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PSA Test

fact sheet

What is a PSA test?

A PSA test measures the level of Prostate Specific Antigen (PSA) in the blood. It is a blood test that can help diagnose prostate disease. Prostate Specific Antigen is a protein made mainly in the prostate gland and low levels of PSA are normally present in the blood stream. As a man ages, the prostate grows and the level of PSA also increases.

A high PSA in the blood almost always means that something is wrong with the prostate, but not necessarily prostate cancer. The causes of a high PSA include the benign (non-cancerous) growth that accompanies ageing (benign prostatic hyperplasia, BPH), inflammation or infection of the prostate (prostatitis), and, least commonly, prostate cancer.

Is a PSA test worthwhile if there are no symptoms of prostate cancer?

Although there are still many questions about the value of using PSA to test for prostate cancer because there are too many false positive and negative results, it is the best test that is available. A false positive result occurs when PSA levels are high but there is no prostate cancer.

A false negative result occurs when PSA levels are low or within the normal range, but prostate cancer is present.

In the early stages, prostate cancers usually do not show any symptoms. Cancer can grow in the prostate and not affect urine flow until it is late stage prostate cancer. A PSA test will give an indication of problems in the prostate before symptoms have developed.

How well does the PSA test work for finding prostate cancer?

About one in three men with a PSA between 4 and 10 ng/ml could have prostate cancer, although this proportion varies with the population tested.

Recent studies have shown that there is still a small risk of prostate cancer, even if blood PSA levels are normal for age. Therefore even a normal blood PSA level does not mean that there is definitely no prostate cancer present.

The only definite way to confirm whether prostate cancer is present or not is by prostate biopsies (taking small samples of tissue). Transrectal ultrasound (TRUS) biopsies are almost always performed using an ultrasound probe which is placed in the back passage (rectum) to visualise the prostate.

A small needle is then inserted into the prostate gland through the rectal wall to remove samples from different parts of the prostate gland.

Biopsies are not a minor medical procedure and can be accompanied by short term side-effects such as blood in the urine, faeces and/or ejaculate. After biopsies, patients may have temporary difficulty passing urine. Importantly, there is a low (less than 1%) risk of serious infection as a result of this procedure but it is rarely life-threatening.

How do I make a decision about whether or not to have a PSA test?

Having a PSA test may require further decisions after the test results are back, especially if the blood PSA level is raised. There are several things to consider before having a PSA test for prostate cancer:

- Your level of concern about having prostate cancer
- Your risk of having prostate cancer e.g. is there a family history of the disease
- The risk and benefits of early detection. The benefit being that a PSA test may detect prostate cancer when it is small and curable. The risks being those associated with unnecessary and possibly harmful treatment from surgery or radiotherapy (with or without male hormone suppression) with complications such as erectile problems (difficulty having erections, impotence) and urinary incontinence (inability to hold urine, urine leakage, having to wear urine pads).

Unlike many other cancers, the majority of prostate cancers tend to progress slowly with most men dying from other diseases such as a cardiovascular episode (heart attack, stroke) rather than prostate cancer. Therefore a man's age and his personal choices must be considered before deciding to have a blood PSA test and/or deciding what to do if raised PSA levels are found.

For example, an increased PSA level due to a prostate cancer in an older man aged 75-80 may not be a major health threat

PSA levels for different age groups of Western men

AGE (Years)	Serum PSA (ng/ml) – average	Serum PSA (ng/ml) – upper limit of normal
40-49	0.65	2.0
50-59	0.85	3.0
60-69	1.39	4.0
70-79	1.64	5.5

Of 100 unscreened men in each age group tested for the first time[1-4]:

AGE (Years)	Men who will have a PSA over 4.0	Of these, men who could have cancer
50s	5 out of 100	1-2 men
60s	15 out of 100	3-5 men
70s	27 out of 100	9 men

when other factors are considered such as life expectancy and general health. On the other hand, in an otherwise healthy younger man aged 50-55, an increased PSA level is more likely to affect his life (due to the effect of prostate cancer or the complications of treatment) and further investigation should be considered.

The risk of death from prostate cancer depends on the man's life expectancy and the aggressiveness of the cancer. As a rule, men with high blood PSA levels with a life expectancy of 10 years or more (or a family history of prostate cancer) should consider further testing to make the diagnosis of prostate cancer.

With more aggressive cancers, local treatments do not always cure cancers as microscopic spread may have happened that cannot be detected with scans and X-ray imaging. These patients need to be followed so that other treatments can be undertaken as indicated.

Will a PSA test tell me if I have prostate cancer?

A single PSA test is not a reliable indication of prostate cancer, unless it is extremely high. Men with a blood PSA level over 10 ng/ml have a 50 per cent risk of having prostate cancer.

An increased PSA level may cause concern and anxiety in some men. It is important to remember that not everyone with increased levels of PSA has prostate cancer. Other prostatic conditions, such as BPH or prostatitis can also cause increased PSA levels.

Results of a PSA test need to be interpreted with caution. Prostatic biopsies are needed to confirm prostate cancer is present and to give an idea of how aggressive the prostate cancer is.

New research suggests that the rate or how quickly PSA levels rise over time is important (this is called PSA velocity). Regular tests, every one to two years, are necessary to check if the level of PSA changes with time. If the PSA level doubles in 12 months, this is of concern as it may be due to the presence of a fast growing cancer or infection in the prostate (prostatitis). So, if PSA level is increasing, further action should be taken and a specialist Urologist consulted for more detailed monitoring.

What are the benefits and risks of testing for prostate cancer?

An important benefit of testing for prostate cancer is that early detection of prostate cancer when it is smaller and curable gives better chance for more effective treatment and cure.

Risks of testing for prostate cancer include:

- If the PSA level is raised, it does not always indicate prostate cancer. Biopsies will be needed to determine if cancer is present.
- Prostate biopsies and treatments for prostate cancer have side-effects that may affect the quality of life.
- If prostate cancer is slow-growing, a decision may be made not to undergo any active treatment (watchful waiting/ active surveillance with further biopsies at a later date) but to have careful monitoring. In some men this approach can cause considerable anxiety.

What if I choose to get tested?

If a man makes an informed decision to be tested for prostate cancer, it is important that a digital rectal examination (DRE) is also performed.

A combination of a PSA test and DRE is better than either one alone.

If a PSA test is performed, it is important to return to your GP for follow-up testing every 12 months. And if a PSA level is high for your age, the test should be repeated. For men with PSA values less than 1ng/ml with no risk factors, further testing may not be needed for several years.

What other tests can check for prostate cancer?

There are currently no tests better than PSA for testing for prostate cancer. Throughout the world, investigators are trying to develop more accurate and reliable tests for prostate cancer.

There are some refinements of the PSA test that some doctors believe may add more value to the test. For example, the free to total PSA ratio is another blood test that can help determine whether or not an elevated PSA level may be a result of prostate cancer.

A proportion of the PSA circulating in the blood is free. Non-free PSA is bound to proteins. Men with prostate cancer will usually have lower levels of free PSA as a proportion of their total PSA measurement, than men with prostate enlargement (BPH). This ratio (or percentage) is most useful for PSA values between 4 and 10 ng/ml.

This information can help the patient and doctor make a decision regarding the options for further investigation and management.

The decision to be tested for prostate cancer is entirely a personal one in consultation with your doctor to help you make the best informed choice for your situation. This information is provided to help men and their families understand the PSA test, and to make discussion with a doctor easier. Andrology Australia recommends readers speak to a local doctor about PSA testing and any other health concerns.

Andrology Australia wishes to acknowledge and thank all those who contributed to and reviewed this information.

1-4 Oesterling JE et al. 1995; Fang et al. 2001; Gann et al. 1995; Carter et al. 1992

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