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Intra-Practice Urologist-Level Variation in Cancer Detection Rates with Targeted Cores on Fusion Biopsy

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INTRODUCTION

- Level 1 evidence supports use of MR and fusion biopsy (FBx) in the prostate cancer diagnostic pathway.
- Cancer detection rates (CDR) with FBx range from 46-70%
- The success of FBx programs depends on MR image quality, MR interpretation, MRI-ultrasound image registration, and FBx technique.

OBJECTIVE

- Using a cohort of experienced urologists at a large academic center, we aimed to characterize provider-level variation in CDR and lesion-level variation in CDR by PIRADS score.

METHODS

- Examined alll men in the Michigan Urological Surgery Improvement Collaborative (MUSIC) registry who underwent multiparametric prostate MRI (mpMRI) at Michigan Medicine from 8/2017 – 3/2019.
- MUSIC clinical registry is maintained by trained data abstractors who enter a set of data elements for all men in MUSIC practices who undergo a prostate biopsy.
- mpMRI was performed on a 3T magnet and met PIRADSv2 criteria for technical requirements and were interpreted by one of 13 experienced radiologists.
- Bivariate and multivariable logistic regression analyses were performed to assess variation in CDR at the fusion biopsy provider level controlling for patient age, PSA, race, family history, clinical stage, and PIRADS score.
- High grade (HG) cancer was defined as grade group (GG) ≥ 2.
- Primary outcome was defined as overall CDR by targeted cores. Secondary outcomes included HG CDR on targeted cores stratified by PIRADS score and meeting of MUSIC FBx scorecard benchmark measures.

RESULTS

- 708 patients in the MUSIC registry underwent FBx.
- Biopsies were performed by five providers, whose volumes ranged from 77-199 FBx.
- There was no significant difference in distribution of age, race, family history, or PSA across patients treated by the five providers. However, there were statistically significant differences in DRE, maximum PIRADS score, prior diagnosis of prostate cancer, and number of cores biopsied across patients treated by the five providers.
- There was no significant difference in targeted CDR across the five FBx providers in our study. (Figure 1) Adjusted targeted CDR ranged from 54-74% (adj p = 0.60) with an average of 62.6%.

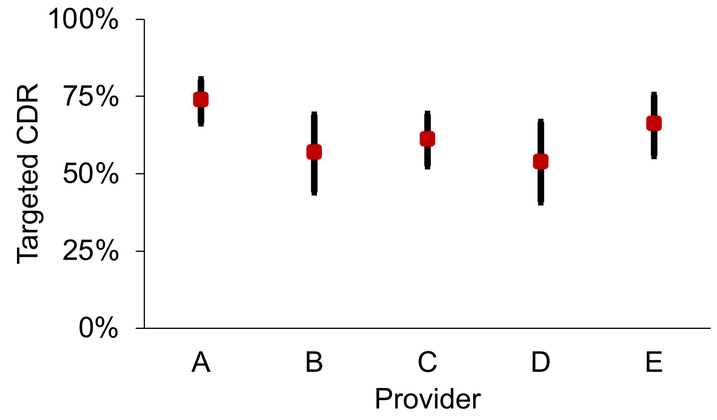

Figure 1. Targeted CDR by FBx Provider, Adjusted. This figure demonstrates the average overall CDR on targeted cores with fusion biopsy for each provider at the single institution in our study. The error bars represent the standard error of each value based on fixed-effect logistic regression model.

- There was no significant difference in HG CDR for PIRADS 3, 4, and 5 lesions.
- Targeted CDR for all providers surpassed the MUSIC quality benchmark of >45%.

Table 1. Lesion-Level CDR by FBx Provider

	PIRADS-3 lesion[1]		PIRADS-4 lesion[2]		PIRADS-5 lesion[2]	
	No. lesion	HG CDR	No. lesion	HG CDR	No. lesion	HG CDR
Total	190	10.5%	437	34.8%	215	70.2%
Provider						
A	46	13.0%	147	45.1%	55	75.2%
B	20	5.0%	54	36.9%	34	72.0%
C	54	14.8%	122	22.4%	53	74.7%
D	24	0.0%	45	29.1%	26	83.4%
E	46	10.9%	69	34.8%	47	65.3%
p-value		1		0.134		1

1. For the comparison of CDR across providers, based on Chi-squared test
2. For the comparison of CDR across providers, based on logistic regression model controlling for age, race, family history, PSA, DRE, prior cancer diagnosis.

CONCLUSIONS

- We found no difference in CDR by targeted lesions at the provider and lesion-level across FBx providers at a single institution.
- Collectively, these findings suggest that, among experienced providers, variation in FBx technique may not contribute to overall variation in CDR with targeted cores on FBx.

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