

Intra-Practice Urologist-Level Variation in Fusion Biopsy Outcomes

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INTRODUCTION AND OBJECTIVES: Level 1 evidence supports use of MR and fusion biopsy (FBx) in the prostate cancer diagnostic pathway. The success of nascent FBx programs depends on multiple factors including MR image quality, MR interpretation, MR-ultrasound image registration, and FBx technique. Using a cohort of experienced urologists, we aimed to define expected provider-level variation in cancer detection rate (CDR) and FBx upgrading at a large academic center.

METHODS: We identified all men in the prospective Michigan Urological Surgery Improvement Collaborative (MUSIC) registry who underwent multiparametric prostate MRI (mpMRI) and FBx at Michigan Medicine from 8/2017-9/2018. mpMRI was performed at a single site on a 3T magnet (Philips Ingenia, Siemens Vida); all studies met PIRADSV2 criteria for technical requirements. Each MR interpretation was performed by one of 13 radiologists in the cohort (2-12 years' experience). Patient, imaging, and pathology characteristics were reviewed and stratified by urology provider. Bivariate and multivariable logistic regression analyses were performed to assess variation in cancer detection rate (CDR) at urology 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) \geq 2. Upgrading was defined as any increase in GG by biopsy type (standard cores vs. targeted cores) within the same patient.

RESULTS: We identified 333 patients in the MUSIC registry who had FBx. Provider-level performance demonstrated no significant variation among providers in any domain on multivariate analysis (Figure 1). Though upgrading by standard cores for all providers was higher than expected (13.3%-25.3%), upgrading to HG cancer on standard cores was low (expected <15%, observed 2.2%-12.7%), reflecting an increased detection of GG1 on standard biopsy.

CONCLUSIONS: Amongst trained FBx providers within a single center with consistent mpMRI image quality and interpretation, minimal variation in CDR or upgrading rates exists. Greater study power will validate these early findings and provide insight into similar domains across radiology providers.

Source of Funding: Blue Cross Blue Shield of Michigan

Figure 1: Comparison of MUSIC Fusion Biopsy Scorecard domains by Urology biopsy provider

Outcome	MUSIC Benchmark*	Urologist				p-value**
		A n=104	B n=45	C n=94	D n=90	
Overall CDR	>55%	78.9%	60.0%	72.3%	67.8%	>0.05
Target Cores CDR	>45%	67.3%	51.1%	57.5%	57.8%	>0.05
Standard Cores CDR	>50%	70.2%	53.3%	59.6%	57.8%	>0.05
HG by Target Cores CDR	>35%	45.5%	46.3%	40.0%	42.9%	>0.05
Upgrading by Target Cores	>15%	26.9%	17.8%	25.5%	18.9%	>0.05
Upgrading by Standard Cores	<15%	21.2%	13.3%	25.5%	18.9%	>0.05
HG Upgrading by Target Cores	>20%	16.4%	13.3%	13.8%	11.1%	>0.05
HG Upgrading by Standard Cores	<15%	8.7%	2.2%	12.8%	5.6%	>0.05

■ Benchmark met
■ Within 10% of benchmark
■ Greater than 10% from benchmark

*MUSIC benchmarks determined by radiology/urology consensus based on published literature

**Based on multivariable analysis controlling for age, PSA, race, family history, clinical stage, and PIRADS score.