

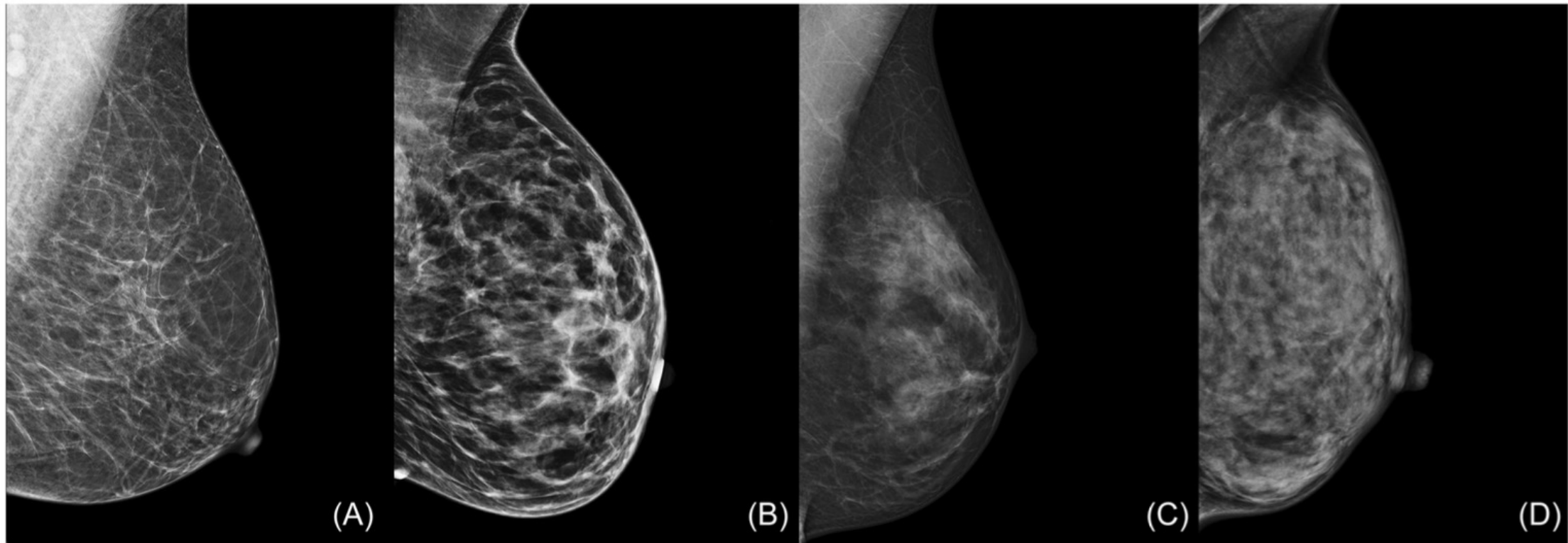


Evaluation of Artificial Intelligence for BI-RADS Breast Density Assessment in a Symptomatic Breast Service

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Introduction and background

- Women with dense breasts have a higher chance of developing breast cancer. [1]
- Official review by the UK National Screening Committee state that about **10 % of women have “very dense breasts.”** [2]
- This term corresponds closely to **BI-RADS D** (*extremely dense*).
- BI-RADS density D often get additional imaging including Tomosynthesis, Contrast Enhanced Mammography and MRI Breast, both at diagnosis and follow-up.
- The accurate identification of BI-RADS D breasts will have a direct impact on the departmental workload and budgeting.



Aims and objectives

The purpose of this study was to compare density classification generated by the Quantra™ Density Assessment Software with radiologist-assigned BI-RADS density scores.

Any discrepancy in reporting of density is important to understand due to additional patient investigations and different management pathways for high density (BI-RADS D) breasts.

Results

25 reports had to be excluded due to mammogram being performed prior to implementation of Quantra™ software or due to duplicate cases.

A total of 368 mammograms were reviewed for BI-RADS breast density classification.

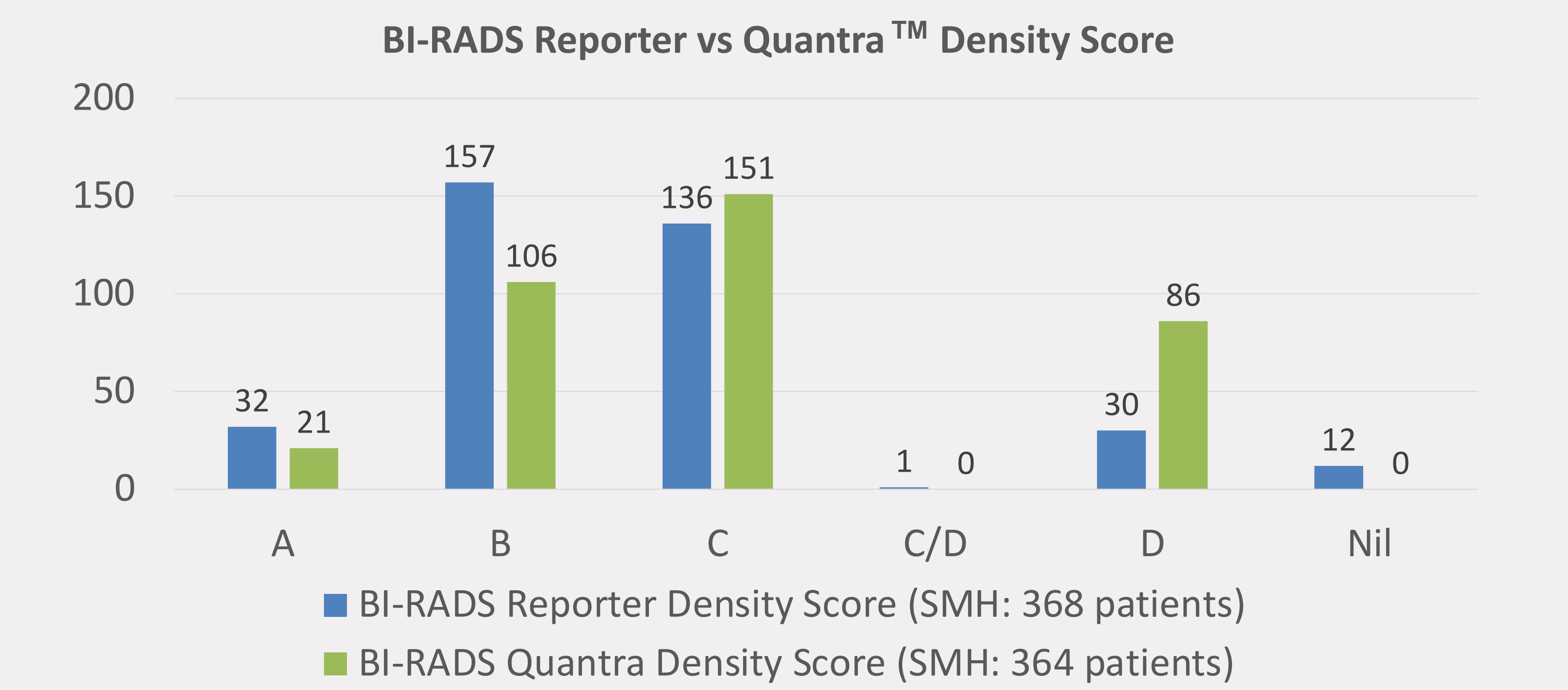


Figure 2. Comparison of Radiologist BI-RADS and Quantra™ breast density scores.

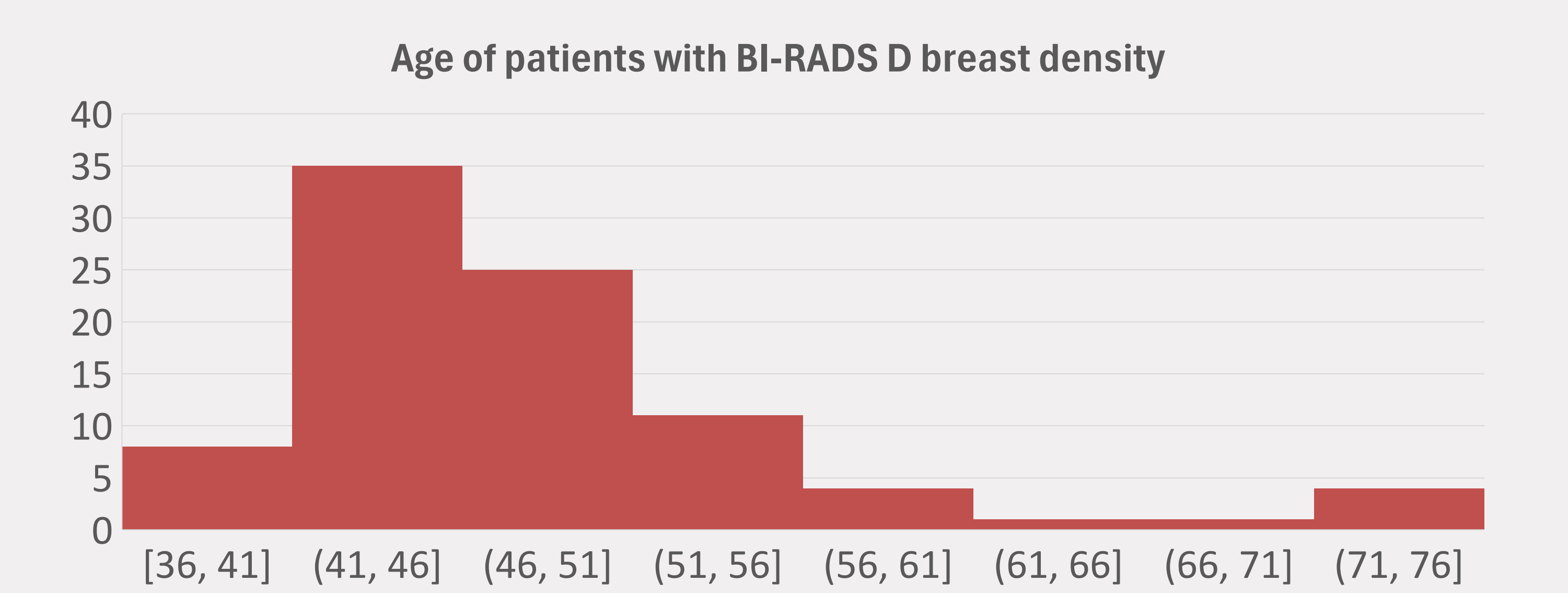


Figure 3. Age distribution of patients with BI-RADS D breast density.

Discussion

The Quantra™ density assessment software assigned a BI-RADS D breast density score in 24% of mammograms, compared with 8% when assessed by our radiologists.

Potential benefits of using AI software:

- Improved standardisation of breast density assessment across the service;
- Easier and earlier identification of BI-RADS D patients by all members of the breast team, prior to the formal report;
- Increased identification of patients requiring additional imaging, ensuring more comprehensive assessment of the higher-risk group, which may ultimately improve patient outcomes.

Potential drawbacks:

- Additional cost associated with implementing Quantra™ software;
- Increased workload due to a higher volume of additional imaging;
- Increased expenditure associated with performing additional imaging studies

Conclusion

Quantra™ software appears to assign higher breast density classifications than radiologists, potentially increasing referrals for additional imaging.

However, the majority of patients in this study were younger symptomatic, pre-menopausal patients in the pre-screening age group and are therefore more likely to have dense breasts. As a result, higher breast density and the associated need for enhanced imaging may be less of an issue in the screening population.

Quantra™ Density Assessment Software

“Powered by machine learning, Quantra technology software analyses both 2D™ and tomosynthesis images for distribution and texture of parenchymal tissue.” [3]

- Quantra™ software categorizes breast tissue into the ACR BI-RADS breast density score (A, B, C or D).
- Key documented benefits: standardisation and time (density score visible on PACS prior to the radiologist’s report).

Figure 1. Examples of BI-RADS breast density categories [4]. Representative mammographic images demonstrating the four BI-RADS breast density categories:

A – almost entirely fatty
B – scattered areas of fibroglandular density
C – heterogeneously dense
D – extremely dense breasts

Methods

- Study period: 1st September 2025 - 17th November 2025
- Breast density data was collected from both Quantra™ software outputs and radiologist-reported assessments within a **symptomatic** breast imaging service at St Mary’s Hospital (SMH).

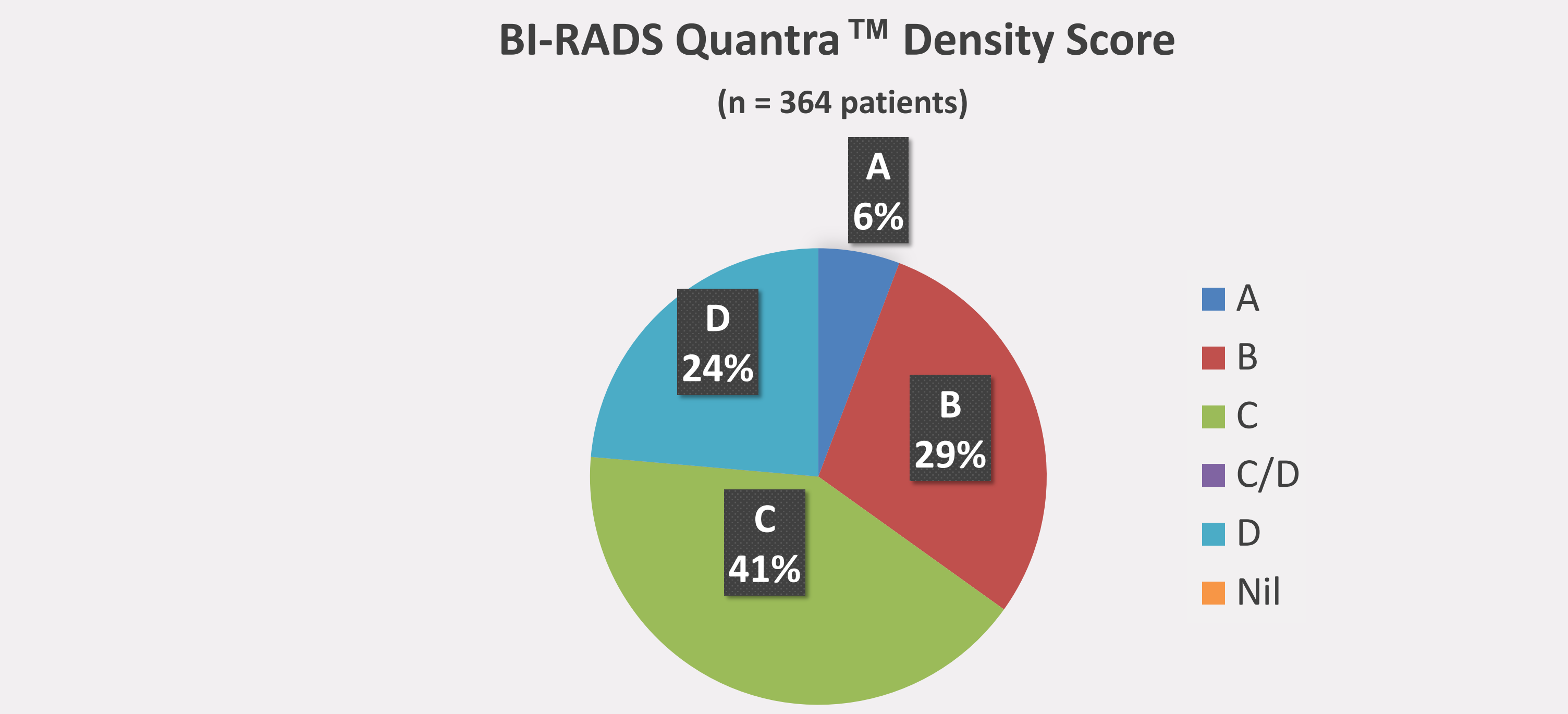


Figure 4. Distribution of Quantra™ breast density scores.

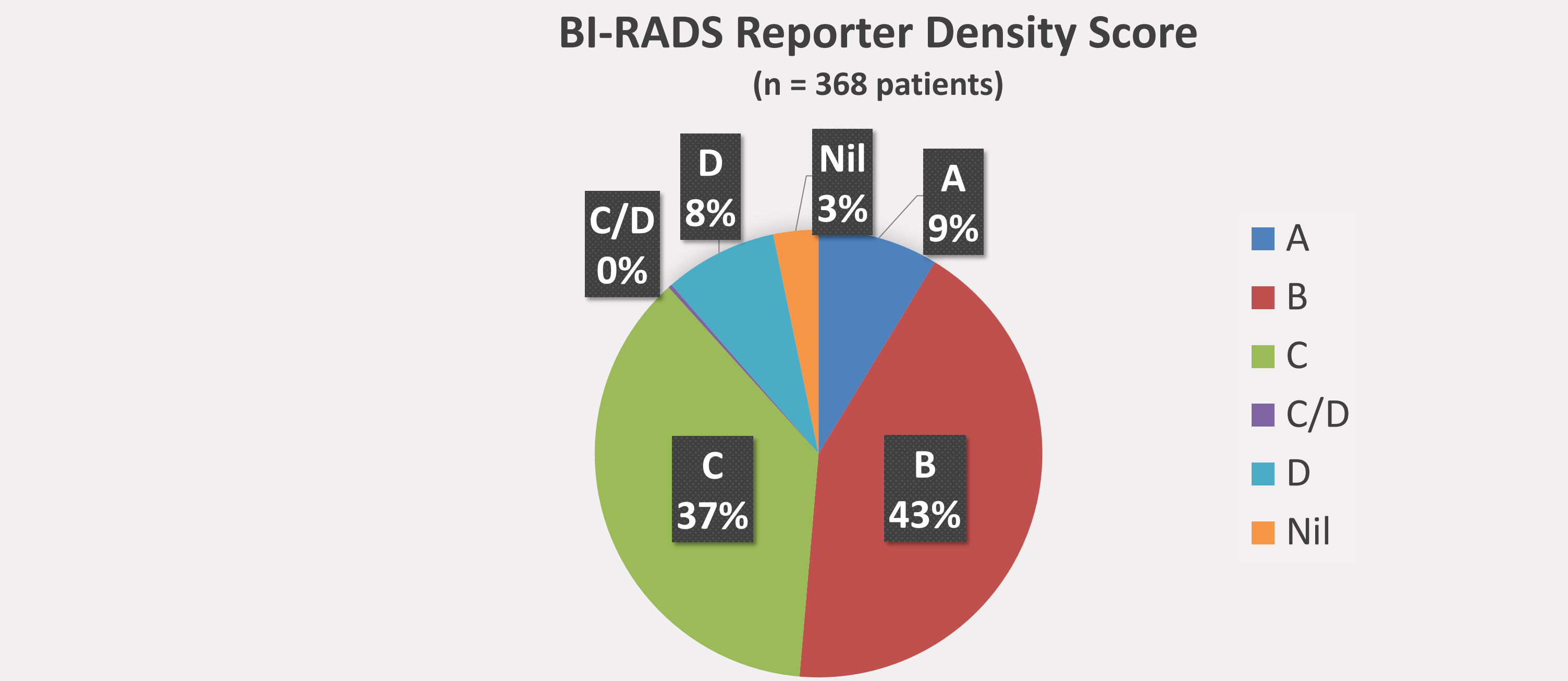


Figure 5. Distribution of reporter-assessed BI-RADS breast density scores.

References

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- UK National Screening Committee. UK NSC is reviewing the latest evidence for additional screening based on breast density [Internet]. London: GOV.UK; 2025 May 28.
- Hologic. Quantra™ Technology [Internet]. Marlborough (MA): Hologic Inc.
- Upadhyay N, Wolska J. Imaging the dense breast. J Surg Oncol. 2024 Jul;130(1):29-35.