# Rates of false negative screening PSA tests secondary to 5-alpha reductase inhibitor usage

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## Introduction

Prostate specific antigen (PSA) has seen controversy recently, but remains the most common tool for prostate cancer screening, with 34-50% of men aged 55-70 having been screened in 2013(Drazer, Huo, & Eggener, 2015). Many of these men take a 5-alpha reductase inhibitor (5-ARI) for management of benign prostatic hyperplasia (BPH). These medications inhibit the conversion of testosterone to dihydroxytestosterone, removing the primary trophic factor for the prostate and decreasing the systemic PSA level by approximately half (Modi, Helfand, & McVary, 2010). We hypothesized that this interaction would lead to false negative screening tests.

## Methods And Materials

Using Looking Glass, a database query software designed at our institution, we collected the first screening PSA test for all men screened between January of 2014 to July of 2017 with any 5-ARI prescription in the year prior, and the identity of the orders providers. Men with a diagnosis of prostate cancer prior to the first PSA test were excluded from the analysis. Published normal values were used and patients taking a 5-ARI had their result doubled. Manual chart review was then used to determine if the provider who ordered the screening test was aware of the effect of the 5-ARI. Statistics were done using Fischer's exact test and Chi square.

| | False Negative Identified | | |
|---|---|---|---|
| Urologist | No | Yes | p = 0.001 |
| No | 30 | 51 | |
| Yes | 3 | 34 | |

A) Observed missed false negative rates when PSA level ordered by urology provider compare to all others.

| | False Negative Identified | | |
|---|---|---|---|
| Concordant | No | Yes | p = 0.837 |
| No | 18 | 49 | |
| Yes | 15 | 36 | |

B) The observed false negative rate when the ordering providers for the 5-ARI and PSA level were not concordant.

## References

Drazer, M. W., Huo, D., & Eggener, S. E. (2015). National Prostate Cancer Screening Rates After the 2012 US Preventive Services Task Force Recommendation Discouraging Prostate-Specific Antigen-Based Screening. *J Clin Oncol, 33*(22), 2416-2423. doi:10.1200/jco.2015.61.6532

Modi, P., Helfand, B. T., & McVary, K. T. (2010). Medications and surgical interventions for benign prostatic hyperplasia are potential confounders of prostate-specific antigen. *Curr Urol Rep, 11*(4), 224-227. doi:10.1007/s11934-010-0113-9

## Results

A total of 29,131 men met inclusion criteria. Of these men 1,654 (5.7%) were reported as being prescribed a 5-ARI in the 12 months prior to the incident PSA screening test, with 118 (7.1%) of these having a value that would be positive only if corrected for 5-ARI use. On chart review 33 (27.9%) of these patients had no indication that the provider had noted this.
We also evaluated the effect of PSA screening tests being ordered by a different provider than the 5-ARI and found no effect on rates of false negative values (p = 0.837) (Table 1a). Interestingly, if the provider who ordered the PSA test was a urologist or care extender working in a urology setting the likelihood that a false negative value would be identified was much lower (p=0.001) (Table 1b).

## Conclusions

More than a quarter of men with false negative screening tests were missed by the ordering provider. This happened more often when the ordering provider was not a urologist or urology care extender. Interestingly, discordance between the providers ordering the 5-ARI inhibitor and the PSA screen did not appear to be related to rates of missed false positives, implying that communication between providers is not a major contributor to this issue. An opportunity exists to improve the quality of PSA testing by preventing false negative tests.