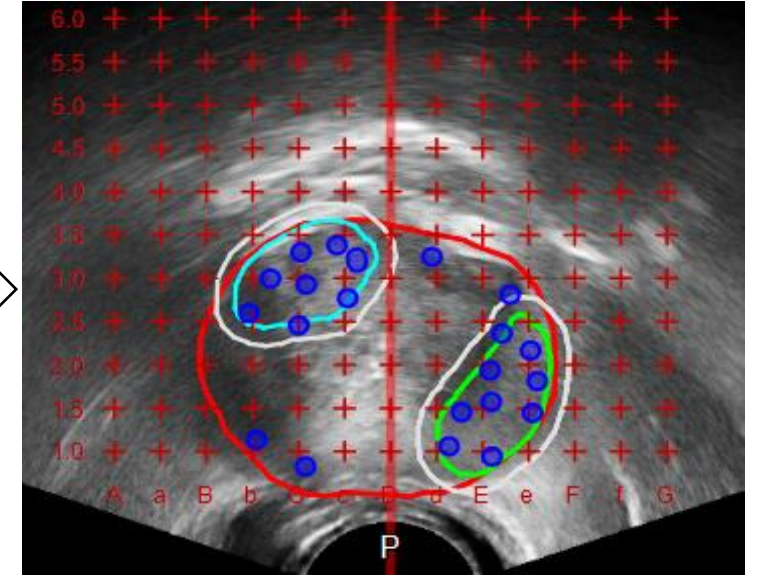
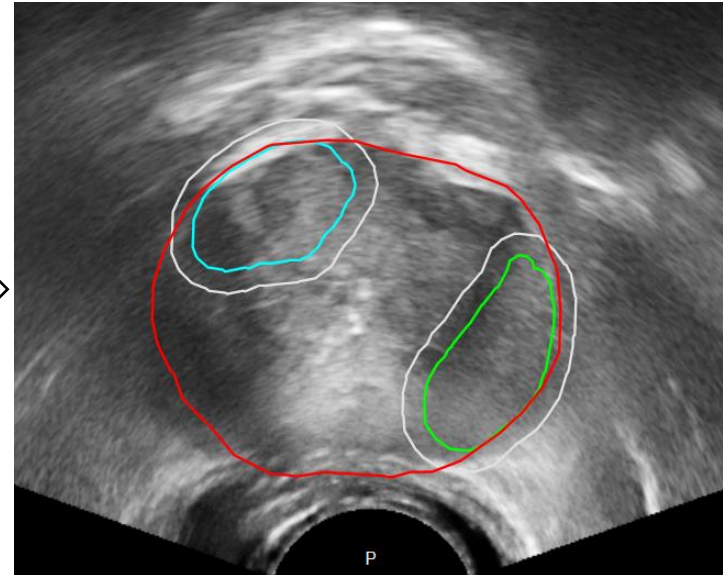
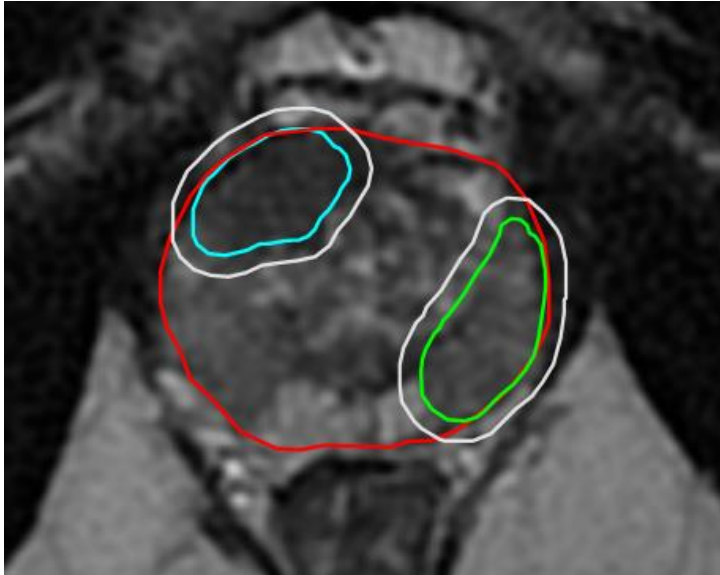
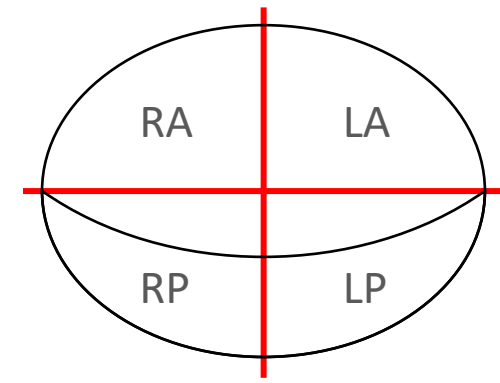


Predictive Factors in US-MRI Fusion Prostate Biopsies

Harry Gibbard

US-MRI Fusion Prostate Biopsies



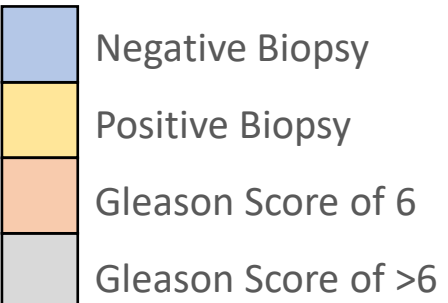
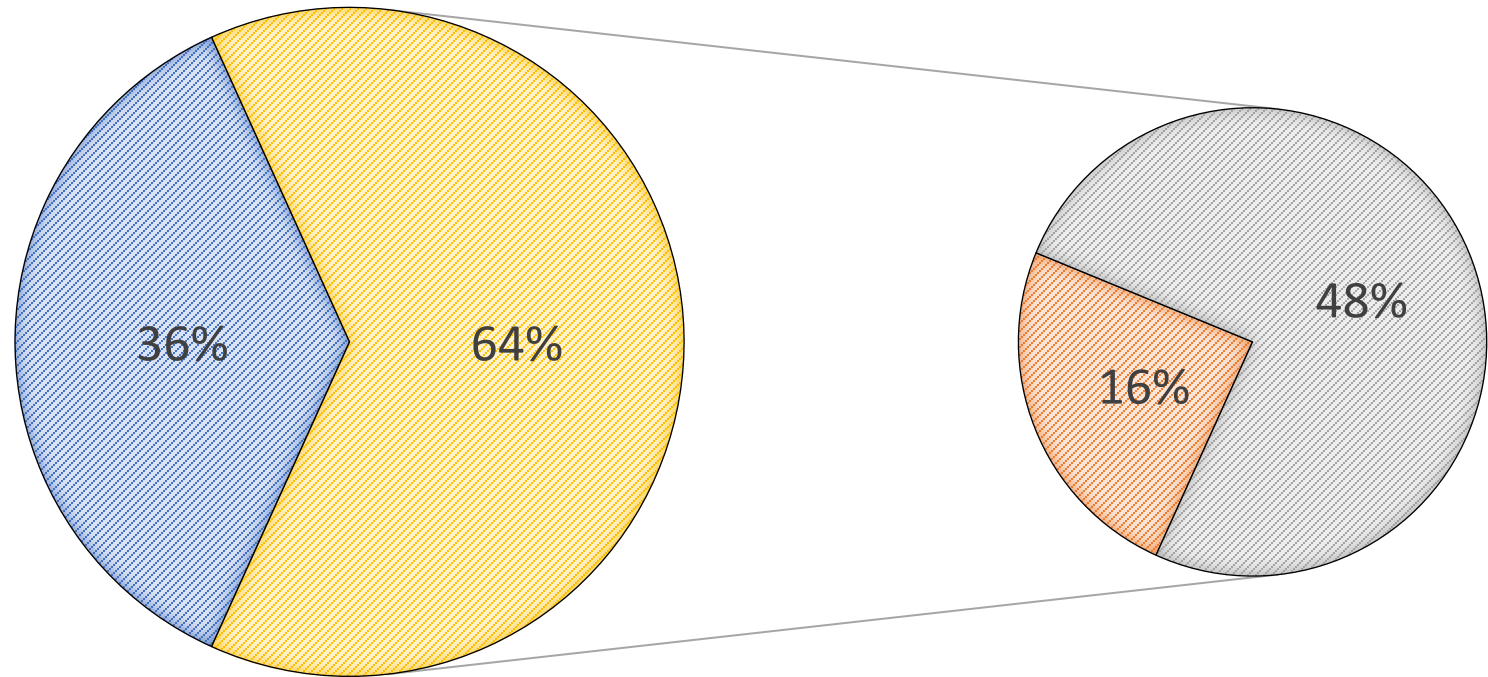
Aims of the project

- Retrospectively review histopathology results from the US-MRI Fusion Prostate Biopsy service.
- Compare PSA and PSA density as parameters for predicting detection rates of prostate cancer.
- Assess the impact of the type of procedure and the influence of the operators.

Overall Detection Rate

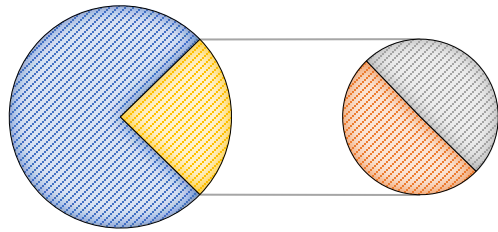
RESULT OF THE BIOPSY (-VE OR +VE) AND THE CLINICAL SIGNIFICANCE OF THE CANCER FOUND FOR 2350 PATIENTS BETWEEN 2018 AND 2023

Number of patients	2350
Negative Biopsy	857
Positive Biopsy	1493
Gleason Score of 6	365
Gleason Score of >6	1128



Detection Rate with PI-RADS Score

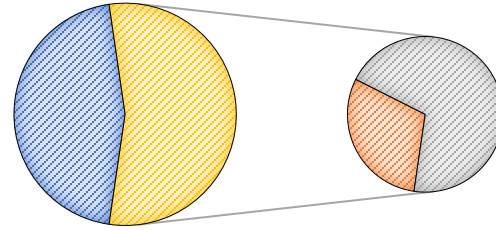
PI-RADS 3



25% Positive

(12% Clinically Significant)

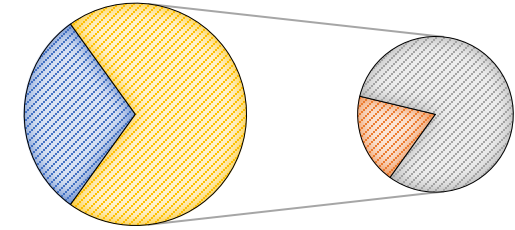
PI-RADS 4



55% Positive

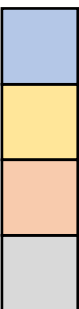
(38% Clinically Significant)

PI-RADS 5



70% Positive

(57% Clinically Significant)



Negative Biopsy

Positive Biopsy

Gleason Score of 6

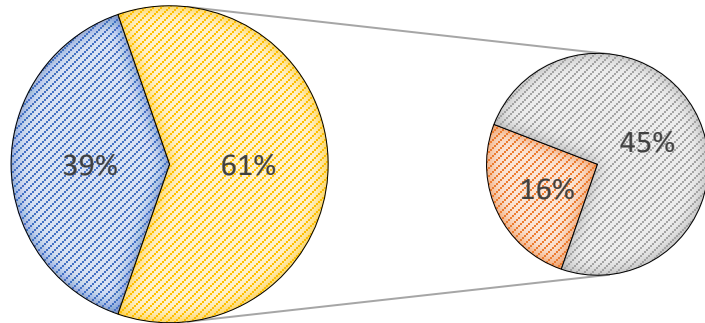
Gleason Score of >6

	PI-RADS 3	PI-RADS 4	PI-RADS 5
Number of lesions	813	1763	875
Negative Biopsy	613	800	264
Positive Biopsy	200	963	611
Gleason Score of 6	101	290	115
Gleason Score of >6	99	673	496

Results similar to [1] Sonn et al., 2019

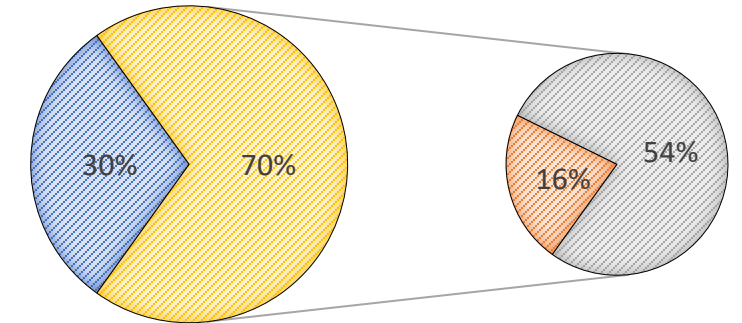
A comparison between General and Local Anaesthetic Biopsies

GENERAL ANAESTHETIC

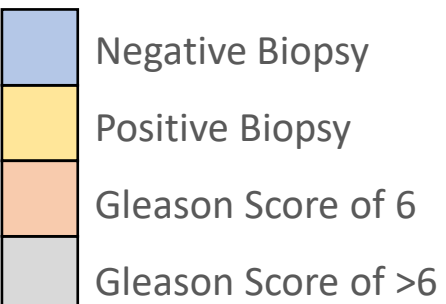


	General	Local
Number of patients	1595	755
Negative Biopsy	629	228
Positive Biopsy	966	527
Gleason Score of 6	247	118
Gleason Score of >6	719	409

LOCAL ANAESTHETIC

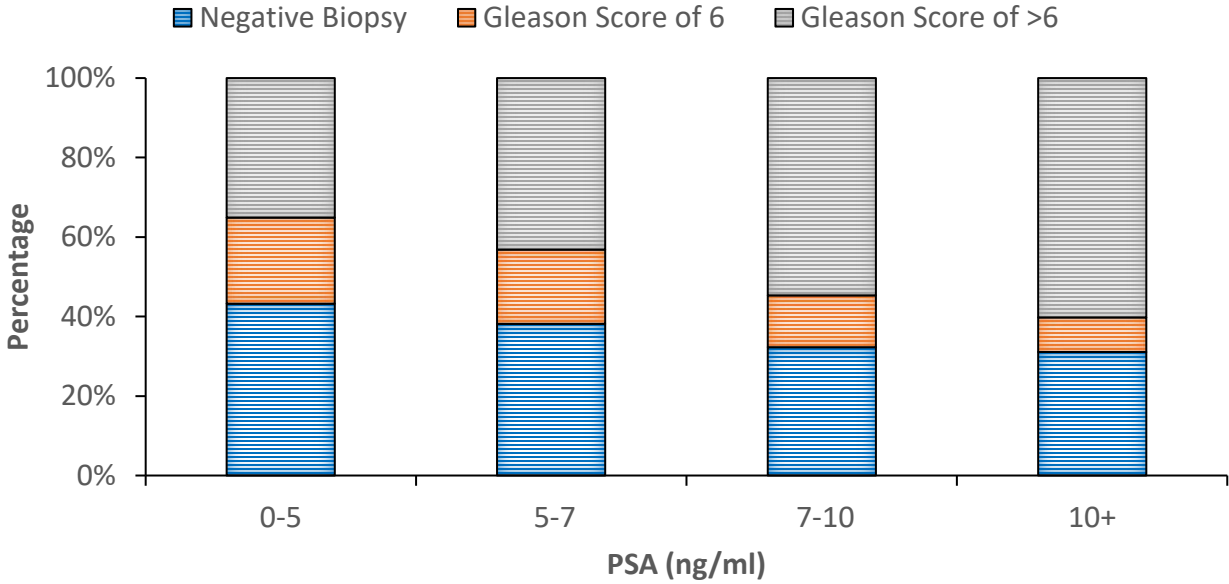


	General	Local
Age (yr)	67.0	67.9
PSA (ng/ml)	8.52	9.14
Volume (ml)	61.6	52.2
PSA Density (ng/ml²)	0.16	0.20

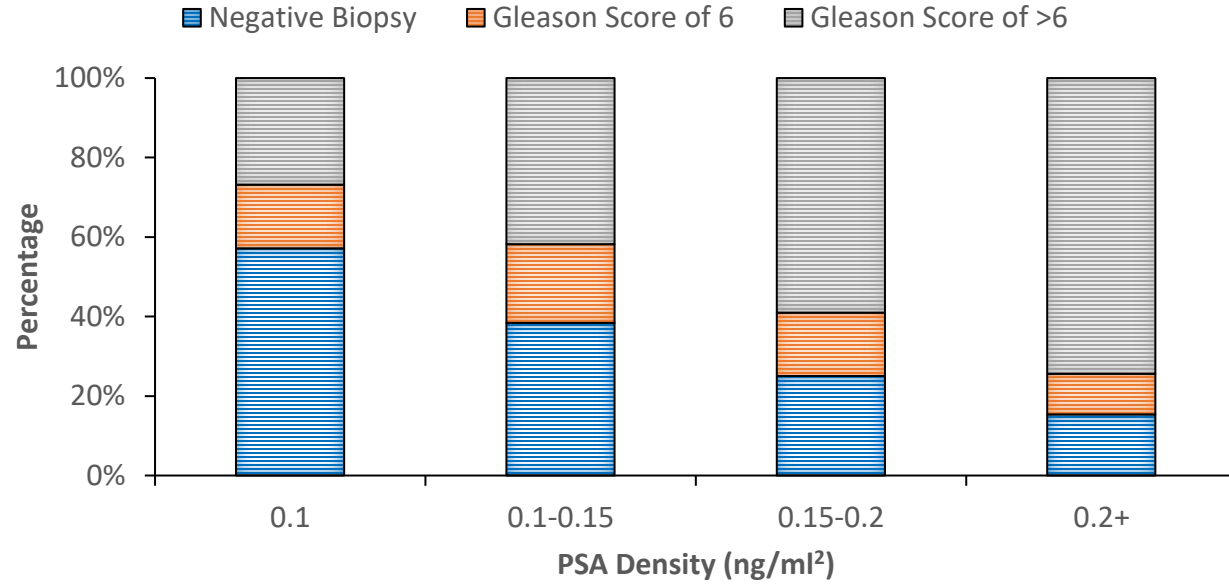


Detection Rate with PSA and PSA Density

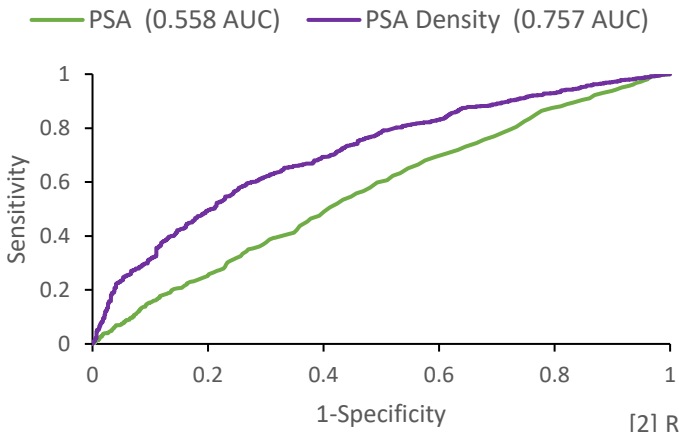
CANCER DETECTION RATES GROUPED BY PSA



CANCER DETECTION RATES GROUPED BY PSA DENSITY



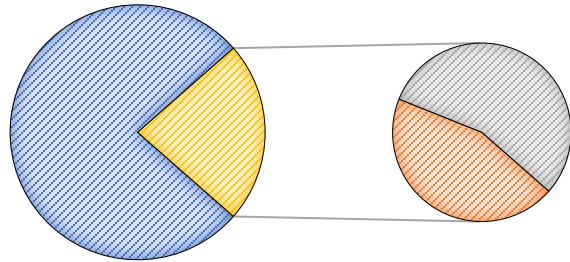
ROC Curve for PSA and PSA Density



- Negative Biopsy
- Positive Biopsy
- Gleason Score of 6
- Gleason Score of >6

Do we still need to biopsy PI-RADS 3 lesions?

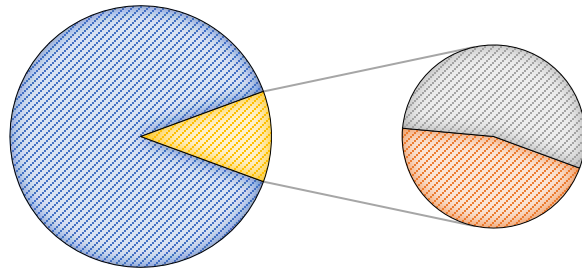
DETECTION RATE OF PI-RADS 3 LESIONS



23% of PI-RADS 3 lesions return with a positive result.

13% of all PI-RADS 3 lesions have a clinically significant cancer.

DETECTION RATE OF PI-RADS 3 LESIONS WITH PSAD < 0.1 ng/ml²



PSA Density less than 0.1 ng/ml²

PI-RADS 3 lesions return with a positive result **11%** of the time.

6% of all PI-RADS 3 lesions return with a clinically significant cancer.

PSA Density less than 0.125 ng/ml²

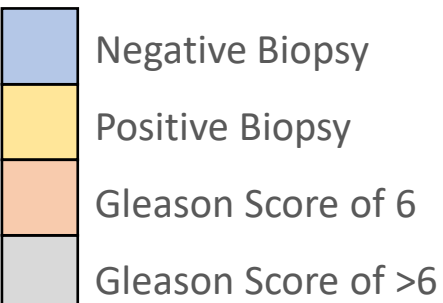
PI-RADS 3 lesions return with a positive result **16%** of the time.

7% of all PI-RADS 3 lesions return with a clinically significant cancer.

PSA Density less than 0.15 ng/ml²

PI-RADS 3 lesions return with a positive result **19%** of the time.

9% of all PI-RADS 3 lesions return with a clinically significant cancer.



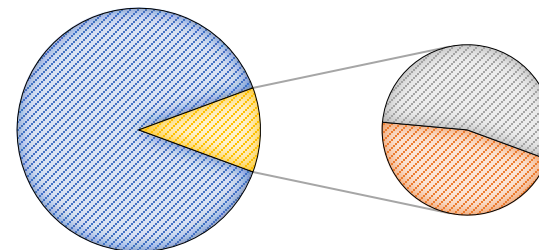
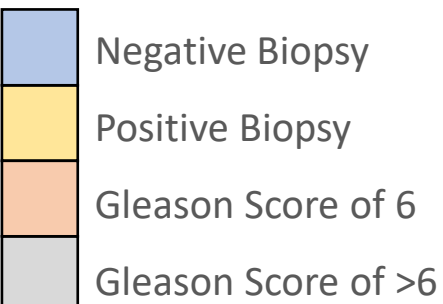
These numbers were calculated for patients with a maximum PI-RADS of 3. If we include patients with another higher PI-RADS lesion the positive return rate is still very similar for those PI-RADS 3 lesions.

Do we still need to biopsy PI-RADS 3 lesions?

153 patients fit the criteria of PI-RADS 3 lesion and a PSA Density of less than 0.1 ng/ml².

- **125** patients were discharged with the recommendation of having a repeat PSA
- **20** patients were put on active surveillance
- **8** patients had treatment for their prostate cancer (**4** Prostatectomy, **3** Radiotherapy, **1** both)

DETECTION RATE OF PI-RADS 3 LESIONS
WITH PSAD < 0.1 ng/ml²

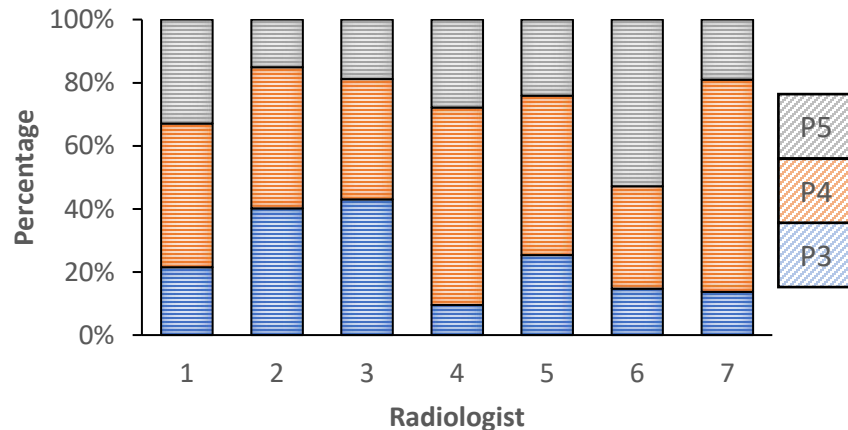


How much variance is there between Radiologists?

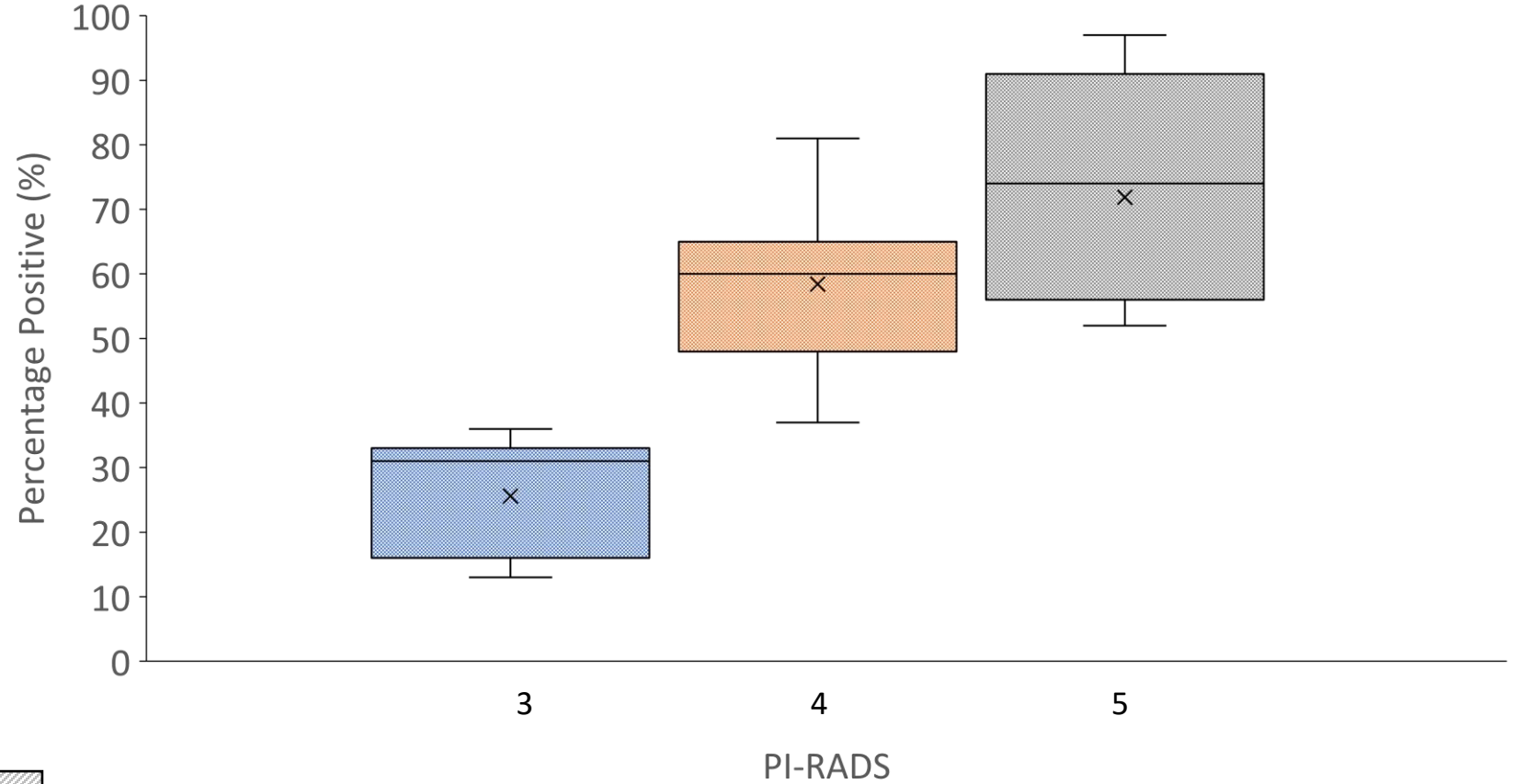
	Average	Range
Number of patients	265	110-660
Age (yr)	66.4	62.1-68.0
PSA (ng/ml)	8.93	6.44-13.1
PSAd (ng/ml ²)	0.18	0.12-0.29
Volume (ml)	58.9	50.4-63.5

Demographics for the patients reported on by this cohort of radiologists

PROPORTION OF PI-RADS BY RADIOLOGIST



DETECTION RATE FOR A COHORT OF RADIOLOGISTS BY PI-RADS SCORE



Conclusions

- PI-RADS, PSA and PSA density were all predictors of prostate cancer in this cohort of patients.
- A combination of PI-RADS and PSA density could be used in the screening process to avoid unnecessary biopsies.
- The impact of the radiologist and the type of procedure needs more work to understand the causes before trying to find potential solutions.

Thank you for listening

Presented on behalf of: Dominic Hodgson, Inna O’Hea and Sarah Wilby

Thank you to: Tomas Austin, Sam Barnes, Ioanna Mone, David Nash

And the Radiotherapy Physics and Urology Departments at PHU

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