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Urology

Title

High-resolution Micro-ultrasound Transperineal ProstateBiopsy: Cancer Detection with Cognitive Targeting of MRIVisible Lesions

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Introduction

- Prostate cancer affects 13% of men over their lifetime ¹
- Multi-parametric MRI (mpMRI) can select men at higher risk for prostate cancer to undergo prostate biopsy
- Standard technique for prostate biopsy: transrectal ultrasound probe with a transrectal or transperineal needle approach
- Targeting capabilities of high-resolution prostate micro-ultrasound imaging in conjunction with mpMRI for biopsy is not well studied
- We examined micro-ultrasound cognitive fusion using the ExactVu™ platform for detection of prostate cancer during transperineal, office-based prostate biopsies

Objectives

- Assess prostate cancer detection stratified by mpMRI PIRADS score
- Examine ability to target MRI visible lesions, defined as concordance between MRI lesion and positive biopsy location

Methods

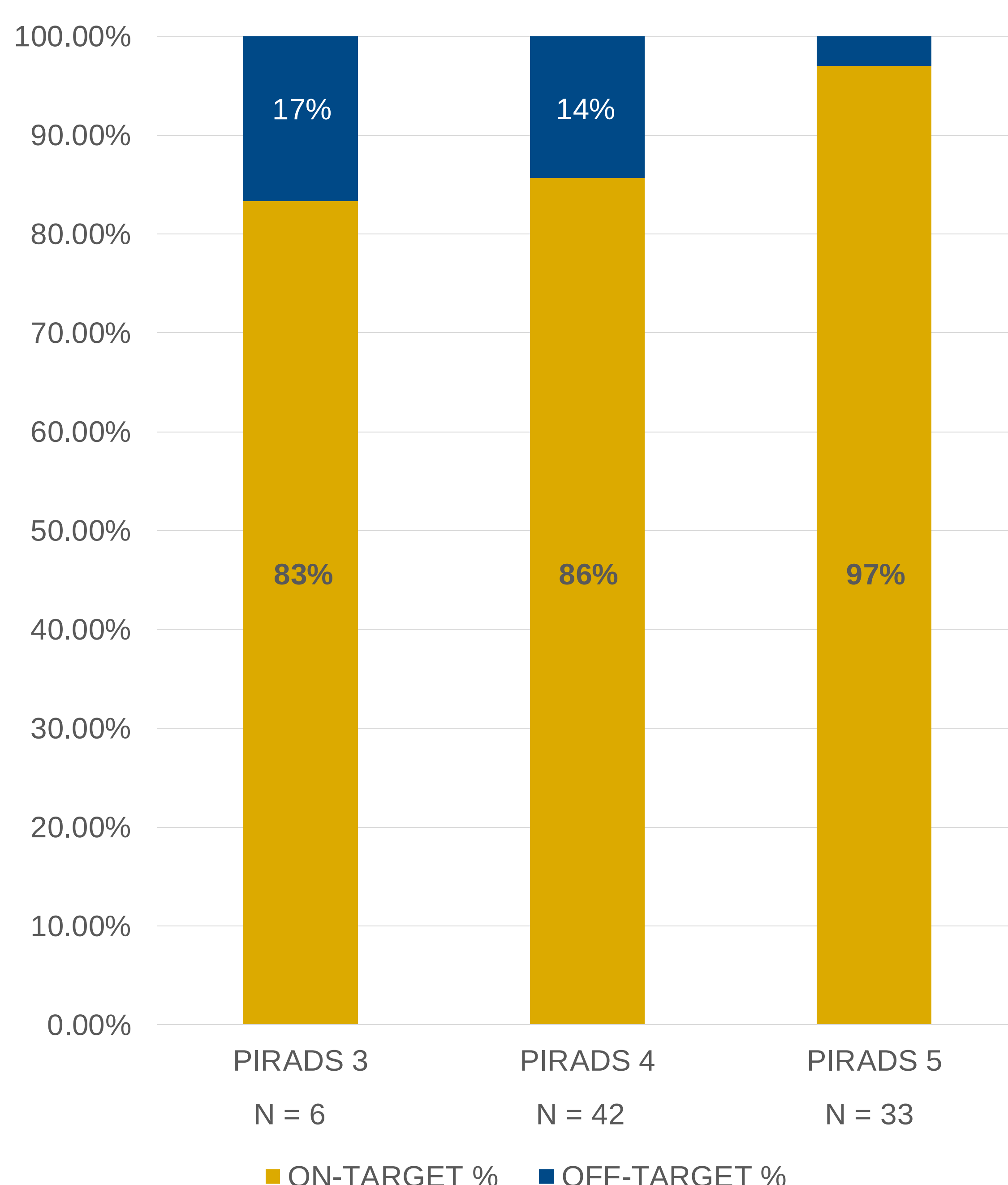
- Retrospectively examined men undergoing transperineal (TP) prostate biopsy utilizing ExactVu™ microultrasound system
- Collected baseline clinical characteristics, including prostate mpMRI findings and biopsy results
- All procedures performed under local anesthetic with free-hand, cognitive targeting of MRI visible lesions utilizing ExactVu™ needle guide

Results

Table 1: Patient Demographics

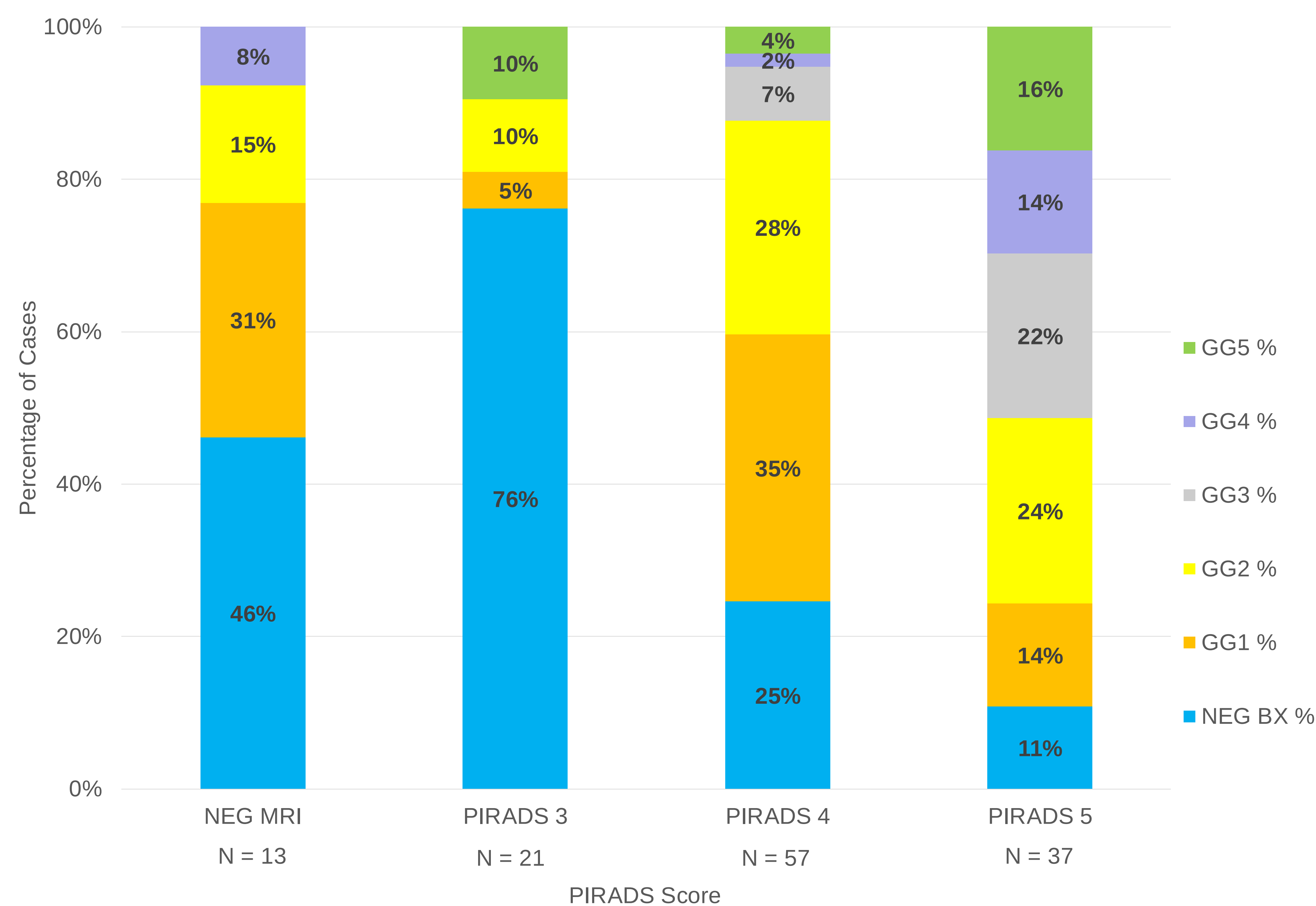
Demographics	Overall N = 128
Median Age	69 years
Median PSA	7.5 ng/mL
Race	
White	80 (62.5%)
Black	2 (1.6%)
Native American	3 (2.3%)
Asian	7 (5.5%)
Other	22 (17.2%)
Declined to state	14 (10.9%)
Ethnicity	
Hispanic/Latino	13 (10.2%)
Not Hispanic/Latino	96 (75.0%)
Declined to state	19 (14.8%)
Family History of Prostate Cancer	
Yes	26 (20.3%)
No	102 (79.7%)

Figure 1: Targeting of MRI lesion with positive biopsy by PIRADS



Results (continued)

Figure 2: Biopsy Gleason grade group distribution by mpMRI PIRADS score



Summary

- 128 men met inclusion criteria between September 2023 and July 2024
- Overall cancer detection rate was high with 69% of men having a positive biopsy
- Cancer detection for PIRADS 4 and 5 lesions was 75% and 89% respectively
- Concordance between MRI lesion and positive biopsy location was 90.9% overall – suggests high targeting accuracy

Conclusions

- High-resolution micro-ultrasound TP prostate biopsy with free-hand cognitive MRI lesion targeting is highly accurate for prostate cancer detection.
- Results appear strikingly similar to other computer-assisted fusion devices performed with transrectal approach. ²
- Technology offers a safe, high-throughput option for performing TP prostate biopsies with MRI lesion targeting in a clinic setting.

References

- Desai MM, Cacciamani GE, Gill K, et al. Trends in Incidence of Metastatic Prostate Cancer in the US. *JAMA Netw Open*. 2022;5(3):e222246. Published 2022 Mar 1. doi:10.1001/jamanetworkopen.2022.2246
- Kasivisvanathan V, Rannikko AS, Borghi M, et al. MRI-Targeted or Standard Biopsy for Prostate-Cancer Diagnosis. *N Engl J Med*. 2018;378(19):1767-1777. doi:10.1056/NEJMoa1801993