groups (favorable or unfavorable)

These prostate cancers can be felt on exam or can be seen on an imaging test. The cancer might be found in more than half of one side of the prostate (cT2b) or in both sides of the prostate (cT2c), and/or have a Grade Group of 2 or 3 (Gleason score of 7) and/or a PSA level between 10 and 20 ng/ml.

Additional factors are used to split these prostate cancers into **favorable intermediate-risk** and **unfavorable intermediate-risk** categories.

High-risk group

Prostate cancers in this group have only 1 of these high-risk features (and no very high-risk features [see below]):

- The tumor has grown outside the prostate (cT3a).

- The cancer has a Grade Group of 4 or 5 (Gleason score 8 to 10).
- The initial PSA level is more than 20.

Very high-risk group

These prostate cancers have a very high risk for the tumor growing or spreading to nearby lymph nodes (or other parts of the body). These cancers have at least 1 of the following traits:

- The tumor has spread to the seminal vesicles (cT3b) or into other structures next to the prostate (cT4).
- The most common areas of cancer in the biopsy have a Gleason 5 pattern.
- More than 4 biopsy cores are Grade Group 4 or 5 (Gleason score 8 to 10).
- The cancer has 2 or 3 of the features found in the high-risk group (see above).

The risk group can help decide if any further tests should be done, as well as help guide [treatment options](#). **Cancers in lower-risk groups have a smaller chance of growing and spreading compared to those in higher-risk groups.**

If you have prostate cancer that has not spread to nearby lymph nodes or to other parts of the body, talk to your doctor about which risk group your cancer falls into. This can help you better understand your treatment choices. To learn more about how risk groups are used, see [Initial Treatment of Prostate Cancer, by Stage and Risk Group](#)¹.

Lab tests to help determine if localized prostate cancer needs to be treated

Along with the risk groups above, some doctors are now using newer types of lab tests, known as **genomic, molecular, or proteomic tests**, to help predict how quickly a prostate cancer might grow or spread, and as a result, help decide what treatment options might be best. These tests look at which genes or proteins are active inside the prostate cancer cells.

Examples of such tests include:

- **Decipher:** This test measures the activity of certain genes in prostate cancer cells taken from a biopsy. These are used to create a risk score on a scale from 0 to 1, with a higher score indicating a cancer is more likely to spread to other parts of the

body. This might be helpful in determining the best treatment options. For men who choose surgery ([prostatectomy²](#)) to treat their cancer, another version of this test can be used to measure the activity of certain genes in prostate cancer cells from the surgery tissue. This can help determine the risk that the cancer will come back in other parts of the body after surgery, and as a result, if these men should consider further treatment.

- **Oncotype DX Prostate:** This test measures the activity of certain genes in prostate cancer cells taken from a biopsy and reports it as a score on a scale from 0 to 100. (Higher scores indicate a cancer that is more likely to grow and spread quickly, as well as a higher risk of dying from prostate cancer.)
- **Prolaris:** This test measures the activity of a different set of genes in prostate cancer cells taken from a biopsy and reports it as a score on a scale from 0 to 10. (Higher scores indicate a cancer that is more likely to grow and spread quickly, as well as a higher risk of dying from prostate cancer.)
- **ProMark:** This test measures the activity of a set of proteins in prostate cancer cells taken from a biopsy and reports it as a score that helps predict how likely a cancer is to grow and spread quickly.

If your doctor suggests using one of these tests to help determine your treatment options, have them explain what it can tell you, as well as how accurate it's likely to be.

These and other new tests are also being studied to look for more areas where they can help with treatment decisions.

Hyperlinks

1. www.cancer.org/cancer/types/prostate-cancer/treating/by-stage.html
2. www.cancer.org/cancer/types/prostate-cancer/treating/surgery.html

References

Klein EA. Prostate cancer: Risk stratification and choice of initial treatment. UpToDate. 2023. Accessed at <https://www.uptodate.com/contents/localized-prostate-cancer-risk-stratification-and-choice-of-initial-treatment> on July 26, 2023.

National Comprehensive Cancer Network (NCCN). Practice Guidelines in Oncology: Prostate Cancer. Version 2.2023. Accessed at



years after being diagnosed.

Where do these numbers come from?

The American Cancer Society relies on information from the SEER (Surveillance, Epidemiology, and End Results) database, maintained by the National Cancer Institute (NCI), to provide survival statistics for different types of cancer.

The SEER database tracks 5-year relative survival rates for prostate cancer in the United States, based on how far the cancer has spread. The SEER database, however, doesn't group cancers by [AJCC TNM stages](#) (stage 1, stage 2, stage 3, etc.). Instead it

after treatment.

- **These numbers don't take everything into account.** Survival rates are grouped based on how far the cancer has spread, but your age and overall health; test results, such as the [PSA level and Grade Group](#) of the cancer; how well the cancer responds to treatment; and other factors can also affect your outlook.
- **Men now being diagnosed with prostate cancer may have a better outlook than these numbers show.** Treatments for prostate cancer have improved over time, and these numbers are based on men who were diagnosed and treated at least 5 years earlier.

References

American Cancer Society. *Cancer Facts & Figures 2025*. Atlanta: American Cancer

Questions to Ask About Prostate Cancer

- What are the chances that the cancer has spread beyond my prostate? If so, is it still curable?
- Do I need any [other tests](#)¹ before we decide on treatment?
- Should I see any other types of doctors before deciding on treatment?
- What is the [clinical stage](#) and [grade \(Gleason score or Grade Group\)](#) of my cancer? What do those mean for me?
- Which [risk group](#) does my cancer fall into? What does this mean?
If I'm concerned about the _____

- How will we know if the treatment is working?
Is there anything I can do to help manage [side effects](#)⁸?

5. www.cancer.org/cancer/types/prostate-cancer/treating/radiation-therapy.html
6. www.cancer.org/cancer/types/prostate-cancer/treating.html
7. www.cancer.org/cancer/managing-cancer/making-treatment-decisions/clinical-trials.html
8. www.cancer.org/cancer/managing-cancer/side-effects.html
9. www.cancer.org/cancer/survivorship/coping/nutrition.html
10. www.cancer.org/cancer/survivorship/be-healthy-after-treatment.html
11. www.cancer.org/cancer/types/prostate-cancer/after-treatment/follow-up.html
12. www.cancer.org/cancer/survivorship/long-term-health-concerns/recurrence.html
13. www.cancer.org/cancer/managing-cancer/side-effects/fertility-and-sexual-side-effects.html
14. www.cancer.org/cancer/managing-cancer/finding-care/the-doctor-patient-relationship.html

Last Revised: November 22, 2023

Written by

The American Cancer Society medical and editorial content team
(<https://www.cancer.org/cancer/acs-medical-content-and-news-staff.html>)

Our team is made up of doctors and oncology certified nurses with deep knowledge of cancer care as well as editors and translators with extensive experience in medical writing.

American Cancer Society medical information is copyrighted material. For reprint requests, please see our Content Usage Policy (www.cancer.org/about-us/policies/content-usage.html).

cancer.org | 1.800.227.2345