SIIM 2016 Scientific Session
Posters & Demonstrations
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# Multiparametric Prostate MRI Reporting Translation Tool: Converting Free Text into PI-RADS

Paul B. Stoddard, MD, University of Maryland School of Medicine; Alaa Beydoun, MD (Presenter); Kenneth Wang, MD, PhD, Melina Pectasides, MD

## Background

We sought to derive and validate a natural language translation tool to convert free text multiparametric prostate MRI (mpMRI) reports into Prostate Imaging Reporting and Data System (PI-RADS) version 2 scores as a first step towards an automated natural language processing (NLP) tool for retrospective PI-RADS validation studies.

## Case Presentation

IRB-approved, HIPAA-compliant retrospective study of mpMRI reports with corresponding prostate histology. PI-RADS used as ontologic basis in the creation of a translation tool, which would extract and categorize essential elements within free text mpMRI reports and convert into PI-RADS scores. The tool was then implemented within the cohort, assessing for correlation of PI-RADS scores with free text mpMRI and with histology.

## Outcome

Conversion into PI-RADS using the tool possible in 53% of lesions (202/384) and in 69% of patients (127/184). Strong correlation between free text mpMRI and PI-RADS scores was observed (rho = 0.607). Free text mpMRI index of suspicion was significantly associated with the presence of clinically-significant cancer (chi-squared 23.381, $p < 0.0005$) with a sensitivity of 91.7%. Our derived PI-RADS scores also significantly predicted the presence of clinically-significant cancer (chi-squared 4.052, $p = 0.044$), albeit with slightly lower sensitivity 81.7%.

## Discussion

Each updated version of PI-RADS requires validation. Retrospective studies of existing free text mpMRI reports most efficiently serves this purpose in disease with notoriously long maturation time. Initial validation of our translation tool provides the foundation to develop an automated NLP tool to perform rapid PI-RADS validation.

## Conclusion

PI-RADS has immense potential utility to improve reporting of mpMRI and allow for quality assurance monitoring of radiologic-pathologic correlation. Nevertheless, new validation studies are required with each updated version of PI-RADS to verify its utility. Retrospective studies of prior mpMRI would best serve this purpose in a disease with a notoriously long maturation time. Our study provides a foundation with which we will develop an automated tool. Our tool would directly act as a springboard for further retrospective analyses of prior mpMRI reports for PI-RADS validation. This self-reflection is timely given the recent release of PI-RADS, v2. If our goal is to reduce inter-reader variability, adhere to standardized interpretation

methods, and facilitate clinical decision-making, greater attention to structured reporting should be paid. However, structured reporting must be evidenced-based in its superiority. Our tool directly addresses the need for PI-RADS validation in the most efficient manner by utilizing extant reports.

## References


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## Keywords

Multiparametric Prostate MRI, Structured Reporting, Prostate Cancer Lexicon, Data Translation