

What is PSA?

PSA or prostate specific antigen is a protein produced only in the prostate gland. Its purpose is to improve sperm mobility. Normal men have low levels of PSA in the blood. The PSA level usually increases with age as the prostate enlarges.

Is PSA a cancer test?

PSA is not a specific test for cancer. It is a marker of cancer risk. To confirm if cancer is present, it is necessary to take a biopsy of the prostate. The biopsy will also help to determine how aggressive a cancer is.

How is it used?

PSA is used in two ways: to identify men at risk for prostate cancer before they develop symptoms (screening), and to monitor men with prostate cancer. A single test should not be used as the only indicator of cancer risk. If it is high, it is usually repeated a few months later.

PSA as a marker of risk for prostate cancer

Total PSA is made up of free PSA (not attached to other proteins) or fragments of PSA (attached to other proteins). If the total PSA result is above the midpoint for age, but the proportion of PSA that is free is high, then this may be used by doctors to indicate a low risk. High total PSA and low proportion of free PSA suggests an increased risk for prostate cancer.

The rate of change in the PSA level is also used as an indicator of prostate cancer risk. If the level doubles within a year it should be followed up by a specialist. At least 3 measurements, several months apart, are needed to confirm this.

Monitoring prostate cancer with PSA

For men with known prostate cancer, PSA is repeated over time to check for cancer progression.

Because PSA varies from day to day in all men, the result needs to increase by more than 20-30% to be significant.

Levels of PSA in men who have had their prostate removed are extremely low, at or below the lowest level that can be measured by the test. For this group of men, any increase should be confirmed as a progressive change on a repeat test.

National and international guidelines suggest that there should be a continuing increase in PSA levels before management is changed. A specialist will use the PSA level as one factor in deciding what treatment to recommend. The PSA rate of change and the man's general health will also be taken into account.

What is "normal"?

Because PSA increases with age, the upper limit of normal also increases. Doctors also use the mid-point of normal (also called the median result) to assess risk.

At SA Pathology, the upper limit of normal and the median results for men in different age groups are as follows:

Age	Total PSA reference interval (ug/L)	Age related median (ug/L)
< 50 years	0.2-3.0	0.6
51-60 years	0.2-4.0	0.8
61-70 years	0.2-6.5	1.1
>71 years	0.1-8.5	1.6

What does it mean to have a high PSA level?

PSA increases in cancer but also in non-cancer conditions including benign prostatic hyperplasia (benign age related enlargement of the prostate) and inflammation or infection of the prostate. It can also increase soon after a rectal examination or after ejaculation.

Most men with a high PSA do not have prostate cancer.

Some prostate cancers do not release much PSA. Patients with these types of cancer will have a false negative result).

Why do results differ between laboratories?

PSA is measured by a process called immunoassay. This method uses antibodies, which are immune proteins which react with the substance being measured. Manufacturers who supply laboratories with test kits each produce their own antibody. The result shows how much antibody reacted with the blood specimen.

PSA is a large protein which exists in many different forms (both in its intact state or as fragments, and attached to different proteins) in the blood. Every man has a different proportion of these PSA forms in his blood, and cancers can affect the pattern as well.

The antibodies in the different test kits can react differently according to the form of PSA which is present. This means that a blood sample can read differently if measured in different laboratories on the same day. For this reason, repeat tests on the same man should be measured by the same method if possible.

When a laboratory switches methods, it is common practice to provide results for both the old and the new test for a period of time to allow the treating doctor to judge if a result is truly changing over time.

Where do I find more information?

Several organisations have information on PSA and prostate cancers including the following:

Andrology Australia

https://www.andrologyaustralia.org/wp-content/uploads/Factsheet_PSA-Test.pdf

Prostate Cancer Foundation of Australia

<http://www.prostate.org.au/>

Lab tests online

<https://labtestsonline.org/understanding/analytes/psa/tab/test>