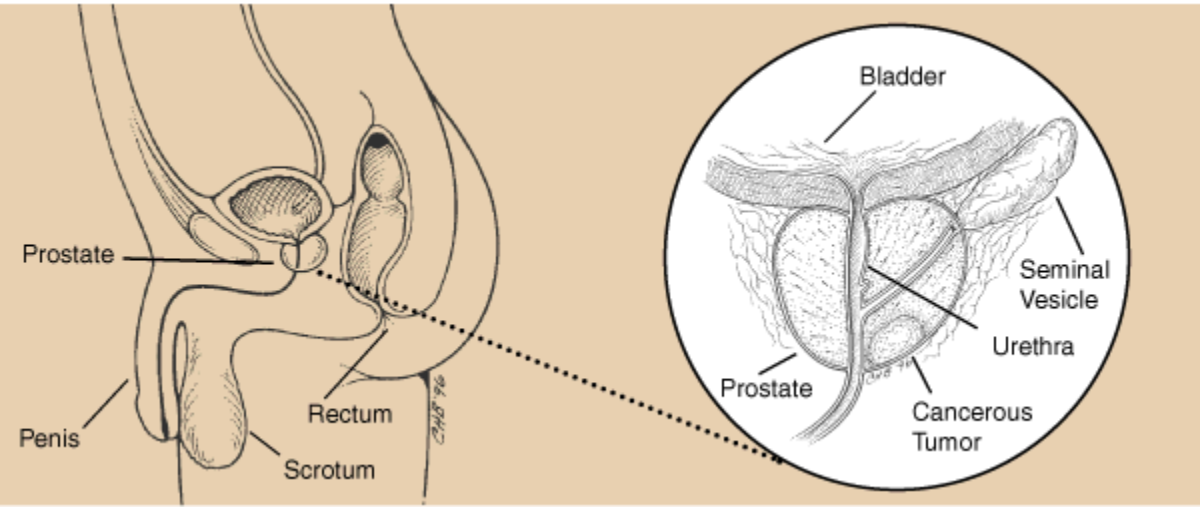
Prostate Cancer Prevention and Early Detection

What is prostate cancer?

To understand prostate cancer, it helps to know about the prostate and nearby structures in the body. The prostate is a gland found only in males. It is located below the urinary bladder and in front of the rectum. The size of the prostate changes with age. In younger men, it is about the size of a walnut, but it can be much larger in older men.

The prostate's job is to make some of the fluid that protects and nourishes sperm cells in semen, making the semen more liquid. Just behind the prostate are glands called *seminal vesicles* that make most of the fluid for semen. The *urethra*, the tube that carries urine and semen out of the body through the penis, goes through the center of the prostate.



The prostate starts to develop before birth. It grows rapidly during puberty, fueled by male hormones (called *androgens*). The main androgen, *testosterone*, is made in the testicles. The enzyme *5-alpha reductase* converts testosterone into *dihydrotestosterone* (DHT). DHT is the main hormone that signals the prostate to grow.

The prostate usually stays at about the same size or grows slowly in adults, as long as male hormones are present.

Benign prostatic hyperplasia (BPH)

The inner part of the prostate (around the urethra) often keeps growing as men get older, which can lead to a common condition called *benign prostatic hyperplasia* (BPH). In BPH, the prostate tissue can press on the urethra, leading to problems urinating.

BPH is *not* cancer and does not develop into cancer. But it can be a serious problem for some men. If it requires treatment, drugs can often shrink the prostate or to relax the muscles within it, which usually helps with urine flow. If drugs aren't helpful, some type of surgery, such as a transurethral resection of the prostate (TURP) may be needed.

Prostate cancer

Several types of cells are found in the prostate, but almost all prostate cancers develop from the gland cells, which are the cells that make the prostate fluid that is added to the semen. The medical term for a cancer that starts in gland cells is *adenocarcinoma*.

Other types of cancer can also start in the prostate gland, including sarcomas, small cell carcinomas, and transitional cell carcinomas. But these other types of prostate cancer are so rare that if you have prostate cancer it is almost certain to be an adenocarcinoma.

Some prostate cancers can grow and spread quickly, but most grow slowly. In fact, autopsy studies show that many older men (and even some younger men) who died of other diseases also had prostate cancer that never affected them. In many cases neither they nor their doctors even knew they had it.

What are the risk factors for prostate cancer?

A risk factor is anything that affects your chance of getting a disease such as cancer. Different cancers have different risk factors. Some risk factors, like smoking, can be changed. Others, like a person's age or family history, can't be changed.

But risk factors don't tell us everything. Many people with one or more risk factors never get cancer, while others with this disease may have had few or no known risk factors.

We don't yet completely understand the causes of prostate cancer, but researchers have found several factors that might affect a man's risk of getting it.

Age

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

Race/ethnicity

Prostate cancer occurs more often in African-American men and Caribbean men of African ancestry than in men of other races. African-American men are also more than twice as likely to die of prostate cancer as white men. Prostate cancer occurs less often in Asian-American and

Hispanic/Latino men than in non-Hispanic whites. The reasons for these racial and ethnic differences are not clear.

Geography

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

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

Family history

Prostate cancer seems to run in some families, which suggests that in some cases there may be an inherited or genetic factor. Having a father or brother with prostate cancer more than doubles a man's risk of developing this disease. (The risk is higher for men who have a brother with the disease than for those with a father with it.) The risk is much higher for men with several affected relatives, particularly if their relatives were young when the cancer was found.

Gene changes

Scientists have found several inherited gene changes (mutations) that seem to raise prostate cancer risk, but they probably account for only a small percentage of cases overall. For example:

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

Other inherited gene changes can also raise a man's risk of prostate cancer.

Some common gene variations have also been linked to a higher risk of prostate cancer in some studies. More studies to confirm this are needed to see if testing for the gene variants will be useful in predicting prostate cancer risk.

Diet

The exact role of diet in prostate cancer is not clear, but several factors have been studied.

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

Some studies have suggested that men who consume a lot of calcium (through food or supplements) may have a higher risk of developing advanced prostate cancer. But most studies

have not found such a link with the levels of calcium found in the average diet, and it's important to note that calcium is known to have other important health benefits.

Obesity

Most studies have not found that being obese (very overweight) is linked with a higher risk of getting prostate cancer overall.

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

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

Smoking

Most studies have not found a link between smoking and prostate cancer risk. Some research has linked smoking to a possible small increase in the risk of death from prostate cancer, but this finding will need to be confirmed by other studies.

Workplace exposures

There is some evidence that firefighters are exposed to substances (toxic combustion products) that may increase their risk of prostate cancer.

Inflammation of the prostate

Some studies have suggested that *prostatitis* (inflammation of the prostate gland) may be linked to an increased risk of prostate cancer, but other studies have not found such a link. Inflammation is often seen in samples of prostate tissue that also contain cancer. The link between the two is not yet clear, but 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 not agreed, 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 not found an increased risk among men who have had this operation. Research on this possible link is still ongoing.

Can prostate cancer be prevented?

Because the exact cause of prostate cancer is not known, at this time it isn't possible to prevent most cases of the disease. Many risk factors such as age, race, and family history can't be controlled. But based on what we do know, there are some things you can do that might lower your risk of prostate cancer.

Body weight, physical activity, and diet

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

Some studies have found that men who are overweight may have a slightly lower risk of prostate cancer overall, but a higher risk of prostate cancers that are likely to be fatal.

Studies have found that men who get regular physical activity have a slightly lower risk of prostate cancer. Vigorous activity may have a greater effect, especially on the risk of advanced prostate cancer.

Several studies have suggested that diets high in certain vegetables (including tomatoes, cruciferous vegetables, soy, beans, and other legumes) or fish may be linked with a lower risk of prostate cancer, especially more advanced cancers. Examples of cruciferous vegetables include cabbage, broccoli, and cauliflower.

Although not all studies agree, several have found a higher risk of prostate cancer in men whose diets are high in calcium. There may also be an increased risk from consuming dairy foods.

For now, the best advice about diet and activity to possibly reduce the risk of prostate cancer is to:

- Eat at least 2½ cups of a wide variety of vegetables and fruits each day.
- Be physically active.
- Stay at a healthy weight.

It may also be sensible to limit calcium supplements and to not get too much calcium in the diet. (This does not mean that men who are being *treated for* prostate cancer should not take calcium supplements if their doctor recommends them.)

For more information, see our document *American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention*.

Vitamin, mineral, and other supplements

Some earlier studies suggested that taking certain vitamin or mineral supplements might lower prostate cancer risk. Of special interest were vitamin E and the mineral selenium.

To study the possible effects of selenium and vitamin E on prostate cancer risk, doctors conducted the Selenium and Vitamin E Cancer Prevention Trial (SELECT). Men in this large study took one or both of these supplements or an inactive placebo each day for about 5 years. Neither vitamin E nor selenium was found to lower prostate cancer risk in this study. In fact, men taking the vitamin E supplements were later found to have a slightly higher risk of prostate cancer. For selenium

supplements, the risk of prostate cancer was unchanged in men who had lower selenium levels at the start of the study. Men who had higher baseline levels, though, had an increased risk of high-grade (fast-growing) prostate cancer.

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

Taking any supplements can 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 the 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* block the enzyme and prevent the formation of DHT.

Two 5-alpha reductase inhibitors are already used to treat benign prostatic hyperplasia (BPH), a non-cancerous growth of the prostate:

- Finasteride (Proscar®)
- Dutasteride (Avodart®)

Large studies of both of these drugs have been done to see 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 slightly more intermediate or high-grade prostate cancers. Intermediate and high-grade cancers are more likely to grow and spread than low-grade cancers. Long term, though, this didn’t seem to affect death rates – both groups of men had similar survival.

These drugs can cause sexual side effects such as lowered sexual desire and impotence. But they can help with urinary problems from benign prostatic hyperplasia (BPH) such as trouble urinating and leaking urine (incontinence).

Although these drugs are safe, they aren’t approved by the FDA to help prevent prostate cancer. Right now, it isn’t clear that taking finasteride or dutasteride just to lower prostate cancer risk is very helpful. Still, men who want to know more about these drugs should discuss them with their doctors.

Aspirin

Some research suggests that men who take aspirin daily for a long time 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 solely to try to lower prostate cancer risk.

Other drugs

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

Finding prostate cancer early

Screening refers to testing to find a disease such as cancer in people who don't have symptoms of that disease. For some types of cancer, screening can help find cancers at an early stage, when they are more easily cured.

Prostate cancer can often be found early by testing the amount of prostate-specific antigen (PSA) in a man's blood. Another way to find prostate cancer early is the digital rectal exam (DRE). For this exam, the doctor puts a gloved finger into the rectum to feel the prostate gland. These 2 tests are described in more detail in the section "What tests can detect prostate cancer?"

If the results of either one of these tests are abnormal, further testing is needed to see if there is a cancer. If prostate cancer is found as a result of screening with the PSA test or DRE, it will probably be at an earlier, more treatable stage than if no screening were done.

Since using early detection tests for prostate cancer became fairly common in the United States (about 1990), the prostate cancer death rate has dropped. But it isn't clear that this drop is a direct result of screening. It could also be caused by something else, like improvements in treatment.

There is no question that screening can help find many prostate cancers early, but there are limits to the prostate cancer screening tests used today. Neither the PSA test nor the DRE is 100% accurate. These tests can sometimes have abnormal results even when a man does not have cancer (known as a *false-positive* result), or normal results can occur even when a man does have cancer (known as a *false-negative* result). Unclear test results can cause confusion and anxiety. False-positive results can lead some men to have a prostate biopsy (with small risks of pain, infection, and bleeding) when they don't have cancer. And false-negative results can give some men a false sense of security even though they actually have cancer.

Another important issue is that even if screening detects a cancer, doctors often can't tell if the cancer is truly dangerous. Finding and treating all prostate cancers early might seem as if it would always be a good thing, but some prostate cancers grow so slowly that they would probably never cause problems. Because of an elevated PSA level, some men may be diagnosed with a prostate cancer that they would have never even known about at all. It would never have led to their death, or even caused any symptoms.

But these men may still be treated with either surgery or radiation, either because the doctor can't be sure how quickly the cancer might grow and spread, or because the men are uncomfortable knowing they have cancer and not getting any treatment. Treatments like surgery and radiation can have urinary, bowel, and/or sexual side effects that can seriously affect a man's quality of life.

Men and their doctors may end up struggling over whether they need treatment or whether they might be able to be followed without being treated right away (an approach called *watchful waiting* or *active surveillance*). Even when men are not treated right away, they still need regular blood PSA tests and prostate biopsies to determine the need for future treatment. These tests are linked with risks of anxiety, pain, infection, and bleeding.

Doctors are conducting large studies to see if early detection tests will lower the risk of death from prostate cancer. The most recent results from 2 large studies were conflicting, and didn't offer clear answers.

Early results from a 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.

A 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 1,050 men would need to be screened (and 37 treated) in order to prevent one death from prostate cancer. Neither of these studies has shown that PSA screening helps men live longer (lowers the overall death rate).

Prostate cancer is often a slow-growing cancer, so the effects of screening in these studies may become clearer in the coming years. Both of these studies are being continued to see if longer follow-up will give clearer results. Several other large studies of prostate cancer screening are now going on as well.

At this time, the American Cancer Society recommends that men thinking about prostate cancer screening make informed decisions based on available information, discussion with their doctor, and their own views on the benefits and side effects of screening and treatment. (See the section "American Cancer Society recommendations for prostate cancer early detection.")

Until more information is available, you and your doctor should decide whether you should have tests for prostate cancer. There are many factors to take into account, including your age and health. If you're young and develop prostate cancer, it may shorten your life if it's not caught early. Screening men who are older or in poor health is less likely to help them live longer. This is because most prostate cancers are slow-growing, and men who are older or have major health problems are more likely to die from other causes before their prostate cancer grows enough to cause problems.

What tests can detect prostate cancer early?

The tests discussed below are used to look for warning signs of prostate cancer. But these early detection tests can't tell for sure if a man has cancer. If the result of one of these tests is abnormal, you will probably need a *prostate biopsy* to determine if you have cancer (see "If prostate cancer screening test results aren't normal").

Prostate-specific antigen (PSA) blood test

Prostate-specific antigen (PSA) is a substance made by cells in the prostate gland (both normal cells and cancer cells). PSA is mostly found in semen, but a small amount is also found in the blood. Most healthy men have levels under 4 nanograms per milliliter (ng/mL) of blood. The chance of having prostate cancer goes up as the PSA level goes up.

When prostate cancer develops, the PSA level usually goes above 4. Still, a level below 4 does not guarantee that a man doesn't have cancer – about 15% of men with a PSA below 4 will have prostate cancer on a biopsy. Men with a PSA level between 4 and 10 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, your doctor may advise either waiting a while and repeating the test, or getting a prostate biopsy to find out if you have cancer. Not all doctors use the same PSA cutoff point when advising whether to do a biopsy. Some may advise it if the PSA is 4 or higher, while others might recommend it at 2.5 or higher. Other factors, such as your age, race, and family history, may also come into play.

Factors that might affect PSA levels

The PSA level can also be increased by a number of factors other than prostate cancer, such as:

- **An enlarged prostate:** Conditions such as *benign prostatic hyperplasia* (BPH), a non-cancerous enlargement of the prostate that affects many men as they grow older, can raise PSA levels.
- **Older age:** PSA levels normally go up slowly as you get older, even if you have no prostate abnormality.
- **Prostatitis:** This term refers to infection or inflammation of the prostate gland, which can raise PSA levels.
- **Ejaculation:** This can make the PSA go up for a short time, and then go down again. This is why some doctors suggest that men abstain from ejaculation for 2 days before testing.
- **Riding a bicycle:** Some studies have suggested that cycling may raise PSA levels (possibly because the seat puts pressure on the prostate), although not all studies have found this.
- **Certain urologic procedures:** Some procedures done in a doctor's office that affect the prostate, such as a prostate biopsy or cystoscopy, can result in higher PSA levels for a short time. Some studies have suggested that a digital rectal exam (DRE) might raise PSA levels slightly, although other studies have not found this. Still, if both a PSA test and a DRE are being done during a doctor visit, some doctors advise having the blood drawn for the PSA before having the DRE, just in case.
- **Certain medicines:** Taking male hormones like testosterone (or other medicines that raise testosterone levels) may cause a rise in PSA.

Some things might cause PSA levels to go down (even if cancer is present):

- **5-alpha reductase inhibitors:** Certain drugs used to treat BPH or urinary symptoms, such as finasteride (Proscar or Propecia) or dutasteride (Avodart), may lower PSA levels. These drugs can also affect prostate cancer risk (discussed in the section "Can prostate cancer be prevented?"). You should tell your doctor if you are taking these medicines because they may lower PSA levels, so the doctor might need to adjust the reading.
- **Herbal mixtures:** Some mixtures that are sold as dietary supplements may also mask a high PSA level. This is why it's important to let your doctor know if you are taking any type of supplement, even ones that are not necessarily meant for prostate health. Saw palmetto (an herb used by some men to treat BPH) does not seem to affect PSA.
- **Obesity:** Obese (very overweight) men tend to have lower PSA levels.
- **Aspirin:** Some recent research has suggested that men taking aspirin regularly may have lower PSA levels. This effect may be greater in non-smokers. More research is needed to confirm this

finding. If you take aspirin regularly (such as to help prevent heart disease), talk to your doctor before you stop taking it for any reason.

- **Statins:** Cholesterol-lowering drugs known as statins, such as atorvastatin (Lipitor®), rosuvastatin (Crestor®), and simvastatin (Zocor®), are linked to lower PSA levels if taken over years. However, this effect on PSA levels is not seen if calcium channel blockers are taken at the same time. Calcium channel blockers, such as diltiazem (Cardizem®), amlodipine (Norvasc®), and verapamil (Calan®), are drugs used to treat high blood pressure and heart problems.
- **Thiazide diuretics:** Thiazide diuretics, such as hydrochlorothiazide (HCTZ), are a type of water pill often used to treat high blood pressure. Taking a thiazide diuretic for years is linked to lower PSA levels. Taking both a thiazide diuretic and a statin is linked to even lower PSA levels than with either type of drug alone.

For men not known to have prostate cancer, it's not always clear if lowering the PSA is helpful. In some cases the factor that lowers the PSA may also lower a man's risk of prostate cancer. But in other cases, it might lower the PSA level without affecting a man's risk of cancer. This could actually be harmful, if it were to lower the PSA from an abnormal level to a normal one, as it might result in not detecting a cancer. This is why it is important to talk to your doctor about anything that might affect your PSA level.

Special types of PSA tests

Some doctors might consider using newer types of PSA tests (discussed below) to help decide if you need a prostate biopsy, but not all doctors agree on how to use these other PSA tests. If your PSA test result isn't normal, ask your doctor to discuss your cancer risk and your need for further tests.

Percent-free PSA

PSA occurs in 2 major forms in the blood. One form is attached to blood proteins, while the other circulates free (unattached). The *percent-free PSA* (fPSA) is the ratio of how much PSA circulates free compared to the total PSA level. The percentage of free PSA is lower in men who have prostate cancer than in men who do not.

This test is sometimes used to help decide if you should have a prostate biopsy if your PSA results are in the borderline range (like between 4 and 10). A *lower* percent-free PSA means that your likelihood of having prostate cancer is higher and you should probably have a biopsy. Many doctors recommend biopsies 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 prostate 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.

A newer test, known as *complexed PSA*, directly measures the amount of PSA that is attached to other proteins (the portion of PSA that is not "free"). This test is done instead of checking the total and free PSA, and it could give the same amount of information as the other tests done separately. Studies are now under way to see if this test provides the same level of accuracy.

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, the ACS guidelines do not recommend using the 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 (discussed in “If prostate cancer screening test results aren’t normal”) and divides the PSA number by the prostate volume. A higher PSA density indicates a greater likelihood of cancer. PSA density has not been shown to be as useful as the percent-free PSA test.

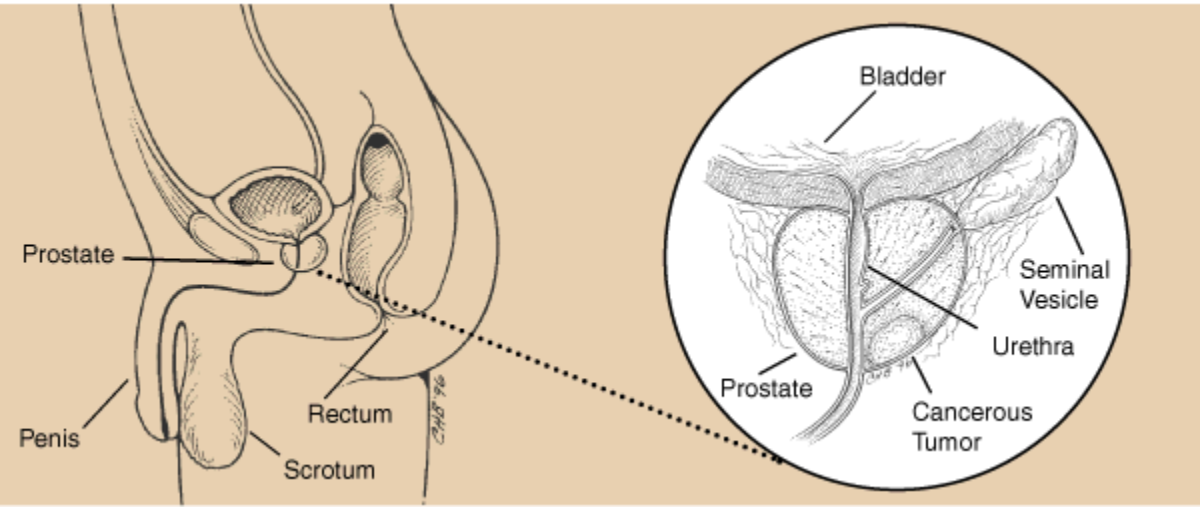
Age-specific PSA ranges

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 very worrisome in a 50-year-old man but cause less concern 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 because the usefulness of age-specific PSA ranges is not well proven, most doctors and professional organizations (as well as the makers of the PSA tests) 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 gland is just in front of the rectum, and most cancers begin in the back part of the gland, which can 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 may be included as a part of prostate cancer screening.

American Cancer Society recommendations for prostate cancer early detection

The American Cancer Society (ACS) 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 uncertainties, risks, and potential benefits of prostate cancer screening. Men should not be screened unless they have received this information. 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 Americans and men who have a first-degree relative (father, brother, or son) 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, those men who want to be screened should be tested with the prostate-specific antigen (PSA) blood test. The digital rectal exam (DRE) may also be done as a part of screening.

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 patient’s general health preferences and values.

Assuming 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 do not have a 10-year life expectancy should not be offered testing since they are not likely to benefit. 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 the patient's health, values, and preferences.

If prostate cancer screening test results aren’t normal

If the results of early detection tests – the prostate-specific antigen (PSA) blood test and/or digital rectal exam (DRE) – suggest that you might have prostate cancer, your doctor will do other tests, such as a transrectal ultrasound and a prostate biopsy to find out.

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

TRUS is not used as a screening test for prostate cancer because it can't always tell the difference between normal tissue and cancer. Instead, it is most often used to look for prostate cancer when a man has symptoms or has an abnormal PSA level or digital rectal exam (DRE). During a prostate biopsy, TRUS is used to guide the biopsy needles into the right area of the prostate.

TRUS is useful in other situations as well. It can be used to measure the size of the prostate gland, which can help determine the PSA density and may also affect which treatment options a man has.

Prostate biopsy

A biopsy is a procedure in which a sample of body tissue is removed and then looked at under a microscope. A *core needle biopsy* is the main method used to diagnose prostate cancer. It is usually done by a urologist, a surgeon who treats cancers of the genital and urinary tract, which includes the prostate gland.

Using transrectal ultrasound to "see" the prostate gland, the doctor quickly inserts a thin, hollow needle through the wall of the rectum into the prostate. When the needle is pulled out, it removes a small cylinder (core) of prostate tissue. This is repeated from 8 to18 times, but most urologists will take about 12 samples.

Though the procedure sounds painful, each biopsy usually causes only a brief uncomfortable sensation 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 with local anesthetic. You might want to ask your doctor if he or she plans to do this.

The biopsy itself takes about 10 minutes and is usually done in the doctor's office. You will probably 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 will probably notice blood in your urine. You may also have some light bleeding from your rectum, especially if you have hemorrhoids. Many men also see some blood in their semen or have rust colored semen. This can last for several weeks after the biopsy, depending on how frequently you ejaculate.

Your biopsy samples will be sent to a lab, where a *pathologist* (a doctor who specializes in diagnosing disease in tissue samples) will look at them under a microscope to see if they contain cancer cells. If cancer is present, the pathologist will also assign a *grade* to it. This is often expressed as a *Gleason score* (or *Gleason sum*). Although in theory this can range from 2 to 10, Gleason scores below 6 are rare. The higher your Gleason score, the more likely it is that your cancer will grow and spread quickly.

Getting the biopsy results usually takes at least 1 to 3 days, but it can sometimes take longer.

Even when taking many samples, biopsies can still sometimes miss a cancer if none of the biopsy needles pass through it. This is known as a *false-negative* result. If your doctor still strongly suspects you have prostate cancer (because your PSA level is very high, for example) a repeat biopsy may be needed to help be sure.

Prostate biopsy results are sometimes called *suspicious*. The pathologist may use terms such as prostatic intraepithelial neoplasia (PIN), atypical small acinar proliferation (ASAP, or just atypia), or proliferative inflammatory atrophy (PIA). Suspicious results mean that the cells don't look quite normal, but they don't look like cancer, either. If your biopsy results come back suspicious, your doctor may want to repeat the biopsy.

More information about the possible results of prostate biopsies can be found in our document *Prostate Cancer* or in the Prostate Pathology section of our website.

What are the signs and symptoms of prostate cancer?

Early prostate cancer usually causes no symptoms. But more advanced prostate cancers can sometimes cause symptoms, such as:

- Problems urinating, including a slow or weak urinary stream or the need to urinate more often, especially at night.
- Blood in the urine
- Trouble getting an erection (erectile dysfunction)
- Pain in the hips, back (spine), chest (ribs), or other areas from cancer spread to bones
- Weakness or numbness in the legs or feet, or even loss of bladder or bowel control from cancer pressing on the spinal cord.

Other conditions can also cause many of these same symptoms. For example, trouble urinating is much more often caused by benign prostatic hyperplasia (BPH) than cancer. Still, it's important to tell your doctor if you have any of these problems so that the cause can be found and treated, if needed.

Insurance coverage for prostate cancer screening

The American Cancer Society supports legislation assuring that men will receive insurance coverage for prostate screening exams. The Society recognizes that differing opinions exist as to whether early detection testing for prostate cancer lowers disease-specific mortality. Until such time when studies are conclusive, patients, in consultation with their doctors, should be free to determine on an individual basis whether testing is appropriate. Prostate cancer screening should not be prevented because of the reimbursement limitations of health insurance plans.

The American Cancer Society does not support routine testing for prostate cancer at this time because we believe proper pretest guidance and education is necessary. Doctors and other clinicians should provide information on the potential risks and benefits of PSA testing to appropriate patients, allowing them to make an informed decision on testing.

State efforts to ensure prostate cancer screening coverage

States have passed laws on a variety of issues relating to prostate cancer, including:

- Assured health insurance coverage for prostate cancer screening
- Public education on prostate cancer
- Prostate cancer research funds

Many states have laws assuring that private health insurers cover tests to detect prostate cancer, including the PSA test and 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 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 see what's covered.

Medicare coverage

Medicare covers prostate-specific antigen (PSA) blood test and a digital rectal exam (DRE) once a year for all men with Medicare age 50 and over. There is no co-insurance and no Part B deductible for the PSA test. For other services, the beneficiary would pay 20% of the Medicare-approved amount after the yearly Part B deductible.

Additional resources

More information from your American Cancer Society

The following related information may also be helpful to you. These materials can be ordered from our toll-free number, 1-800-227-2345.

American Cancer Society Guidelines for the Early Detection of Cancer (also in Spanish)

Prostate Cancer (also in Spanish)

National organizations and websites*

Along with the American Cancer Society, other sources of information and support include:

Urology Care Foundation
Toll-free number: 1-800-828-7866
Website: www.urologyhealth.org

Offers free brochures on prostate cancer and screening as well as online information on diseases of the prostate, bladder, and other urology health issues in the "Urology A – Z" section of their website.

National Association for Continence
Toll-free number: 1-800-252-3337 (1-800-BLADDER)
Website: www.nafc.org

This group offers information and support to all people who are living with incontinence and has information for men who have had prostate surgery. Also available in Spanish.

National Cancer Institute
Toll-free number: 1-800-422-6237 (1-800-4-CANCER); TYY: 1-800-332-8615
Website: www.cancer.gov

Free, accurate, up-to-date information about cancer to patients, their families, and the general public; also helps people find clinical trials in their area

National Coalition for Cancer Survivorship
Toll-free number: 1-888-650-9127
1-877-622-7937 (1-877-NCCS-YES) for publications and Cancer Survivor Toolbox® orders
Website: www.canceradvocacy.org

Offers information on work, health insurance, and more. The Cancer Survival Toolbox is a free, self-learning audio program to help cancer survivors and caregivers develop practical tools needed to deal with the diagnosis, treatment and challenges of cancer. Listen online or order CDs. Also in Spanish and Chinese.

Prostate Cancer Foundation (formerly CaPCURE)
Toll-free number: 1-800-757-2873 (1-800-757-CURE) or 1-310-570-4700
Website: www.pcf.org

You can find information on prostate cancer and treatment options as well as patient guides and survivor stories.

US Too International, Inc.
Toll-free number: 1-800-808-7866 (1-800-80-US-TOO)
Website: www.ustoo.com

Free information about all stages of prostate cancer, different treatment options, new research findings and current clinical trials, and some referrals to local support groups

**Inclusion on this list does not imply endorsement by the American Cancer Society.*

No matter who you are, we can help. Contact us anytime, day or night, for information and support. Call us at 1-800-227-2345 or visit www.cancer.org.

References

Algotar AM, Thompson PA, Ranger-Moore J, et al. Effect of aspirin, other NSAIDs, and statins on PSA and PSA velocity. *Prostate*. 2010;70:883-888.

American Cancer Society. *Cancer Facts & Figures 2015*. Atlanta, Ga: American Cancer Society; 2015.

American Cancer Society. *Prostate Cancer*. Cancer Information Database. 2015.

Andriole GL, Bostwick DG, Brawley OW, et al. Effect of dutasteride on the risk of prostate cancer. *N Engl J Med*. 2010;362:1192-1202.

Andriole GL, Grubb RL, Buys SS, et al. Mortality results from a randomized prostate-cancer screening trial. *N Engl J Med*. 2009;360:1310-1319.

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.

Klein EA, Thompson IM, Tangen CM, et al. Vitamin E and the risk of prostate cancer: The Selenium and Vitamin E Cancer Prevention Trial (SELECT). *JAMA*. 2011;306:1549-1556.

Kristal AR, Darke AK, Morris JS, et al. Baseline selenium status and effects of selenium and vitamin E supplementation on prostate cancer risk. *J Natl Cancer Inst*. 2014 Mar;106(3) (published online ahead of print).

Lippman SM, Klein EA, Goodman PJ, et al. Effect of selenium and vitamin E on risk of prostate cancer and other cancers: The Selenium and Vitamin E Cancer Prevention Trial (SELECT). *JAMA*. 2009;301:39-51.

Lucia MS, Epstein JI, Goodman PJ, et al. Finasteride and high-grade prostate cancer in the Prostate Cancer Prevention Trial. *J Natl Cancer Inst*. 2007;99:1375-1383.

Schroder FH, Hugosson J, Roobol MJ, et al. Prostate-cancer mortality at 11 years of follow-up. *N Engl J Med*. 2012;366:981-990. Erratum in: *N Engl J Med*. 2012;366:2137.

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

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For additional assistance please contact your American Cancer Society
1-800-227-2345 or www.cancer.org