

The PSA test

What it is and what it means for men

Information Guide

- What is PSA?
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What is PSA?

PSA is the acronym for **Prostate Specific Antigen**, a protein molecule produced by the prostate gland that makes up part of semen.

PSA helps to keep semen liquid, so that sperm can escape from semen after ejaculation and attempt to penetrate and fertilise the egg in a woman's reproductive tract.

It was originally thought that PSA was only produced by the prostate, but it has recently been discovered that it can be produced by other male and female tissues – and is sometimes found in cases of breast and ovarian cancer.

Why are PSA levels elevated in prostate cancer cases?

Although PSA should only be present in the prostate gland and semen, in most men a tiny amount 'leaks' into the bloodstream. Prostate tumours disrupt the physical structure of the prostate gland and, as a result, even more PSA is released into the bloodstream. Prostate cancer cells actually produce the same amount of PSA as healthy prostate cells – but the more the prostate gland is disrupted by a tumour, the more PSA leaks into blood.

Normal PSA levels in the absence of all other factors:

Age 40–49	up to 2.5ng/ml
Age 50–59	up to 3.5ng/ml
Age 60–69	up to 4.5ng/ml
Age 70–79	up to 6.5ng/ml

(ng/ml = nanograms per millilitre)

What other factors can cause PSA levels to rise?

Elevated PSA levels can be caused by a number of other, non-cancerous, conditions:

- Benign Prostate Hyperplasia – see below.
- Infections of the prostate or bladder.
- Holding urine back when the bladder is full.
- Recent ejaculation.
- Anything that manipulates the prostate (e.g. riding a bicycle, other forms of exercise).

What is Benign Prostate Hyperplasia?

Benign Prostate Hyperplasia (BPH) is when the prostate grows larger than its normal size but isn't cancerous. The prostate has two stages of growth – in puberty and then from around the age of 25 onwards – so some degree of prostate enlargement is completely normal.

However, severe BPH can cause serious problems over time. Many symptoms of BPH stem from obstruction of the urethra and gradual loss of bladder function, which results in incomplete emptying of the bladder. Urine retention and strain on the bladder can then lead to urinary tract infections, bladder or kidney damage, bladder stones, and incontinence.

BPH can be treated effectively with drugs, a herbal treatment or, for more severe cases, by surgery. In many – perhaps most – incidences of BPH, PSA levels are elevated and may be as high as 10 ng/ml.



What does PSA testing involve?

The PSA test is a simple blood test that uses a technique called **radioimmunoassay** to measure the amount of PSA in blood serum. Radioimmunoassay relies on the ability of antibody proteins to bind to specific molecules – in this case, PSA molecules. Scientists can detect the antibodies (and the PSA molecules they are bound to) because of tiny amounts of radiation the antibodies give off... and so calculate PSA levels.

So how good is the PSA test at detecting prostate cancer?

PSA levels are only elevated in 75% of men with prostate cancer, which means that 25% of prostate cancers will *not* be detected by the PSA test. However, only about one third of men who *do* have elevated PSA levels are found to have prostate cancer upon further investigation. Despite this, the PSA test is still the best available diagnostic tool for detecting prostate cancer.

What do PSA test results actually mean?

- A repeated PSA between 4 and 10 ng/ml is *slightly* elevated – cancer is possible.
- A repeated PSA between 10 and 20 ng/ml is *moderately* elevated – cancer is probable.
- A repeated PSA above that is considered *highly* elevated – cancer is very likely.

Because various factors can cause PSA levels to increase, no conclusion should be made from a single test result.

Are there different types of PSA test?

Yes there are. Because the PSA test is not completely accurate, doctors have started to use variations of it – either alone or in tandem – which are better at predicting when a man has prostate cancer.

PSA velocity test

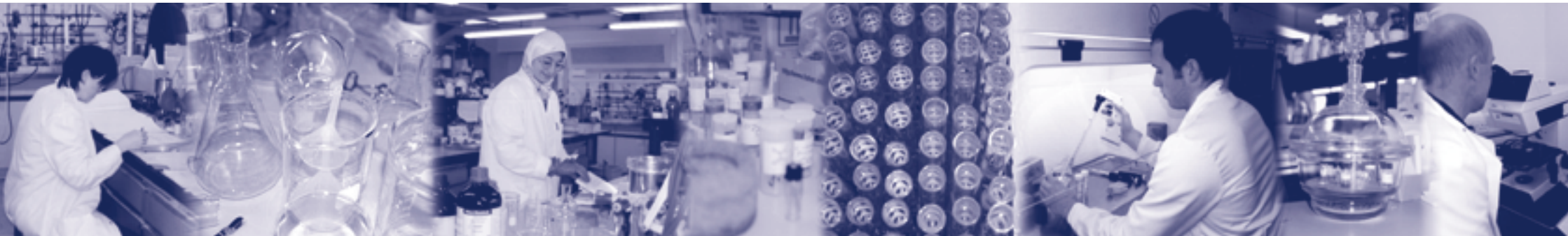
Several PSA tests are done over a year or two and the rate of increase in the PSA level (called the *PSA velocity*) is calculated. An annual rate of increase of more than 0.75 ng/ml is considered a strong indication of cancer.

Free PSA ratio

PSA is found in two forms in the bloodstream – either bound to another protein or free. The greater the proportion of PSA that is bound, the more likely the occurrence of prostate cancer. If the free ratio test detects that over 85% of PSA is bound, this is considered a strong indication of cancer.

PSA density test

In this test, the ratio between PSA levels and the size of the prostate gland (measured by ultrasound) is calculated. Although it is not a very accurate way of measuring the size of the prostate gland, the PSA density test does appear to be very good at distinguishing between BPH and cancer.



When should I ask for a PSA test?

You should request a PSA test from your doctor in the following circumstances:

- If you are over 50 and have a family history of prostate cancer.
- If you are over 50 and have a family history of female breast cancer.
- If an enlarged prostate has already been detected by rectal examination. A rectal examination involves your doctor placing a gloved finger into your rectum and feeling your prostate gland to see if it has increased in size, or hardened, or anything else out of the ordinary. While uncomfortable, a rectal examination is not usually painful.
- If you have any symptoms of BPH or prostate cancer. Symptoms include:
 - Blood in urine or semen
 - Frequent urination, especially at night
 - Inability to urinate
 - Nagging pain or stiffness in the back, hips, upper thighs, or pelvis
 - Pain during ejaculation
 - Pain or burning during urination
 - Weak or interrupted urinary flow

Remember that these symptoms can also be caused by less serious conditions.

How often should I have a PSA test?

This will depend mostly on your age and current PSA level, and whether or not there is a history of prostate cancer in your family.

If your PSA count is within the normal range for your age group, you might only need a test every two years.

However, if you have a high PSA count, you might have a test as often as every six months. In most cases, tests every 12 to 18 months are the norm.

Should an initial test reveal high PSA levels, your doctor will advise you on how often you need to re-test.

What questions should I ask my doctor when I see him/her about a PSA test?

You may find it useful to ask your doctor the following questions:

- *Do I need to prepare for the test in any way?*
- *How long will I have to wait for the test results?*
- *How will I be informed of the test results?*



Working towards a future free from prostate cancer

The Spotlight Appeal was launched by AICR to increase awareness of one of the biggest threats to male health today. Despite its seriousness, prostate cancer has been largely ignored compared to other major cancers.

Thanks to the kindness and concern of our supporters, the Spotlight Appeal has already raised over £2,000,000 to fund vital scientific research and educate men about their risk from prostate cancer – and how best to minimise it.

More than 11,000 men die from prostate cancer every year. Earlier and more accurate diagnosis would greatly reduce this death rate. The Spotlight Appeal is calling for the current tests (such as the PSA test) to be easily available to all men, and it is committed to finding more accurate methods of diagnosing and treating prostate cancer.

With the continued help of friends like you, we believe that prostate cancer could even be beaten *within our lifetime*.

Thank you for all your support so far. Please continue to support the Spotlight Appeal as much as you can.



ASSOCIATION FOR INTERNATIONAL CANCER RESEARCH

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