INTEGRATED DIAGNOSTICS SHARED RESOURCE'S QUALITY IMPROVEMENT WORKFLOW FOR RADIOLOGY-PATHOLOGY CORRELATION OF PROSTATECTOMY

Alondra Prado, Nashla Barroso, Preeti Ahuja,
Dieter Enzmann, Steven S. Raman, William Hsu

UCLA David Geffen School of Medicine

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Introduction

The diagnosis and treatment of prostate cancer (PCa) depends on a series of interconnected results, including:

- Patient age and race
- Prostate-Specific Lab Values (e.g. Serum PSA)
- Genomics (e.g. Decipher Testing)
- Imaging (mpMRI)
- Pathology (Biopsy, Prostatectomy)

Both radiological and pathological results may not always correlate, complicating treatment decisions for patients

Introduction

The Integrated Diagnostics Shared Resource (IDx) is an interdisciplinary program integrating imaging with histopathology and molecular diagnostics to understand the nature and biology of cancers.

IDx uniquely operationalizes quality control (QC) metrics through structured correlation workflows that identify radiological-pathological (RadPath) discrepancies and, in turn, creates a curated dataset available for researchers to use for their academic endeavors.

By systematically collecting

Clinical and Outcomes Data

Imaging Data

Pathology Data

Prospective biospecimens

Multi-omics Data

In this study, we aim to assess the impact of IDx's QC-centered workflow by quantifying the improved accuracy of RadPath findings

Methods

IDx's QC-Centered Workflow

Treatment-Naïve patients scheduled for Radical Prostatectomy (RALP) at our Institution

Multi-parametric MRI (mpMRI) ≤ 1 year of RP

Prostate Volume ≥ 25 g

"Yes" → Custom 3D Mold*

"No" → Library Mold

Review at **Multidisciplinary "Match" Meeting**

MRI
vs
PSMA PET
vs
MicroUS
vs
WMHP (Whole-Mount Histopathology)

Lesions "MATCHED"

*Used to generate high-quality, standardized, Whole-Mount histopathology slides (WMHP) for clinical pathology reports

Methods

Multidisciplinary/Collaborative Care along the Diagnosis and Treatment Timeline for PCa Patients*

- mpMRI
- PSMA-PET
- Micro-US

Diagnostic Radiology, Nuclear Medicine, Urology

Urology, Interventional Radiology

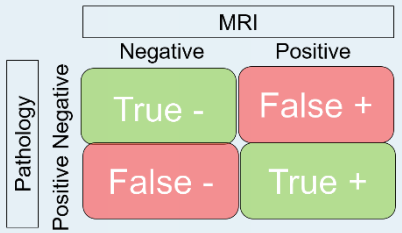
- Image-Guided Biopsy (MR, MR-US Fusion, TRUS)
- RALP

- WMHP slides (includes use of patient-specific 3D molds when grossing the specimen)

Pathology, Radiological Sciences

Multidisciplinary Meeting Team

- Board-Certified: Urologists, Radiologists, Genitourinary (GU) Pathologists, Nuclear Medicine Physicians
- Medical trainees including residents, fellows, medical students
- After a second reading, all attendees consensually match lesions between MRI/WMHP as true/false positive/negative (below)



*All clinical data noted in this timeline are captured in the in-house IDx database made available to researchers. The operational team validates the data collected on both a monthly, and quarterly basis.

Results

Between 2023-2024, 190 unique radical prostatectomy (RALP) cases reviewed and matched at monthly Multidisciplinary Meetings:

- **242 foci** were called as prostate cancer on **mpMRI**
- **361 foci** were called as prostate cancer on **WMHP**

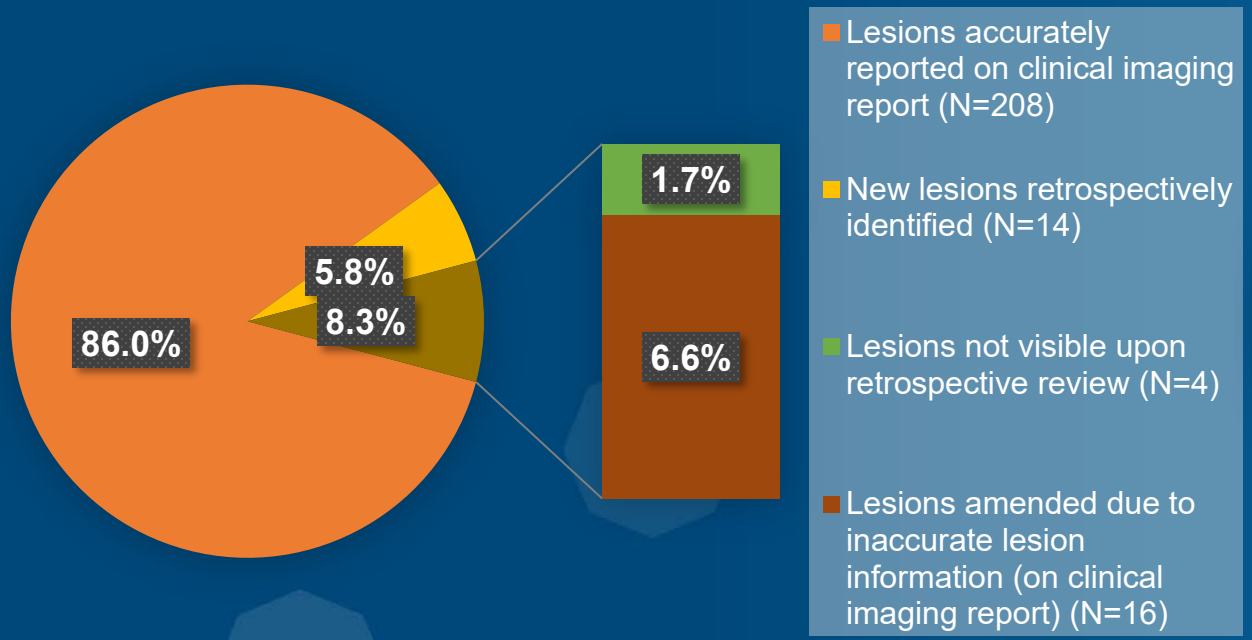
All mpMRI/WMHP lesions were filtered for discrepancies between originally reported characteristics versus characteristics retrospectively noted and/or amended upon retrospective review at Multidisciplinary Meeting

Results

RAD-PATH Corrections Identified by IDx's QC-Centered Workflow

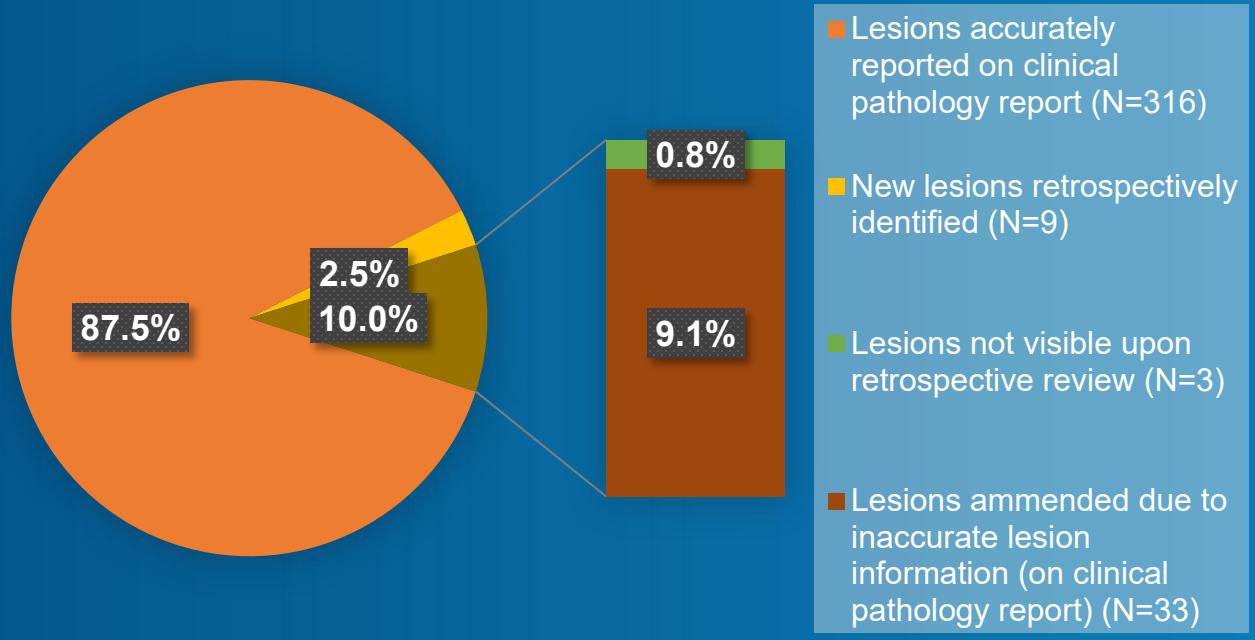
RAD

(N= 242 MR Lesions retrospectively reviewed at the Match Meeting)



PATH

(N= 361 Pathology lesions retrospectively reviewed at the Match Meeting)



Discussion

Previously missed lesions and clinically-relevant characteristics are among the many corrections resulting from IDx's QC workflows.

Implementation of such QC-centered workflows and creation of curated datasets at high-volume academic medical centers can help improve:

Detection and Diagnosis of Cancer

By accurately correlating imaging results with pathology/genomics, similar datasets can improve the accuracy of image-based cancer detection, ultimately improving future patient care

Training and Education of Trainees

Obtaining an independent second review of both pre-surgical imaging and post-surgical WMHP serves as a valuable educational tool for meeting attendees, including trainees (e.g. residents, fellows, students).

Conclusion

- IDx plays a critical role in ongoing PCa research by implementing unique QC-centered workflows that help address and improve RadPath discrepancies, ultimately helping improve the image-based detection of PCa.

- By simultaneously upholding the integrity of data, and creating curated datasets available to other researchers, the IDx program serves as a unique institutional resource that delivers integrated, curated, and annotated multi-scale, multi-modal data in a transparent and timely manner

For any questions/comments, feel free to reach out to the IDx team at pahuja@mednet.ucla.edu

Or Scan our QR code to access our website for further information and resources:

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