

Patient information from the BMJ Group

Prostate cancer

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Prostate cancer

Prostate cancer is serious, but it usually grows slowly. You don't have to rush into a decision about treatment.

We've brought together the best research about prostate cancer and weighed up the evidence about how to treat it. You can use our information to talk to your doctor and decide which treatments are best for you.

What is prostate cancer?

If you have prostate cancer it means that some of the cells in your prostate gland have started to grow out of control, invading and destroying healthy cells. The disease is serious, but it usually grows very slowly. Most men live without symptoms for many years, and some men never get symptoms.

Only men have a prostate. It makes the fluid that carries sperm out of your penis when you have an orgasm. This disease is common among older men. As you age, your chances of getting cancer of the prostate rise.

If you or someone close to you has been diagnosed with prostate cancer, you may feel frightened and anxious about what lies ahead. Deciding on the best treatment can be difficult. Be certain to take your time and don't rush into a decision. Learn all you can about the condition and how it is treated, and talk to your doctor about the options open to you.

Key points for men with prostate cancer

- Prostate cancer is a serious disease, but it usually grows slowly. This means you can live for years without symptoms.
- If you are older when you get prostate cancer you may never have any symptoms. You have a good chance of surviving this type of cancer.
- There are several treatments available for prostate cancer, but they can have serious side effects.

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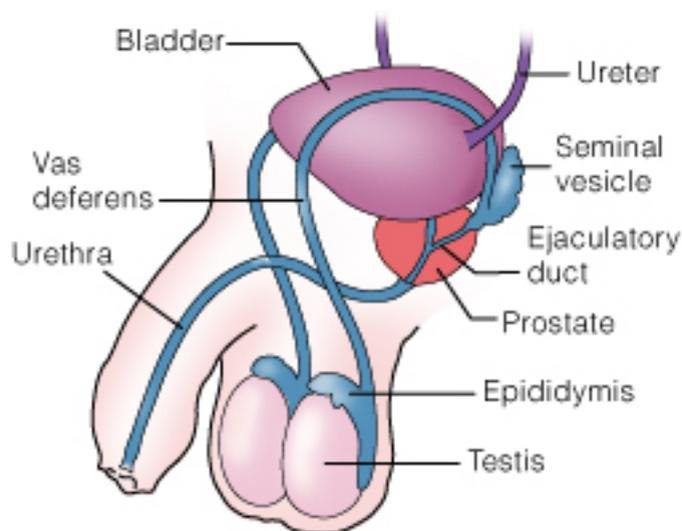
- If you have early prostate cancer that has not spread, you have a good chance of surviving, whether or not you have treatment.
- If your cancer has spread to other organs nearby, your chances of surviving the disease are still good. Some treatments can help you live longer.

What is the prostate?

To understand prostate cancer and its treatments, it helps to know more about the prostate. The [symptoms](#) of the disease will also make more sense if you know how the prostate is linked to other parts of your body.

The prostate is a small, solid gland, about the size of a chestnut. It makes the milky fluid that comes out of your penis when you have an orgasm. The fluid from the prostate helps keep your sperm healthy and also helps them to swim. To read in detail about the prostate and what it does, see [An in-depth look at the prostate](#) .

Where is the prostate?



The prostate (in red) lies beneath your bladder.

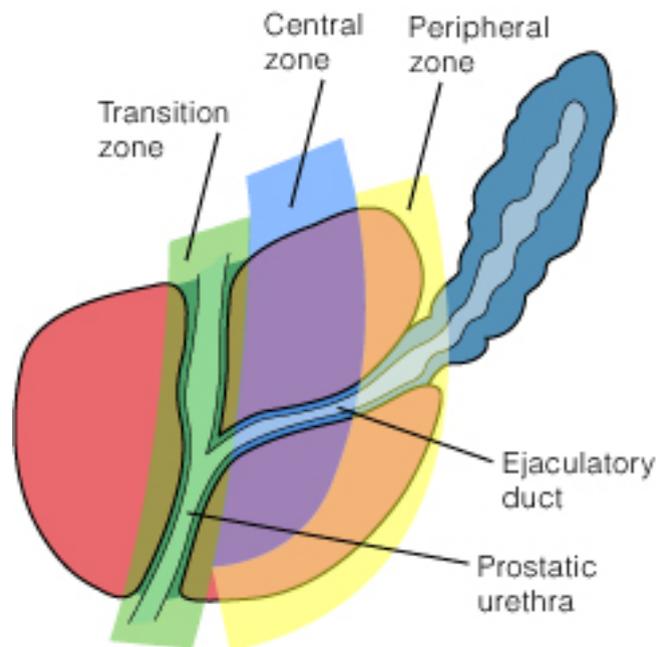
- Your prostate lies at the base of your **bladder**, the sac that holds your urine.
- The front of your prostate is wrapped around your **urethra**, the tube that runs down from your bladder and through your penis. The urethra carries urine and semen (your sperm and the fluid they are carried in) out of your body. Any change in the size or shape of the prostate can pinch this tube, making it difficult for you to urinate.
- The back of your prostate presses against your **rectum** . This is why your doctor examines your rectum if there's a problem with your prostate. He or she can feel your prostate gland through your rectum wall.

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- The prostate is connected to two other glands, called **seminal vesicles**, which sit like small bunches of grapes on either side of the prostate. These glands also make some of the fluid that comes out when you **ejaculate** at orgasm. Tubes called **ejaculatory ducts** run from these vesicles through the prostate, carrying the fluid to the urethra.
- **Two bundles of nerves** that control your erections run on either side of the prostate. Because they are so close to the prostate, these nerves can be damaged by surgery on the gland.
- The prostate is also linked to your **testicles**, which lie in a pouch of skin on either side of your penis and make your sperm. The sperm are carried by tubes from the testicles to the ejaculatory ducts, through the prostate and into the urethra. The prostate adds its fluid to the sperm when they reach the urethra. ^[1]

Prostate zones

To make a diagnosis, doctors think of the prostate in three different parts, which they call 'zones'. You don't need to know these zones to understand your prostate, but it may help you talk to your doctor if you know what they mean.



The prostate has three main zones.

- **Peripheral zone:** This is the largest zone and refers to the area that presses against your rectum.
- **Transition zone:** This is the small, inner part that wraps around the urethra. Problems here can pinch the urethra and make it difficult to pass urine.

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- **Central zone:** This refers to the part between the peripheral and transition zones. The ejaculatory duct runs through this part.

Doctors once described these different parts as 'lobes', but most now describe the prostate by zones. You may sometimes see the term 'lobe' used to describe the right and left sections of the prostate gland. ^[1] ^[2] ^[3]

Sex hormones and the prostate gland

Your sex hormones have a great effect on your prostate. They make it grow during puberty (the time when your sex organs mature) and they also help it make the fluid that carries sperm out of your body.

Hormones are chemicals produced by one part of the body to travel through the bloodstream and have an effect on another part.

The sex hormones in men are known as **androgens**, and the main one is **testosterone**. Testosterone is mainly made by the testicles, but a smaller amount is also made by your adrenal glands, which lie on top of your kidneys.

Testosterone travels through the bloodstream to the prostate where a chemical called **5-alpha-reductase** changes it into a more active form of the hormone, called **dihydrotestosterone**. Dihydrotestosterone has two jobs in relation to the prostate: it makes the prostate grow during puberty and it enables it to make fluid that carries your sperm.

The prostate often starts growing again when you get older. Doctors don't know why this is, but it is probably linked to hormone changes. When the prostate gets bigger, this condition is called **benign prostatic hyperplasia** (BPH). 'Benign' means non-cancerous and 'hyperplasia' is an increase in the number of normal cells. This condition is not cancerous but may lead to annoying symptoms such as having to urinate more often and more urgently, dribbling urine, finding it hard to urinate and having to urinate frequently at night. For more information, see [Prostate, enlarged](#) .

What happens in prostate cancer?

When your body's cells are healthy, they grow and divide to form new cells as your body needs them. When cells grow old and die, new cells take their place.

Sometimes this process breaks down. New cells form too rapidly, when the body doesn't need them, and old cells don't die when they should. You get prostate cancer when some of the cells in your prostate begin to grow out of control. The extra cells can form a mass of tissue called a growth or tumour.

- Some tumours are **benign**. This means they don't spread and they are not cancerous.
- Some tumours are **malignant**. This means they spread and they are cancerous.

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Cancer cells look different from normal cells.^[1] Often they have abnormal shapes. This is because they grow too quickly and don't have time to develop fully before they start dividing again.

Specialists now think that prostate cancer cells slowly change their appearance and the speed they are dividing before true cancer starts. These pre-cancerous changes have been called **prostatic intraepithelial neoplasia** (PIN).^[1] Researchers think around half of all men have PIN and that cancer may develop in some of them after 10 to 20 years. Once researchers find out more about PIN, they may be able to predict the chance of a man developing prostate cancer.

Where does it start?

Most prostate cancers start in cells near the rectum (the peripheral zone of the prostate).^[2] This is why doctors will often look for signs of cancer by examining your prostate through the wall of your rectum.

If your cancer hasn't spread outside your prostate gland, doctors call it **clinically localised cancer**. Sometimes the cancer cells in the prostate can keep growing and spread to nearby parts of the body. Your doctor may call this **locally advanced cancer**.

If your cancer does spread, it is likely to go to these areas.^[1]

- **Your bladder:** This is where your urine is stored. Cancer usually affects the bottom part of it.
- **Your seminal vesicles:** These are the two glands that sit next to the prostate and also produce fluid for sperm to travel in.
- **Your rectum:** The cancer doesn't always invade here because a layer of dense tissue separates the rectum from the prostate.

How prostate cancer spreads

Prostate cancer cells can be carried to other, more distant parts of the body through the **blood vessels** or **lymphatic vessels** in the prostate. This spread is called **metastasis**. This is a more advanced and serious form of cancer.

When cells from prostate cancer spread to another part of the body, such as a lung, it is still called prostate cancer (not lung cancer).

Lymphatic vessels are small tubes that reach every part of your body, a bit like your blood vessels. They collect fluid (called **lymph**) from tissues all over your body, including your prostate, and take it to your **lymph nodes**, which are small lumps packed with special cells (called **lymphocytes**) that fight infection. Lymph nodes trap unwanted bacteria and waste products in the fluid to prevent them from getting into your bloodstream.

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Cancer cells in your prostate may be picked up by the lymph and carried to the lymph nodes in your pelvic cavity (the space between your hip bones and the lowest part of your back). The cancer cells may continue growing there or travel to other parts of your body through your lymphatic vessels. You can't tell for certain if cancer has spread to the lymph nodes in your pelvic cavity unless your doctor removes at least one of them to take a closer look under a microscope. This may be done if you have surgery to remove a cancerous prostate.

Cancer cells can also get into blood vessels in the prostate and travel around the body. This is why men with prostate cancer are sometimes given drugs that treat the whole body. This is called **systemic treatment**.

When prostate cancer cells spread it is usually to bones such as your hips and lower spine, but it is not clear why.

Like normal prostate cells, cancer cells need male hormones to help them grow. Some treatments can block the action of hormones in the prostate and stop the cancer growing. To learn more, see our section on [hormone therapy](#) .

Cancer cells also need a new blood supply please remove bold to provide them with oxygen and nutrients so they can keep growing. The way cancer cells make this new blood supply is a process called **angiogenesis**. Drugs that stop this process (angiogenesis inhibitors) are being investigated as a treatment for prostate cancer.

Prostate cancer: why me?

Your doctor will not be able to tell you why you have cancer. For most men, no cause can be found. Instead, your doctor may talk about risk factors, which are things that make it more likely that certain men will develop the disease. Having a risk factor doesn't mean you'll definitely get prostate cancer. It just means you're more likely to get it than someone who doesn't have the risk factor.

These are the most well-known risk factors for prostate cancer. ^[4]

- Being older. More than 90 percent of men with prostate cancer are over 65.
- Having a family history of prostate cancer. Men with a close relative who had prostate cancer aged 70 or under are twice as likely to get prostate cancer.
- Being African-Caribbean.
- Eating a high-fat diet. A diet high in fat, meat, and dairy products and low in fruit and vegetables may increase the risk of getting cancer. There is some evidence that diets containing high levels of soy products and selenium may reduce the risk of prostate cancer. ^[5] ^[6] Studies have shown that vitamins taken as food supplements do not reduce the risk of prostate cancer. ^[7] ^[8]

Staging your prostate cancer

How doctors classify your cancer

Doctors use number and letter classification systems to describe how far your cancer has spread. This is called **staging**. There are several systems, but the most common is called the **TNM system**. See our explanation of the [TNM system](#) to find out what the different classifications mean.

How doctors grade your cancer

Doctors use something called the Gleason score to describe how your cancer looks under a microscope. This is called your **cancer grade**. A tumour that has a low-grade score is likely to be growing slowly, while one with a high-grade score is more aggressive and likely to spread. If your cancer has been given a grade, read our explanation of the [Gleason score](#) to learn more about what it means.

How doctors describe the overall stage of your cancer

Your doctor may combine your TNM classification and Gleason score to tell you the overall stage of your cancer. Knowing this stage can help you and your doctor consider what may happen to you, and it can help you decide on the best course of treatment.

There are four stages of prostate cancer. Stage 1 is the earliest, and stage 4 is the most advanced. ^[9]

For more information, see [Defining your cancer's overall stage](#) .

What are the symptoms of prostate cancer?

If you have early prostate cancer (the cancer has not grown much or spread to other parts of your body), then you probably won't have any symptoms.

You are more likely to get symptoms if your cancer grows or spreads. But many prostate cancers grow very slowly. If you are older, you may never have any symptoms or problems from the disease.

Here are some of the most common symptoms that men experience as their cancer gets worse. Please bear in mind that if you have any of these symptoms, it does not mean you have cancer. But it is a good idea to see your GP.

Problems urinating

You may find you have an urgent need to urinate or that you need to go very often, especially at night. You may also find it difficult to start urinating and to control the flow of your urine. It may dribble out, and stop and start. When you do go, it can be painful and you may feel a burning sensation. Some men also find blood in their urine when they first start to urinate.

These problems happen because the growing tumour can press on the urethra, the tube that carries the urine out through your penis. This makes it difficult for urine to flow through

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it. The symptoms can also occur because the cancer has spread into the ring of muscle in the neck (opening) of the bladder.

However, if you have problems urinating, it does not necessarily mean you have cancer. This symptom can also be caused by your prostate getting larger as you get older. This condition is called **benign prostatic hyperplasia (BPH)**. 'Benign' means non-cancerous, and 'hyperplasia' is an increase in the number of normal cells. BPH is not dangerous or life threatening, but an enlarged prostate can be uncomfortable. To learn more, see [Prostate, enlarged](#) .

Problems passing urine may also be a sign of an infection in your urinary tract (the parts of your body that produce and remove urine). Men with urinary problems are no more likely than men without urinary problems to have early prostate cancer.

Painful orgasms

You may feel pain when you have an orgasm for the same reason that you may have problems urinating: the tumour in your prostate may be pressing on the urethra, the tube that carries urine and semen out through your penis. As the tumour grows, it can block the opening of the urethra.

Pain or stiffness in your lower back, hips or the bones in your thighs

When prostate cancer spreads (a process called **metastasis**), it tends to travel to the nearby bones, and this can be very painful. You may ache and feel very stiff. If the cancer has spread to your spine, your legs may tingle and swell, making it difficult to get up and walk around comfortably. Sometimes the bones can become weak and break, even if you have not had a fall. ^[11]

Normally your bones stay healthy as old bone is broken down and new bone replaces it. Cancer cells can upset this cycle, so the bones become weak and tend to break more easily.

Tiredness and loss of appetite

If your prostate cancer spreads, you may develop **anaemia**, which means you have too few **red blood cells** . This can cause extreme tiredness. Advanced cancer can also cause a loss of appetite.

How do doctors diagnose prostate cancer?

If you are worried that you may have something wrong with your prostate, you will probably go to your GP first.

Questions your doctor may ask you

Your doctor may ask you some of the following questions.

- Do you have trouble urinating?

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- Do you find it hard to urinate? Do you 'dribble', or stop and start?
- How often do you have to get up in the night to urinate?
- Is there any blood in your urine?
- Is urinating painful?
- Do you have pain anywhere else?
- How long have you had your symptoms?

Digital rectal examination

If your tumour is bigger than half an inch (around 1.5 centimetres), your doctor may be able to feel it through the wall of your **rectum**. Wearing a medical glove and using a lubricating gel to make the examination less uncomfortable, your doctor will put a finger into your rectum to feel for a lump. This is called a digital rectal examination (DRE). It doesn't hurt, but some men find it uncomfortable, embarrassing, or both.

PSA test

The PSA blood test can help to diagnose prostate cancer. It measures the amount of a substance called **prostate-specific antigen (or PSA)** in your blood. PSA is made by your prostate and keeps your semen healthy. But if there is a cancer in the prostate, more PSA can get into your blood from your prostate leading to high blood levels

A PSA test on its own cannot tell you for certain whether you have prostate cancer. It can only tell you what your chance of having prostate cancer is.

Your test result will show the level of PSA in a measurement of micrograms per litre of blood. If your level of PSA is between 4 micrograms/litre and 10 micrograms/litre, you have a 20 percent to 50 percent chance of having cancer. If your PSA level is above 10 micrograms/litre, it is highly likely that you have cancer. If you do have cancer, then the higher your level of PSA, the larger your tumour and the more likely it is to have spread.

If you've already had treatment for prostate cancer, your doctor may recommend that you have regular PSA tests to check that the cancer has not come back or grown.

If, after getting the results of your tests, your GP thinks you may have prostate cancer, he or she should talk to you about seeing a specialist. What you decide to do may depend partly on how old you are and how well you are. If you and your GP decide that you should see a specialist urgently, you should get an appointment within two weeks. ^[19]

If your PSA test results show that you have a borderline level of PSA and you have no other symptoms, your GP should repeat the test one to three months later. If this second test shows that your PSA has gone up, your doctor should refer you and you should get a specialist appointment within two weeks. ^[19]

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Should I have a regular PSA test?

In some countries the PSA test is often offered as part of a routine health check and may be referred to as screening for prostate cancer. Most British doctors do not advise men to have the test unless they have symptoms because: ^[20] ^[9] ^[21] ^[22]

- There is no definite evidence that detecting and treating prostate cancer early will improve your chances of surviving the disease. One large study that included more than 34,000 men found that men who had a PSA test were no more likely to survive the disease than men who didn't have the test
- Most prostate cancers grow slowly and don't spread, so they may never need treatment
- If a PSA test detects a slow-growing cancer, you might end up having unnecessary treatment. One study of regular PSA testing found that 48 men had unnecessary treatment for every life saved
- Not all prostate cancers are picked up by a PSA test.
- PSA levels can be high for reasons other than prostate cancer.

If you wish to consider having the PSA test because you are worried about prostate cancer, your GP should explain the pros and cons to you. If you decide to go ahead, your GP will arrange it. You're entitled to have the test free on the NHS. ^[23]

Referral to a specialist

If your GP refers you to a specialist, usually called a **urologist**, the specialist will probably repeat some of the things that your GP did and discuss whether you should have a **biopsy**. If necessary, he or she will check how far the cancer has spread and grade it.

Biopsy

A biopsy is the main test doctors use to find out for certain if you have cancer. But you may choose not to have a biopsy if your doctor thinks there's little chance you have a cancer that will cause symptoms or shorten your life. To help you decide whether to have a biopsy, your doctor should talk to you about: ^[24]

- The risks and benefits of having a biopsy
- The results of any tests you've had, including the PSA test, the digital rectal exam and any previous biopsies
- Any [risk factors](#) you have, such as being older or from a black African or black Caribbean background.

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If you decide to have a biopsy, your doctor will use a special needle to remove very small pieces of tissue from your prostate to look at under a microscope. The needle will be either gently pushed through the wall of your rectum into the prostate or inserted into the skin between your scrotum (the sac that holds your testicles) and your anus (the opening through which you empty your bowels). The needle will be guided by a special device called an **ultrasound probe**.

A biopsy is not usually painful, but you may feel a sharp scratch, even if you are given a local **anaesthetic** (painkiller) to numb the area.

The more abnormal the cancer cells look compared with healthy prostate cells, the more likely the cancer is to be aggressive and able to spread.

How doctors know how far the cancer has spread

Most of the time, doctors will know whether your cancer has spread by looking at a combination of your PSA level and your biopsy results. If they need more information about your cancer, doctors can use special techniques to look at other parts of your body, including your lymph nodes and your bones. They may use **ultrasound scans**, **x-rays**, or body scans (**computed tomography** and **magnetic resonance imaging**) to check whether cancer is anywhere else in your body.

From the results of your tests, your doctor will be able to tell you:

- How big your prostate cancer is
- How likely it is that your prostate cancer has spread to your **lymph nodes**
- Whether your prostate cancer has spread to other parts of your body
- What type of prostate cancer cells you have and how fast they are likely to grow and spread.

How common is prostate cancer?

Prostate cancer is the most common cancer among men in the UK. ^[12]

The number of men with prostate cancer has been rising steadily for the last 30 years. Doctors think this may be partly because men are living longer (prostate cancer tends to affect older men) and because of better diagnosis. ^[12]

The latest figures show that more than 36,000 men find out they have prostate cancer each year. More than half of prostate cancers are diagnosed in men over age 70. ^{[13] [14]}

Here are some more facts and figures about men with prostate cancer.

- Prostate cancer is the second leading cause of death from cancer among men in the UK, after lung cancer. It kills around 10,000 men each year. ^{[12] [14]}

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- But many more men survive prostate cancer than die of it. Today, more than 3 out of 4 men survive beyond five years, whereas in the 1970s, only 1 in 3 men did. ^[12]
- Other health problems sometimes found in older men, such as heart disease, are more likely to cause symptoms and lead to their death than their prostate cancer. Reports from autopsies (examinations of the body after death) have shown that around 60 percent of men in their 80s have prostate cancer, but most die from other causes. ^[15]
- More men are being diagnosed at an early stage of the disease than before. ^[16]

What treatments work for early prostate cancer?

Most prostate cancers grow slowly, so you have a good chance of surviving your cancer whether you have treatment or not. Even if your cancer has spread to tissue nearby, your chances of surviving are still good.

Doctors still don't know enough about whether the treatments available for early prostate cancer will help you live longer. And all the treatments for this cancer can have serious side effects.

What treatments you are offered will depend on:

- The size of your prostate cancer and how slow- or fast-growing it is
- Whether the cancer has spread to other areas and, if so, where it has spread
- Your age and general health.

Here, we look at treatments for cancer that has not spread outside your prostate (**clinically localised cancer**). There is some information on treatments for more advanced disease at [Treatments for advanced prostate cancer](#) .

Key points for men whose cancer has not spread

- You have three main treatment options: **surgery**, **radiotherapy**, and **active surveillance**. Active surveillance is when doctors regularly check your cancer with tests and investigations rather than treat it immediately, and may switch to another form of treatment if necessary.
- Your doctor may also recommend hormone treatment if you're having radiotherapy.
- If you choose active surveillance, you have a good chance of surviving your cancer and you can avoid the side effects of treatment. But you have to live with an untreated cancer.

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- If you have surgery, there is a small chance that you will live longer than if you choose active surveillance.
- Surgery, radiotherapy, and hormone therapy can all have serious side effects. The main side effects are erection problems and incontinence (you can't control when you urinate).
- Another type of radiotherapy, called **brachytherapy**, may be more convenient for you than standard radiotherapy. Standard radiotherapy involves treatment for five days a week for four to eight weeks. Brachytherapy involves only one trip to hospital.
- Most prostate cancers grow slowly. Most men with early-stage cancer survive for at least five years, whether or not they have treatment.

Your decision on treatment may be based on your own personal preference. To help you make this decision, you may need to ask yourself:

- Would I be too worried to live with an untreated cancer?
- What effect would erection problems and incontinence have on my life?
- Am I fit and healthy enough to have surgery?
- Does my age make a difference to my decision?

Deciding between active surveillance and early treatment can be difficult. See [How do I decide if active surveillance or early treatment is right for me?](#)

Treatment Group 1

Treatments for cancer that has not spread

Cancer that hasn't spread is called **clinically localised cancer**. All the treatments for this type of cancer need further study before we know which ones work best. ^[27]

Treatments that need further study

- [Active surveillance](#) : This is where doctors regularly check on your cancer rather than treat it straight away. They may begin treatment if your cancer shows signs of growth or you start having symptoms. [More...](#)
- [Radical prostatectomy](#) : This is an operation to remove the prostate and prostate cancer as well as some of the tissue nearby. [More...](#)
- [Radiotherapy](#) : A machine beams radiation from outside the body into the tumour to kill the cancer cells. [More...](#)

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- [Internal radiotherapy \(brachytherapy\)](#) : Radioactive seeds are placed directly in the prostate to kill the cancer cells. [More...](#)
- [Hormone therapy \(with drugs or surgery\)](#) : Some cancer cells need hormones to grow and spread. Hormone therapy can switch off these hormones or block the effects of hormones on your body. In early prostate cancer, hormone therapy isn't usually used on its own, but in combination with radiotherapy. [More...](#)

What will happen to me?

If you or someone you know has been diagnosed with prostate cancer, you may want to find out all you can about what lies ahead. But no one can say for certain what will happen to you.

Doctors usually talk about the percentage of men who are likely to be alive in five or 10 years. You may find it easier to cope if you know these figures. On the other hand, you may find this kind of information confusing and frightening.

If you don't want to read about figures on surviving prostate cancer, then skip this section. If you do read on, bear in mind that no statistics can tell you what will happen to you as an individual. There are many different things that can affect the outlook for you personally.

What lies ahead?

Most prostate cancers grow slowly, and many men live for years without getting any symptoms. More than 7 out of 10 men will still be alive five years after being diagnosed. ^[12]

There are two factors that doctors use to predict what may happen to you. The first is the [TNM stage](#) of your cancer. TNM stands for 'tumour, node, metastasis', and this staging system looks at how far your cancer has spread and whether any lymph nodes have been affected.

The second factor doctors look at is the [grade](#) of your tumour. Your cancer grade is determined by your [Gleason score](#), a system that rates how aggressive your cancer looks under a microscope. The more your cancer cells look like normal prostate cells, the lower your grade and the better your chances. A low-grade tumour (Gleason score 2 to 4) is likely to be growing slowly, while a high-grade tumour (Gleason score 8 to 10) is more likely to grow aggressively or to have already spread.

- If you have been diagnosed at an early stage of the disease and the cancer has not spread beyond your prostate, there's a good chance that you will live as long as someone who does not have prostate cancer. Around 90 out of every 100 men with the early stage of prostate cancer are still alive five years after their diagnosis. ^[17] But that doesn't necessarily mean that you are 'cured'. You will probably always need regular check-ups.

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- If your cancer has spread to the organs close to your prostate, the cancer is not usually curable, but your chances of surviving the disease are still good.
- Most men who have prostate cancer that has spread to more distant parts of their body or to their bones (called **metastatic disease**) will die from it. Only a third of these men will still be alive five years after being diagnosed. ^[17] ^[18]
- Your age and general health can affect whether you will survive your cancer. If you are older (say, over 70) and have other health problems, such as heart disease or diabetes, you may be more likely to die from these conditions than from your cancer. The chance of dying from prostate cancer is higher if you are a younger man, as you are less likely to have other health problems. You also have longer to live, which means the disease has more time to get worse.

We have prepared some detailed information about what may happen to people with different types of prostate cancer. To read more, see [Survival rates for prostate cancer](#)

Questions to ask your doctor

If you've been diagnosed with prostate cancer, you may want to talk to your doctor to find out more.

Here are some questions you may want to ask.

- How sure are you that I have cancer?
How reliable are the tests you used to diagnose my prostate cancer?
- How big is my tumour?
- Has my prostate cancer spread? What [stage](#) is it? How sure are you that this is the stage of my cancer?
- Do I need extra tests to see if the cancer has spread to my [lymph nodes](#) or other parts of my body? How reliable are these tests?
- What is the [grade](#) of my prostate cancer? (This can tell you how aggressive your cancer is and how likely it is to spread.)
- What about my age and my general health? Will this affect what will happen to me?
- Will I get symptoms even if I don't have any now? What will they feel like?
- How often will I need to have tests and check-ups?
- What's the best treatment for me? Do I have any choices?

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- Can treatments stop my cancer spreading and causing symptoms?
- What are the side effects of treatment?
- What's the chance that I will survive my prostate cancer? How long will I probably live?
- Is there anything I can do to help myself? Do I need to make any changes to my lifestyle?
- How can I tell my family I have cancer?

Survival rates for prostate cancer

Here we talk about the average survival rates for men with different types of prostate cancer. As you read this information, remember that we can't say exactly what will happen to you. We can only give you an idea about what happens to the average person.

If your cancer has not spread beyond your prostate

This is known as **clinically localised cancer**. Doctors classify it as T1 or T2 in the [TNM system](#).

Almost all men whose cancer has not spread beyond their prostate will be alive five years after diagnosis. ^[18]

If your cancer has spread into tissues or organs next to your prostate

This is called **locally advanced cancer**, and doctors classify it as [T3 or T4](#) in the TNM system.

- One study found that about 6 in 10 men (60 percent) whose cancer has spread into tissues or organs near the prostate will live for at least five years. ^[18] However, this study was done several years ago. With advances in treatment, more men may be surviving today.
- You have about a 30 percent chance that your disease will have spread to other organs and bones (called metastatic disease) 10 years after your diagnosis.
- Men whose cancer has spread may develop symptoms such as blood in their urine (called haematuria), problems passing urine and swollen lower legs.

If your cancer has spread to your bones and other distant parts of your body

This is called **metastatic disease**.

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- About one-third of men whose cancer has spread to other places in their body will live for five years or more. ^[17]
- Cancer that has spread to your bones can be very painful. Men with metastatic disease may also develop anaemia, which means they have too few red blood cells . This causes extreme tiredness. Advanced cancer may also lead to loss of appetite.

Treatments:

Active surveillance

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This information is for men who have early prostate cancer . It tells you about active surveillance, a treatment used for prostate cancer that has not been detected outside of the prostate gland. It is based on the best and most up-to-date research.

Does it work?

Monitoring a cancer through active surveillance doesn't cure it or control its spread. But most men with an early-stage tumour who choose active surveillance still have a good chance of surviving the disease.

If you choose active surveillance you can avoid or delay side effects, such as erection problems, which can be caused by treatments like [prostate surgery](#) and [radiotherapy](#) . On the other hand, you do have to live with an untreated cancer.

One large study found that men who choose active surveillance are more likely to die of their prostate cancer than men who have prostate surgery. But the difference in numbers was quite small. ^[28] A more recent study of a similar size found that men who chose active surveillance over surgery were no more likely to die from prostate cancer. ^[29]

Your choice of treatment will depend on several things, including your individual preference, your age and general health, and the stage of your cancer.

The information here is for men whose cancer is at an early stage and has not been detected outside their prostate gland. Some doctors call this stage **clinically localised cancer** and classify the cancer as **T1** or **T2**. For more information about how doctors classify prostate cancer, see [The TNM system](#) .

What is it?

Active surveillance means you don't try to remove or cure the cancer with immediate treatment. Instead, your doctor monitors any growth of your cancer at regular intervals and checks whether the cancer is causing other problems.

If you choose active surveillance, you will need to see your doctor regularly to check if your tumour is growing, becoming more aggressive or spreading beyond your prostate gland into other areas. You might see your doctor every three months at first and then every six months after a while. ^[24]

To monitor your cancer, your doctor may use the same tests that he or she used to diagnose the cancer.

- **A PSA test:** The **PSA test** checks the amount of prostate-specific antigen (PSA) in your blood. PSA is a substance that helps prostate fluid stay liquid. If you have cancer, more PSA seeps out of your prostate and into your bloodstream. So a rise in your PSA levels may show that your tumour is growing.
- **A biopsy:** Your doctor uses a fine needle to remove samples of prostate cancer cells to look at under a microscope. The more abnormal these cells look, the greater the grade of your cancer and the greater the risk your cancer will grow fast and spread. Doctors use a grading system known as the **Gleason score** to rate how aggressive your cancer is.
- **A digital rectal examination (DRE):** This is a physical examination of your prostate through the wall of your **rectum**. The doctor puts his or her finger into your rectum, using gloves and a lubricating gel, to feel if the cancer has grown.

If your tumour seems to be growing or causes problems, your doctor may recommend you have [surgery to remove your prostate](#) or [radiotherapy](#).

This kind of treatment is also called **observation**, **expectant therapy**, and **monitoring**. You may also hear it referred to as **watchful waiting**, although this term is now used mainly to describe a less active type of monitoring (see below).

Watchful waiting

If you're older or have another serious health condition, you might choose a less active type of monitoring called watchful waiting. Instead of having regular tests as you would in active surveillance, you and your doctor watch for symptoms that indicate your cancer is progressing. You then have treatment to help your symptoms rather than to stop your cancer. Since prostate cancer is often slow-growing, many men who are older or have other health problems will die of something other than their cancer, so active monitoring and treatment aren't necessary.

How can it help?

Here's what we know about how active surveillance can help.

- You have a good chance of living as long as a man who doesn't have prostate cancer.
- After 10 years, about 60 percent of men need treatment to improve their symptoms. But if your [tumour grade](#) is between 2 and 5, your chances of needing treatment within 10 years will be less than this.
- If your cancer was detected by a [PSA test](#) as part of a routine health check, you may have an even lower chance of developing symptoms within 10 years because your cancer may be at an even earlier stage.
- You can delay and may even avoid the pain and probable side effects of treatment for prostate cancer. This may be important to consider if you do not currently have any symptoms, because some treatments can cause incontinence (you drip or leak urine) and erectile dysfunction (you can't get an erection). ^[30]
- You keep your prostate, and it's likely that it can still do its job and help produce semen.

How does it work?

Active surveillance doesn't cure or control the spread of the cancer. But it can be an appealing option for men who don't want to deal with the side effects of [surgery](#) or [radiotherapy](#) .

Since most prostate cancers grow very slowly, the cancer may not cause any symptoms during your lifetime. This is particularly true if you are older or have other health conditions such as heart disease, [diabetes](#) or lung disease. You may be more likely to die from other causes than from prostate cancer.

By monitoring your cancer rather than treating it, you avoid the side effects of early treatment and may have a better quality of life with no difference in the length of your life. However, if your cancer does seem to be growing or causes problems, active surveillance will detect it and you can start treatments to slow the progression of the cancer.

Can it be harmful?

There are some downsides to active surveillance.

- You may feel very worried and anxious about living with an untreated cancer. This can put a lot of stress on your life at work, at home and in your personal relationships. Even though it's unclear whether treatment improves chances of survival, many men

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decide to have surgery or radiotherapy because they feel they need to do something.
[31]

- Active surveillance delays treatment. As you get older, you may become unable to have certain treatments, particularly if your general health is not good. The risks of surgery and radiotherapy will be too great.

Research doesn't give us a clear answer about whether men who choose active surveillance over surgery are more likely to die of prostate cancer. One large study found that, after about 12 years, men who chose active surveillance were more likely to have died of their prostate cancer. [28]

- About 52 in 100 men who had surgery were still alive. This compares with 42 in 100 of those who had chosen active surveillance.
- About 15 in 100 men who had surgery had died of their cancer. This compares with 23 in 100 of those who had active surveillance.
- For 78 in 100 men who had surgery, the cancer had not spread to other parts of their body. This compares with about 67 in 100 men who had chosen active surveillance.

But a more recent study in 731 men found that men who chose active surveillance rather than surgery were no more likely to die of prostate cancer. In this study, after 12 years, about half the men in each group had died. But only about 7 in 100 men had died from prostate cancer. [29]

Even if you choose active surveillance, your doctor may recommend treatment later on, based on the results of your check-ups. So, you may still end up having surgery or radiotherapy eventually. The tests that doctors use in check-ups have improved since the study on active surveillance was done. So, the advantage of having surgery straight away may be even smaller than the research suggests.

It can be difficult to decide whether you should choose active surveillance or get early treatment for your cancer. See [How do I decide if active surveillance or early treatment is right for me?](#)

How good is the research on active surveillance?

We found two good-quality studies (called randomised controlled trials) that compared active surveillance with other treatments for cancer that hasn't spread.

The first study involved 142 men with prostate cancer who were treated with either active surveillance or [surgery to remove the prostate](#) . [32] But the study had too few men for us to be certain about the results. It's also fairly old and used surgical techniques that may not be as good as those used today.

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The second study was much larger, and so the results are more reliable. It involved 695 men who also had either active surveillance or surgery. ^[33]

Radical prostatectomy

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[How good is the research on radical prostatectomy?](#)

This information is for men who have early prostate cancer. It tells you about radical prostatectomy, a treatment used for prostate cancer where the cancer has not been detected outside the prostate gland. It is based on the best and most up-to-date research.

Does it work?

So far, research hasn't provided a clear answer as to whether men who have prostate surgery are less likely to die of their prostate cancer than men who choose [active surveillance](#) (monitoring their cancer rather than starting treatment straight away). Some research has found that men who have surgery are slightly less likely to die from prostate cancer. ^[28] But more recent research suggests that, for men whose cancer hasn't spread, there is no advantage in having surgery. ^[29]

If there is any advantage in having surgery over active surveillance it is probably quite small. And removing the prostate is major surgery. It can have serious side effects, including erection problems and incontinence (where you cannot control your flow of urine).

Whether you choose surgery will depend on several things, including your individual preference, your age, your general health and the stage of your cancer.

The information here is for men whose cancer is at an early stage and has not been detected outside their prostate gland. Some doctors call this stage **clinically localised cancer** and classify the cancer as a **T1** or **T2**. For more information about how doctors classify prostate cancer, see [How far has your cancer spread? The TNM system](#) .

We don't know for certain how well surgery works compared with other treatments because there are only a few studies that have looked at this.

What is it?

A **radical prostatectomy** is an operation that removes your whole prostate. It also removes some healthy tissue around it, including the seminal vesicles, which are two small glands that (like the prostate) produce fluid that comes out with your sperm when you **ejaculate** .

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Doctors hope that by taking away your prostate, they'll get rid of all the cancer. The main reason for completely removing the cancer is to stop it spreading to other parts of your body.

This type of surgery is also called **prostatectomy** or **prostate surgery**.

Your prostate is difficult to get to, so the operation is tricky to perform. There are two routes in.

- Through a cut in your abdomen: This is called [retropubic surgery](#) .
- Or, through a cut in the skin between your anus (where you empty your bowels) and your scrotum (the sac that holds your testicles). This second method is called [perineal surgery](#) .

With both kinds of surgery you will be given a **general anaesthetic** to put you to sleep. The operation lasts between two and four hours.

You will have a catheter in place for a week or two after the operation. A catheter is a flexible tube inserted into your penis that goes through your urethra (the tube that runs next to the prostate and carries urine from your bladder). You will need a catheter to help you urinate because your urethra is temporarily closed after surgery and it will need time to recover.

You can also have a type of keyhole (laparoscopic) surgery to remove your prostate. Your surgeon does the operation with a tiny camera and instruments inserted through small cuts in your body. But not all hospitals offer this type of surgery.

How can it help?

Removing your prostate takes away the tumour so it can't continue to grow and spread.

One large study found that, after about 12 years, fewer men who had surgery had died than men who had chosen active surveillance.^[28] But the difference in numbers was quite small:

- About 52 in 100 men who had surgery were still alive. This compares with 42 in 100 of those who had chosen active surveillance
- About 15 in 100 men who had surgery had died of their cancer. This compares with 23 in 100 of those who had active surveillance
- For 78 in 100 men who had surgery, the cancer had not spread to other parts of their body. This compares with about 67 in 100 men who had chosen active surveillance.

A more recent study in 731 men with localised cancer (cancer that hadn't spread) who had either surgery or active surveillance found no difference in how many people were

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still alive after 12 years, and in how many people had died of prostate cancer. In this study, about 7 in 100 men had died of prostate cancer after 12 years. ^[29]

However, even if you choose active surveillance, your doctor may recommend treatment later on, based on the results of your check-ups. So, you may still end up having surgery or radiotherapy eventually. The tests that doctors use in check-ups have improved since the study on active surveillance was done. So, the advantage of having surgery straight away may be even smaller than the research suggests.

How does it work?

Surgeons remove the whole prostate and tissues around it because this provides the best chance of getting rid of all the cancer cells in the area. Removing only part of the prostate may mean that cancer is left behind. Cancer cells may be scattered around different parts of the prostate.

It seems logical to assume that removing your prostate will leave you free of cancer and less likely to die of your disease. But there are two reasons why you may not benefit from surgery.

- First, surgery may not work. Despite your surgeon's attempt to remove all of the tumour, you may not be cancer-free. Even if your test results indicate your cancer is only in your prostate, it's still possible that it has spread to other parts of your body but can't be detected. Tests for cancer aren't 100 percent reliable. So your risk of dying from prostate cancer may be the same even if your prostate is removed.
- Second, surgery may not be necessary. Many prostate cancers grow slowly. If you have this kind of cancer, then you may not get any symptoms or health problems in your lifetime, even without early treatment.

Can it be harmful?

Having your prostate removed is a major operation and there are risks. The main problems occur if organs and nerves close to your prostate are damaged during the surgery.

The risk of dying from prostate cancer surgery is about 1 in 200. ^[34] Although you probably won't die from the surgery, you may get some side effects.

Incontinence (problems controlling your flow of urine)

You may find it difficult to control your urine flow when your catheter is removed after surgery. It may be hard to urinate, and you may drip or leak urine. Some men find this eventually goes away, but others continue to have problems.

In one study of men two years after their surgery, 30 percent to 46 percent said they leak "a few drops" every day and have to wear a pad to deal with the wetness. But only a few men (2 percent to 4 percent) were totally incontinent (they did not have any control over their flow). ^[35]

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This happens because your urethra (the tube that carries the urine from your bladder out through your penis) runs through your prostate and can get damaged during surgery.

Erectile dysfunction (problems getting an erection)

After surgery, you may find it difficult to get and maintain an erection. This occurs in about 60 percent of men, although some studies suggest that the risk may be as high as 90 percent.

Although you may not be able to have sex, you may still get the sensation of an orgasm. But, it is unlikely that you will produce any semen. However, your erections may continue to improve over time. The nerves that are involved seem to be able to recover after surgery. But the older you are, the less likely you are to regain the ability to have an erection.

Erectile dysfunction happens because the nerves and blood vessels that control erections lie close to the prostate and can become damaged during surgery. A technique called **nerve-sparing surgery** can protect the nerves from injury. However, nerve-sparing surgery is performed only on men with small, slow-growing tumours. Even in these men, it may not be successful at preventing erectile dysfunction. One good-quality study has found that men who have nerve-sparing surgery are more likely to have erectile dysfunction than those who have radiotherapy.^[36]

Coping with erectile dysfunction can be difficult, especially if everything was working fine before the operation and having erections and sex is important to you. Erectile dysfunction can affect how you feel about yourself and your personal relationships, and some men find this topic hard to talk about. But many men say they find other ways to get sexual satisfaction.

There are treatments available for erectile dysfunction, so it's worth talking to your doctor about which ones may be right for you.

Dry orgasm

After your prostate is removed, you will no longer be able to ejaculate (release fluid from your penis when you orgasm). This is because you no longer have a prostate to produce this fluid.

Bowel problems

It is possible for your **rectum** to become damaged during surgery, although this is not common. Only about 5 percent of men cannot control their bowels after the operation and have to wear protective pads. It is possible to have an operation to correct the damage, but only about 1 percent of men have damage that's serious enough to require surgery.^[37] ^[38]

Dying from your surgery

There is a very small (less than 1 percent) chance that you may die from your surgery. The operation involves a general anaesthetic (which puts you to sleep) and this can lead

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to complications such as heart problems and breathing problems. You may also lose a lot of blood from the surgery, which can be risky if you are older or in poor health.

About 8 percent of men over age 65 have major heart problems within a month of surgery. ^[34]

How good is the research on radical prostatectomy?

We found only a few good studies of how well surgery for prostate cancer (radical prostatectomy) works. It's difficult to compare these studies because they include men with different stages of cancer who do not have an equal chance of dying from the disease. Also, the research is on older men (over age 65), so we can't use this information to decide how well the treatment works for younger men.

We found one review of two studies that compared surgery with [active surveillance](#) (monitoring the cancer rather than treating it straight away). ^[28]

The largest and best of the two studies included nearly 700 men with early prostate cancer, so it's more reliable. It's also more recent and involved newer surgery techniques. We also found another, more recent study of a similar size. ^[29] But there still isn't enough good research into this treatment to give really clear answers about how well it works. ^[33]

We didn't find any good-quality, recent research comparing surgery with [radiotherapy](#) .

Radiotherapy

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[How good is the research on radiotherapy?](#)

This information is for men who have early prostate cancer. It tells you about radiotherapy, a treatment used for prostate cancer that has not been detected outside the prostate gland. It is based on the best and most up-to-date research.

Does it work?

We don't know for certain. Having radiotherapy may help, but it hasn't been studied thoroughly.

We do know that between 5 in 10 and 9 in 10 men who have radiotherapy for early cancer survive their disease for at least 10 years. And around half of these men don't get any symptoms during this time. But we don't know whether the radiotherapy helped these men to live longer. They may have lived just as long without the treatment. ^[39]

Prostate cancer

We don't know how radiotherapy compares with [active surveillance](#) or [surgery to remove the prostate](#) . We haven't found any good-quality studies comparing these treatments.

A newer radiotherapy, called **conformal radiotherapy**, may have fewer side effects than the standard external beam radiotherapy.

The information here is for men whose cancer is at an early stage and has not been detected outside their prostate gland. Some doctors call this stage **clinically localised cancer** and classify the cancer as **T1** or **T2**. For more information about how doctors classify prostate cancer, see [How far has your cancer spread? The TNM system](#) .

What is it?

Radiotherapy is a treatment that uses a machine positioned above your body to direct X-rays (a form of radiation) through your abdomen and into the cells in your prostate. This treatment is also called **external beam radiotherapy**.

Radiation is a source of energy that is transmitted in the form of either waves or particles. X-rays are a form of very high-energy radiation that can penetrate and destroy cells. ^[40] The aim of the treatment is to kill the cancer cells in the prostate so that the tumour can't grow and spread to other parts of your body. If the cancer spreads, you could die from prostate cancer. You will need to have radiotherapy five days a week for four to eight weeks.

It takes only a few minutes to have treatment with radiotherapy. Your doctor will carefully calculate the dose of radiation you need at each session.

The radiation is targeted at your whole prostate, because cancer cells are often scattered throughout it. Radiation may also be targeted at your seminal vesicles, just in case the cancer has spread there. Like the prostate, the seminal vesicles help produce the fluid that comes out with your sperm when you [ejaculate](#) .

As an extra form of insurance, some doctors may also aim the radiation at the lymph nodes near your prostate. Lymph nodes are small lumps made up of special cells that help protect your body against infection. Tiny tubes, called lymph vessels, drain fluid from the prostate and carry it to the nodes. This fluid contains waste material from the prostate cells. If there are any cancer cells in the fluid, they will also be carried to your lymph nodes. From here, the cancer cells may spread to other parts of your body. ^[24]

A newer technique, called **3-D conformal radiotherapy**, is designed to provide a more accurate way to make sure the radiation goes where it's needed most. Your doctor will scan your prostate and feed this information into a computer to produce a three-dimensional image of your prostate gland. A device attached to the radiotherapy machine then shapes the beams to the exact size and shape of your prostate. This allows a higher dose of radiation to hit your prostate and reduces the amount of radiation that hits healthy cells in organs near your prostate, such as your bladder and rectum. ^[41] ^[1]

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If you're having radiotherapy and your [Gleason score](#) is 8 or higher, your doctor will probably recommend you also have [hormone treatment](#) for at least two years. ^[24]

How can it help?

It is difficult to say for sure whether radiotherapy will stop your cancer growing and spreading, or help you live longer. Also, we don't know how radiotherapy compares with [active surveillance](#) or [surgery](#). There hasn't been enough good research to know which treatment works the best.

As with all of the other treatment options for prostate cancer, radiotherapy seems to work better for men with small or slow-growing tumours than for men with large or aggressive cancers. But no one knows whether this is because the radiation is having a positive effect, or whether this group of men would do better anyway.

Research does show that conformal radiotherapy works just as well as standard radiotherapy. ^[42] You're just as likely to be alive five years later whatever type of radiotherapy you have.

Knowing if your treatment has worked

Your doctor will not be able to tell you straight away whether your treatment has successfully killed the cancer cells and stopped new cells growing and spreading. It is possible that some cells may escape the radiation.

After treatment, your doctor will check the levels of a protein, called prostate-specific antigen (PSA), in your blood. This test is called a PSA test. Men with cancer have high levels of PSA. Cancer disrupts the network of cells and tubes (called ducts) inside the prostate, so more PSA leaks out into your blood.

In general, if your PSA level goes down after treatment, this is a sign that your cancer may have been destroyed. The problem is that experts do not all agree on what level of PSA indicates you are free of disease. And you will still produce some PSA because you still have your prostate.

In addition, PSA levels can rise right after radiotherapy because the treatment may temporarily affect the way the prostate works. After treatment, PSA levels tend to drop slowly and may not reach low levels for about 17 months. So don't worry if your PSA level is high straight after treatment. It doesn't necessarily mean your cancer is still growing.

You have a higher chance of being free of cancer after treatment if: ^[43]

- Your PSA level is below 0.5
- Your PSA level does not show any increase in three consecutive tests (the tests should be at least three to six months apart).

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If cancer is going to come back, it's most likely to happen within five years of having radiotherapy. ^[44]

It's possible that your cancer had already spread beyond your prostate before your treatment but it was too small to be detected. So radiotherapy may have killed the cells in your prostate, but cancer cells are still growing elsewhere in your body.

If the treatment doesn't work

It's important to remember that even if your PSA level rises and the cancer is still present in your prostate, you may not develop any symptoms or die from the disease for many years, if ever. But if the cancer is still in your prostate, you may want to consider further treatment, possibly with surgery.

However, not all men are suitable for surgery because radiotherapy can damage delicate tubes and organs near your prostate (such as your bladder), making an operation very risky.

How does it work?

Radiotherapy uses energy in the form of waves or particles to damage the DNA in the cancer cells. DNA is the genetic material inside cells that tells them how to grow and divide.

When your body's cells are healthy, they grow and divide to form new cells as your body needs them. When cells grow old and die, new cells take their place. Sometimes this process breaks down. New cells form too rapidly, when the body doesn't need them, and old cells don't die when they should.

You get prostate cancer when some of the cells in your prostate begin to grow out of control. The extra cells can form a mass of tissue called a growth or tumour. If there are enough X-rays to damage the DNA in the cancer cells, then the cells won't be able to repair themselves, and they will die.

Radiation can damage normal cells, too. It works best at killing cells that are dividing, particularly if they are dividing quickly, as cancer cells do. Because it isn't so good at killing cells that are resting or that divide slowly, it is less likely to harm healthy cells.

The doses of radiation are usually given five days a week for four to eight weeks. Not all of the cancer cells will be dividing at the same time. So to destroy as many as possible, you need to be treated for several days at a time. The timing of the doses makes it more likely that the cells that grow and divide quickly, like cancer cells, are hit more often with the radiation than normal cells, which grow more slowly.

Can it be harmful?

There are some possible downsides to radiotherapy. Your chances of having harmful effects from it depend on:

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- The total dose of your radiotherapy and how much you are given during each session (a higher dose may be better at destroying cancer cells, but it can also damage normal cells in the prostate and in other organs nearby)
- The radiotherapy technique used (conformal radiotherapy may have fewer side effects).^[45]

You can get side effects from radiotherapy soon after treatment and later on. Having reactions early on does not mean you will get reactions later.

Early effects

These side effects often begin a few weeks after treatment starts.

Overwhelming tiredness: Radiotherapy can be exhausting, and the effects can remain for some time after you've finished your course of treatment. No one knows why. Some men continue to go to work while having radiotherapy, but others stay at home because they feel so worn out.

Bowel problems: It's quite common to feel as if you need to move your bowels more often and more urgently, but all you pass is some wind and a little diarrhoea. Your doctor will be able to suggest a change in diet or a medicine that may ease these symptoms.

Skin irritation and hair loss: The skin on your lower abdomen may become a bit sore or red, and the hair there may fall out. These effects are not very common.

Later effects

These side effects often begin three to six months after treatment stops, but they can still appear for the first time a year or two later.

Bowel problems: These occur in a small number of men (around 10 percent). The most common problems are:

- Changes in bowel habits. You may need to go urgently and frequently (more than three times a day)
- Straining to move your bowels but nothing seems to happen
- Diarrhoea
- Feeling generally uncomfortable in your rectum
- Bleeding out of your rectum, and mucus in your stools.

These problems occur because your prostate presses against your rectum. So radiotherapy targeted at your prostate can also damage healthy cells in your rectum, leaving it irritated, sore and inflamed (this is known as proctitis).

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You are less likely to get these symptoms if you have conformal rather than standard radiotherapy because this method is better at avoiding healthy tissue.

You are more likely to have these symptoms with radiotherapy (a 10 percent chance) than with surgery (a 4 percent chance). For some men, these side effects become permanent.^[44]

Bladder problems: You may have problems with your bladder, but you are less likely to get these with radiotherapy than with surgery.

- Incontinence (loss of control over your flow of urine): There is a chance you may not be able to stop urine leaking or dripping from your bladder and through your penis. A survey of men who had radiotherapy found that around two-thirds did not have any problems, and only 7 percent needed to wear pads to control the wetness. However, around 32 percent of surgery patients ended up wearing pads.^[44]
- Cystitis (inflammation of the bladder): This can cause a burning sensation when you urinate. You may also find you need to go more often and urgently, especially at night, and there may be blood in your urine. Talk to your doctor about treatments for cystitis.

These symptoms happen because your bladder and your urethra (the tube that carries urine out of the bladder) are next to your prostate and can be damaged by the radiation. The blood vessels in your bladder can become more fragile during treatment, and this can cause blood to appear in your urine.

Erectile dysfunction (problems getting an erection): Radiotherapy can affect your ability to get and maintain an erection. This is because it can injure the healthy cells in the blood vessels and nerves that are close to the prostate and that control erections.^[46]

- The actual risk of this happening after radiotherapy is not known. One study found that between 23 percent and 32 percent of men were unable to get an erection after their treatment. But some studies report figures as high as 50 percent to 60 percent.^[44]
- For most men, the problem does not usually start until a year or two after radiotherapy.
- The risk of erectile dysfunction is higher among older men who had erection problems before treatment.
- You are probably less likely to get this side effect if you have radiotherapy treatment rather than surgery.
- This side effect is thought to be permanent.

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Coping with erectile dysfunction can be difficult, especially if everything was working fine beforehand and having erections and sexual intercourse is important to you. It can affect how you feel about yourself and your personal relationships, and you may find this topic hard to talk about. You may still be able to experience the sensation of an orgasm even without an erection, but you may not be able to have sexual intercourse. Many men say they find other ways to get sexual satisfaction.

There are treatments available for erectile dysfunction, so it's worth talking to your doctor about which ones may be suitable for you.

Dry orgasm: Some men find that they do not produce any fluid when they ejaculate. This is because the prostate cells that produce the fluid can become damaged by radiotherapy. This is sometimes called 'dry orgasm' or 'dry ejaculation'.

Other effects

- Each year, a few men will die from radiotherapy, but the chances of this happening are very small.
- Some studies suggest that men who have radiotherapy are more likely than men who have surgery to feel concerned about their cancer after treatment.^[47] Because their prostate is still intact, men who've had radiotherapy may feel less certain about whether their cancer cells have all been destroyed.^[31]
- Radiotherapy typically involves having treatment in hospital five days a week for up to eight weeks. Since there isn't much information on whether radiotherapy works, some men decide they do not want this interruption to their lives. Other men say they would rather have radiotherapy than live with untreated cancer inside them, or would prefer to have surgery to remove their prostate.

The chances of side effects with conformal radiotherapy

Some research shows that men who have conformal radiotherapy are slightly less likely to get side effects than those men who have standard radiotherapy.^[48]

Men treated with conformal radiotherapy were:

- Less likely to get the early side effects, which start a few weeks after treatment. In one study, only 8 in 100 men who had conformal radiotherapy had anal pain that needed painkillers compared with 16 in 100 men who had standard radiotherapy.^[48]
- Less likely to get the long-term bowel problems (proctitis) that can occur one year or more after radiotherapy.^[49]

How good is the research on radiotherapy?

There isn't much evidence from reliable studies to say for certain whether radiotherapy can stop your cancer growing or help you live longer. There is little good research comparing radiotherapy with [active surveillance](#) . Also, we didn't find any good-quality, recent research comparing radiotherapy with [surgery to remove the prostate](#) . We did find some older studies comparing surgery with older radiotherapy techniques, but nothing comparing surgery with more modern techniques.

We found one good study of just over 300 men that compared conformal radiotherapy with standard external beam radiotherapy. ^[50]

We also found a summary of the research, called a [systematic review](#) , which looked at the side effects of conformal and standard radiotherapy. ^[50]

Internal radiotherapy (brachytherapy)

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[How good is the research on internal radiotherapy \(brachytherapy\)?](#)

This information is for men who have early prostate cancer. It tells you about internal radiotherapy (brachytherapy), a treatment used for prostate cancer which has not been detected outside of the prostate gland. It is based on the best and most up-to-date research.

Does it work?

We don't know if brachytherapy works. There are no reliable studies that show whether brachytherapy will help stop your cancer growing and spreading, improve your quality of life or help you live longer. Brachytherapy is sometimes offered to men with low- to medium-risk prostate cancer (men with a [Gleason score](#) of 7 or less and a [PSA level](#) of 20 or less). ^[24] These men typically do well with any treatment option, including [active surveillance](#) .

For men with more advanced cancer, brachytherapy alone does not appear to work as well.

We don't know if brachytherapy works any better than other treatments for prostate cancer, such as [surgery to remove the prostate](#) and [external radiotherapy](#) .

The information here is for men whose cancer is at an early stage and has not been detected outside their prostate gland. Some doctors call this stage **clinically localised cancer** and classify the cancer as **T1** or **T2**. For more information about how doctors classify prostate cancer, see [How far has your cancer spread? The TNM system](#) .

What is it?

Brachytherapy is a form of radiotherapy. This treatment is also called interstitial therapy and seed implants.

Unlike standard radiotherapy, where X-rays are beamed into your prostate from a machine outside the body, brachytherapy uses radioactive metal 'seeds' or pellets that are placed directly into your prostate. The seeds contain a radioactive substance that breaks down in the cells, giving off rays of energy called radiation. This is designed to kill cancer cells.

Brachytherapy has been around for several decades, but now there are new techniques that are better at getting the seeds to the right place and making sure the radiation is spread evenly throughout your prostate. Brachytherapy is available at some, but not all, cancer centres in the UK.

The aim of brachytherapy is to target and destroy the cancer cells (and prevent them from growing and spreading to other parts of your body) affecting healthy cells as little as possible.

The treatment involves a small operation lasting about an hour. You'll need either a general anaesthetic (which puts you to sleep) or a spinal anaesthetic (which is known as an epidural and makes you numb below your waist). You can probably go home the same day, and most men find they can get back to normal after a day or two. ^[51]

Your doctor will scan your prostate to decide where to put the radioactive seeds and how many you need. Your prostate presses against your rectum, so your doctor can get a scan of the prostate by inserting an ultrasound probe into your rectum. The ultrasound probe produces sound waves that bounce off the prostate and are turned into a 3-D image by a computer.

Using the image as a guide, the doctor inserts thin, hollow needles through the skin between your scrotum (the sac that holds your testicles) and anus, and up into your prostate. The radioactive seeds are delivered through the needles.

There are two types of brachytherapy: permanent and temporary.

- In **permanent brachytherapy**, the seeds contain substances that produce low doses of radiation that last for a few weeks or months. The seeds are left in place when the radiation has run out, but they are small, so you can't feel them. The treatment tends to be used in men who have tumours that don't look aggressive and are less likely to spread.
- In **temporary brachytherapy**, the seeds produce high doses of radioactive energy. Sometimes, the seeds are left in for about three days and then removed. Other times, higher-dose seeds are used for a few brief treatments and the seeds are put in place for a few minutes and taken out. This approach is only available at a few centres in the UK.

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The National Institute for Health and Care Excellence (NICE), the government body that decides which treatments should be available on the NHS, has issued guidelines on brachytherapy for prostate cancer.^[52] ^[53] NICE says that men whose cancer hasn't spread outside the prostate can be treated with **low-dose brachytherapy** or **high-dose brachytherapy** plus standard radiotherapy that's given from a machine outside the body.

You may not be suitable for brachytherapy if you've had surgery to remove part of your prostate. This is because it may be too difficult to insert the seeds in the right place. Men who have an enlarged prostate (a non-cancerous condition called [benign prostatic hyperplasia](#)) sometimes have part of their prostate removed.^[51]

How can it help?

There really isn't any clear-cut evidence on whether brachytherapy can help stop your cancer growing and spreading, or help improve your chances of surviving prostate cancer.

There aren't any studies that look at how long men who have this treatment live because the modern methods of brachytherapy have not been around for long enough yet. Also, most men who have early-stage disease will survive at least five years, with or without treatment.

On a practical level, some men find brachytherapy more convenient than standard [radiotherapy](#) , which involves going to hospital five days a week for four to eight weeks. Brachytherapy involves a quick operation, and most men find they can get back to work within a day or two. Some men may also prefer brachytherapy to [surgery to remove the prostate](#) , which is a larger and more daunting operation. There hasn't been much research comparing the two procedures. But we found one summary of the research (a [systematic review](#)) comparing brachytherapy and surgery.^[54] This review found one study that showed that brachytherapy worked as well as surgery. There were differences in side effects, with men having brachytherapy more likely to be in pain and men having surgery more likely to be incontinent. We need more studies before we can know all the differences in how they work for sure.

Knowing if your treatment has worked

Your doctor will not be able to tell you straight away whether your treatment has successfully killed the cancer cells and stopped new cells growing and spreading. It's possible that some cells may escape the radiation.

After treatment, your doctor will check the levels of a protein, called prostate-specific antigen (PSA), in your blood. This test is called a PSA test. Men with cancer have higher levels of PSA. Cancer disrupts the network of cells and tubes (called ducts) inside the prostate, so more PSA leaks out into their blood.

In general, if your PSA level goes down after treatment, this is a sign that your cancer may have been destroyed. The problem is that experts do not all agree what level of PSA indicates you are free of disease. And you will still produce some PSA because you still have your prostate.

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In addition, PSA levels can rise after radiotherapy because the treatment may temporarily affect the way your prostate works. After treatment, PSA levels tend to drop slowly and may not reach low levels for about 17 months. So don't worry if your PSA level is high straight after treatment. It doesn't necessarily mean your cancer is still growing.

You have a higher chance of being free of cancer after treatment if:

- Your PSA level is below 0.5 micrograms/litre (this means you have less than 0.5 micrograms of PSA per litre of blood)
- Your PSA level doesn't increase in three consecutive tests (with the tests at least three to six months apart).

If your cancer is going to come back, it is most likely to happen within five years of your radiotherapy.

It's possible that your cancer had already spread beyond your prostate before your treatment, but it was too small to be detected. So your radiotherapy may have killed the cells in your prostate, but cancer cells are still growing elsewhere in your body.

How does it work?

Putting the seeds directly into your prostate ensures that the cancer gets the maximum dose of radiation without damaging the healthy organs nearby.

The radiation damages the DNA in the cancer cells. DNA is the genetic material inside cells that tells them how to grow and divide. If the radiation does enough damage to the DNA of the cancer cells, the cells won't be able to repair themselves and will die.

Radiation can damage normal cells, too. It works best at killing cells that are dividing, particularly if they are dividing quickly, as cancer cells do. Because it isn't so good at killing cells that are resting or that divide slowly, it is less likely to harm healthy cells.

Can it be harmful?

There are some possible harmful effects of brachytherapy, but it's difficult to say how likely you are to have unpleasant side effects. The idea is that this treatment should have fewer side effects than [external radiotherapy](#), but there's no research to support this.

The information here is based on the best available research, but it is not from very good studies. If you are considering having brachytherapy, talk to your doctor about the rates of side effects at the hospital where you will be treated.

Problems passing urine

Between 2 in 100 and 12 in 100 men have problems passing urine after brachytherapy. Brachytherapy can cause your prostate to swell slightly and block your urethra (the tube that urine goes out of when it leaves your body), making it difficult for you to control the flow of your urine. These side effects happen straight after treatment.^[55] Other common

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side effects include pain when urinating and having to urinate frequently at night.^[56] Around 7 in 100 men have incontinence (loss of control over their flow of urine) after brachytherapy.^[55]

These side effects happen because the bladder and urethra are next to the prostate and can become damaged and inflamed by the radiation. Researchers do not know if these problems are less likely to occur with brachytherapy than with standard external radiotherapy.

Bowel problems

Nearly 1 in 5 men have problems with their bowels after having brachytherapy. Sometimes this happens immediately or sometimes a year or so after treatment.^[55]

These side effects occur because the prostate presses against the rectum, so brachytherapy targeted at the prostate can also damage healthy cells here, leaving the rectum irritated, sore and inflamed (this is known as proctitis). Brachytherapy can also damage blood vessels in the rectum so blood can leak out with your stools.

Erectile dysfunction (problems getting an erection)

Around 1 in 3 men have some problem getting an erection after having brachytherapy.^[55] Brachytherapy can affect your ability to get and maintain an erection because it can injure the healthy cells in the blood vessels and nerves that control erections and are close to your prostate. The problems tend to start a year or more after treatment. It's difficult to be certain of the actual risk of this happening to you because studies vary.

Effect of the brachytherapy on other people

Some men worry about whether it's safe for them to be around other people while they have radiation inside them. Experts say it is safe because your prostate absorbs the radiation, so significant amounts do not escape from your body.^[51]

There is a small chance that the seeds can become dislodged and come out with your semen when you ejaculate. You may want to wear a condom during sex for the first few weeks after treatment to prevent any seeds from being passed to your partner.

How good is the research on internal radiotherapy (brachytherapy)?

There is no clear evidence from reliable studies to say whether brachytherapy works or not.

We have looked at the best research there is so far, but we can't draw any firm conclusions from the results. The studies were too small and they included men at different stages of the disease, which probably explains why the results vary so much.

We found two summaries of research, called **systematic reviews**, which looked at the side effects of brachytherapy.^[57] ^[58]

Hormone therapy (with drugs or surgery)

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on hormone therapy?](#)

This information is for men who have early prostate cancer. It tells you about hormone therapy, a treatment used for prostate cancer. It is based on the best and most up-to-date research.

Does it work?

Hormone treatment may stop your cancer growing and help to kill existing cancer cells. It isn't usually used on its own for early-stage prostate cancer, but your doctor may recommend having it with [radiotherapy](#) if your cancer seems like it might spread. Research shows this might help you live longer.

Hormone treatment has side effects. You need to decide with your doctor whether this treatment is right for you.

The information here is for men whose cancer is at an early stage and has not been detected outside their prostate gland. Some doctors call this stage **clinically localised cancer** and classify the cancer as **T1** or **T2**. For more information about how doctors classify prostate cancer, see [How far has your cancer spread? The TNM system](#) .

What is it?

Hormone treatment uses surgery or drugs to block the action of the male sex hormones that help prostate cancer grow. This treatment is also called **androgen deprivation** and **androgen suppression**.

Male hormones are called **androgens**, and the main one is **testosterone**. The cells that make up your prostate need testosterone for two reasons:

- To grow at puberty
- To produce the fluid for your sperm to swim in.

Your prostate doesn't produce testosterone itself. Testosterone is mainly produced by your testicles. A small amount also comes from your adrenal glands (two organs that lie on the surface of your kidneys).

Like normal prostate cells, cancer cells in the prostate also need testosterone. It helps them grow faster, multiply and spread. The aim of hormone treatment is to stop the cancer cells getting testosterone so that they stop growing and die. This treatment doesn't remove the tumour.

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There are two ways to stop the cancer cells getting testosterone:

- By removing your testicles through surgery
- By using drugs (tablets or injections) to switch off your hormone supply.

Surgery

Removing your testicles permanently gets rid of the main source of testosterone. It's unlikely that you'll have this done if you have early-stage cancer. Most men who need hormone treatment use drugs to block their testosterone.

Removing the testicles is a minor operation, and you will need a **local anaesthetic** (a drug that numbs the area being operated on) or a **general anaesthetic** (a drug that makes you sleep). It is possible for you to keep your scrotum and just have your testes (the organs inside it) removed. Your testes are taken out through a tiny cut in your scrotum.

Artificial testicles can be implanted so your scrotum looks the same as before. You will probably not need to stay in hospital overnight. Doctors call this surgery **orchidectomy**.

Injections of drugs

Drugs called **LHRH agonists** switch off the production of male hormones by the testicles. LHRH stands for luteinising hormone-releasing hormone. Here are some commonly used LHRH agonists (and their brand names):

- leuprorelin acetate (Prostap SR, Prostap 3)
- goserelin (Zoladex)
- buserelin (Suprefact)
- triptorelin (De-capeptyl).

These drugs are injected just under your skin. They have the advantage of being reversible. Once you stop getting injections, you will produce testosterone again. This is an important advantage over surgery, as a lack of testosterone in your body has side effects.

Tablets

Drugs called **antiandrogens** stop testosterone reaching the cancer cells and helping them grow. Here are some commonly used antiandrogens (and their brand names):

- bicalutamide (Casodex)
- flutamide (Drofenel)
- cyproterone acetate (Cyprostat).

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Bicalutamide isn't recommended for prostate cancer that hasn't spread (localised cancer).^[59] That's because it can cause side effects that affect your heart. For some men with cancer that has spread (locally advanced or advanced prostate cancer), doctors think that the benefits are big enough to outweigh the risks.

Diethylstilbestrol (DES), a man-made version of the hormone **oestrogen**, also blocks the production of testosterone. But it can increase the risk of having heart attacks and blood clots, so it isn't used very much to treat prostate cancer.

How hormone therapy is used

Hormone treatment is usually used in men whose cancer has spread to other parts of their body. It slows down the growth of the cancer, shrinks the tumour and relieves symptoms. Sometimes it is also given to men with cancer that hasn't spread, but it is usually combined with [radiotherapy](#). If you're having radiation for a cancer that looks like it might grow quickly and spread (its [Gleason score](#) is 8 or more), your doctor will probably recommend you have hormone treatment for at least two years.^[24]

Occasionally, men with early cancer have hormone therapy on its own or with [surgery to remove their prostate](#), but these aren't standard treatments.

How can it help?

A summary of the research found that having hormone therapy after radiotherapy may help you live longer if you have prostate cancer that hasn't spread.^[60] But you may not live any longer if you have hormone therapy before radiotherapy, before or after surgery, or on its own.

Overall, there isn't much research on using hormone therapy for early prostate cancer, so we need more studies to know for sure how it might help.

How does it work?

Surgery to remove your testicles

Removing your testicles gets rid of the main testosterone supply. This stops prostate cancer cells growing and spreading. The level of testosterone will drop quickly in the bloodstream after the surgery. There is a 90 percent to 95 percent drop within three hours of surgery.^[61]

LHRH agonists (drugs that switch off hormone production)

LHRH agonists switch off your testosterone supply but they do not work directly on your testicles. Instead, they reduce the levels of another hormone, called luteinising hormone, which is released by the pituitary gland in your brain. This is a pea-sized gland that produces lots of hormones needed by other parts of your body. Luteinising hormone goes to your testicles to help them make testosterone. So, less luteinising hormone means less testosterone for your prostate.

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Many men can't face the thought of having their testicles removed and choose hormone injections instead. LHRH injections can be as effective as surgery in reducing your testosterone level. But you will need to have injections every month or every three to four months.

Antiandrogens (drugs that stop testosterone influencing prostate cells)

- Antiandrogens work differently to LHRH agonists. They don't stop your body producing testosterone, but they do stop testosterone getting inside the cancer cells in your prostate.
- Usually testosterone will travel from the testicles to the prostate and get inside the cells. Once inside, it is converted to an active form that sticks to the walls of the cells. There are special spaces for the testosterone on the wall of each cell.
- Once testosterone attaches itself to a cell, it tells the cell to grow or multiply.
- Antiandrogens work by getting to the cell first, so they stop testosterone sticking to the cell walls. So, the hormone can't tell the cells to grow or multiply, and without this instruction, the cells grow more slowly and eventually die.

Not all prostate cancers will respond to hormone therapy. Some tumours continue to grow without a supply of testosterone, and doctors can't say what will happen until they start the treatment. About 80 percent to 90 percent of prostate cancers respond to hormone therapy at first, but over time the cancer cells become resistant to the treatment and continue to grow and multiply.^[61]

A small amount of testosterone is made by the adrenal glands, and experts think this might explain why some cancers still grow after the main source of testosterone is removed by surgery or injections. However, antiandrogen tablets act on testosterone from both the testicles and the adrenal glands.

Unfortunately, cancer cells lose their dependency on hormones over time and can grow without them. However, this generally happens at the very advanced stages of prostate cancer when it has spread to other parts of the body.

Can it be harmful?

Hormone therapy has some unpleasant side effects. It's difficult to say how likely you are to get these because there are no reliable studies that look at this. Our information is based on the best research to date, but your true risk may be higher or lower. The side effects also vary depending on the way the hormone therapy is given.

Most of these side effects are caused by the drop in testosterone, the primary male sex hormone. With surgery, these side effects are permanent since the supply of testosterone has been removed. But with LHRH injections and antiandrogens, the effects are reversible. There doesn't seem to be any difference among brands of tablets or injections in the frequency or severity of side effects.

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Tumour flare: When you first have an injection of LHRH agonists, your testosterone level will temporarily increase by as much as 50 percent. This can cause a tumour 'flare', which means your tumour may grow quickly and press on your **rectum** and your urethra (the tube that carries your urine from your bladder and out through your penis). You may have difficulty passing urine or emptying your bowels. Taking an antiandrogen tablet at the same time as the injection can help prevent this flare. The increase in size is only temporary and disappears after a couple of weeks.

Erectile dysfunction (problems getting an erection): You may have difficulty getting an erection after surgery or while having injections that switch off your testosterone supply. This is because testosterone helps you get and maintain an erection. In some studies, up to one-quarter of men who had hormone therapy had problems getting an erection. [\[62\]](#)

Hot flushes: Hot flushes are a common side effect. A hot flush is when a sensation of warmth spreads across your face and upper body. Often, if you have a hot flush, your skin goes red. Hot flushes normally last a few minutes and vary in severity. They happen because low testosterone levels seem to affect the part of your body that regulates temperature. Hot flushes happen to about 40 percent of men who have hormone therapy. [\[63\]](#)

Growth of breasts: Hormonal changes may cause your chest to feel tender and you may grow breasts. Between 5 percent and 10 percent of men taking most forms of hormone therapy say they experience this. [\[62\]](#) Again, this is because of changes in hormone levels. [\[61\]](#) The risk of getting larger, tender breasts is very high in men taking bicalutamide (an antiandrogen). About 1 in 2 men taking this drug experienced this side effect in one study. [\[63\]](#) [\[64\]](#)

Hair loss and weight gain: A few men (2 percent to 8 percent) lose some hair or gain weight. [\[65\]](#)

Osteoporosis (weakened bones): Hormone therapy may increase your risk of developing this disease, which can weaken your bones, causing them to break easily. It is caused by the change in your testosterone levels. Studies that describe this side effect don't say how often it occurs.

Heart problems: High doses (150 milligram tablets) of bicalutamide can stop your heart working properly. [\[59\]](#) Bicalutamide isn't recommended for men with prostate cancer that hasn't spread. For men whose cancer has spread (they have locally advanced cancer), the benefits may be worth the risk. But the 150 milligram dose of bicalutamide is recommended only for men with locally advanced cancer that has a high risk of getting worse. A lower (50 milligram) dose of bicalutamide is sometimes used for men with advanced prostate cancer. This lower dose doesn't seem to cause heart problems.

Some studies have also suggested that hormone therapy in general may increase the risk of heart and circulation problems, as it may lead to weight gain, raised cholesterol

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levels and other known risk factors for heart disease.^[66] However, there's not yet enough good research to know for certain.

How good is the research on hormone therapy?

There has been quite a lot of good research into hormone therapy for early-stage prostate cancer.

We found a summary of the research (a **systematic review**) on the effects of having hormone therapy, either before or after radiotherapy or surgery,^[67] and a study that looked at side effects of having hormone treatment before surgery.^[68]

Further informations:

An in-depth look at the prostate

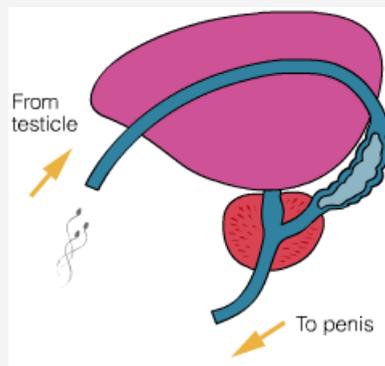
What is the prostate made of?

The prostate is mainly made up of special cells that make the fluid that you ejaculate. (Cells are the tiny building blocks that make up all the tissues in your body.) The prostate fluid drains into a network of thin tubes called ducts. These ducts carry the fluid into the urethra. All around the cells in the prostate gland is supporting tissue (called stroma) which gives the gland its structure.

Your prostate also has a thick layer of muscle along the section next to the urethra. This helps pump the fluid into the urethra. Most of your prostate is covered with a thin but tough sheath of muscle and fibrous tissue, as well as a layer of blood vessels which carry oxygen and food to the prostate cells.

Inside the prostate, there are more blood vessels and also lymphatic vessels. Lymphatic vessels carry a fluid known as **lymph**, which is important in protecting the body against infection. Both blood vessels and lymphatic vessels play a role in the spread of cancer, as they can carry cancer cells from the prostate to other parts of the body.

What does the prostate do?



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Sperm travel from each testicle and through the prostate, where they pick up fluid before exiting through the penis.

To help the sperm along their way, the prostate has to make and release its fluid at the right time during sexual activity. When you become excited during sex, sperm travel from your testicles through a series of tubes to the part of the urethra that the prostate wraps around.

On the way, the sperm collect some jelly-like liquid from the seminal vesicles and then travel through the prostate in the ejaculatory duct .

When the sperm arrive in the urethra, nerves in the prostate trigger the muscle here to flex. As the muscle flexes, it squeezes the network of tubes in the prostate, so that they pump out fluid into the urethra where it mixes with the sperm to become semen. The semen flows out of your body through your penis when you ejaculate.

The prostate also makes sure that your semen flows in the right direction. The prostate partly controls a ring of muscle that flexes as your semen is carried through your penis. This shuts off the urethra, so that semen cannot flow back up it into the bladder.

What does prostate fluid do?

The prostate fluid contains foods, such as sugar and calcium, which help keep your sperm healthy. It also makes a substance that doctors call **prostate-specific antigen**, or **PSA**. PSA helps the semen stay liquid, so the sperm can swim freely.

When something goes wrong with the prostate, large amounts of PSA can enter your bloodstream. If there is cancer in the prostate, for example, this can disrupt the network of tubes there and cause more PSA to leak into the blood. A blood test to check how much PSA is in your blood can indicate your chances of having prostate cancer. ^[2] However, not all prostate cancers are picked up by a PSA test, and PSA levels can be high for reasons other than prostate cancer. The test isn't widely used in the UK.

To learn more, see [How do doctors diagnose prostate cancer?](#)

How far has your cancer spread? The TNM system

The TNM system classifies your prostate cancer by looking at three factors:

- **T** is for tumour
- **N** is for (lymph) nodes
- **M** is for metastasis. (Metastasis is when the cancer spreads to other parts of your body, such as your bones.)

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Each factor is given a number. Generally, lower numbers mean your cancer is smaller and hasn't spread far (if at all).

- **For T:** The number tells you how big your cancer is and whether it has spread outside the prostate.
- **For N:** The number tells you whether your prostate cancer has spread to the lymph nodes in your pelvis near the prostate. These are sometimes called **regional lymph nodes**. Cancer cells can grow in the nodes and then travel from there to other parts of the body.
- **For M:** The number tells you whether your prostate cancer has spread to other areas of your body, such as your hip bones or your back.

The numbers are then sometimes followed by letters. These tell the doctor how the cancer was found and they give more details about how far it has spread.

Here is an explanation of what each letter and number says about your cancer. ^[10]

TNM		What it means
T (tumour)	T1	A T1 cancer hasn't spread outside the prostate, and your doctor can't feel the tumour through your rectum. At this stage, the cancer will have been detected incidentally during surgery on the prostate for a condition that had nothing to do with the cancer, or by a routine test of the level of prostate-specific antigen (PSA) in your blood.
	T1a	The cancer cells were discovered in a small piece (5 percent or less) of the tissue removed during prostate surgery for a condition called benign prostatic hyperplasia (BPH). BPH is a common condition where the prostate grows and becomes uncomfortable as it presses on the bladder and rectum. It is unrelated to the cancer.
	T1b	The cancer cells were found in more than 5 percent of the tissue removed in surgery for benign prostatic hyperplasia (BPH).
	T1c	The cancer was identified by needle biopsy, which was performed because your prostate-specific antigen (PSA) level is high or rising.
	T2	Your tumour has not spread beyond your prostate, but it has grown big

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		enough for your doctor to feel in an examination of your rectum.
	T2a	The tumour is in one side of your prostate.
	T2b	The tumour is in both sides of your prostate.
	T3	Your tumour has spread outside your prostate and may be in tissue next to the prostate or in the seminal vesicles (two glands that sit on either side of the prostate).
	T3a	The tumour has spread just beyond your prostate into nearby tissue.
	T3b	The tumour has spread outside your prostate and into two small, nearby glands called seminal vesicles. Like the prostate, these glands produce the fluid that comes out of your penis with your sperm when you ejaculate.
	T4	Your tumour has spread to other organs near your prostate. This is a more serious stage of cancer. Your tumour has invaded organs near the prostate, such as your bladder, your rectum and other tissues in the wall of your pelvis.
N (nodes)	N0	The tumour has not spread to any of the nearby lymph nodes.
	N1	A small tumour is in one of the lymph nodes in your pelvis.
M (metastasis)	M0	Metastasis has not occurred. Your cancer has not spread beyond the pelvic lymph nodes.
	M1a	Cancer has spread to lymph nodes beyond the pelvic lymph nodes.
	M1b	Cancer has spread into your bones.
	M1c	Cancer has spread to other parts of your body.

An example

If your cancer was classified as **T2bN0M0** in this system, this would indicate that your tumour is in both sides of your prostate, that it has not spread to the lymph nodes nearest to it, and that it has not spread anywhere else in your body.

Grading your prostate cancer: the Gleason score

Your doctor will grade your tumour by using a numbering system called the Gleason score, named after the doctor who invented it. This score measures how abnormal the cells in your tumour look under a microscope. And it provides doctors with a clue about how your tumour will behave and whether it will spread quickly.

The system uses numbers from 2 to 10 to indicate how far your cells have gone along the path from normal to abnormal. A higher Gleason score means the cells look more abnormal and different when compared with healthy prostate cells. A tumour with a low grade is likely to be slow-growing, whereas one with a high grade is more likely to grow aggressively or to have already spread.

Different areas of the prostate may be at different stages of cancer, so doctors normally take two samples from different areas of the prostate and examine them both under a microscope. Each sample is then given a score between 1 and 5, and these scores are added together to give your overall Gleason score. For example, a tumour with 2-grade and 3-grade cells in the two samples is given a Gleason score of 5.

Score 2 to 4: Your cancer has the lowest chance of spreading. These are sometimes called well-differentiated tumours. This means the cancer cells look similar to normal cells.

Score 5 to 7: You have a slightly higher chance that your cancer will spread. These are sometimes called moderately differentiated tumours, meaning the cancer cells look less like normal cells.

Score 8 to 10: You have the highest chance that your cancer will grow and spread. These are sometimes called poorly differentiated tumours. The cancer cells look very unlike healthy cells.

Defining your cancer's overall stage

This is another step in defining the stage of your cancer. Your doctor combines your [TNM classification](#) and [Gleason score](#) to help you work out the best treatment. If your doctor has told you that your tumour is stage 1, 2, 3, or 4, the chart below will explain what this means. ^[10]

Stage	TNM	Gleason score
Stage 1. Your cancer has not spread outside your prostate to any lymph nodes or any other parts of your body.	T1a, N0, M0	G1 (low)
Stage 2. Your cancer has not spread outside your prostate, but it may show up on test results, and the tumour may	T1a, N0, M0	G2, G3 or G4 (intermediate or high)
	T1b, N0, M0	Any score

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be big enough for your doctor to feel through your rectum.	T1c, N0, M0	Any score
	T2, N0, M0	Any score
Stage 3. Your cancer has started to spread beyond your prostate and may be in nearby glands called seminal vesicles.	T3, N0, M0	Any score
Stage 4. Your cancer has spread outside your prostate into other tissues near it, such as the opening to your bladder and the wall of your pelvis. It may have spread to your lymph nodes and to other parts of your body, such as distant bones and your lungs.	T4, N0, M0	Any score
	Any T, N1, M0	Any score
	Any T, any N, M1	Any score

Treatments for advanced prostate cancer

We haven't looked at the research on treatments for advanced prostate cancer in as much detail as we've looked at the research on most of the treatments we cover. (To read more, see Our Method.) But we've provided a general overview of treatment options.

There are two forms of advanced prostate cancer, locally advanced prostate cancer and metastatic prostate cancer. Most of the treatments are similar to those used on early prostate cancer, but there are some differences. ^[24]

Locally advanced prostate cancer

Locally advanced disease includes cancer that has spread from the prostate itself only to the surrounding 'capsule' tissue, and cancer that has spread to nearby organs and tissues like the bladder or rectum or the lymph nodes. However, the cancer has not spread to tissues further away from the prostate.

Radiotherapy

Radiotherapy may be used to treat locally advanced prostate cancer. A type called **conformal radiotherapy** is becoming more common. It uses a beam of radiation that is carefully shaped to match the shape of the cancer, which limits damage to surrounding healthy cells.

Where there is some risk of spread to the lymph nodes near the prostate, another type of radiotherapy, pelvic radiotherapy, may also be used. Radiotherapy is usually used with hormone therapy.

Hormone therapy

Men receiving radiotherapy often also have hormone therapy to slow the growth and spread of prostate cancer cells. If the cancer is likely to be aggressive (it has a high **Gleason score**) hormone treatment may continue for several years.

Other treatments

High-intensity focused ultrasound (HIFU) is a newer treatment in which ultrasound waves are directed at the prostate tumour from a probe inserted into the rectum. The ultrasound waves cause cancer cells to heat up and die. But it is not clear how well it works and what the side effects are so it remains an experimental treatment.

Cryotherapy: This treatment uses freezing cold probes to kill cancer cells. Its long-term benefits and side effects are unknown. ^[25]

Advanced (metastatic) prostate cancer

When cancer has spread from the prostate and the tissues around it to more distant tissues and organs, it is known as advanced or metastatic prostate cancer.

Hormone therapy

Long-term hormone therapy is used to reduce the size of the tumour, slow down the growth and spread of the prostate cancer cells, and reduce symptoms. There is a range of side effects, which vary between the different hormone treatments. Additional treatments may be needed to manage the side effects of hormone therapy.

Surgery

Surgery to remove the hormone-producing part of the testicles, or the entire testicles (an operation called orchidectomy), stops most production of androgen hormones. These are the hormones that prostate cancer cells need to grow and spread. The effect of this surgery is similar to long-term hormone therapy.

Drug treatment (chemotherapy)

Chemotherapy drugs may be used for some men when prostate cancer cells grow despite hormone treatment. Examples include **docetaxel** and **denosumab**. **Bisphosphonate** drugs may also be used to relieve pain in men where the cancer has spread to the bone.

Strontium-89 is another drug that may be used if hormone treatments aren't helping and the cancer has spread to the bone.

Palliative care

When, in advanced disease, the cancer is not responding to treatment, palliative care aims to treat symptoms such as pain.

How do I decide if active surveillance or early treatment is right for me?

It can be very difficult to make a decision about whether to choose active surveillance or treatment for your cancer. Prostate cancer is an unpredictable disease, so it's difficult for your doctor to say how quickly your cancer will grow, spread or respond to treatment.

Although many doctors have strong opinions, no one can tell for certain whether you are more likely to survive your disease if you choose early treatment with [surgery to remove the prostate](#) or [radiotherapy](#), rather than [active surveillance](#). There are no reliable studies that compare all of the options, so your decision comes down to personal preference.

If you have a slower-growing cancer, you're unlikely to have serious problems from the cancer, even after 15 years. Therefore, you may not require early treatment, particularly if you're elderly or have another serious condition such as heart disease. Also, you may prefer active surveillance if you're concerned about the side effects of early treatment options.

If you have a fast-growing prostate cancer or are younger, you may decide that some early treatment is the best option, even with the known risks and unproved benefits.

There are studies under way comparing different treatment options for prostate cancer. To learn more, and to see if you may be suitable for study, see <http://www.prostate-cancer.org.uk>.

The grade of your cancer

One thing that may influence your decision about whether to choose active surveillance or early treatment is your [Gleason score](#). This score measures how fast- or slow-growing your tumour is. You may be more likely to choose active surveillance if you have a low-grade (slow-growing) tumour. But you may be more willing to accept the risks and side effects of treatment if you have a high-grade tumour, which is more likely to spread quickly.

- Men with low-grade tumours (Gleason score 2 to 4) who choose active surveillance have less than 5 percent chance of dying from their cancer within 15 years of diagnosis. Many older men die of causes other than their prostate cancer.
- Men with high-grade tumours (Gleason score 7 to 10) have 42 percent to 87 percent chance of dying within 15 years of diagnosis. Between 20 percent and 40 percent of these men will die from their cancer within five years. ^[15]

For more details about your Gleason score and your chances of survival, see [Active surveillance: Men alive 10 years after diagnosis](#).

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Another option: watchful waiting

If you're older or have another serious health condition, you might choose a less active type of monitoring called watchful waiting. Instead of having regular tests as you would with active surveillance, you and your doctor watch for symptoms that indicate your cancer is progressing. You then have treatment to help your symptoms rather than to stop your cancer. Since prostate cancer is often slow-growing, many men who are older or have other health problems will die of something other than their cancer, so active monitoring and treatment aren't necessary.

Active surveillance: Men alive 10 years after diagnosis

These tables show the percentage of men treated with active surveillance who live at least 10 years after learning they have prostate cancer. ^[26] The men are divided into groups by age and [Gleason score](#). These numbers come from a 1998 report. With the testing available today to monitor prostate cancers, the percentage of men surviving might be higher.

Men ages 55 to 59

Gleason score	Died from prostate cancer	Died from other causes	Alive
2 to 4	4%	27%	69%
5	6%	27%	67%
6	18%	25%	57%
7	70%	15%	15%
8 to 10	87%	10%	3%

Men ages 60 to 64

Gleason score	Died from prostate cancer	Died from other causes	Alive
2 to 4	5%	40%	55%
5	8%	39%	53%
6	23%	36%	41%
7	62%	24%	14%
8 to 10	81%	16%	3%

Men ages 65 to 69

Gleason score	Died from prostate cancer	Died from other causes	Alive
2 to 4	6%	56%	38%
5	10%	55%	35%
6	27%	48%	25%

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7	53%	36%	11%
8 to 10	72%	25%	3%

Men ages 70 to 74

Gleason score	Died from prostate cancer	Died from other causes	Alive
2 to 4	7%	73%	20%
5	11%	71%	18%
6	30%	59%	11%
7	42%	51%	7%
8 to 10	60%	38%	2%

Retropubic surgery for prostate cancer

Here are the steps surgeons take during retropubic surgery.

- The surgeon makes a cut from your bellybutton to your pubic bone (just above where your pubic hair starts).
- Before your prostate is removed, the surgeon will remove the lymph nodes near your prostate (the pelvic lymph nodes) to check whether your cancer has spread here.
- Some surgeons will not continue to remove your prostate if there are cancer cells in your nodes. This is because they feel the operation is of little benefit if the cancer has already spread. Before you have your operation, you may want to ask your surgeon what he or she will do if you have cancer in your nodes.

Your surgeon will try to avoid cutting the two bundles of nerves that run on either side of the prostate and control erections. This can be tricky. Cancer cells have a tendency to grow near the edge of the prostate next to these nerves. If your tumour is bulky or right next to the nerves, or if cancer has spread to the nerves, your surgeon may not be able to avoid damaging them.

Perineal surgery for prostate cancer

In this surgery, the prostate is removed through a cut in the skin between your anus and scrotum (the sac under your penis that contains your testicles). It is not possible to remove your lymph nodes this way, so the surgeon will not be able to tell if the cancer has spread. The nerves that control erections are more likely to be damaged with this technique.

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This operation is quicker than [retropubic surgery](#), so it may be better for men who have other health problems (such as heart conditions) that make it risky to be under a general anaesthetic for a long time.

Glossary:

rectum

The rectum is the last 15 to 20 centimetres (six to eight inches) of the large intestine, ending with the anus (where you empty your bowels from).

ejaculation

When a man ejaculates, his penis suddenly releases semen, the white or transparent fluid that carries sperm.

ejaculatory duct

The ejaculatory duct is a passage that carries fluid from the seminal vesicles to the penis, where the fluid joins the sperm to make semen. The duct runs through the prostate.

metastasis

This happens when cancer cells spread to parts of the body that are far away from the original tumour. The cancer can travel through the bloodstream, lymphatic system or other fluids. New tumours may form in another area of the body as a result.

lymph

Lymph is a clear or whitish liquid that flows throughout your body through the lymphatic vessels and lymph nodes (also called lymph glands). Lymph contains proteins and fats, some red blood cells and many white blood cells (especially lymphocytes). Lymphocytes help your body fight infection.

lymph nodes

Lymph nodes (also called lymph glands) are small, bean-shaped lumps that you can't usually see or feel easily. You have them in various parts of your body, such as your neck, armpits, and groin. Lymph nodes filter lymph and remove unwanted things from your body, such as bacteria and cancer cells.

seminal vesicles

The seminal vesicles are two glands that sit on either side of the prostate. These glands make some of the fluid that comes out when men ejaculate (push out semen from their penis).

semen

Semen is the whitish fluid that is released through the penis during an orgasm. Semen is made up of millions of tiny sperm floating in fluid. Sperm are the part of the semen that can join with a woman's eggs to make her pregnant. Sperm are made in the testicles, and travel through tubes (called the vas deferens) to get to the penis. Along the way, the sperm are joined by fluid that is released from the prostate and seminal vesicles. This fluid helps the sperm to travel and provides them with nutrients.

red blood cells

Red blood cells are the part of your blood that makes it red. Their main job is to carry oxygen from your heart and lungs to the tissues of your body. Once these cells unload oxygen, they pick up carbon dioxide. They take carbon dioxide back to your lungs so it can be breathed out of your body.

diabetes

Diabetes is a condition that causes too much sugar (glucose) to circulate in the blood. It happens when the body stops making a hormone called insulin (type 1 diabetes) or when insulin stops working (type 2 diabetes).

biopsy

Biopsy is when doctors remove some tissue from a part of your body, so that it can be examined under a microscope.

ultrasound probe

Ultrasound is a technique doctors use to create images of the organs in your body. An ultrasound probe is a device that lets the ultrasound machine focus on an area of your body. The ultrasound machine can then send out high-frequency sound waves, which reflect off parts of your body to create a picture.

anaesthetic

An anaesthetic is a chemical that blocks the ability to feel sensations like pain or heat. A local anaesthetic blocks the feeling in a specific area of the body. For example, your dentist uses a local anaesthetic like lignocaine in your gums so that you don't feel the pain of having a cavity filled. A general anaesthetic makes you completely unconscious and is usually used only in a carefully controlled environment like an operating room.

X-ray

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X-rays are pictures taken of the inside of your body. They are made by passing small amounts of radiation through your body and then onto film.

CT scan

A CT scan is a type of X-ray. It takes several detailed pictures of the inside of your body from different angles. CT stands for computed tomography. It is also called a CAT scan (computed axial tomography).

MRI scan

A magnetic resonance imaging (MRI) machine uses a magnetic field to create detailed pictures of the inside of your body.

heart disease

You get heart disease when your heart isn't able to pump blood as well as it should. This can happen for a variety of reasons.

anus

The anus, which is at the end of the rectum, is where stools leave your body when you go to the toilet. Part of the anus is a muscle that helps you hold in the stool until you are on the toilet.

general anaesthetic

You may have a type of medicine called a general anaesthetic when you have surgery. It is given to make you unconscious so you don't feel pain when you have surgery.

PSA test

A PSA test measures the amount of a substance called prostate-specific antigen, or PSA, in your blood. The prostate gland produces PSA to keep semen liquid. When men have prostate cancer, more PSA seeps from the prostate into the blood. So, the PSA test can be used to detect the chance of a man having prostate cancer.

randomised controlled trials

Randomised controlled trials are medical studies designed to test whether a treatment works. Patients are split into groups. One group is given the treatment being tested (for example, an antidepressant drug) while another group (called the comparison or control group) is given an alternative treatment. This could be a different type of drug or a dummy treatment (a placebo). Researchers then compare the effects of the different treatments.

inflammation

Inflammation is when your skin or some other part of your body becomes red, swollen, hot, and sore. Inflammation happens because your body is trying to protect you from germs, from something that's in your body and could harm you (like a splinter) or from things that cause allergies (these things are called allergens). Inflammation is one of the ways in which your body heals an infection or an injury.

systematic reviews

A systematic review is a thorough look through published research on a particular topic. Only studies that have been carried out to a high standard are included. A systematic review may or may not include a meta-analysis, which is when the results from individual studies are put together.

epidural

Layers of tissue cover your brain and spinal cord. The epidural space is the space between two of these layers. Before surgery or a procedure, you may be given pain medicine in the epidural space of your spinal cord. You'll have no feeling in your body below where the medicine was injected.

benign prostatic hyperplasia

Benign prostatic hyperplasia (BPH) is a non-cancerous condition where your prostate grows bigger than normal. If you have BPH, you might have difficulty starting to urinate or maintaining a stream of urine. This is because your enlarged prostate can interfere with the passage of urine.

local anaesthetic

A local anaesthetic is a painkiller that's used to numb one part of your body. You usually get local anaesthetics as injections.

oestrogen

Oestrogen is the name given to three female sex hormones: oestradiol, oestrone and oestriol. Oestrogen causes women's sexual development during puberty: it is needed to develop breasts, have periods and get pregnant. Oestrogen is also thought to affect women's health in other ways. It may influence their mood, cholesterol levels and how their bones grow. Men have very low levels of oestrogen in their bodies, but doctors aren't completely sure what it does. Oestrogen is an important ingredient in most types of contraceptive pill and hormone replacement therapy.

blood clot

A blood clot forms when the cells in blood clump together. Sometimes this happens to stop you from bleeding if you've had an injury. But it can also happen on the inside of your blood vessels, even when you haven't had an injury. A blood clot inside a blood vessel is called a thrombus.

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