

Capstone for Impact Submission | GY2020

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

Student Name(s): Apoorv Dhir

Advisor Names(s): Arvin George, Chad Ellimoottil

Branch: Procedures Based Care

Path of Excellence: Health Policy

If this project can be continued by another UMMS student, please include your contact information or any other details you would like to share here:

Summary: While fusion biopsy (FBx) outperforms systematic biopsy, significant variation in cancer detection rates (CDR) exists, ranging from 46-70%. Patient, tumor, and imaging factors can impact FBx outcomes. However, it remains unknown to what extent differences in biopsy technique (urologists) contribute to variation in CDR.

Methodology: All men in the Michigan Urological Surgery Improvement Collaborative (MUSIC) clinical registry who underwent FBx at Michigan Medicine from August 2017 to May 2019 were included. The primary outcome was CDR by targeted cores. Secondary outcomes were $GGG \geq 2$ CDR on targeted cores stratified by PIRADS score and achieving MUSIC FBx scorecard benchmark measures. Bivariate and multivariable logistic regression analyses was performed to assess variation in CDR at the FBx provider level adjusting for age, PSA, race, family history, clinical stage, prior cancer diagnosis, number of lesion, number of cores taken and PIRADS score.

Results: A total of 708 FBx were performed by five providers, whose volume ranged from 77-199 FBx during the study period. Figure 1a. demonstrates distribution of patient factors by provider.

There was no significant difference in targeted CDR across providers. (Figure 1b) Adjusted overall CDR with targeted cores on FBx ranged from 54-74% across providers (adjusted $p = 0.60$) with an average CDR rate of 60.7%. CDR for all providers met the MUSIC quality benchmark of $>45\%$.

$GGG \geq 2$ CDR in PIRADS 3 ranged from 0-15% across the five providers (unadjusted $p = 1.000$) with an average $GGG \geq 2$ CDR of 10.5%. Risk adjusted $GGG \geq 2$ CDR in PIRADS 4 ranged from 34-59% across providers (adjusted $p = 0.134$) with an average $GGG \geq 2$ CDR of 34.8%. Risk adjusted $GGG \geq 2$ CDR in PIRADS 5 ranged from 70-86% across providers (adjusted $p = 1.000$) with an average $GGG \geq 2$ CDR of 70.2%.

Conclusion: We found no difference in cancer detection rates by targeted cores across fusion biopsy providers and no significant difference in GGG \geq 2 detection rates for PIRADS 3, 4, and 5 lesions. These findings suggest that differences in FBx technique may not contribute to overall variation in CDR in FBx performed by experienced providers. Although we did not find a statistically significant variation in CDR across providers, it is possible that there is room for QI work to decrease the demonstrated variation in CDR.

Reflection/Impact Statement:

You may use the following questions to guide your reflection:

1. How did the process of conducting this research confront any limitations of your prior thinking?
2. Who could potentially benefit from this CFI project over different timescales and how?
3. What actions will you take afterwards to continue the momentum of this project, and maximise the likelihood of the identified benefits being achieved?
4. What advice would you give to another student completing their CFI?

This CFI project was in line with the type of research I have been interested/involvement in before and throughout medical school. Its potential for impact is primarily through informing quality improvement initiatives in the state of Michigan and potentially outside of the state as well. This work has already been accepted for poster presentation at the Society of Urologic Oncology annual meeting and for a podium presentation at the upcoming American Urologic Association Annual Meeting. We hope to continue to disseminate this information and increase knowledge of the minimal impact of urologist-level variation in fusion biopsy cancer detection rates by having our work accepted for publication in a major urologic journal. My advice to students completing their CFI is to do work they are interested in that can simultaneously improve their candidacy for residency.