

Prostate Cancer Early Stage

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get lost in
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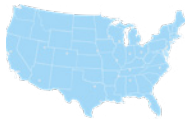
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- ✓ Based on treatment guidelines used by health care providers worldwide
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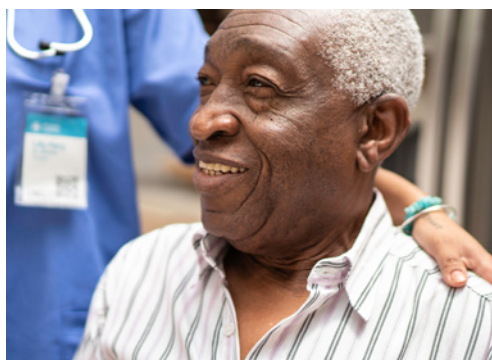
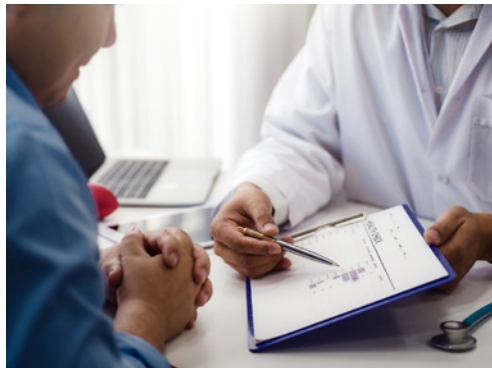
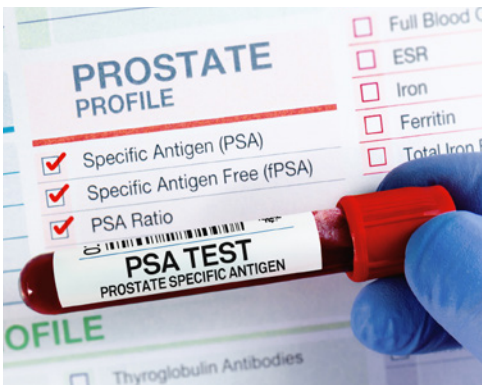
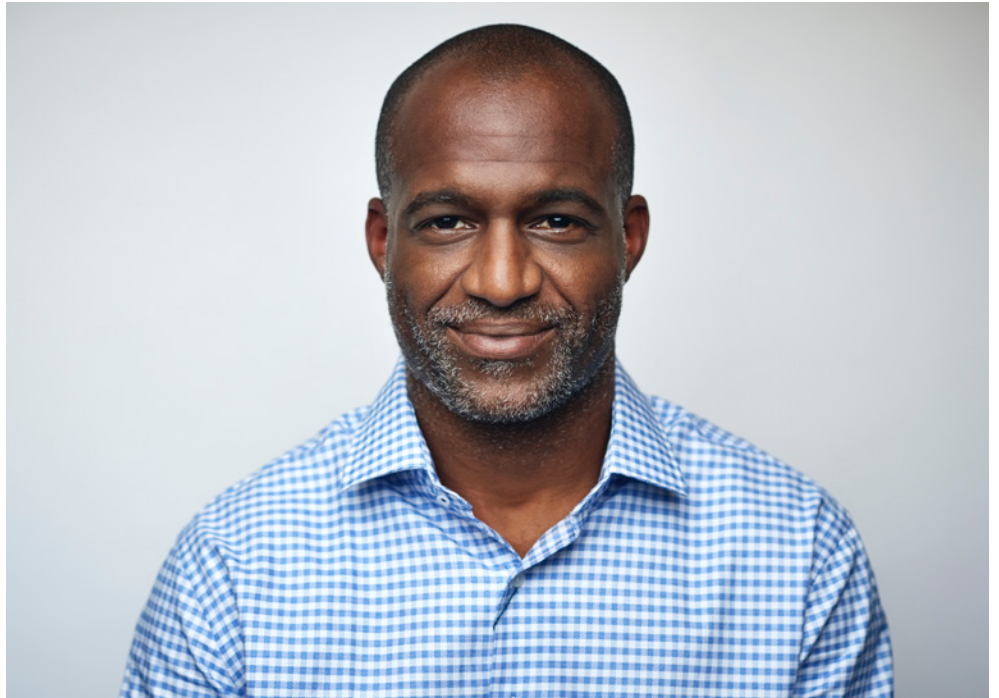
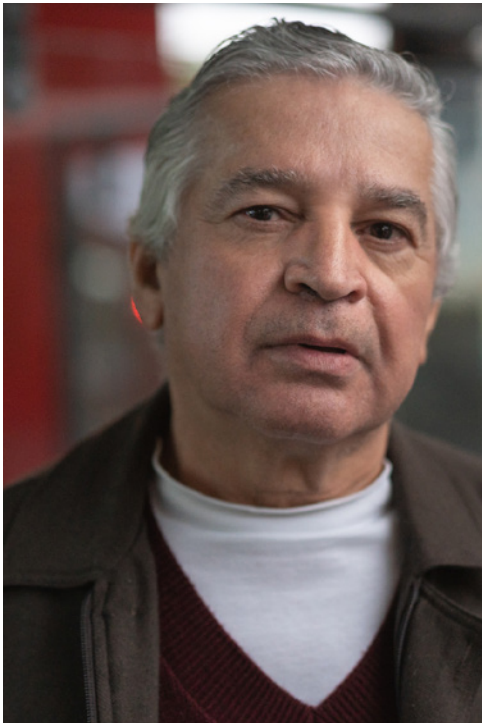
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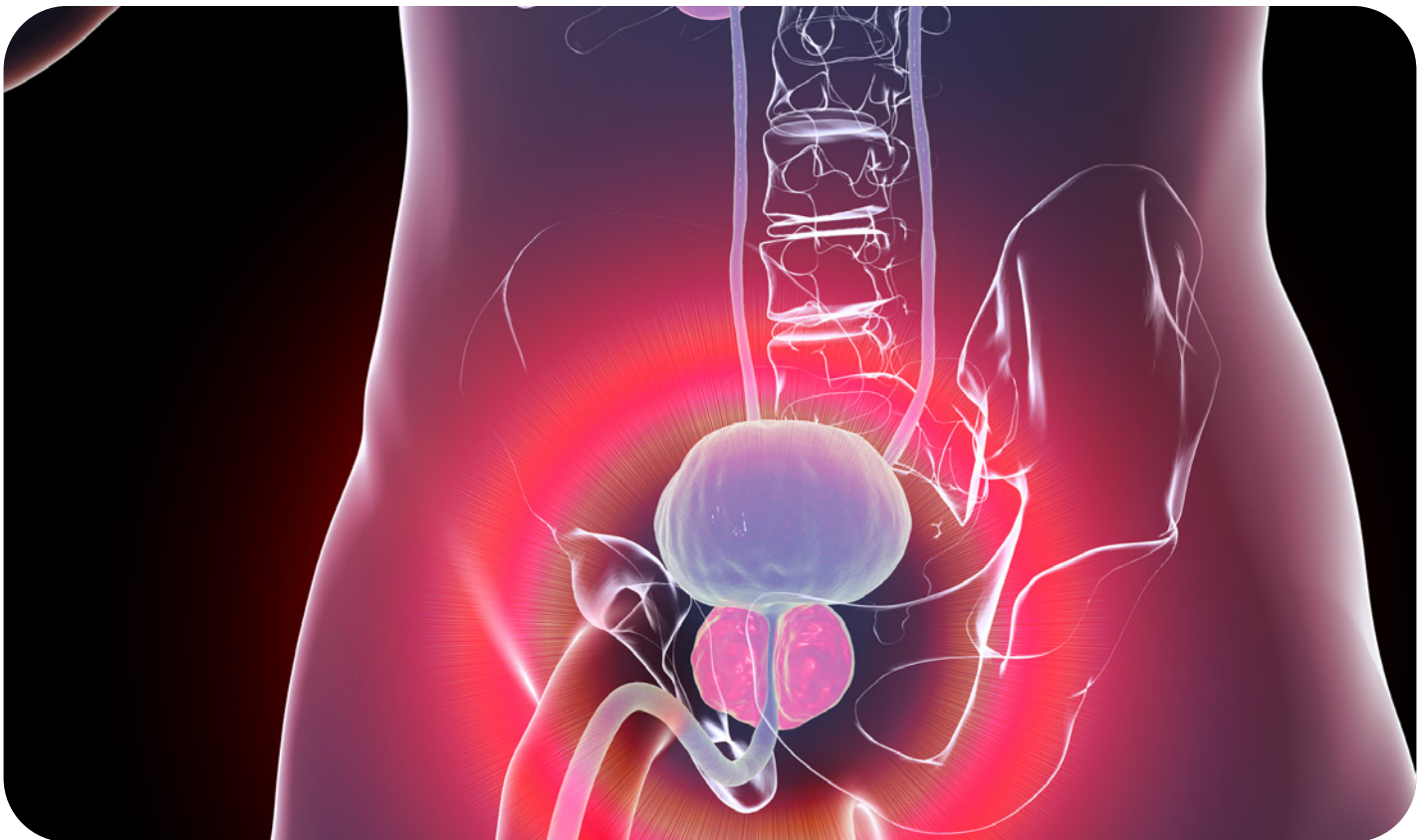
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Prostate cancer basics

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The prostate is a gland located deep inside the lower abdomen. Anyone with a prostate has a chance of getting prostate cancer. It's usually not fatal, particularly early-stage prostate cancer. This chapter offers an overview of this common cancer.

What is prostate cancer?

Prostate cancer develops in a small gland called the prostate. The prostate is part of the male reproductive system. Besides the prostate, the male reproductive system includes the penis, seminal vesicles, and testicles. The prostate is located deep inside the lower part of the trunk of the body, just below the bladder.

Prostate cancer develops when cells in the gland start to grow out of control.

What is cancer?

Cancer is a disease where cells—the building blocks of the body—grow out of control. This can end up harming the body. There are many types of cells in the body, so there are many types of cancers.

Cancer cells don't behave like normal cells. Normal cells have certain rules. Cancer cells don't follow these rules.

- Cancer cells develop genetic errors (mutations) that allow them to multiply and make many more cancer cells. The cancer cells crowd out and overpower normal cells. Cancer cells take away energy and nutrients that normal cells need.
- Normal cells live for a while and then die. Cancer cells avoid normal cell death. They survive much longer than normal cells do.
- Cancer cells can spread to other areas of the body. They can replace many normal cells and cause organs to stop working well.
- Treatment may get rid of cancer at first but sometimes the cancer comes back later.
- Cancer can stop responding to treatment that worked before.

Scientists have learned a great deal about cancer. As a result, today's treatments work better than treatments in the past. Also, many people with cancer have more treatment choices now than before.

What causes prostate cancer?

Many people who develop cancer wonder where it came from and how they got it. Doctors don't know exactly what causes prostate cells to grow out of control (become cancerous). But several factors are linked to a higher risk of prostate cancer. These are called risk factors. A risk factor is anything that increases your chance of getting cancer.

Risk factors don't necessarily cause prostate cancer, but people with prostate cancer usually have one or more of these risk factors:

- ▶ **Age** – The biggest risk factor for prostate cancer is age. Prostate cancer is diagnosed most often in those aged 65 years and above. Your chances of getting prostate cancer increase as you become older.
- ▶ **Family history** – Your family health history is information about the diseases and health conditions in your family. A family history reflects a pattern of certain diseases among family members. With prostate cancer, males who have a close family member (a brother or father) with this disease have a greater chance of getting it themselves. Those with a family history of certain other cancers (breast, ovarian, colon, pancreatic, and other cancers) are also at a higher risk for prostate cancer.
- ▶ **Genetic factors** – When a family history shows that prostate cancer “runs in the family,” genetic testing can be done to find specific genetic abnormalities (mutations) known to be linked with prostate cancer or other cancers. For instance, a man with an inherited genetic abnormality in the *BRCA2* gene likely has a higher risk

of prostate cancer. Genetic abnormalities that aren't inherited can occur, too.

- ▶ **Race** – Black males are more likely than White males to develop prostate cancer. Prostate cancer in Black males is also more likely to occur at an earlier age and be more aggressive and more advanced when diagnosed. Black males are also twice as likely to die from prostate cancer compared with White males. Lack of equal access to health care is a major factor contributing to these differences.
- ▶ **Diet and lifestyle** – Eating food that's high in fat, such as meat and dairy products, has been linked with an increased risk of prostate cancer. Eating more fruits and vegetables may reduce this risk. Exercise also likely decreases the likelihood of dying from prostate cancer. However, smoking may increase the risks of developing prostate cancer and of dying from it.

These risk factors aside, anyone with a prostate has a risk of getting prostate cancer. Prostate cancer is the most common cancer in American males besides skin cancer.

The prostate enlarges with age

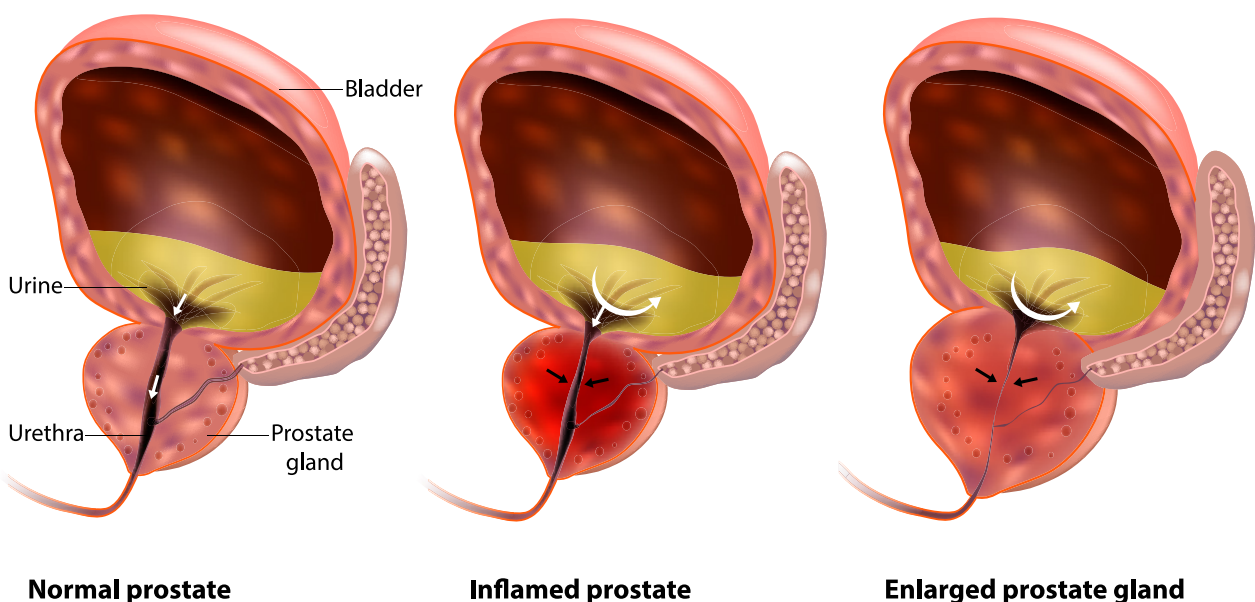
A young man's prostate is said to be the size of a walnut or a ping-pong ball and weigh about the same as an AA battery. As you grow older, your prostate gradually grows larger, possibly reaching the size of a lemon or an orange.

Having an enlarged prostate is a condition called benign prostatic hyperplasia (BPH). Benign means it's not cancerous. An enlarged prostate doesn't cause prostate cancer or increase your risk of getting it. However, it's common to have an enlarged prostate and prostate cancer at the same time. Notably, an enlarged prostate can cause the same symptoms as those caused by prostate cancer.

Doctors aren't sure what causes the prostate to grow as men get older. A common theory is that levels of hormones (like testosterone) change with age, which affects the size of the prostate.

In many individuals, the prostate grows large enough to squeeze the urethra—a tube that passes through the prostate. The urethra allows urine to flow out of the bladder. This squeezing can narrow the urethra, which slows down or stops the flow of urine when you try to pee.

Although prostate cancer usually doesn't cause any symptoms, it also can slow the flow of urine if it grows large enough. That's why it's important to get these problems checked out.



Are there types of prostate cancers?

Simply put, prostate cancer can be grouped into early-stage cancer or advanced-stage cancer.

Early stage

Early-stage prostate cancer has not spread beyond the prostate. Prostate cancer usually grows slowly and stays in the prostate. Cancer that is contained entirely within the prostate is called localized prostate cancer.

This book is all about early-stage (localized) prostate cancer.

Advanced stage

Advanced stage means that the cancer has spread beyond the prostate to other areas in the body. This spreading is called metastasis or metastatic cancer. Prostate cancer can metastasize to the bones, lymph nodes, liver, lungs, and other organs.

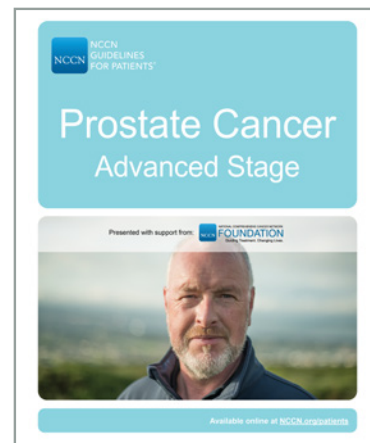
- Cancer that has spread from the prostate gland to nearby lymph nodes, but no farther, is called regional metastatic prostate cancer.
- Cancer that has spread beyond the prostate and the regional lymph nodes is called distant metastatic prostate cancer.

Cancer cells can use the bloodstream like a highway to travel to distant areas in the body.

Cancer cells can also spread through the lymphatic system. The lymphatic system is a network of organs and vessels that fights infections and circulates a clear fluid called lymph throughout the body. Lymph nodes are

a key part of this system. Lymph nodes are small, disease-fighting clusters that filter the lymph fluid to remove germs. Lymph vessels and nodes are found everywhere in the body.

A book about advanced prostate cancer, *NCCN Guidelines for Patients: Prostate Cancer, Advanced Stage*, can be found at [NCCN.org/patientguidelines](https://www.nccn.org/patientguidelines).



Where does the prostate fit in?

The prostate is located deep inside the lower body. It makes semen and is important for sexual reproduction.

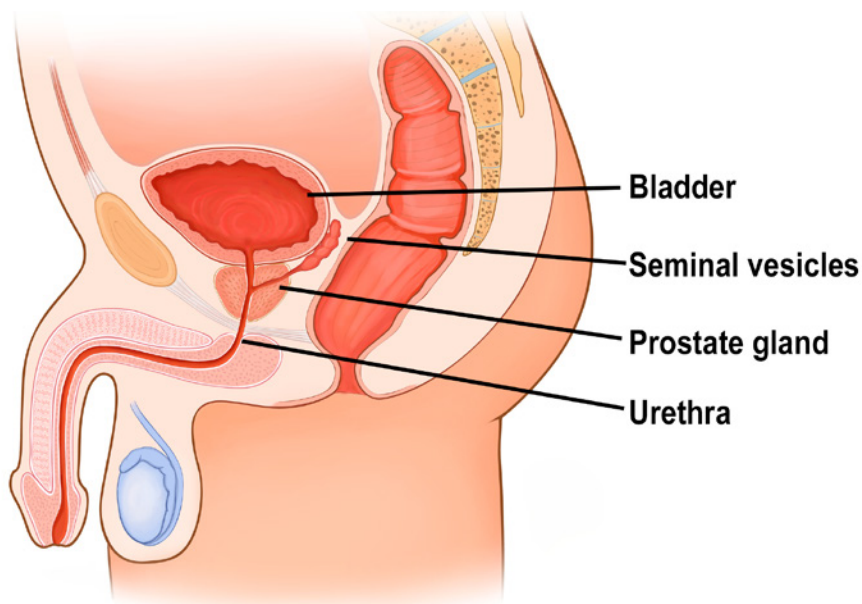
Prostate: A gland in the male reproductive system. A gland is an organ that makes fluids or chemicals the body needs. The prostate gland makes a liquid that nourishes and helps transmit semen.

Semen: A fluid made up of liquids from the prostate and the seminal vesicles as well as sperm from the testicles. During ejaculation, semen is released from the body through the urethra and out through the penis.

Urethra: A tube that carries urine from the bladder and out of the body. The prostate wraps around the urethra just beneath the bladder.

Seminal vesicles: Two glands that make another part of the fluid that becomes semen. The seminal vesicles are located above the prostate and behind the bladder.

Bladder: An organ that holds urine.



What are symptoms of prostate cancer?

A symptom is a feeling or problem that can indicate a disease or condition. Prostate cancer often grows slowly and shows no symptoms for a long time. But you don't have to have symptoms to have prostate cancer. This is especially true in the early stages of the disease. Even advanced prostate cancer may have few or mild symptoms. Some symptoms that may occur include:

- Urinating (peeing) frequently, especially at night
- Weak or intermittent urine stream
- Trouble urinating or straining to urinate
- Trouble holding in urine
- Feeling like your bladder hasn't fully emptied
- Blood in the urine or semen
- Erectile dysfunction (difficulty getting an erection)
- Dull pain in the groin or pelvis
- Burning or pain while urinating
- Unexplained weight loss
- Bone, hip, or back pain

It's important to know that prostate cancer has many of the same symptoms as a condition called enlarged prostate (also called benign prostatic hyperplasia, or BPH). It's difficult to tell the difference between the two conditions based on symptoms alone, and BPH is much more common than prostate cancer. Be sure to tell your doctor about any symptoms you have, because you may need specific testing.

Prostate cancer has one of the highest survival rates of any cancer when found early.

Can prostate cancer be cured?

Early-stage prostate cancer is highly treatable and often curable. The earlier that prostate cancer is diagnosed and treated, the more likely that a patient will live without cancer. The majority of people with early-stage disease are able to live without cancer for many years, usually the rest of their lives.

Treatments for early-stage prostate cancer include surgery, radiation, and hormone therapy, among others.

However, not everyone with prostate cancer needs to be treated. Many patients with early-stage prostate cancer can be managed with active surveillance. During active surveillance, you'll have regular tests to keep an eye on your cancer. But you won't have treatment unless the cancer grows or changes in a way that requires treatment. The goal of active surveillance is to avoid the potential side effects of treatment, with the option for treatment in the future if you need it.

Advanced-stage prostate cancer isn't curable, but treatment can slow down its growth and reduce symptoms. Treatment for advanced-stage prostate cancer includes surgery, radiation therapy, chemotherapy, and hormone therapy. Many males with advanced-stage prostate cancer continue to live their lives with the cancer until they die from something else. Early detection and treatment can greatly reduce the chances of getting advanced-stage prostate cancer.

Something to remember: When found early, prostate cancer has one of the highest survival rates of any cancer.

Key points

- Prostate cancer develops when cells in the prostate gland grow out of control.
- The prostate gland makes a liquid called PSA that nourishes and helps transmit semen.
- Age is the biggest risk factor for prostate cancer. As you age, your chances of developing prostate cancer increase.
- The majority of prostate cancers are diagnosed in males over the age of 65.
- Males who have a close family member (brother, father) with prostate cancer have a greater chance of getting it themselves.
- All males are at risk for prostate cancer, but Black males are at greater risk.
- Prostate cancer usually grows slowly and stays in the prostate.
- Early-stage prostate cancer hasn't spread beyond the prostate.
- Advanced-stage prostate cancer has spread beyond the prostate to other areas in the body. This spread is called metastasis.
- Cancer cells can spread to other body parts through blood or lymph.
- You don't have to have symptoms to have prostate cancer.
- Not everyone diagnosed with prostate cancer needs treatment.
- When found early, prostate cancer has one of the highest survival rates of any cancer.

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Prostate cancer tests

- 15 Screening tests
- 17 General health tests
- 17 Blood and urine tests
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Testing is necessary to find out if you have prostate cancer. If you do have prostate cancer, testing can show whether it's early-stage or advanced-stage cancer. Testing can also help your doctors plan how to treat it.

Doctors use a variety of tests to find out if you have prostate cancer and determine how advanced the cancer is. Tests are used to plan treatment and check how well treatment is working. This chapter will help you know what tests you may have and what to expect during testing. Bring someone with you to listen, ask questions, and write down the answers.

Testing begins with screening tests, followed by tests of your general health, and then diagnostic tests, if needed. Not every person with prostate cancer will receive every test listed here.

Screening tests

A screening test looks for disease before you have any symptoms. The goal of screening is to detect disease early when there's a better chance of stopping it.

Screening tests aren't diagnostic, which means they can't tell you for sure whether or not you actually have the disease. Rather, screening tests indicate that you may need a diagnostic test.

The two screening tests for prostate cancer are a digital rectal exam and a prostate-specific antigen (PSA) test.

Tips for testing

Results from blood tests, imaging studies, and biopsies will be used to determine your treatment plan. It's important you understand what these tests mean. Ask questions and keep copies of your test results. Online patient portals are a handy way to access your test results.

Remember these tips for testing:

- Bring someone with you to doctor visits, if possible.
- Write down questions and take notes during appointments. Don't be afraid to ask your care team questions. Get to know your care team and help them get to know you.
- Get copies of blood tests, imaging results, and reports about the specific type of cancer you have.
- Organize your papers. Create files for insurance forms, medical records, and test results. You can do the same on your computer.
- Keep a list of contact information for everyone on your care team. Add it to your phone. Hang the list on your refrigerator or keep it in a place where someone can access it in an emergency. Keep your primary care physician informed of any changes.

Digital rectal exam

Don't be fooled by the name—no high-tech electronics are used in a digital rectal exam. For this test, the word “digital” means “finger.” To put it bluntly, the doctor will stick a finger up your butt (rectum) to check your prostate. The doctor will wear gloves and use a lubricant to make it easier.

A digital rectal exam (also called a prostate exam) may sound like a crude and unpleasant form of testing. But it's the simplest and most direct way for the doctor to feel the size and texture of your prostate. If the doctor finds an irregular or hardened part of the prostate, it could be a sign of a tumor.

Not every doctor will require you to have a digital rectal exam. This decision depends on a number of considerations. The digital rectal exam is usually paired with a PSA test and other factors—your age, race, family history, and more—to determine whether you need further testing, such as imaging or a biopsy.

PSA test

This test measures the amount of prostate-specific antigen (PSA) in your blood. PSA is a protein made inside the prostate. Its job is to help semen transport sperm.

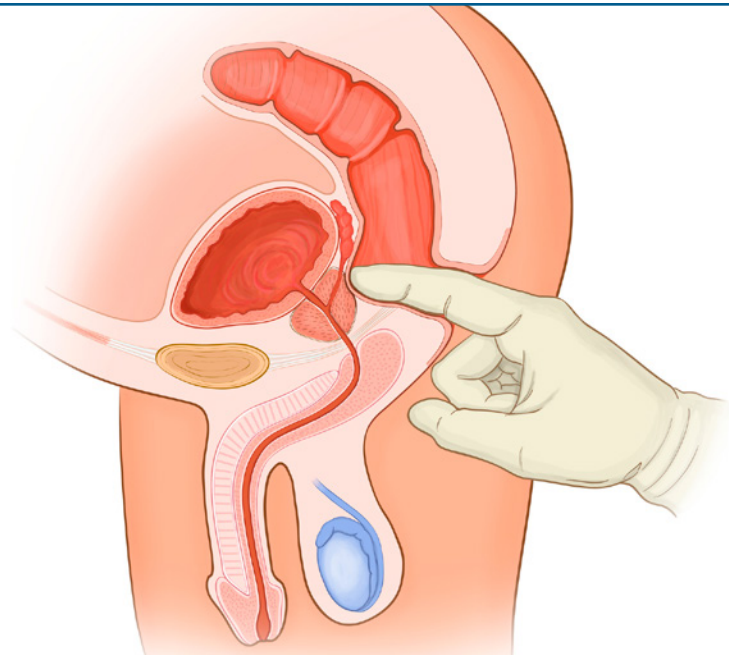
Both normal prostate cells and prostate cancer cells make PSA. If there's something wrong with the prostate—like prostate cancer—these cells may make more PSA. An unusually high amount of PSA in the blood may be a sign of prostate cancer.

However, other conditions—such as an enlarged prostate or a urinary tract infection—can also cause high levels of PSA. This means that a PSA test by itself can't provide a diagnosis of prostate cancer. That's why a PSA test is often paired with a digital rectal exam or imaging, or both, to decide whether you need a biopsy.

If a person has a high PSA level but no other symptoms of prostate cancer, a second PSA

Digital rectal exam

A digital rectal exam is a procedure in which your doctor will insert a finger into your rectum to feel your prostate. An irregular or hardened part of the prostate could be a sign of a tumor.



test may be performed. This is done to double-check the result before undergoing additional testing.

General health tests

Health history

Your doctors need to have all of your health information. They'll ask you about any health problems and treatments you've had in your life. Be prepared to talk about any illness or injury you've had and when it happened.

Bring a list of old and new medicines and any over-the-counter medicines, herbals (such as saw palmetto), or supplements you take. Tell your doctor about any symptoms you have.

Family history

Some cancers and other diseases can run in families. Your doctor will ask about the health history of family members who are blood relatives. This information is called a family history.

It's important to ask members from both your mother's and father's side of the family about all cancers, not just prostate cancer. Ask family members about other health issues like heart disease and diabetes, at what age they were diagnosed, and if anyone died from cancer. Share this information and any changes to your family history with your doctor.

Blood and urine tests

For a blood test, a needle is inserted into a vein in your arm to remove a sample of blood. The sample is examined in a lab where cells, proteins, and other components in the blood are tested for signs of disease or other conditions.

Sometimes, men with a higher PSA level have additional blood or urine testing. These tests, sometimes referred to as biomarker tests, can be used in addition to PSA to help decide whether a biopsy is needed. Biomarker tests such as PHI, SelectMDx, 4Kscore, MPS, IsoPSA, and ExoDx are options to consider for those with prostate cancer.

Diagnostic tests

If the digital rectal exam, PSA test, and other factors (like family history, race, or age) suggest you have prostate cancer, you'll be offered diagnostic testing. Talk with your doctor about whether a biopsy or imaging should be the next test you take.

Sometimes prostate cancer is found without even looking for it. It might be discovered by chance during a biopsy or surgery for another health issue. This is called an incidental finding.

Imaging tests

An imaging test takes pictures (images) of the insides of your body. The images can reveal cancer, including its size, location, and other features such as the size of the prostate itself. The images may show where the cancer started (primary tumor) and whether the cancer has spread (metastasized). Imaging is also used after cancer treatment to see how well it worked and to check if the cancer comes back.

Imaging can come before, during, or after a biopsy.

- **Before** – Imaging may be ordered beforehand to find out if a biopsy is truly necessary.
- **During** – Imaging is used during a biopsy to guide the removal of tissue samples.
- **After** – Imaging may come after a biopsy to see the size and location of the cancer, which helps to plan treatment.

Imaging methods for detecting prostate cancer include ultrasound, MRI, CT, PET, or a combination of these.

After your scan, your images will be studied by a radiologist. A radiologist is a doctor who's an expert in reading imaging tests. The radiologist will send the results to your doctor. This information helps your doctor plan the next steps of your care. Your doctor will discuss the results with you. Be sure to ask any questions you may have.

Imaging may not be needed for early-stage prostate cancer. If your PSA, digital rectal exam, and biopsy results indicate that your risk is low for the cancer to metastasize (spread

beyond the prostate), then you may not need imaging tests at this time.

On the other hand, if your test results suggest a high risk—or even a moderate risk—for the cancer to spread, your doctor may recommend one or more of the following imaging tests to look for cancer growth:

CT scan

A computed tomography (CT or CAT) scan uses x-rays and computer technology to take pictures of the inside of the body. CT takes many x-rays of the same body part from different angles. The computer combines all the x-ray pictures to make a single detailed image.

A CT scan of your abdomen and/or pelvis may be used to look for cancer that has spread beyond the prostate. CT scans are good at seeing lymph nodes and the area around the prostate.

A CT scanner is a large machine that has a tunnel in the middle. During the test, you'll lie on a table that moves slowly through the tunnel. Pillows or straps may be used to help keep you still during the test. Tell your team if you get nervous in small spaces. You may be given a sedative (medicine) to help you relax.

You may also be given contrast (sometimes called contrast dye) before the CT scan. Contrast is used to make blood vessels, organs, and other tissues stand out more clearly in the images. Contrast is injected into the bloodstream and flushed out in urine.

For the scan, you'll be alone but a technician will operate the machine in a nearby room. The

technician will be able to see, hear, and speak with you at all times.

As the machine takes pictures, you may hear buzzing, clicking, or whirring sounds. A CT scan is done in about 30 seconds, but the entire process takes 20 to 30 minutes.

MRI scan

A magnetic resonance imaging (MRI) scan uses radio waves and powerful magnets to take pictures of the inside of the body. Like a CT scan, an MRI may use contrast to make the images clearer. Also like a CT scan, the MRI scanner is a large machine with a tunnel in the middle. It also makes a lot of noise. Unlike a CT scan, MRI doesn't use radiation (x-rays).

An MRI is used to get a more detailed view of the cancer within the prostate. It's also used to see if cancer has spread to nearby lymph nodes or to the bones in your pelvis.

Because an MRI uses magnets, don't bring any metal objects (jewelry, cell phone, wristwatch, belts with metal buckles) into the imaging room.

➤ mpMRI

A multiparametric MRI (mpMRI) is a special type of MRI scan. In an mpMRI, multiple scans are performed without contrast followed by another MRI with contrast.

You might have more than one mpMRI during the course of treatment. An mpMRI might be done to learn more about your prostate cancer or to look for bleeding after a biopsy. An mpMRI might help detect certain types of tumors. It also might help determine if you should

have certain treatment, such as active surveillance.

PET scan

A positron emission tomography (PET) scan highlights cells in your body that may be cancerous. A PET scan can show even small amounts of cancer. It's used after you've been diagnosed to determine the extent of your cancer or to see if it has metastasized. PET imaging can also show how well treatment is working.

A PET scan requires injecting a radioactive substance called a tracer into your bloodstream. It takes about an hour for the tracer to circulate throughout your body. The tracer targets your cancer cells, which show up as bright spots on the scan. Afterward, the radiotracer is passed out of your body in your urine.

Like a CT and MRI, a PET scanner is a large, donut-shaped machine with a tunnel in the middle. A PET scan appointment can take 1 to 2 hours, including about 30 minutes of actual scanning time.

➤ PSMA-PET

PSMA-PET imaging is a special kind of PET imaging that locates a protein called prostate-specific membrane antigen (PSMA) on the surface of prostate cancer cells. Prostate cancer cells make a lot of PSMA, so doctors developed tracers that target this specific protein.

PSMA-PET is especially useful for detecting cancer that has spread to nearby lymph nodes or has metastasized to farther areas. PSMA-PET is used to see smaller metastases. It's also used to

monitor prostate cancer that may return after treatment (recurrence). Like all imaging tests, PSMA-PET is not perfect and sometimes misses areas of cancer.

➤ PET-CT and PET-MRI

Because PET uses a different imaging method, it's often combined with other types of imaging, such as CT or MRI, to provide an even more detailed image. These combined methods are called PET/CT or PET/MRI scans.

Bone scan

A bone scan can detect whether cancer has spread to your bones. A bone scan may be used if you have bone pain, have a high risk for bone metastases, or have changes in certain test results. Bone scans may also be used to monitor treatment.

A bone scan uses a radioactive tracer to make pictures of the inside of bones. Before the pictures are taken, the tracer is injected into your bloodstream. It can take a few hours for the tracer to enter your bones.

A special camera will take pictures of the tracer in your bones. Areas of bone damage absorb more tracer than healthy bone. These areas show up as bright spots on the pictures. Bone damage can be caused by cancer, cancer treatment, or other health problems.

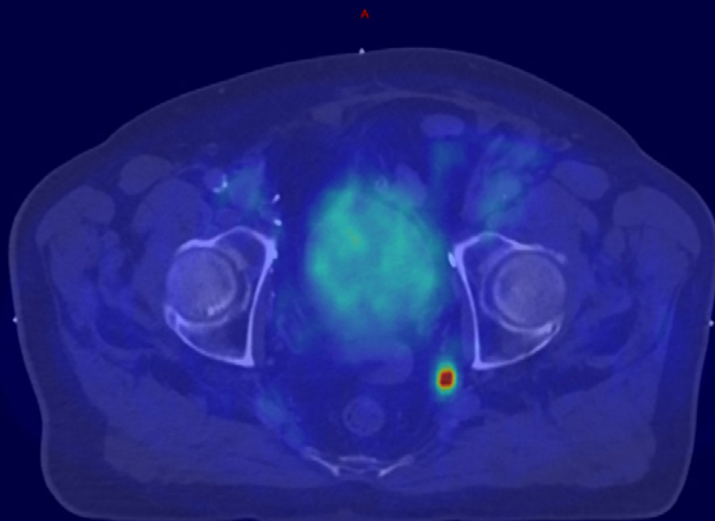
Biopsy

A biopsy is a procedure that removes a small piece of tissue or cells from your body. The samples are tested in a laboratory to find cancer. A biopsy is the only test that can confirm (diagnose) prostate cancer.

A biopsy is an invasive test, which means that it goes into (invades) your body. All invasive

PET/CT scan of metastatic prostate cancer

This image combines PET and CT scans to show a cross-section of a patient's pelvis. The greenish circle identifies cancer in the prostate, while the intense red dot indicates cancer that has spread to a pelvic lymph node.



tests have some risk. The risks for a prostate biopsy include infection, bleeding, and pain. Doctors use invasive tests only when needed. You and your doctors will decide when, or if, you need a biopsy.

The most common biopsy for prostate cancer is a core needle biopsy. This procedure is usually performed by a urologist using an ultrasound probe inserted in the rectum to see the prostate. A urologist is a doctor who's an expert in treating diseases of the urinary system and the male reproductive organs.

For this procedure, you'll lie on a table on your side with your knees bent. Once the lubricated probe is inserted into your rectum, it will release high-energy sound waves that will bounce off of internal tissues. A computer will convert these sound waves into a sonogram, which shows a video image of the prostate.

The urologist will then insert a hollow needle into the prostate gland using the ultrasound image to guide it. The needle will be inserted either through the rectum or through the perineum (the skin between the anus and scrotum). When the doctor removes the needle, it will pull out a small sample of prostate tissue called a core.

Your doctor will take 12 or more core samples from different parts of the prostate. Sometimes these will be removed from a specific area in the prostate based on the findings of an MRI.

Your biopsy samples will then be sent to a lab for testing. At the lab, a specialist called a pathologist will examine the samples under a microscope. A pathologist is a doctor who's an expert at examining cells and tissue to find disease.

If the pathologist finds cancer cells in the samples, further testing can identify your cancer risk. More tests may indicate that the cancer will grow and spread quickly, for example. Or the results may suggest that the cancer will grow very slowly and not spread outside of the prostate at all. This information helps plan the best treatment for your type of cancer.

Genetic tests

A genetic test is used to find abnormal changes (mutations) in your genes. Genes are small segments of DNA inside every cell. Genes provide the instructions to tell the cell how to make proteins, which are the building blocks of tissues.

Once in a while, a gene will have or develop an abnormal change (mutation). A mutation is when something is different in your genes than in most other people's genes. Sometimes an abnormal change can cause a gene to make the wrong type of protein or make no protein at all. This abnormality could affect the cell, which may in turn cause a disease—such as cancer.

Mutations can be passed down in families, in which case they occur in every cell in your body. Or, mutations can occur spontaneously in just some of your cells, such as in cancer cells. In other words, they may be present before you're born (called an inherited or germline mutation) or occur on their own later in life (called an acquired or somatic mutation).

The two basic types of genetic tests used for prostate cancer care are germline testing and molecular biomarker testing:

Germline testing

Sometimes, mutations in genes inherited from your parents can increase the risk of different cancers. You can pass these genes on to your children. Other family members might also carry these mutations. If you have a family history of cancer or other features, your doctor might suggest genetic testing to find out if you have an inherited cancer risk.

The goal of this type of genetic testing is to look for germline (inherited) mutations that occur in every cell in your body. Genetic germline testing is done using a sample of your blood, urine, or saliva.

For prostate cancer, germline testing looks for mutations in these genes: *BRCA1*, *BRCA2*, *ATM*, *CHEK2*, *MLH1*, *MSH2*, *MSH6*, *PALB2*, *PMS2*, and others. Some mutations can put you at risk for more than one type of cancer. Germline mutations in genes like *BRCA1* or *BRCA2* are also related to breast, ovarian, and pancreatic cancer. Germline mutations in *MSH2*, *MSH6*, *MLH1*, and *PMS2* are related to colorectal and uterine cancers in addition to prostate cancer.

If a germline mutation is suspected based on your family's or your own health history, you should seek genetic counseling. A genetic counselor is an expert who has special training in genetic diseases and can help you decide whether you would like to undergo germline testing. A genetic counselor will also help you interpret the results of these tests.

Germline testing is recommended for those with prostate cancer and any of the following:

- A family history of prostate cancer, breast cancer, ovarian cancer, intestinal cancer, and certain other cancers
- High-risk, very-high-risk, regional, or metastatic prostate cancer regardless of family history
- Ashkenazi Jewish ancestry
- Having any other cancer

Talk to your medical providers and/or a genetic counselor about your family history of cancer.

Molecular biomarker testing

In biomarker testing, a sample from your biopsy is tested to look at its molecular components. This information is used to help choose the best treatment for you. Biomarker testing can be considered for those with localized, regional, or metastatic prostate cancer. Biomarker testing is sometimes called gene profiling or molecular tumor testing.

The main reason to have a molecular biomarker test is to help assess whether you have lower or higher risk prostate cancer. If you have lower risk cancer, you may be able to avoid or delay treatment such as surgery or radiation therapy, which means you'd also avoid or delay any treatment-related complications and side effects. On the other hand, a molecular biomarker test can flag those who have higher risk prostate cancer, which may give them a head start on treatment.

Molecular biomarker testing is discussed further in [Chapter 4](#).

Key points

- Tests are used to plan treatment and check how well treatment is working.
- A digital rectal exam is the simplest way for the doctor to check the size and texture of your prostate.
- A biopsy is used to confirm (diagnose) prostate cancer. It's a procedure that removes samples of cells or tissue to find cancer.
- Imaging tests may be used to see if the cancer has spread beyond the prostate.
- Imaging may not be needed for early-stage prostate cancer.
- A genetic test is used to find abnormal changes (mutations) in your genes.
- Your doctor might refer you for genetic counseling and testing to find out if you have an inherited risk for cancer.
- A biopsy sample of your tumor might be tested to look at its molecular components (biomarker testing).

3

Clinical characteristics of risk

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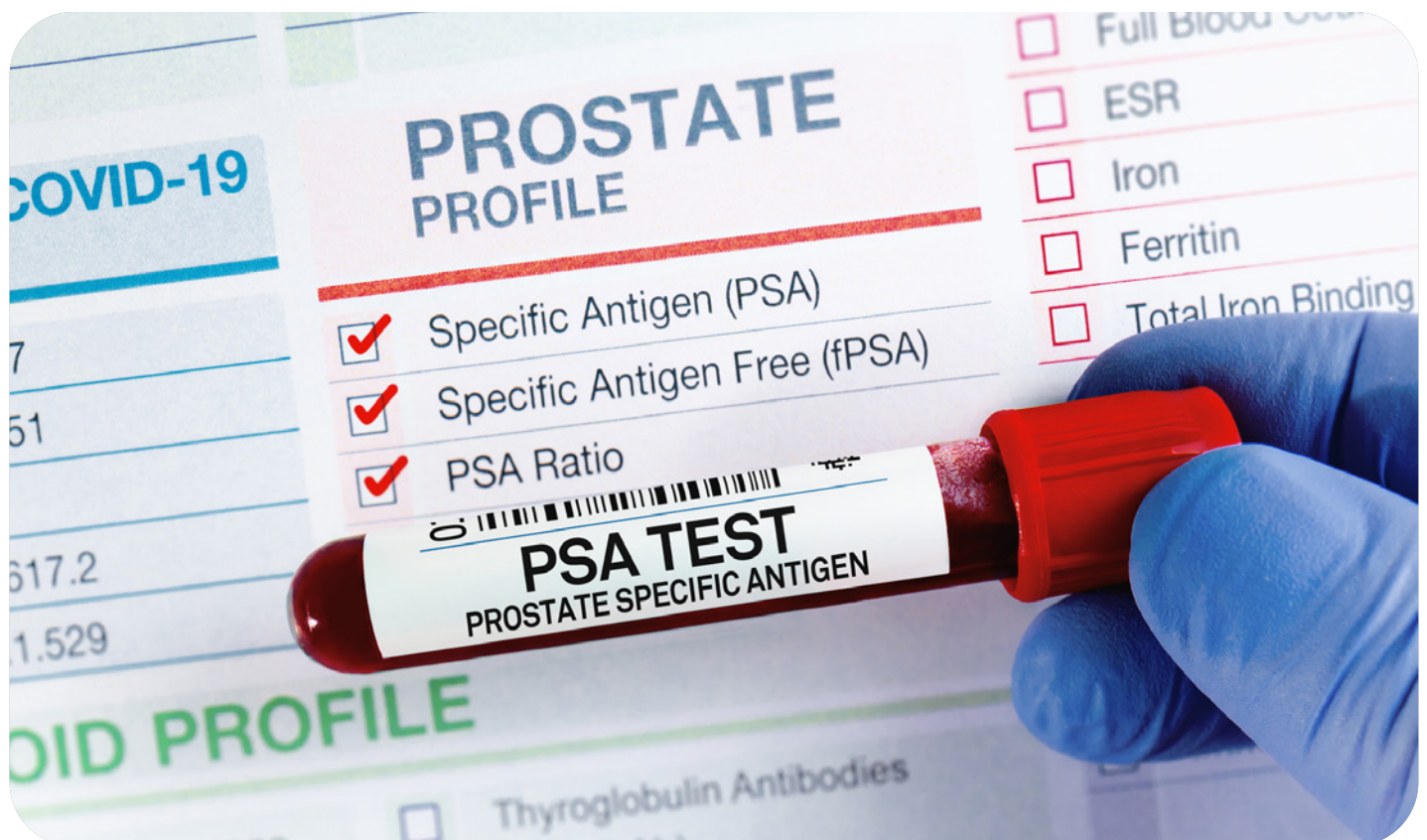
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It's important to know the risk of your cancer getting worse. Doctors look at several key characteristics to find out your risk group. This chapter explains each of these characteristics.

Early-stage prostate cancer hasn't spread outside the prostate itself. But what are the chances that it could? What are the chances that it might grow or spread after treatment?

Both doctors and patients want to know the risk for the cancer to spread. So doctors look at the clinical characteristics of your cancer, such as your PSA level, biopsy results, and other test results (which we'll talk about in this chapter). From this information, doctors can classify your disease into one of 5 different risk groups:

1. Very low risk
2. Low risk
3. Intermediate risk
4. High risk
5. Very high risk

Why do you need to know your risk group? Because your prognosis is based on your risk group. A prognosis predicts the likely course and outcome of a disease. Your prognosis guides your treatment options. For example, patients with lower risk generally get minimal treatment or no treatment at all. Patients with higher risk usually get more aggressive treatment.

But before we get into treatment, let's talk about the clinical characteristics that make up each of the 5 risk groups. These characteristics come from the results of tests described in the previous chapter plus tests described in this chapter.

Let's take a look at the following tests to see how they contribute to each risk group:

Digital rectal exam

A digital rectal exam is used to screen for cancer, rate the tumor size, and assess how your cancer is responding to treatment. For this test, your doctor will insert a lubricated, gloved finger into your rectum. Your doctor will feel your prostate for abnormal size or hardness, either of which may be a sign of a tumor.

Not all parts of the prostate can be felt during this exam, though. So other tests, like PSA level and imaging, are used to get a more complete picture of your prostate health.

Diagnosis vs. prognosis

What's the difference between your diagnosis and your prognosis? These two words sound alike but they're very different.

Diagnosis means identifying an illness based on tests. Your diagnosis names what illness you have.

Prognosis is the likely course and outcome of a disease based on tests and your response to treatment. Your prognosis predicts how your illness will turn out.

PSA

A simple blood test will tell you how much prostate-specific antigen (PSA) is in your bloodstream. PSA level (also called total PSA) is measured in nanograms of PSA per milliliter (ng/mL) of blood. A high amount of PSA in the blood may be a sign of prostate cancer. However, high PSA levels can vary by age and other factors.

Age

PSA level tends to increase with age. For males in their 40s, a PSA level above 2.5 ng/mL is very suspicious for disease. For males in their 60s, 4.5 ng/mL or higher is suspicious. A PSA level of 10 ng/mL or higher is a danger sign at any age. [See Guide 1.](#)

Race

Black males tend to have higher PSA levels than White males—about 1 point higher on average among males of the same age. Researchers don't know the reason for this difference, but they're investigating it.

Guide 1 PSA increases with age

Age in years	Normal PSA range
40–49	0.0–2.5 ng/mL
50–59	2.5–3.5 ng/mL
60–69	3.5–4.5 ng/mL
70–79	4.5–6.5 ng/mL

Other factors

Several other factors can affect PSA level, too.

- The larger the prostate, the more PSA it can make. In addition to cancer, other health issues can also cause an enlarged prostate.
- Some medicines, herbals, and supplements can also affect PSA level.
- PSA level rises after a biopsy of the prostate.
- PSA increases after ejaculations and vigorous exercise (like running or bicycling). Your doctor may recommend avoiding sex and exercise for 2 or 3 days before a PSA test. This respite allows PSA to return to its usual level.

PSA level doesn't tell the whole story, though. There are other ways that PSA can be interpreted, such as PSA density.

PSA density

Males with larger prostates tend to have higher PSA levels. But that doesn't mean they have a greater likelihood for prostate cancer. To adjust for this, doctors can calculate the PSA density.

PSA density is the amount of PSA compared to the size of the prostate. PSA density is calculated by dividing a patient's PSA level by his prostate size. The size of the prostate is measured by transrectal ultrasound or MRI scan. A higher PSA density (above 0.15 ng/mL², for example) indicates a greater likelihood of cancer. PSA density also accounts for males with small and very small prostates, who could have prostate cancer even with low PSAs.

Prostate biopsy

A biopsy removes a sample of tissue that's tested for cancer. Rising PSA levels and an abnormal digital rectal exam are signs of possible prostate cancer. However, the only way to know for sure if you have prostate cancer is to remove tissue from your body and test it for cancer cells.

For a prostate biopsy, a sample of tissue is removed using a hollow needle. You may need to stop taking some medicines, such as aspirin or blood thinners, a week before the procedure.

It's common for patients to have more than one biopsy. You'll have one biopsy to determine your diagnosis and another biopsy in a year or

two (called a confirmatory biopsy) to see if the results of both biopsies are the same.

There are two surgical methods for prostate cancer biopsies: transrectal and transperineal.

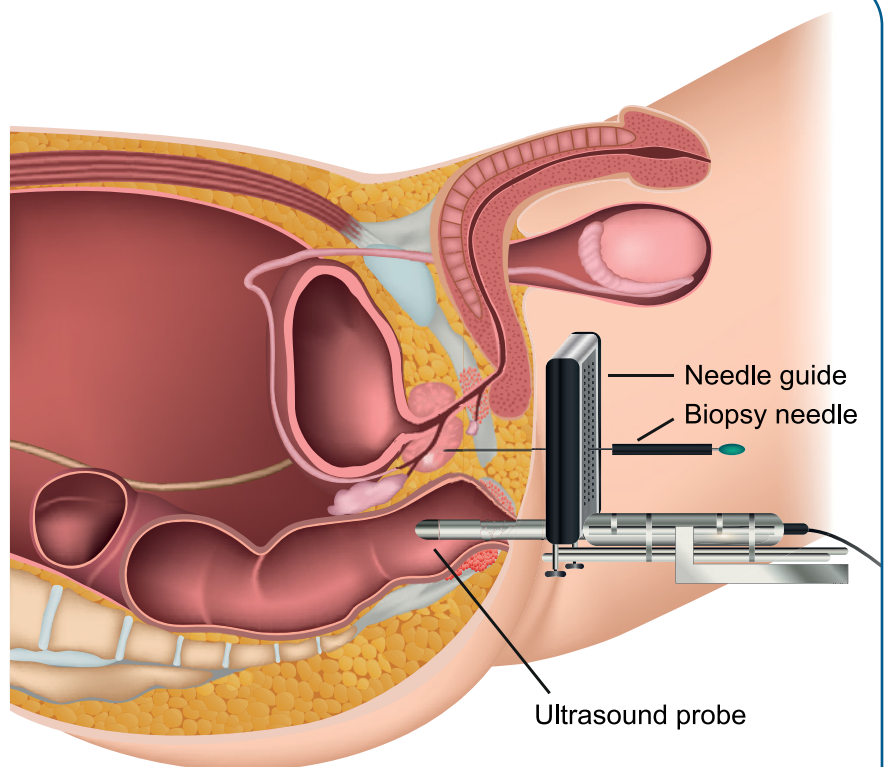
Transrectal biopsy

A transrectal biopsy is the most common type of prostate biopsy. A sample of tissue is removed by going into the rectum (transrectal) and, from there, into the prostate.

This can be done in the urologist's office. You'll be awake for the procedure but receive anesthesia to prevent any pain. You'll lie on your side with your knees curled up. A probe will be inserted into your rectum. The probe has a spring-loaded hollow needle. Your doctor will trigger the needle to go through the

Prostate biopsy

A biopsy removes a sample of tissue that is tested for cancer. A biopsy is the only way to be certain that someone has cancer. This is a transperineal biopsy, in which a needle is inserted through the perineum and into the prostate. An ultrasound probe, which goes into the rectum, helps the doctor guide the needle into the prostate.



rectal wall and into your prostate. The needle will remove tissue samples—called cores—about the length of a dime and the width of a toothpick.

At least 12 or more core samples are taken from different parts of the prostate. Checking different areas provides a more complete evaluation of cancer throughout the gland.

To ensure the best samples are removed, imaging methods—ultrasound, MRI, or sometimes both—are used to view the prostate gland and guide the needle.

Transrectal biopsies aren't perfect tests. They sometimes miss cancer sites in the prostate. They can also cause complications. A complication is an unwanted and unplanned result from an operation. Complications of a transrectal biopsy include bleeding from the rectum or blood in the urine, stool, or semen. This usually goes away after a few days or, with semen, after a few weeks.

Fever is a sign of a more serious complication, and it's caused by an infection. To prevent this, you'll be given an antibiotic medicine to take the day of the biopsy and for a few days after it. Even with antibiotics, infection is still a serious risk with transrectal biopsy. Difficulty peeing is another uncommon but potentially serious complication. Speak to your doctor if you have either of these problems.

A transrectal biopsy, including preparation and recovery, may take several hours, though the procedure itself takes only about 20 minutes.

Transperineal biopsy

For a transperineal biopsy, a needle is inserted into the prostate through the perineum. The perineum is the area in the crotch between the testicles and the anus.

For this biopsy, you'll lie on your back with your legs raised or you'll lie on your side with your knees curled up. Depending on the center, you'll be given general anesthesia that will put you to sleep for the procedure or you'll be awake for the procedure and have local anesthesia to numb your genital and prostate area.

After cleansing the perineum, the doctor will insert a long biopsy needle through the skin and into the prostate to draw out samples of tissue. The doctor may make multiple needle punctures in the perineum to remove multiple core samples. Or the doctor may use a technique that removes multiple samples but requires only a few punctures through the skin.

Ultrasound, MRI, or a combination of both imaging methods are used to guide this procedure. The ultrasound or MRI probe must be inserted into the rectum to scan the prostate.

The transperineal procedure takes about 20 to 40 minutes.

Pathology report

Your biopsy samples will be sent to a lab where a pathologist will examine them under a microscope and test them for cancer. The pathologist will find out how many of the core samples contain cancer and will also measure the percentage of cancer in each core. With this information, the pathologist can estimate the amount of cancer in the prostate and can sometimes tell whether the cancer has spread outside of the prostate. Also, by knowing where each core sample was taken, the pathologist can figure out whether the cancer is concentrated in a certain section of the prostate.

The pathologist will put these results into a report. Ask your doctor to review the report with you.

Your pathology report

Lab results used for diagnosis are put into a pathology report. This report will be sent to your doctor. It's used to plan your treatment.

Ask for a copy of the report. Ask your doctor to review your results with you. Take notes and ask questions.

Gleason score

After studying your biopsy sample under a microscope, the pathologist will give it a Gleason score. A Gleason score represents how much your biopsy sample looks like normal prostate tissue. It also describes how aggressive your prostate cancer is—how quickly it will grow and whether it will spread. A Gleason score is another factor that doctors use to determine risk and plan treatment.

For a Gleason score, the pathologist assigns a number, ranging from 3 to 5, based on the “pattern” of cancer cells in the biopsy sample. Cancer with a cell pattern that looks more like normal and healthy cells has a lower number. Cancer with a cell pattern that looks more abnormal has a higher number.



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Prostate cancers often contain more than one pattern of cancer cells. To account for this, a Gleason score is made up of two numbers. The pathologist gives one number to the pattern of cancer cells that take up the largest area in the tumor. The second number is given to the cell pattern that accounts for the second-largest area.

Add these two numbers together and you get a Gleason score. For example:

pattern 3 + pattern 4 = Gleason score of 7

Most prostate cancers have a Gleason score between 6 and 10. A Gleason score of 6 is low-grade cancer, 7 is intermediate-grade, and 8 to 10 is high-grade. A higher Gleason score means the cancer is more likely to grow and spread quickly than a cancer with a lower Gleason score.

To double-check your Gleason score, you can ask for a second pathologist to review your biopsy.

Guide 2

What does your Gleason score tell you?

Gleason patterns	Gleason score	Grade Group	Risk	Prognosis
3+3	6	1	Low risk	Low-grade cancer is less aggressive and likely to grow and spread very slowly. If the cancer is small, many years may pass before it becomes a problem. Low-grade cancer may never need treatment.
3+4	7	2	Low to intermediate risk	Intermediate-grade cancer is moderately aggressive and likely to grow and spread at a modest pace. If the cancer is small, several years may pass before it becomes a problem. To prevent problems, treatment may be needed.
4+3	7	3	Intermediate risk	
4+4, 3+5, 5+3	8	4	High risk	High-grade cancer is very aggressive and likely to grow and spread quickly. If the cancer is small, a few years may pass before the cancer becomes a life-threatening problem. To prevent problems, treatment is needed now.
4+5, 5+4, 5+5	9 or 10	5	Very high risk	

Grade groups

Gleason scores can be organized into Grade Groups to make them simpler to understand. A Gleason score ranges from 6 to 10, where 6 is the lowest score. This can be confusing because 6 seems like it would be a medium score, not a low score. There are five Grade Groups, numbered 1 to 5. The higher the Grade Group, the more aggressive the cancer. A Gleason score 6 cancer is assigned Grade Group 1 to show that it is the lowest score.

The Grade Group system also takes into account that Grade Group 2 and Grade Group 3 both have a Gleason score of 7. The difference is the cancer in Grade Group 3 is more serious. Why? Because the first number of the Gleason score in Grade Group 3 (4+3) is higher than the first number in Grade Group 2 (3+4). Remember, the first number is given to the cancer pattern that makes up the largest area of the tumor. See [Guide 2](#).

Tumor stage

The tumor, node, metastasis (TNM) system is used to “stage” prostate cancer. Staging is a way to describe how much cancer is in your body and how far it has spread. Knowing your stage is important for predicting the course of your disease and for making a treatment plan.

In this system, the letters T, N, and M stand for different areas of cancer growth:

- **T (tumor)** - Describes the size of the main (primary) tumor and if it has grown outside the prostate
- **N (node)** – Identifies whether cancer has spread to nearby lymph nodes
- **M (metastasis)** – Indicates if cancer has spread to distant parts of the body (metastasized)

Based on test results, your doctor will assign a number to each letter. The higher the number, the larger the tumor or the more the cancer has spread. These scores are combined to assign a stage to the cancer.

Cancer staging is often done twice. The first time is before any treatment. The second time is after (or during) treatment to see how well the treatment has worked.

Know the (TNM) score

Tumors come in all shapes and sizes. This makes it tough to be able to compare one tumor to another. So cancer experts created a “score” that can describe any tumor. Each letter is matched with a number that explains the extent of the cancer.

T = Tumor

T stands for tumor, and the numbers 0 through 4 refer to its size and growth:

- **T0** means that no tumor can be detected.
- **T1** tumors can't be felt during a digital rectal exam and aren't found on imaging tests, although a biopsy shows cancer is present.
- **T2** tumors can be felt during a digital rectal exam. They also may be seen on an imaging test. T2 tumors are found only in the prostate gland.
- **T3** tumors have broken through the outside layer of the prostate gland. They may reach the connective tissue around the prostate or the neck of the bladder.
- **T4** tumors have grown outside the prostate

into nearby structures such as the bladder, rectum, pelvic muscles, or pelvic wall.

N = Node

N is for node, as in lymph node. There are hundreds of lymph nodes throughout your body. They work as filters to help fight infection and remove harmful substances. The number 0 or 1 after the letter N tells whether the cancer has or hasn't spread to the lymph nodes near the prostate:

- **N0** means cancer hasn't spread to any lymph nodes.
- **N1** means cancer has spread to lymph nodes near the prostate (regional lymph nodes).

M = Metastasis

When prostate cancer metastasizes, it tends to spread to the bones, liver, lungs, distant lymph nodes, and other organs:

- **M0** means the cancer hasn't spread to distant parts of the body.
- **M1** metastasis has spread to distant parts of the body.

How to read a TNM score

Let's say your prostate cancer is given a TNM score of **T2, N0, M0**. This score means that the tumor is big enough to be felt during a digital rectal exam (T2), but it hasn't spread outside the prostate gland to nearby lymph nodes (N0) or to distant parts of the body (M0).

Why know your TNM score? For one, it lets you know the extent of your cancer. It also helps characterize your risk group. Your risk group suggests the most appropriate treatment for you.

Summary

If you've read this chapter from the beginning, you'll recall that it all started with a discussion of risk—the risk that your cancer might grow. All the elements described in this chapter (digital rectal exam, PSA level, biopsy results, Gleason score, Grade Group, and tumor stage) are put together to come up with your initial level of risk.

In the next chapter, we'll talk about risk assessment and what that means for you.

Key points

- Early-stage prostate cancer hasn't spread outside the prostate itself.
- Clinical characteristics of your cancer—digital rectal exam, PSA level, biopsy results, Gleason score, Grade Group, and tumor stage—are used to classify your disease into one of 5 different risk groups.
- Patients with lower risk generally get minimal or no treatment. Patients with higher risk usually get more aggressive treatment.
- A high amount of PSA in the blood may be a sign of prostate cancer.
- The only way to know if you have prostate cancer is to remove tissue from your body and test it for cancer cells (biopsy).
- A Gleason score describes how aggressive your prostate cancer is.
- Gleason scores are organized into Grade Groups, which are simpler to understand.
- The tumor, node, metastasis (TNM) system is used to stage prostate cancer.
- Cancer staging describes how much cancer is in the body and where it is located.

4

Risk assessment

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- 36 Life expectancy
- 37 Nomograms
- 38 Molecular tumor tests
- 38 Key points



A risk assessment estimates the chances of future problems or difficulties. In the case of prostate cancer, a risk assessment helps to plan the best treatment for you.

After being told you have cancer, your next thought may be, “How soon can I start treatment to get rid of it?” The fact is, a lot of patients with prostate cancer don’t need treatment right away. Many never need treatment.

So who needs treatment and who doesn’t? Figuring out when to be treated or which treatment to use requires an assessment of your risks. A risk assessment involves identifying potential problems and then considering what would happen if those problems occurred. In the case of prostate cancer, a risk assessment considers how likely the cancer is to:

- Remain within the prostate
- Spread to nearby lymph nodes
- Come back after treatment (recurrence)
- Be controlled with another treatment

Doctors use these tools to make a risk assessment:

- Risk groups
- Life expectancy
- Nomograms
- Molecular testing

Risk groups

Doctors use risk groups to help choose treatment options and to predict the likelihood that the cancer will recur after initial treatment.

As you read in Chapter 3, results from several different tests are put together to determine each risk group:

- **Digital rectal exam** – Is a tumor detectable by touch?
- **PSA level** – What’s the likelihood of prostate cancer?
- **Biopsy** – What’s the extent of the cancer?
- **Gleason score, Grade Group** – How quickly will the cancer grow?
- **TNM score** – How far has the cancer spread?

Based on the results of these tests, you’ll be placed into an initial risk group. Your risk group helps determine which treatment options may be best for you. Using these tests together to create risk groups is more reliable than using any test by itself to choose treatment options. See [Guide 3](#) and [Guide 4](#).

Guide 3 Prostate cancer risk groups

	PSA level	Grade Group	TNM score (tumor stage)	Biopsy	PSA density
Very low risk <i>Includes all of these</i>	Less than 10 ng/mL	1	T1c	Cancer in 1 to 2 biopsy cores with no more than half of each core showing cancer	less than 0.15 ng/mL/g
Low risk <i>Includes all of these</i>	Less than 10 ng/mL	1	T1 to T2a	More than 3 biopsy cores show cancer, but less than half of all cores show cancer	
Favorable intermediate risk <i>Includes all of these</i>	10 to 20 ng/mL	1 or 2	T2b or T2c	Less than half of biopsy cores show cancer	
Unfavorable intermediate risk <i>Includes at least one</i>	10 to 20 ng/mL	3	T2b or T2c	More than half of biopsy cores show cancer	
High risk <i>Includes only one</i>	More than 20 ng/mL	4 or 5	T3a	More than half of the biopsy cores show cancer, but less than 4 cores are Grade Group 4 or 5	
Very high risk <i>Includes at least one</i>	More than 20 ng/mL	*	T3b to T4	More than 4 biopsy cores are Grade Group 4 or 5	

* Gleason pattern 5 in the cancer cells that take up largest area in the tumor

Additional tests

Once your doctor determines your risk group, you may need some additional tests before you can be treated, particularly if you're in a higher risk category. If you didn't have an MRI or mpMRI earlier, you'll likely have one at this point. Other tests that may be done—or re-done—to confirm your diagnosis and plan your treatment include:

- Biopsy
- Bone scan
- PSMA-PET, PET-CT, or PET-MRI

Life expectancy

Life expectancy is the average lifespan of a person. It's measured in years. An estimate of your life expectancy is an important factor in deciding which tests and treatments you'll need.

It's important to be aware that life expectancy is only an estimate based on large numbers of people. That means life expectancy can be applied to a big population or a broad age range, but it's not as easy to make a precise estimate of the lifespan of an individual patient.

Guide 4

T Guide

In [Guide 3](#), the TNM score includes letters after the tumor stage. These letters give more information about the amount of cancer and its location in the prostate.

T1	T1a – Cancer found in 5 percent (5%) or less of the removed tissue.
	T1b – Cancer found in more than 5 percent (5%) of the removed tissue.
	T1c – Cancer found in one or both sides of the prostate.
T2	T2a – Cancer is found in half or less than half of one side of the prostate.
	T2b – Cancer is found in more than half of one side of the prostate, but it isn't in both sides.
	T2c – Cancer has grown into both sides of the prostate.
T3	T3a – Cancer has grown outside the prostate, but not into the seminal vesicle(s).
	T3b – Cancer has grown outside the prostate and into the seminal vesicle(s).

Sometimes, patients in certain risk groups should wait until symptoms appear before having tests or starting treatment. Prostate cancer often grows slowly. There may be no benefit to having additional tests or undergoing treatment if you don't have any symptoms or if you have other more life-threatening health conditions.

If you don't have any symptoms, are expected to live 10 years or less, and have very-low-risk, low-risk, or intermediate-risk cancer, then observation is usually recommended. This is different than active surveillance, which usually involves routine imaging and biopsies.

We'll talk more about life expectancy and how it impacts treatment options in [Chapter 6](#).

Nomograms

A nomogram predicts the course your cancer will take (your prognosis). A nomogram uses math to compare you and your prostate cancer to hundreds or thousands of other patients who have been treated for prostate cancer.

To use a nomogram, your doctor will input information about you and the characteristics of your cancer—your age, PSA level, Gleason score, or other details—and the nomogram will calculate the likely result of a certain treatment or outcome.

For comparison, risk groups are used to consider the many treatment options for prostate cancer while nomograms can provide information that is more specific to you. Both are used, along with other risk assessment tools, to plan treatment.

Molecular tumor tests

Molecules are very tiny particles found in the cells of your body. Special tests are now used to measure certain molecules and biomarkers. A biomarker is something found in your body that can be measured to assess your health. One type of cancer biomarker is a molecule released by a tumor.

Molecular tests use samples of prostate or lymph node tissue that was removed during biopsy. Results from these and other tests may help choose a treatment plan that's right for you. Another reason you might have a molecular test is to see how well your body is responding to prostate cancer treatment.

Importantly, molecular tests can identify lower risk prostate cancer that doesn't need treatment right away. These patients can be spared aggressive treatment along with its complications and side effects.

A molecular tumor test is also known as a molecular assay or analysis. A few of the more common molecular tests for prostate cancer are named Decipher, Oncotype DX, and Prolaris.

If your doctor recommends molecular testing, it would be in addition to standard tests such as PSA, Gleason score, and imaging. If you have any questions about why you're having a test or what it means, ask your care team.

Key points

- A risk assessment identifies potential problems and then considers what would happen if those problems occurred.
- A risk assessment consists of risk groups, life expectancy, nomograms, and possibly molecular tumor tests. A risk assessment is used to plan treatment.
- Doctors use risk groups to help choose treatment options and to predict the likelihood that cancer will recur after initial treatment.
- Results from several different tests are put together to determine your risk group.
- Life expectancy is the number of years you will likely live. Life expectancy is used to choose the best treatment for you.
- Observation is recommended for those with a life expectancy of 5 years or less.
- A nomogram predicts the course your cancer will take, called a prognosis.
- An important feature of molecular tests is that they can identify lower risk prostate cancer that doesn't need treatment right away.

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Prostate cancer treatment

40 Treatment team

41 Observation

41 Active surveillance

43 Surgery

45 Radiation therapy

47 Hormone therapy

50 Chemotherapy

50 Clinical trials

52 Key points



There's more than one treatment for prostate cancer. This chapter describes treatment options and what to expect. Discuss with your doctor which treatment might be best for you.

Treatment team

Treating prostate cancer takes a team approach. Some members of your care team will be with you throughout your cancer treatment, while others will only be there for parts of it. Your team should communicate and work together to bring the best knowledge from each specialty. Get to know your care team and help them get to know you.

Depending on your diagnosis, your team may include a dozen or more health care providers:

- **Your primary care doctor** handles medical care not related to your cancer. Your primary doctor can help you express your thoughts about treatments to your cancer care team.
- **A pathologist** interprets tests on cells, tissues, and organs removed during a biopsy or surgery.
- **A diagnostic radiologist** reads the results of x-rays and other imaging tests.
- **An anesthesiologist** gives anesthesia, a medicine so you don't feel pain during surgery or procedures.
- **A urologist** is an expert in the male and female urinary systems and the male reproductive organs.
- **A urologic oncologist** is a surgeon who specializes in diagnosing and treating cancers of the urinary tract and the male reproductive organs.
- **A radiation oncologist** prescribes and plans radiation therapy to treat cancer.
- **A medical oncologist** treats cancer using systemic therapies such as hormone therapy and chemotherapy. A medical oncologist will often coordinate your care with other team members. If not, ask who will coordinate your care.
- **Advanced practice providers** are an important part of any team. These are registered nurse practitioners and physician assistants who monitor your health and provide care.
- **Residents and fellows** are doctors who are continuing their training, some to become specialists in a certain field of medicine.
- **Oncology nurses** provide your hands-on care, like giving systemic therapy, managing your care, answering questions, and helping you cope with side effects.
- **Nutritionists** can provide guidance on what foods or diet are most suitable for your particular condition.
- **Psychologists and psychiatrists** are mental health experts who can help manage issues such as depression, anxiety, or other mental health conditions that can affect how you feel.
- **Genetic counselors** are experts who can help interpret how your family history may impact your treatment.

TIP: It's important to see both a radiation oncologist and a urologist to discuss the treatment approach that's right for you.

Keep a list of names and contact information for each member of your team. This will make it easier for you and anyone involved in your care to know who to contact with questions or concerns.

Prostate cancer is usually a slow-growing disease. It's also a complex disease with many treatment options. Treatments for early prostate cancer include surgery, radiation therapy, and hormone therapy to remove or reduce the size of the tumor. Treatment can be local, systemic, or a combination of both.

- Local therapies target specific areas of the body that contain cancer cells.
- Systemic therapies attack cancer cells throughout the body.

Then again, your treatment plan may include no direct therapy but instead include observation or active surveillance:

Observation

Observation involves monitoring your prostate cancer and watching for symptoms. (You may hear it called watch-and-wait or watchful waiting.) If symptoms develop, treatment is focused on palliative care or symptom relief instead of trying to cure the cancer. Palliative care treats the symptoms of cancer and the side effects of cancer treatment. This allows patients to maintain a good quality of life without the burden of unnecessary treatment.

Observation often applies to older or frail patients with shorter life expectancies. These patients commonly have one or more other illnesses or diseases that are more severe than their prostate cancer.

Observation is different from active surveillance. Observation is a less aggressive way to monitor prostate cancer. It doesn't require regular biopsies—just a PSA test and a physical once or twice a year. By comparison, active surveillance involves frequent testing to see whether the cancer is progressing in order to cure it before it can get worse.

Active surveillance

Active surveillance is a plan that closely watches your condition, with treatment at the ready if needed.

Because a small tumor can grow very slowly, it's possible to wait to treat prostate cancer until the tumor grows larger. During this time, you'll have tests and biopsies on a regular basis to look for changes in tumor growth. You won't receive any cancer treatment during

active surveillance. But treatment will begin if your cancer grows or spreads.

Why wait to be treated? Mainly because surgery and other forms of treatment have side effects. If you can delay treatment without harm—or avoid it altogether—then you can also delay or entirely avoid the side effects of treatment.

Overall, active surveillance is the preferred strategy for patients (particularly younger patients) with lower-risk prostate cancer and a longer life expectancy (10 or more years).

To see if you're a good candidate for active surveillance, you may need a confirmatory mpMRI with or without a confirmatory prostate biopsy. Molecular tumor analysis can also be considered in patients with very-low-, low-, and favorable intermediate-risk prostate cancer to help decide if active surveillance is an option.

Local vs systemic therapy

There are two types of treatment:

- **Local therapy** focuses on a certain area of the body. In prostate cancer, local treatments include surgery and radiation therapy.
- **Systemic therapy** works throughout the body. Systemic therapy includes hormone therapy, chemotherapy, and other treatments designed to maintain or improve your quality of life.

Other factors that you and your doctor should consider:

- Your life expectancy
- Your overall health
- Features or unique qualities of your tumor
- Possible side effects of treatment
- Your wishes about treatment

Regular tests during active surveillance include:

- PSA no more than every 6 months or as needed
- Digital rectal exam no more than once a year or as needed
- Repeat prostate biopsy no more than once a year or as needed
- Repeat mpMRI no more than once a year or as needed

A big question about active surveillance: When do you know to switch from surveillance to treatment? There are a number of factors but the most common one is that a patient's Grade Group in a later biopsy has increased compared to a previous biopsy.

Other reasons for starting treatment may include an increase in the size of the tumor or a rise in PSA level. A patient's feelings of anxiety (due to living with untreated cancer) can also be a valid reason to consider treatment.

Surgery

Surgery is a procedure to remove cancer from the body. The tumor will be removed along with some normal-looking prostate tissue around its edge called the surgical margin.

- A **positive margin (R1)** is when cancer cells are found along the edge of the tissue that the surgeon removes.
- A **negative margin (R0)** is when no cancer cells are found around the edge of the tissue that the surgeon removes.

A negative margin is the better result because it means that all of the tumor in that area has likely been removed.

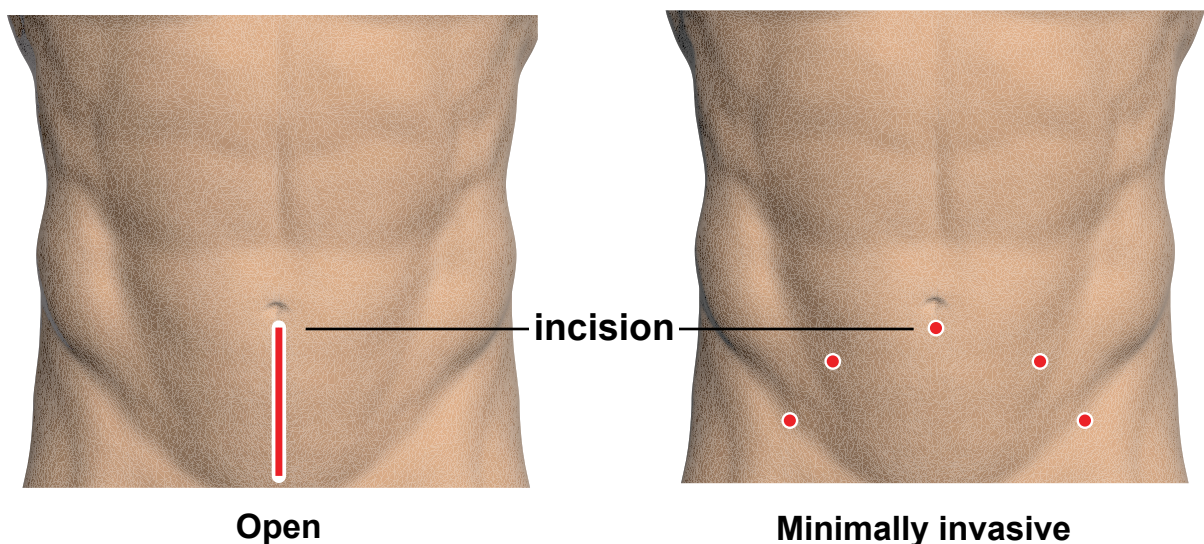
Surgery can be used as the main (primary) treatment. Or surgery may be only one part of a treatment plan. The type of surgery you receive depends on the size and location of the tumor. It also depends on whether cancer is found in any surrounding organs and tissues.

Radical prostatectomy

Prostatectomy means removing the prostate gland through surgery. A radical prostatectomy removes not only the entire prostate but also the surrounding tissue and seminal vesicles. Pelvic lymph nodes may also be removed.

Open vs. minimally invasive prostatectomy

A prostatectomy is an operation that removes the whole prostate. Open surgery removes the prostate through one large cut or incision. Minimally invasive surgery uses several small incisions or cuts instead of one large cut.



A radical prostatectomy is often used when:

- The tumor is found only in the prostate.
- The tumor can be removed completely with surgery.
- You have a life expectancy of 10 or more years.
- You have no other serious health conditions.

A radical prostatectomy is complex and requires a great deal of skill. Surgeons who are experienced in this type of surgery often have better results.

There are two surgical methods for radical prostatectomy:

- **Open surgery** removes the prostate through one large cut or incision. The large incision lets your doctor directly view and access the tumor to remove it. When the incision runs from your belly button down to the base of your penis, it's called radical retropubic prostatectomy. When the cut is made in the perineum (the area between your scrotum and anus), it's called a radical perineal prostatectomy.
- **Minimally invasive surgery** has become more common than open surgery. Minimally invasive surgery uses several small incisions or cuts instead of one large cut. The surgeon uses robotic arms to precisely insert small tools through each incision to perform the surgery. This is called robot-assisted radical prostatectomy. One of the tools, called an endoscope, has a light and a video camera at the end. The camera gives the surgeon a magnified view of your prostate

and the nearby tissues inside your body. Other surgical tools are used to remove the tumor.

Either open surgery or minimally invasive surgery can be used for a radical prostatectomy. Patients who receive minimally invasive surgery often have shorter hospital stays, less blood loss, fewer surgical complications, and faster recovery time. The major side effects from robotic-assisted radical prostatectomy—**incontinence** and **erectile dysfunction**—occur about as often as they do with open surgery.

Side effects of surgery

Radical prostatectomy frequently causes two side effects:

Urinary incontinence. You'll likely lose the ability to hold your pee after a radical prostatectomy. This is called urinary incontinence and it's usually temporary. Most patients gradually recover control of their bladder in a few weeks or months.

Immediately after the procedure, a catheter will be inserted into your urethra to allow you to empty your bladder and for your urethra to heal. The catheter will stay in place for 1 to 2 weeks after surgery. You'll be shown how to care for it while at home. If the catheter is removed too early, you may lose control of your bladder or be unable to urinate due to scar tissue.

Erectile dysfunction. Erectile dysfunction means having difficulty or being unable to have an erection of the penis. This happens a lot after prostate surgery but it's also usually temporary. There's a higher risk for erectile dysfunction if:

- You are older
- You have erectile problems before surgery
- Your cavernous nerves are damaged or removed during surgery

The cavernous nerves control the ability to have erections. These nerves run alongside the prostate. Doctors do their best to avoid these nerves when performing a prostatectomy, but damage to the nerves during surgery is sometimes unavoidable.

Removing your prostate and seminal vesicles will cause you to have dry orgasms. This means there will be no semen and you'll be unable to have children (infertile). You may want to look into sperm banking before the surgery if you're thinking of having children.

It may take several months to 2 years to restore the erectile function you had before the prostatectomy. However, you may never regain the same "mojo" you once had. Treatment options for erectile dysfunction include pills (like Viagra and Cialis), injections of medication into the penis, vacuum constriction devices ("penis pump"), and surgical implants that produce an erection.

Radiation therapy

Radiation therapy uses high-energy radiation from x-rays, gamma rays, and other sources to kill cancer cells and shrink tumors. It's given in regular doses over a certain period of time.

Radiation can be used instead of surgery to cure cancer. Sometimes, radiation therapy is given after surgery to help prevent your cancer from coming back. Also, if your PSA begins to rise after surgery, radiation therapy might be recommended to try to kill any cancer cells that could have been left behind. One advantage of radiation therapy is that it's less invasive than surgery.

There are two main types of radiation treatment:

EBRT

External beam radiation therapy (EBRT) uses a machine outside of the body to aim radiation at the tumor(s). The radiation beam focuses directly on the cancer while trying to avoid healthy tissue. This tactic allows for safer, higher doses of radiation.

Several types of EBRT are used for treating prostate cancer:

- **Stereotactic body radiation therapy (SBRT)** uses high-energy radiation beams to treat cancers in fewer treatments.
- **Three-dimensional conformal radiation therapy (3D-CRT)** uses computer software and CT images to aim beams that match the shape of the tumor.
- **Intensity-modulated radiation therapy (IMRT)** uses small beams of different

strengths to match the shape of the tumor. IMRT is a type of 3D-CRT that may be used for more aggressive prostate cancer.

- **Proton beam radiation therapy** uses streams of particles called protons to precisely kill tumor cells.
- **Image-guided radiation therapy (IGRT)** uses a computer to create a picture of the tumor. This image guides the radiation beam accurately during treatment, even when internal organs make slight

movements. This spares normal tissues from radiation damage.

Brachytherapy

Brachytherapy is an internal form of radiation therapy. In this treatment, radiation is delivered inside the body by placing a radioactive object into or next to the tumor. You might hear it called brachy (said “bray-key”) for short.

Brachytherapy may be used alone or combined with EBRT, androgen deprivation

External beam radiation therapy

External beam radiation therapy (EBRT) uses a machine outside of the body to aim radiation at the tumor(s). The radiation beam focuses directly on the cancer while trying to avoid healthy tissue. This tactic allows for safer, higher doses of radiation.



therapy (ADT), or both. Brachytherapy alone may be an option for very-low-, low-, or favorable intermediate-risk prostate cancer, depending on life expectancy. Patients with high-risk cancers aren't usually considered for brachytherapy alone.

There are 2 types of brachytherapy:

- ▶ **Low dose-rate (LDR) brachytherapy** uses tiny radioactive metal “seeds” that are implanted into your prostate. Each seed is about the size of a grain of rice. They're inserted into your body through the perineum and guided into your prostate with imaging. The seeds usually consist of either radioactive iodine or palladium. They'll stay in your prostate permanently and provide a low dose of radiation continuously for a few months. The radiation travels a very short distance. This allows for a large amount of radiation within a small area while sparing nearby healthy tissue. Over time, the seeds will stop radiating but will stay in your body.
- ▶ **High dose-rate (HDR) brachytherapy** uses thin tubes called catheters placed inside your prostate gland. Thin needles with radioactive tips are then inserted through the catheters for a very short time. High-dose radiation is delivered through these needles. After treatment, the needles and catheters are removed.

Side effects of radiation therapy

Common side effects of radiation therapy are urinary problems and bowel problems. Urinary problems include incontinence as well as having to go more often, having to go suddenly, and a burning sensation when you go. Bowel problems can include diarrhea,

pooping frequently, being unable to hold it in, and sometimes bleeding from the rectum.

Urinary and bowel problems usually go away after several weeks for most people, though not for all. Erectile dysfunction also sometimes occurs. Feeling very tired for a few weeks to months after radiation treatment is also common.

Hormone therapy

Hormone therapy is treatment that adds, blocks, or removes hormones. A hormone is a natural chemical made by a gland in the body. Its job is to activate cells or organs.

Male hormones are called androgens. The main androgen is testosterone. Most of the testosterone in the body is made by the testicles. Testosterone helps prostate cancer to grow. A type of hormone therapy called androgen deprivation therapy (ADT) can stop your body from making testosterone or block cancer cells from using testosterone. This can shrink the tumor or slow tumor growth for a period of time.

Hormone therapy is rarely used by itself for the treatment of early-stage prostate cancer. It's usually given with radiation therapy.

You might hear the term “castration” used when describing prostate cancer or its treatment. This term describes a drastic reduction of testosterone. Castration can be a short-term reversible treatment using drugs or it can be permanent surgical removal of one or both testicles (orchiectomy). Though orchiectomy is a surgical procedure, it's

still considered hormone therapy because it removes the primary testosterone source (the testicles). Unlike drug hormone therapy, orchiectomy can't be reversed.

Subcapsular orchiectomy is a version of this procedure but only the tissue that makes testosterone is removed, not the testicles.

Surgical removal of the testicles is much less common nowadays because drug therapy is often just as effective at blocking testosterone.

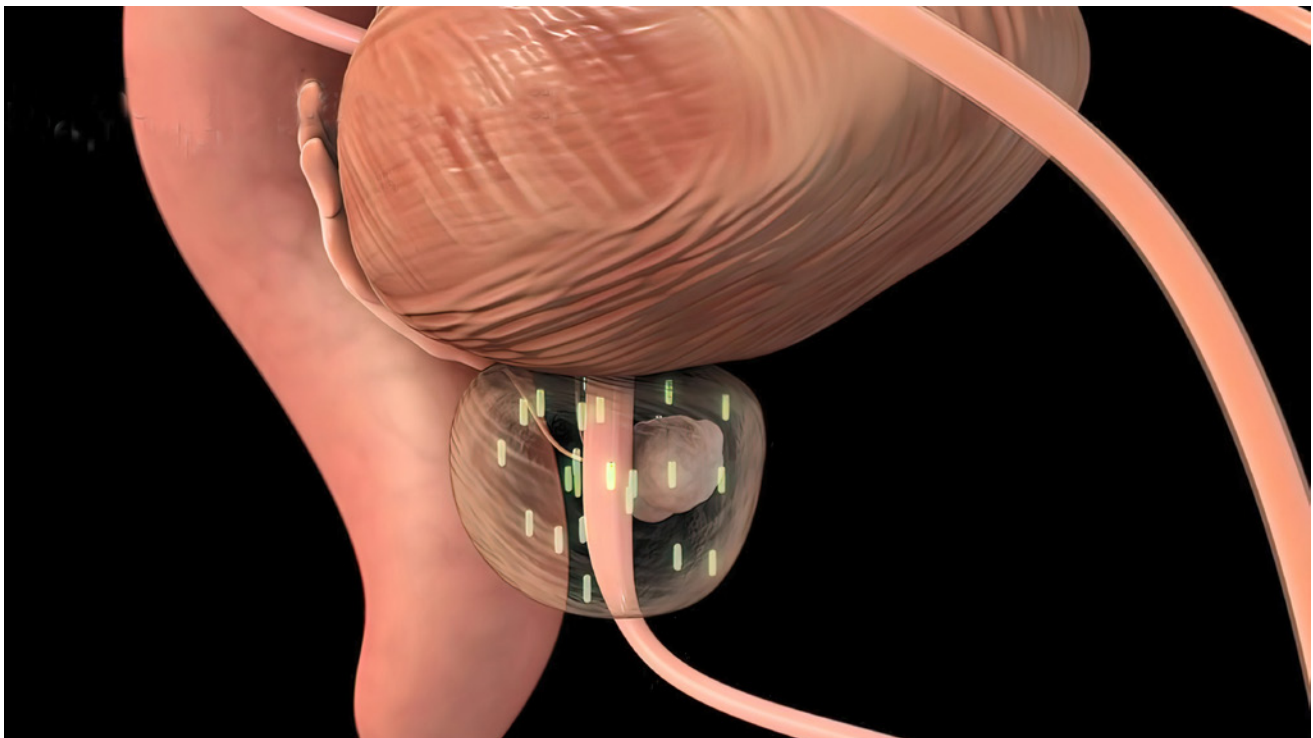
Orchiectomy is now used only for advanced metastatic prostate cancer.

Systemic drug hormone therapies for prostate cancer include luteinizing hormone-releasing hormone (LHRH) agonists and LHRH antagonists, both of which cause the testicles to stop making testosterone.

Most LHRH agonists and LHRH antagonists are injections. These may be given monthly or 2, 3, or 4 times a year. Anti-androgens, corticosteroids, and androgen synthesis

Brachytherapy radiation

Low dose-rate (LDR) brachytherapy uses tiny radioactive metal “seeds” that are implanted into your prostate. Each seed is about the size of a grain of rice. They’ll stay in your prostate permanently and provide a low dose of radiation continuously for a few months. This treatment strategy spares nearby healthy tissue from unnecessary radiation.



inhibitors are available as pills and taken 1 to 3 times a day, depending on the medication. [See Guide 5.](#)

Side effects of hormone therapy

Hormone therapy has significant side effects. Many factors affect your risk for side effects including your age, your health before treatment, how long or often you have treatment, and so forth.

Side effects differ among the types of hormone therapy. In general, ADT may reduce your desire for sex and may cause hot flashes and erectile dysfunction.

The longer you take ADT, the greater your risk for thinning and weakening bones (osteoporosis), bone fractures, weight gain, loss of muscle mass, diabetes, and heart disease.

Other side effects of ADT include hot flashes, mood changes, fatigue, weight gain, and growth and tenderness of your breasts.

ADT increases the risk for diabetes and cardiovascular disease. If you already have either of these conditions, ADT can cause them to get worse. In Black males, ADT may increase the risk of death from heart issues.

Talk to your care team about how to manage the side effects of hormone therapy. They have ways to lessen or soothe some of these problems.

Guide 5 Hormone therapy drugs

LHRH agonists	goserelin, histrelin, leuprolide, triptorelin pamoate
LHRH antagonist	degarelix, relugolix
Anti-androgens	apalutamide, bicalutamide, darolutamide, enzalutamide, flutamide, nilutamide
Corticosteroids	prednisone, methylprednisolone, hydrocortisone, dexamethasone
Androgen synthesis inhibitors	ketoconazole, abiraterone

Chemotherapy

Chemotherapy is a drug therapy that damages rapidly dividing cells throughout the body. Because cancer cells divide and multiply rapidly, they're a good target for chemotherapy. Chemotherapy can harm healthy cells, too. That's why chemotherapy can cause side effects.

The only chemotherapy drug currently used to treat early prostate cancer is docetaxel. Docetaxel is used along with hormone therapy in patients with very-high-risk prostate cancer. Though docetaxel can't cure prostate cancer, it can help people live longer as well as reduce their pain and other symptoms.

Clinical trials

Another avenue of treatment is a clinical trial. A clinical trial is a type of medical research study. After being developed and tested in a laboratory, potential new ways of fighting cancer need to be studied in people. If found to be safe and effective in a clinical trial, a drug, device, or treatment approach may be approved by the U.S. Food and Drug Administration (FDA).

Everyone with cancer should carefully consider all of the treatment options available for their cancer type, including standard treatments and clinical trials. Clinical trials give people access to options that they couldn't usually receive otherwise. Talk to your doctor about whether a clinical trial makes sense for you.

Phases

Most cancer clinical trials focus on treatment. Treatment trials are done in phases.

- **Phase I** trials study the dose, safety, and side effects of an investigational drug or treatment approach. They also look for early signs that the drug or approach is helpful.
- **Phase II** trials study how well the drug or approach works against a specific type of cancer.
- **Phase III** trials test the drug or approach against a standard treatment. If the results are good, it may be approved by the FDA.
- **Phase IV** trials study the long-term safety and benefit of an FDA-approved treatment.

Who can enroll?

Every clinical trial has rules for joining, called eligibility criteria. The rules may be about age, cancer type and stage, treatment history, or general health. These requirements ensure that participants are alike in certain ways in order to compare how they respond to a specific treatment.

Informed consent

Clinical trials are managed by a group of experts called a research team. The research team will review the study with you in detail, including its purpose and the risks and benefits of joining. All of this information is also provided in an informed consent form. Read the form carefully and ask questions before signing it. Take time to discuss it with family, friends, or others you trust. Keep in mind that

you can leave and seek treatment outside of the clinical trial at any time.

Start the conversation

Don't wait for your doctor to bring up clinical trials. Start the conversation and learn about all of your treatment options. If you find a study that you may be eligible for, ask your treatment team if you meet the requirements. If you've already started standard treatment, you may not be eligible for certain clinical trials. Try not to be discouraged if you cannot join. New clinical trials are always becoming available.

Frequently asked questions

There are many myths and misconceptions surrounding clinical trials. The possible benefits and risks aren't well understood by many with cancer.

Will I get a placebo?

Placebos (inactive versions of real medicines) are hardly ever used alone in cancer clinical trials. It's common to receive either a placebo with a standard treatment or a new drug with a standard treatment. You'll be informed, verbally and in writing, if a placebo is part of a clinical trial before you enroll.

Are clinical trials free?

There's no fee to enroll in a clinical trial. The study sponsor pays for research-related costs, including the study drug. However, you may have costs indirectly related to the trial, such as the cost of transportation or child care due to extra appointments. Depending on the trial, you may continue to receive standard cancer care. The standard therapy is billed to—and often covered by—insurance. You're responsible for copays and any costs for this care that aren't covered by your insurance.



Finding a clinical trial

In the United States

NCCN Cancer Centers

[NCCN.org/cancercenters](https://www.nccn.org/cancercenters)

The National Cancer Institute (NCI)

[cancer.gov/about-cancer/treatment/clinical-trials/search](https://www.cancer.gov/about-cancer/treatment/clinical-trials/search)

Worldwide

The U.S. National Library of Medicine (NLM)

clinicaltrials.gov

Need help finding a clinical trial?

NCI's Cancer Information Service (CIS)

1.800.4.CANCER (1.800.422.6237)

[cancer.gov/contact](https://www.cancer.gov/contact)

Key points

- Because surgery and radiation therapy have similar long-term cure rates, it's important to see both a radiation oncologist and a urologist to discuss which treatment approach is right for you.
- Observation looks for signs of cancer in order to treat the symptoms before they start or get worse. Treatment, if needed, focuses on palliative care or symptom relief instead of trying to cure the cancer.
- Active surveillance involves frequent testing, including biopsies, to see whether the cancer is progressing in order to cure it before it can get worse.
- Active surveillance is the preferred strategy for patients with lower-risk prostate cancer and a longer life expectancy.
- Surgery removes the tumor along with some normal-looking tissue around its edge called a surgical margin. The goal of surgery is a negative margin (R0).
- A radical prostatectomy removes the whole prostate, the surrounding tissue, and the seminal vesicles.
- Side effects of a radical prostatectomy can include urinary incontinence and erectile dysfunction.
- Radiation kills cancer cells or stops new cancer cells from being made.
- Hormone therapy treats prostate cancer by either stopping testosterone from being made or blocking cancer cells from using testosterone.
- Castration describes a drastic reduction of testosterone. This can be done surgically or with drugs.
- A clinical trial studies a treatment to see how safe it is and how well it works. Sometimes, a clinical trial is the preferred treatment option for prostate cancer.



Let us know what you think!

Please take a moment to complete an online survey about the NCCN Guidelines for Patients.

[NCCN.org/patients/response](https://www.nccn.org/patients/response)

6

Initial treatment by risk group

54	Very low risk
57	Low risk
59	Intermediate risk
59	Favorable intermediate risk
61	Unfavorable intermediate risk
63	High risk or very high risk
65	After initial treatment
66	Key points



Initial treatment options for prostate cancer are based on your risk assessment. Together, you and your doctor will choose a treatment plan that is best for you.

Your doctor might suspect you have prostate cancer based on an abnormal digital rectal exam or an elevated PSA. Biopsies of the prostate are needed to confirm prostate cancer. A pathologist will assign a primary and secondary Gleason grade to the biopsy sample.

In addition to blood, imaging, and tissue tests, a family history will be taken. Your life expectancy will be estimated. You may have genetic testing. All of these factors will be used to place you into a risk group.

Find your risk group to learn about your initial therapy options:

Very low risk

Patients included in the very-low-risk group have all of the following traits:

- Stage T1c tumor
- Grade Group 1
- PSA less than 10 ng/mL
- Cancer in 1 to 2 biopsy cores with no more than half of each core showing cancer
- PSA density less than 0.15 ng/mL

NCCN experts are concerned about overtreatment of this early cancer. As a result, very-low-risk prostate cancer isn't treated with hormone therapy or other types of systemic therapy. Treatment options are based on life expectancy. [See Guide 6.](#)

Guide 6

Initial therapy options by life expectancy: Very-low-risk group

Less than 10 years	Observation
10 to 20 years	Active surveillance
20 or more years	Active surveillance (preferred)
	EBRT or brachytherapy
	Radical prostatectomy → If adverse features, then also one from below: • EBRT • EBRT with ADT • Observation

- EBRT
- EBRT with ADT
- Observation

Life expectancy: Less than 10 years

If you have very-low-risk prostate cancer and your life expectancy is less than 10 years, observation is recommended.

Observation

This option is for those who have other more serious health problems and whose prostate cancer isn't causing any symptoms. Observation involves occasional PSA tests and watching for symptoms, which can be treated with palliative therapy.

Life expectancy: Between 10 and 20 years

If you have very-low-risk prostate cancer and your life expectancy is between 10 and 20 years, active surveillance is recommended.

Active surveillance

Active surveillance consists of testing on a regular basis, including biopsies, so that treatment can be started when and if needed. To see if you're a good candidate for active surveillance, you may need a confirmatory mpMRI (if you haven't received an MRI already) with or without a confirmatory prostate biopsy. All patients should have a confirmatory prostate biopsy 1 to 2 years after their initial biopsy. Tests required during active surveillance are shown in [Guide 7](#).

Life expectancy: 20 or more years

If you have very-low-risk prostate cancer and your life expectancy is 20 years or more, treatment options include:

Active surveillance

Active surveillance is the preferred option if you have slow-growing disease and your life expectancy is 20 or more years. Tests during

A preferred treatment option is one that's been proven to be more effective or a better choice than other treatment options.

active surveillance include PSA, digital rectal exam, mpMRI, and biopsies. These are done on a regular basis so that treatment can be started when and if needed.

To see if you're a good candidate for active surveillance, you may need a confirmatory mpMRI (if you haven't received an MRI

Guide 7 Tests during active surveillance

PSA no more than every 6 months or as needed

Digital rectal exam no more than every 12 months or as needed

Repeat prostate biopsy no more than every 12 months or as needed

Repeat mpMRI no more than every 12 months or as needed

already) with or without a confirmatory prostate biopsy. All patients should have a confirmatory prostate biopsy 1 to 2 years after their initial biopsy.

Radiation therapy

While active surveillance is preferred, radiation therapy is also an option. Very-low-risk cancers can be treated with external beam radiation therapy (EBRT) or brachytherapy.

Prostate surgery

Surgery to remove the prostate (radical prostatectomy) is another option.

When your prostate is removed, a sample will be sent to a pathologist to see how much cancer there is. After surgery, your PSA level will be tested. Radiation or systemic therapy might follow surgery.

If you choose to have a radical prostatectomy, your doctor will look for signs of disease called adverse (or high-risk) features during and after surgery. If your prostate cancer has adverse features, then EBRT or observation are adjuvant therapy options. Adjuvant therapy is treatment after surgery that helps to stop the cancer from returning. EBRT targets areas where the cancer cells have likely spread. Hormone therapy (androgen deprivation therapy, or ADT) might also be added to EBRT. Treatment will be started after you've healed from the prostate operation.

If test results don't find high-risk features, then no more treatment is needed.

Adverse features

- ✓ Cancer in the surgical margin
- ✓ Cancer outside the layer surrounding the prostate
- ✓ Cancer in the seminal vesicle(s)
- ✓ Certain PSA levels—the range varies depending on risk group

Low risk

The low-risk group includes patients who have all of the following traits:

- Stage T1 to T2a tumor
- Grade Group 1
- PSA of less than 10 ng/mL
- More than 3 biopsy cores show cancer, but less than half of all cores show cancer

Treatment options are based on life expectancy. The initial treatment options for low-risk disease are shown in [Guide 8](#).

Life expectancy: Less than 10 years

If you have low-risk prostate cancer and your life expectancy is less than 10 years, observation is recommended.

Observation

Observation is for those who have other more serious health problems and whose prostate cancer isn't causing any symptoms.

Observation involves occasional PSA tests and watching for symptoms, which can be treated with palliative therapy.

Life expectancy: 10 or more years

If you have low-risk prostate cancer and your life expectancy is 10 or more years, the options are:

Active surveillance

Active surveillance is the preferred option if you have slow-growing disease and your life expectancy is 10 or more years. To see if you're a good candidate for active surveillance, you may need a confirmatory mpMRI (if you haven't received an MRI already) with or without a confirmatory prostate biopsy and/or a molecular tumor analysis. All patients should have a confirmatory prostate biopsy 1 to 2 years after their initial biopsy.

Radiation therapy

If you'll likely live more than 10 years, you may want treatment now instead of active surveillance. In time, the cancer may grow

Guide 8

Initial therapy options by life expectancy: Low-risk group

Less than 10 years	Observation
10 or more years	Active surveillance (preferred)
	EBRT or brachytherapy
	Radical prostatectomy → If adverse features, then also one from below: <ul style="list-style-type: none"> • EBRT • EBRT with ADT • Observation

outside your prostate, cause symptoms, or both. Low-risk cancers can be treated with EBRT or brachytherapy.

Prostate surgery

Prostate surgery (radical prostatectomy) removes the whole prostate. You might have adjuvant therapy after this procedure. Adjuvant therapy is treatment after surgery that helps to stop the cancer from returning.

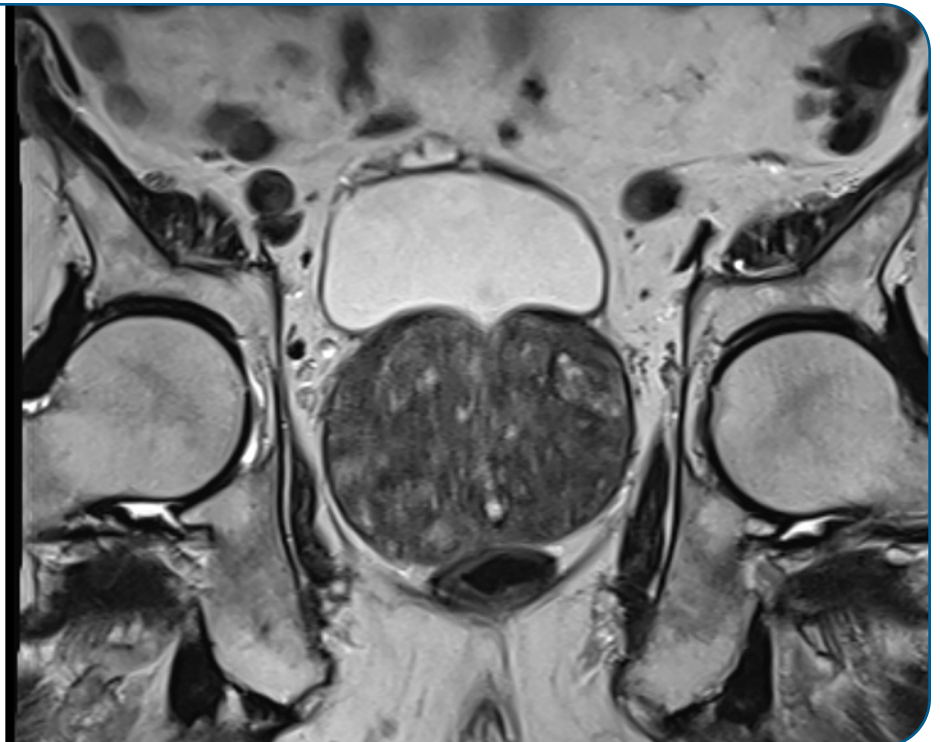
Options for adjuvant therapy are based on the presence of adverse features. If your prostate cancer has adverse features, then EBRT or observation are options. EBRT targets areas where the cancer cells have likely spread. ADT might be added to EBRT. Treatment will be started after you've healed from the prostate operation. Observation is an option, but

radiation therapy may be started if your PSA level begins to rise.

If test results don't show adverse features, then you can begin observation.

Active surveillance

Active surveillance doesn't involve treatment unless tests show that the cancer has started to grow or spread. Regular testing during active surveillance includes PSA, digital rectal exam, biopsies, and MRI. In the MRI image shown here, the large, dark object shaped like a tomato is an enlarged prostate.



Intermediate risk

The intermediate-risk group is for those who don't have high-risk or very-high-risk group features but do have 1 or more of the following intermediate risk factors:

- Stage T2b or T2c tumor
- Grade Group 2 or 3
- PSA 10 to 20 ng/mL

The intermediate-risk group is further divided into favorable and unfavorable subgroups. Treatment is based on whether your prostate cancer is **favorable intermediate risk** or **unfavorable intermediate risk**:

Favorable intermediate risk

The favorable intermediate-risk subgroup is for those who have all of the following traits:

- 1 intermediate risk factor
- Grade Group 1 or 2
- Less than half of biopsy cores show cancer

Treatment options are based on life expectancy. [See Guide 9.](#)

Guide 9

Initial therapy options by life expectancy: Favorable intermediate-risk group

5 to 10 years	Observation (preferred)	
	EBRT or brachytherapy	
10 or more years	Active surveillance	
	EBRT or brachytherapy	
	Radical prostatectomy with or without PLND	<p>➔ If adverse feature(s) and no lymph node metastases, additional options are:</p> <ul style="list-style-type: none"> • EBRT with or without ADT • Observation
		<p>➔ If lymph node metastases, additional options are:</p> <ul style="list-style-type: none"> • ADT with or without EBRT • Observation

Life expectancy: Between 5 and 10 years

If you have favorable intermediate-risk prostate cancer and your life expectancy is between 5 and 10 years, there are 2 treatment options:

Observation

Observation is the preferred option for those with a life expectancy of 5 to 10 years and whose prostate cancer is unlikely to cause problems. Observation involves occasional PSA tests and watching for symptoms, which can be treated with palliative therapy.

Radiation therapy

Radiation therapy is a treatment option for some with favorable-intermediate risk. Radiation therapy includes EBRT or brachytherapy.

Life expectancy: 10 or more years

If you have favorable intermediate-risk prostate cancer and your life expectancy is 10 or more years, there are 3 options:

Active surveillance

Active surveillance consists of testing on a regular basis so that treatment can be started when needed. For favorable intermediate-risk disease, you should be watched closely for any changes. To see if you're a good candidate for active surveillance, you may need a confirmatory mpMRI (if you haven't received an MRI already) with or without a confirmatory prostate biopsy and/or a molecular tumor analysis.

Patients in the favorable intermediate-risk group who have a low percentage of Gleason pattern 4 cancer, low tumor volume, low PSA density, and/or low genomic risk (according

to a molecular tumor analysis) are particularly good candidates for active surveillance.

Radiation therapy

Radiation therapy is a treatment option for some patients with favorable-intermediate risk. Radiation treatment includes EBRT or brachytherapy.

Prostate surgery

If you're expected to live 10 or more years, surgically removing your prostate (radical prostatectomy) may be an option. When your prostate is removed, a sample will be sent to a pathologist to see how far the cancer has spread. Your PSA will also be tested.

Your pelvic lymph nodes may also be removed if the risk for cancer spreading to them is 2 percent (2%) or higher. Your doctor will determine this risk using a nomogram. This procedure is called a pelvic lymph node dissection (PLND).

After prostate surgery, you might have adjuvant therapy. Adjuvant therapy is treatment after surgery that helps to stop the cancer from returning. Adjuvant therapy options are based on whether there are high-risk (adverse) features and cancer in the lymph nodes (metastasis). Adverse features suggest that not all of the cancer was removed during surgery.

If your prostate cancer has adverse features and no lymph node metastases, the adjuvant therapy options are EBRT or observation. EBRT targets areas where the cancer cells have likely spread. Hormone therapy (androgen deprivation therapy, or ADT) might be added to EBRT. ADT is used to suppress or block the amount of testosterone in the body.

Treatment will be started after you've healed from the prostatectomy operation. Observation is the other option. But if there's a rise in PSA level during observation, radiation therapy may be started.

If there are lymph node metastases but no adverse features, then you may have adjuvant treatment or observation, depending on your doctor.

If test results don't find high-risk features or cancer in the lymph nodes, then you may start observation.

Unfavorable intermediate risk

The unfavorable intermediate-risk subgroup is for those who have one or more of the following:

- 2 or more intermediate-risk factors
- Grade Group 3
- More than half of biopsy cores show cancer

Treatment options are based on life expectancy. Treatment options for patients with unfavorable intermediate-risk cancer are shown in [Guide 10](#).

Guide 10

Initial therapy options by life expectancy: Unfavorable intermediate-risk group

5 to 10 years	Observation	
	EBRT with ADT	
	EBRT with brachytherapy	
	EBRT with brachytherapy and ADT	
10 or more years	Radical prostatectomy with or without PLND	<p>➔ If adverse feature(s) and no lymph node metastases, additional options include:</p> <ul style="list-style-type: none"> • EBRT with or without ADT • Observation <hr/> <p>➔ If lymph node metastases, additional options include:</p> <ul style="list-style-type: none"> • ADT with or without EBRT • Observation
	EBRT with ADT	
	EBRT with brachytherapy	
	EBRT with brachytherapy and ADT	

Life expectancy: Between 5 and 10 years

If you have unfavorable intermediate-risk prostate cancer and your life expectancy is 5 to 10 years, your treatment options include:

Observation

Because the cancer may progress too slowly to cause problems within 5 to 10 years, active surveillance is not recommended for patients in this risk group. Observation is the recommended option instead. Observation involves occasional PSA tests and watching for symptoms, which can be treated with palliative therapy.

Radiation therapy

Radiation therapy is another treatment option for those in the unfavorable-intermediate risk group. Treatment includes EBRT with or without brachytherapy. Your doctor may want to also add 4 to 6 months of ADT to your radiation therapy.

Life expectancy: 10 or more years

If you have unfavorable intermediate-risk prostate cancer and your life expectancy is 10 or more years, your treatment options include:

Prostate surgery

If you're expected to live 10 years or more, surgically removing your prostate (radical prostatectomy) may be an option. When your prostate is removed, a sample will be sent to a pathologist to see how far the cancer has spread. Your PSA level will also be tested.

Your pelvic lymph nodes may also be removed if the risk for cancer spreading to them is 2 percent (2%) or higher. Your doctor will determine this risk using a nomogram. This

procedure is called a pelvic lymph node dissection (PLND).

You may receive more treatment after surgery. This is called adjuvant therapy. Adjuvant therapy is treatment given after a primary treatment, like surgery in this case, to help stop the cancer from returning. Adjuvant therapy options are based on high-risk (adverse) features and lymph node metastasis. Adverse features suggest that not all of the cancer was removed during surgery.

If there are adverse features but no lymph node metastases, then the adjuvant options include EBRT (with or without ADT) and observation. EBRT targets areas where the cancer cells have likely spread. ADT might be added to EBRT. Treatment will be started after you've healed from your prostate surgery. Observation is the other adjuvant option. But if there's a rise in PSA level during observation, radiation therapy may be started.

If cancer is found in lymph nodes, treatment options include ADT (with or without EBRT) or observation. Observation is an option, but radiation therapy may be started if there's a rise in PSA level. If test results find no adverse features, no lymph node metastases, and a low or undetectable PSA, then you may start observation.

Radiation therapy

Another treatment option for those with unfavorable intermediate risk is radiation therapy. The most appropriate radiation therapy is EBRT, which can be enhanced with 4 to 6 months of ADT. Or EBRT can be reinforced with brachytherapy, with or without the option of 4 to 6 months of ADT.

High risk or very high risk

The **high-risk group** includes those who have one of the following:

- Stage T3a tumor
- Grade Group 4
- Grade Group 5
- PSA of more than 20 ng/mL
- More than half of the biopsy cores show cancer, but less than 4 cores are Grade Group 4 or 5

The **very-high-risk group** includes those who have one of the following:

- Stage T3b to T4 tumor
- Primary Gleason pattern 5
- 2 or more high-risk factors
- More than 4 biopsy cores that are Grade Group 4 or 5

Treatment for high-risk and very-high-risk prostate cancer is more aggressive. [See Guide 11.](#)

Guide 11

Initial therapy options by life expectancy: High-risk or very-high-risk group

5 years or less with no symptoms	Observation	
	ADT	
	EBRT	
More than 5 years or has symptoms	EBRT with ADT. If very-high-risk, then chemotherapy or an androgen synthesis inhibitor may be added.	
	EBRT with brachytherapy and ADT	
	Radical prostatectomy with PLND	<p>➔ If adverse feature(s) and no lymph node metastases, additional options are:</p> <ul style="list-style-type: none"> • EBRT with or without ADT • Observation
		<p>➔ If lymph node metastases, additional options are:</p> <ul style="list-style-type: none"> • ADT with or without EBRT • Observation

Those who have high-risk or very-high-risk cancer and are expected to live 5 years or less should undergo bone imaging. If cancer is suspected in the lymph nodes, then you might have imaging of your abdomen and/or pelvis.

Treatment options are based on life expectancy and whether or not you have symptoms.

Life expectancy: 5 years or less and no symptoms

There are 3 options for high-risk or very-high-risk prostate cancer when life expectancy is 5 years or less and there are no symptoms:

Observation

Observation is the option for most people in these high-risk groups. Observation involves occasional PSA tests and watching for symptoms, which can be treated with palliative therapy.

Hormone therapy

If observation isn't a good fit, androgen deprivation therapy is an option. Hormone therapy (ADT) can be surgical or medical castration. Surgery to remove the testicles is called an orchiectomy. Other forms of ADT are systemic therapies (drugs).

Radiation therapy

EBRT is an option because it's been shown to be effective in patients with high-risk and very-high-risk prostate cancer.

Life expectancy: More than 5 years or has symptoms

If your life expectancy is more than 5 years or you have symptoms, there are 3 options:

Radiation therapy

EBRT combined with long-term hormone therapy is an effective initial treatment for patients at high risk or very high risk. For this option, ADT is given before, during, and after radiation therapy for 18 months to 3 years. ADT alone is not enough.

The other option is EBRT, brachytherapy, and long-term ADT. Combining EBRT and brachytherapy allows for more careful control of the radiation dose. When ADT is added to this combination, patient outcomes tend to improve.

Prostate surgery

If you're expected to live more than 5 years, a radical prostatectomy with the removal of your pelvic lymph nodes (PLND) is an option for patients in the high-risk group and certain patients in the very-high-risk group. Your age and overall health will be a factor in deciding if this is a good option for you.

During the operation, the prostate tissue is removed from your body and sent to a pathologist to see how far the cancer has spread. After the operation, your PSA level will also be tested.

You may receive more treatment after prostate surgery. This is called adjuvant treatment. Adjuvant treatment helps to stop the cancer from returning. Options for adjuvant treatment after a prostatectomy are based on the presence of adverse (high-risk) features and cancer in the lymph nodes. If test results find

no adverse features or cancer in the lymph nodes, no more treatment is needed. Your cancer will be monitored. If test results find adverse features but no cancer in the lymph nodes, options are EBRT (with or without ADT) or observation.

EBRT targets areas where the cancer cells have likely spread. Treatment will be started after you've healed from the prostate surgery. ADT might be added to EBRT to improve outcomes.

If cancer is found in lymph nodes, then the options are ADT (with or without EBRT) or observation. The first option is to start ADT right away with the option of adding EBRT.

If your PSA levels are undetectable, observation may be a safer option. If PSA levels rise during observation, then palliative care with ADT can be started.

After initial treatment

If your initial treatment was successful, you'll be monitored to make sure the cancer hasn't returned (recurrence). Monitoring involves these follow-up tests:

- PSA every 6 to 12 months for 5 years, then once a year after that. (For patients with a high risk of recurrence, PSA testing every 3 months may be better.)
- Digital rectal exam every 12 months (which may be skipped if your PSA level is undetectable after treatment).

If lymph node metastases (N1) are found while you're on ADT or observation, then you'll have these follow-up tests:

- Physical exam with a PSA every 3 to 6 months
- Imaging for symptoms or increasing PSA

If cancer returns, then additional imaging and tests will be done to decide if you need more treatment.

Key points

- ▶ A preferred treatment option is one that's been proven to be more effective or a better choice than other treatment options.
- ▶ Very-low-risk prostate cancer isn't typically treated with hormone therapy or other types of systemic therapy. Active surveillance is the preferred option.
- ▶ For favorable intermediate-risk or unfavorable intermediate-risk cancer, treatment options include observation, radiation therapy, or prostate surgery depending on life expectancy.
- ▶ A pelvic lymph node dissection (PLND) removes lymph nodes near the prostate.
- ▶ Treatment for high-risk and very-high-risk cancer is more aggressive. It may be treated with radiation or surgery. For those who choose surgery, radiation therapy is often needed after surgery. Sometimes long-term hormone therapy is added to radiation therapy. Observation is also an option.
- ▶ All patients choosing active surveillance should have a confirmatory prostate biopsy 1 to 2 years after their initial biopsy.

7

Making treatment decisions

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It's important to be comfortable with the cancer treatment you choose. This choice starts with having an open and honest conversation with your doctor.

It's your choice

In shared decision-making, you and your doctors share information, discuss the options, and agree on a treatment plan. It starts with an open and honest conversation between you and your doctor.

Treatment decisions are very personal. What's important to you may not be important to someone else. Some things that may play a role in your decision-making:

- What you want and how that might differ from what others want
- Your feelings about pain or side effects such as nausea and vomiting
- Your religious and spiritual beliefs
- Your feelings about certain treatments like surgery or chemotherapy
- Cost of treatment, travel to treatment centers, and time away from work
- Quality of life and length of life
- How active you are and the activities that are important to you

Think about what you want from treatment. Discuss openly the risks and benefits of specific treatments and procedures. Weigh options and share concerns with your doctor. If you build a relationship with your doctor, it will help you feel supported when considering options and making treatment decisions.

Second opinion

It's normal to want to start treatment as soon as possible. While cancer shouldn't be ignored, there is time to have another doctor review your test results and suggest a treatment plan. This is called getting a second opinion, and it's a normal part of cancer care. Even doctors get second opinions!

Things you can do to prepare:

- Check with your insurance company about its rules on second opinions. There may be out-of-pocket costs to see doctors who are not part of your insurance plan.
- Make plans to have copies of all your records sent to the doctor you'll see for your second opinion.

Support groups

Many people diagnosed with cancer find support groups to be helpful. Support groups often include people at different stages of treatment. Some people may be newly diagnosed, while others may be finished with treatment. If your hospital or community doesn't have support groups for people with cancer, check out the websites listed in this book.

Questions to ask your doctors

Possible questions to ask your doctors are listed on the following pages. Feel free to use these or come up with your own. Be clear about your goals for treatment and find out what to expect from treatment. Keep a notebook handy to record answers to your questions.

Questions to ask about testing and staging

1. Can my cancer be cured? If not, how well can treatment stop it from growing?
2. What tests will I have? Will my insurance pay for these tests?
3. When will I have a biopsy? Will I have more than one? What are the risks?
4. Where do I go to get tested? How long will the tests take? Will any test hurt?
5. Will I have any genetic tests or genetic counseling?
6. How often are these tests wrong?
7. Should I bring someone with me?
8. Should I bring a list of my medications?
9. How soon will I know the results and who will explain them to me?
10. Can you give me a copy of the pathology report and other test results?
11. What is the cancer stage? What does this stage mean in terms of survival?
12. What is the grade of the cancer? Does this grade mean the cancer will grow and spread fast?
13. Who will talk with me about the next steps? When?
14. Who can I call if I need help immediately?
15. Can I get a second opinion? Who would you recommend I see for a second opinion?

Questions to ask about treatment

1. What are my treatment options? Are you suggesting options from the NCCN Guidelines, or have you modified the standard approach in my situation?
 2. Which treatment do you recommend and why?
 3. How long do I have to decide about treatment?
 4. What will happen if I do nothing?
 5. How do my age, health, and other factors affect my options?
 6. Does any option offer a cure or long-term cancer control? Are my chances any better for one option than another? Less time-consuming? Less expensive?
 7. When will I start treatment? How long will treatment take?
 8. Will the treatment hurt?
 9. Do I have to go to the hospital or elsewhere? How often? How long is each visit?
 10. How much will the treatment cost? Will my insurance pay for it?
 11. What are my options if treatment stops working?
 12. What are the possible complications?
 13. What are the chances my cancer will return? How will it be treated if it returns?
 14. Which treatment will give me the best quality of life?
 15. Can I stop treatment at any time? What will happen if I stop treatment?
 16. Who can I call on weekends or non-office hours if I have an urgent problem with my cancer or my cancer treatment?
-
-
-

Online resources

American Cancer Society (ACS)
cancer.org/cancer/prostate-cancer.html

California Prostate Cancer Coalition (CPCC)
prostatecalif.org

CancerCare
cancer.org/diagnosis/prostate_cancer

Cancer.Net
cancer.net/cancer-types/prostate-cancer

Cancer Support Community
cancersupportcommunity.org

Malecare Cancer Support
malecare.org

National Cancer Institute
cancer.gov/types/prostate

National Alliance of State Prostate Cancer Coalitions (NASPCC)
naspcc.org

National Coalition for Cancer Survivorship
canceradvocacy.org

PAN Foundation
panfoundation.org

National Prostate Cancer Awareness Foundation (PCaAware)
pcaaware.org

Prostate Cancer Foundation
pcf.org

Prostate Cancer Nomograms
mskcc.org/nomograms/prostate

Prostate Conditions Education Council (PCEC)
prostateconditions.org

Prostate Health Education Network (PHEN)
prostatehealthd.org

U.S. National Library of Medicine Clinical Trials Database
clinicaltrials.gov

Urology Care Foundation
urologyhealth.org

Veterans Prostate Cancer Awareness (VPCa)
veteransprostatecancer.org

ZERO - The End of Prostate Cancer
zerocancer.org



Words to know

active surveillance

Frequent and ongoing testing to watch for changes in cancer status so treatment can be started if needed.

androgen deprivation therapy (ADT)

A treatment that removes the testes or stops them from making testosterone. ADT can be achieved through surgery or drugs.

anti-androgen

A drug that stops the action of the hormone testosterone.

biopsy

A procedure that removes fluid or tissue samples to be tested for disease.

brachytherapy

A treatment with radiation from an object placed near or in the tumor. Also called internal radiation.

castration

Surgery that removes the testicles or drugs that suppress the function of the testicles in order to keep testosterone levels low or close to zero.

computed tomography (CT)

A test that uses x-rays from many angles to make a picture of the inside of the body.

digital rectal exam

An exam of the prostate by feeling it through the wall of the rectum.

erectile dysfunction

A lack of blood flow to the penis that limits getting or staying erect.

external beam radiation therapy (EBRT)

A cancer treatment with radiation received from a machine outside the body.

genetic abnormality (mutation)

An abnormal change in the genetic code (DNA) of a gene within cells.

Gleason score

A rating of how much prostate cancer cells look like normal cells under the microscope.

Grade Group

Like a Gleason score, a Grade Group is a rating of how much prostate cancer cells look like normal cells under the microscope. Grade Groups are meant to be easier to use than Gleason scores.

high dose-rate (HDR) brachytherapy

Treatment with radioactive objects that are removed at the end of the treatment session.

hormone therapy

A cancer treatment that stops the making or action of hormones. Also called androgen deprivation therapy.

image-guided radiation therapy (IGRT)

A treatment with radiation that uses imaging tests to aim at tumors.

intensity-modulated radiation therapy (IMRT)

Treatment with radiation that uses small beams of different strengths.

life expectancy

The number of years a person is likely to live.

low dose-rate (LDR) brachytherapy

Treatment with radioactive objects that are placed in the tumor and left to decay.

luteinizing hormone-releasing hormone (LHRH) agonist

A drug that acts in the brain to stop the testicles from making testosterone.

luteinizing hormone-releasing hormone (LHRH) antagonist

A drug that acts in the brain to stop the testicles from making testosterone.

lymphatic system

A network of organs and vessels that fights infections and transports a fluid called lymph.

magnetic resonance imaging (MRI)

A test that uses radio waves and powerful magnets to make pictures of the insides of the body.

metastasis

The spread of cancer from the first tumor to a new site.

multiparametric magnetic resonance imaging (mpMRI)

A test that makes pictures that show many features of body tissue.

nerve-sparing radical prostatectomy

An operation that removes the prostate and one or neither cavernous nerve bundle.

nomogram

A mathematical tool that uses health information to predict an outcome.

observation

A period of watching for cancer growth or occurrence while not receiving treatment.

orchiectomy

An operation to reduce testosterone in the body by removing one or both testicles.

palliative care

Health care for the symptoms of cancer or the side effects of cancer treatment.

pathologist

A doctor who specializes in testing cells and tissue to find disease.

pelvic lymph node dissection (PLND)

An operation that removes lymph nodes between the hip bones.

perineum

The body region in men between the scrotum and anus.

positron emission tomography (PET)

A test that uses radioactive material to see the shape and function of body parts.

prostate-specific antigen (PSA)

A protein mostly made by the prostate. Measured in nanograms per milliliter of PSA (ng/mL).

prostate-specific antigen density (PSAD)

The level of PSA—a prostate-made protein—in relation to the size of the prostate.

radiation therapy (RT)

Treatment that uses high-energy rays (radiation) to kill cancer cells.

radical perineal prostatectomy

An operation that removes the prostate through one cut made between the scrotum and anus.

radical retropubic prostatectomy

An operation that removes the prostate through one large cut made below the belly button.

recurrence

The return of cancer after a disease-free period.

risk factor

Something that increases the chance of getting a disease.

seminal vesicle

One of two male glands that makes fluid used by sperm for energy.

staging

The process of rating the extent of cancer in the body.

stereotactic body radiation therapy (SBRT)

A treatment that uses high-energy radiation to treat cancers in fewer sessions.

surgical margin

The normal-looking tissue around a tumor that is removed during an operation.

testosterone

A hormone that helps the sexual organs in men to work.

three-dimensional conformal radiation therapy (3D-CRT)

A treatment with radiation that uses beams matched to the shape of the tumor.

ultrasound

A test that uses sound waves to take pictures of the inside of the body.

urethra

A tube that carries urine from the bladder to outside the body through the penis. It also expels semen in men.

urinary incontinence

A health condition in which the release of urine can't be controlled.



We want your feedback!

Our goal is to provide helpful and easy-to-understand information on cancer.

Take our survey to let us know what we got right and what we could do better:

[NCCN.org/patients/feedback](https://www.nccn.org/patients/feedback)

NCCN Contributors

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Abramson Cancer Center
at the University of Pennsylvania
Philadelphia, Pennsylvania
800.789.7366 • penmedicine.org/cancer

Case Comprehensive Cancer Center/
University Hospitals Seidman Cancer
Center and Cleveland Clinic Taussig
Cancer Institute
Cleveland, Ohio
800.641.2422 • UH Seidman Cancer Center
uhhospitals.org/services/cancer-services
866.223.8100 • CC Taussig Cancer Institute
my.clevelandclinic.org/departments/cancer
216.844.8797 • Case CCC
case.edu/cancer

City of Hope National Medical Center
Los Angeles, California
800.826.4673 • cityofhope.org

Dana-Farber/Brigham and Women's
Cancer Center | Massachusetts General
Hospital Cancer Center
Boston, Massachusetts
617.732.5500 • youhaveus.org
617.726.5130
massgeneral.org/cancer-center

Duke Cancer Institute
Durham, North Carolina
888.275.3853 • dukecancerinstitute.org

Fox Chase Cancer Center
Philadelphia, Pennsylvania
888.369.2427 • foxchase.org

Fred & Pamela Buffett Cancer Center
Omaha, Nebraska
402.559.5600 • unmc.edu/cancercenter

Fred Hutchinson Cancer
Research Center/Seattle
Cancer Care Alliance
Seattle, Washington
206.606.7222 • seattlecca.org
206.667.5000 • fredhutch.org

Huntsman Cancer Institute
at the University of Utah
Salt Lake City, Utah
800.824.2073 • huntsmancancer.org

Indiana University
Melvin and Bren Simon
Comprehensive Cancer Center
Indianapolis, Indiana
888.600.4822 • www.cancer.iu.edu

Mayo Clinic Cancer Center
Phoenix/Scottsdale, Arizona
Jacksonville, Florida
Rochester, Minnesota
480.301.8000 • Arizona
904.953.0853 • Florida
507.538.3270 • Minnesota
mayoclinic.org/cancercenter

Memorial Sloan Kettering
Cancer Center
New York, New York
800.525.2225 • mskcc.org

Moffitt Cancer Center
Tampa, Florida
888.663.3488 • moffitt.org

O'Neal Comprehensive
Cancer Center at UAB
Birmingham, Alabama
800.822.0933 • uab.edu/onealcancercenter

Robert H. Lurie Comprehensive Cancer
Center of Northwestern University
Chicago, Illinois
866.587.4322 • cancer.northwestern.edu

Roswell Park Comprehensive
Cancer Center
Buffalo, New York
877.275.7724 • roswellpark.org

Siteman Cancer Center at Barnes-
Jewish Hospital and Washington
University School of Medicine
St. Louis, Missouri
800.600.3606 • siteman.wustl.edu

St. Jude Children's
Research Hospital/
The University of Tennessee
Health Science Center
Memphis, Tennessee
866.278.5833 • stjude.org
901.448.5500 • uthsc.edu

Stanford Cancer Institute
Stanford, California
877.668.7535 • cancer.stanford.edu

The Ohio State University
Comprehensive Cancer Center -
James Cancer Hospital and
Solove Research Institute
Columbus, Ohio
800.293.5066 • cancer.osu.edu

The Sidney Kimmel Comprehensive
Cancer Center at Johns Hopkins
Baltimore, Maryland
410.955.8964
www.hopkinskimmellcancercenter.org

The University of Texas
MD Anderson Cancer Center
Houston, Texas
844.269.5922 • mdanderson.org

UC Davis
Comprehensive Cancer Center
Sacramento, California
916.734.5959 • 800.770.9261
health.ucdavis.edu/cancer

UC San Diego Moores Cancer Center
La Jolla, California
858.822.6100 • cancer.ucsd.edu

UCLA Jonsson
Comprehensive Cancer Center
Los Angeles, California
310.825.5268 • cancer.ucla.edu

UCSF Helen Diller Family
Comprehensive Cancer Center
San Francisco, California
800.689.8273 • cancer.ucsf.edu

University of Colorado Cancer Center
Aurora, Colorado
720.848.0300 • coloradocancercenter.org

University of Michigan
Rogel Cancer Center
Ann Arbor, Michigan
800.865.1125 • rogelcancercenter.org

University of Wisconsin
Carbone Cancer Center
Madison, Wisconsin
608.265.1700 • uwhealth.org/cancer

UT Southwestern Simmons
Comprehensive Cancer Center
Dallas, Texas
214.648.3111 • utsouthwestern.edu/simmons

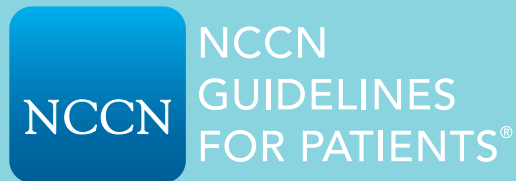
Vanderbilt-Ingram Cancer Center
Nashville, Tennessee
877.936.8422 • vicc.org

Yale Cancer Center/
Smilow Cancer Hospital
New Haven, Connecticut
855.4.SMILOW • yalecancercenter.org

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