

# Automated Breast Density Measurement in Mammography for Cancer Risk Stratification

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## Take-Away Points

- Major Focus: Breast density (BD) was quantified using automated software and compared with subjective radiologist rating of BD.
- Key Result: Automated software improved discrimination of cancer type and of interval cancers compared with visual assessment by a radiologist.
- Impact: Automated BD measurements from mammograms have the potential to stratify patients undergoing breast cancer screening, reducing false-positive rates and the frequency of unnecessary further tests such as MRI or biopsy.

Stratified or risk-based breast cancer screening aims to select the most suitable personalized screening regimen for individual patients by estimating the likelihood of developing cancer and balancing this against the negative impact of unnecessary tests. Risk-based stratification algorithms incorporate BD classified subjectively by a radiologist in Breast Imaging Reporting and Data System.

In the retrospective case-control study highlighted here, the authors used a U.K.-based population database, the OPTIMAM Database, to identify screening mammograms with cancer in women aged 47–73 years. Cancer-free controls ( $n = 605$ ) were identified and matched to cancer cases ( $n = 599$ ) on the basis of age and the imaging equipment used. Automated software (Volpara, version 1.5.1; Volpara Health Technologies) calculated fibroglandular volume (FGV), volumetric BD (VBD), and density grade (DG).

This was compared to BD assessed by a blinded radiologist using a visual analogue scale (VAS) from 0 to 100.

The relative discriminative ability of FGV, both overall and for individual cancer subtypes, was found to be either equivalent to or greater than that of VAS or VBD, whether using statistical analyses based on logistic regression, receiver operating characteristic curves, or number of cancers included in the highest risk category (highest quartile). FGV provided the steepest risk gradient for all cancers, with an odds ratio (OR) for the highest quartile compared to the lowest quartile of 3.7 (95% CI: 2.5, 5.6). FGV quartile, VBD quartile, and DG also predicted node-positive cancers, and FGV quartile demonstrated the steepest risk gradient for interval (OR, 5.3; CI: 3.1, 9.1;  $P < .01$ ), node-positive (OR, 4.7; CI: 2.5, 9.0;  $P < .01$ ), and combined cancers (OR, 4.7; CI: 2.9, 7.8;  $P < .01$ ).

This study suggests that automated FGV may provide a good foundation for stratified breast cancer screening. However, information on several covariates was not collected in this study, necessitating further work to confirm this finding.

—SURREIN DEEN

## Highlighted Article

Burnside ES, Warren LM, Myles J, et al. Quantitative breast density analysis to predict interval and node-positive cancers in pursuit of improved screening protocols: a case-control study. *Br J Cancer* 2021;125(6):884–892. doi: <https://doi.org/10.1038/s41416-021-01466-y>