



Journal Homepage: - [www.journalijar.com](http://www.journalijar.com)

## INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/17188  
DOI URL: <http://dx.doi.org/10.21474/IJAR01/17188>



### RESEARCH ARTICLE

#### PROSTATE CANCER SCREENING USING THE PROSTATE-SPECIFIC ANTIGEN (PSA) TEST

Rahim Abbas

#### Manuscript Info

##### Manuscript History

Received: 26 April 2023  
Final Accepted: 31 May 2023  
Published: June 2023

#### Abstract

We aimed to conduct a systematic review and meta-analysis on published literature extracted from PubMed/Medline, Google scholar, and Cochrane library. The results of the European Randomized Study of Screening for Prostate Cancer (ERSPC) trial showed a statistically significant 29% prostate cancer mortality reduction for the men screened in the intervention arm and a 23% negative impact on the life-years gained because of quality of life. However, alternative prostate-specific antigen (PSA) screening strategies for the population may exist, optimizing the effects on mortality reduction, quality of life, over diagnosis, and costs.

Copy Right, IJAR, 2023,. All rights reserved.

#### Introduction:-

Adapted from Recommendations on screening for prostate cancer with the prostate-specific antigen test, Canadian Task Force on Preventive Health Care<sup>1</sup>The information in this report should be considered realistic but is not always accurate.

#### The Public Health Problem

Prostate cancer is the most commonly diagnosed cancer, and the third leading cause of cancer-related death among men in Canada. The lifetime risk of Canadian males being diagnosed with prostate cancer is 14.3%, whereas the lifetime risk of death is 3.6%. The prevalence of undiagnosed prostate cancer at autopsy is high and increases with age (>40% among men aged 49-49 years to >70% among men aged 70-79 years).

The prostate gland is located underneath a man's bladder. It normally gets bigger with age, resulting in compression on the outlet of the bladder and leading to symptoms such as poor stream, and needing to urinate more often (particularly at night). Many of these symptoms are age-related and are not due to cancer of the prostate.

Prostate cancer usually develops slowly, and therefore may remain asymptomatic for many years. Signs and symptoms of prostate cancer include frequent urination (particularly at night), weak or interrupted urine flow, and blood in urine or semen. The causes of prostate cancer are largely unknown. However, known risk factors are age, having an affected father or brother, and (for reasons not understood) being of African-Caribbean or African descent.

In Canada, the five-year net survival for prostate cancer is among the highest of all cancers at 95%. Survival for early stage disease is almost 100%, but is much lower for cancers that present with distant metastases (stage IV) at diagnosis (29%). In Canada approximately 75% of prostate cancers are detected in the early stages (stages I and II), by contrast only around 9% of prostate cancers are late diagnoses (stage IV).

### Screening, Diagnosis And Treatment

Prostate-specific antigen (PSA) is a biomarker for prostate cancer. The test, which can be done at a doctor's surgery, is a blood test – it measures the level of PSA in the blood. Like any screening test, PSA does not correctly identify all those who do and do not have prostate cancer (Table 1).

**Table 1:-** Sensitivity and specificity of the PSA test and diagnostic biopsy for prostate cancer.

	PSA threshold 4 ng/ml	PSA threshold 3 ng/ml	Biopsy
<b>Sensitivity</b>	85.0	88.9	48
<b>Specificity</b>	88.7	80.2	90.4

PSA screening thresholds vary. Typically, a threshold between 3.0 ng/ml and 4.0 ng/ml is used, although thresholds as low as 2.5 ng/ml have been reported. Lower thresholds increase the probability of false-positive results. No threshold completely excludes prostate cancer.

Those with a positive PSA screen will be invited for biopsy. This is a more invasive and painful test with the potential to do harm. Harms of prostate biopsy include haematuria (310 men per 1000), infection (9 men per 1000), hospital admission (21 men per 1000) and death (2 men per 1000).

Overdiagnosis occurs when cancer is detected correctly but would not cause symptoms or death. The European Randomised Study of Screening for Prostate Cancer (ERSP) estimated the prevalence of overdiagnosis ranged from 40% to 56% of men screened by PSA who went on to receive a diagnosis of prostate cancer.

Overdiagnosis leads to overtreatment. Radical prostatectomy (removal of the prostate), radiation therapy and androgen deprivation therapy are the most common treatments of prostate cancer. Prostatectomy carries a number of long-term risks including urinary incontinence and erectile dysfunction.

### Effectiveness Of Screening

Evidence for the benefits of screening comes from two randomised controlled trials (RCTs). The European Randomized Study of Screening for Prostate Cancer (ERSPC) is a multi-centre RCT conducted across 7 European countries, and the Prostate, Lung, Colorectal, and

Ovarian Cancer Screening Trial (PLCO) conducted in the US. The PLCO trial found no effect of screening on prostate cancer mortality or all-cause mortality. A small absolute reduction in prostate cancer mortality was reported in the ERSPC study. However, there was evidence of heterogeneity between study centres, with some finding that screening reduced prostate cancer mortality while others did not. The ERSPC study found no evidence for a benefit of screening on all-cause mortality.

### Cost Effectiveness<sup>2</sup>

A simulation study based on ERSPC data found that screening between the ages of 50 and 59 years, with two-year intervals, had an incremental cost-effectiveness ratio of \$73,000 US per Quality Adjusted Life Year (QALY) gained. This is equivalent to approximately \$95,000 CAD and is below the \$100,000 CAD cost effectiveness threshold. Screening above the age of 60 was not considered cost-effective because of loss of QALYs due to overdiagnosis. However, simulation studies are limited by the accuracy of the parameters included in the model. Further, the cost data obtained from the ERSPC study may not be generalisable to Canada.

### Recommendations:-

We recommend [screening / not-screening] for prostate cancer with the prostate-specific antigen (PSA) test.

The task force based this recommendation on the overall balance between the possible benefits and harms of PSA screening:

1. Argument 1
2. Argument 2
3. Argument 3

**References:-**

1. Bell N , Connor Gorber S , Shane A , et al . Canadian Task Force on Preventive Health Care. Recommendations on screening for prostate cancer with the prostate-specific antigen test. CMAJ 2014;186:1225–34.doi:10.1503/cmaj.140703
2. HeijnsdijkE. A. M , de CarvalhoT. M , Auvinen A , et al . Cost-effectiveness of Prostate Cancer Screening: A Simulation Study Based on ERSPC Data, **JNCI: Journal of the National Cancer Institute**, Volume 107, Issue 1, January 2015, dju366, <https://doi.org/10.1093/jnci/dju366>.