INTRODUCTION:
Diagnosis of prostate cancer is complicated by the low negative predictive value of conventional ultrasound-guided biopsies, which are unable to exclude clinically significant cancer based on imaging features alone. This has led to unacceptable under-diagnosis rates for systematic biopsies. Recent guidelines have advocated for the addition of imaging-based targeted biopsy using multiparametric MRI (mpMRI), which has demonstrated clear benefits over conventional ultrasound-based systematic biopsy. Here we compare the added value in terms of diagnostic potential of mpMRI with the use of a novel high-resolution 29 MHz micro-ultrasound (micro-US), a novel technique enabling real-time targeting without the complexities, costs and challenges of performing MRI.

METHODS:
• Prospective database study including 22 subjects presenting with elevated PSA or abnormal DRE undergoing prostate biopsy using ExactiVu® micro-ultrasound system (Exact Imaging, Markham, Canada)
• These subjects had also received mpMRI imaging which indicated targets for biopsy
• Each case was analyzed to determine whether mpMRI and/or micro-US targeted samples identified the highest Grade Group (GG) detected by the subject for any technique.

RESULTS:
1. Prostate cancer was identified in 15/22 (68%) subjects, and was clinically significant (GG ≥ 2) in 11/22 (50%)
2. In 11/17 (73%) of all cancers and 9/11 (82%) GG2 cancers, both micro-US and MRI targets identified the highest GG cancer
3. MRI alone detected 2/15 (13%) GG 1 cancers which were not identified by micro-US
4. Micro-US alone detected higher grade group lesions in 2/15 (13%, GG 2 and 4) cases which were not identified by MRI

Detection Rate Overall Micro-US mpMRI
All Cancer 15/22 (68%) 13/22 (59%) 15/22 (68%)
csPCa (GG ≥ 1) 11/22 (50%) 11/22 (50%) 10/22 (45%)
Highest GG per patient N/A 13/15 (87%) 13/15 (87%)
Highest GG per patient (csPCa only) N/A 11/11 (100%) 9/11 (82%)

Table 1: Detection rate results overall and per modality.
Both modalities showed strong concordance in identifying csPCa at the patient level, however micro-ultrasound targets upgraded 2 cases of clinically significant cancer to a higher Grade Group than MRI targets.

CONCLUSIONS:
• Image-based targeting of prostate biopsies added significant value with high rates of clinically significant cancer detection
• With strong agreement between MRI and micro-US in most cases, micro-US may be a reasonable alternative to MRI for targeted biopsy.

REFERENCES