

A Personalized Approach to Breast Density Using VBD%



Breast density is an important factor for risk calculation. The assessment method you choose can significantly impact a patient's breast cancer risk score.

Why does it matter?

BI-RADS® Atlas Density, VAS Percentage Density, and Volpara Volumetric Breast Density (VBD%) are not equivalent. They are measured differently, use different scales, and serve different purposes.

Visual assessment methods group women into broad categories—A through D—based on how dense their breasts appear on a mammogram. The problem? Every woman in the same category receives the same risk input, regardless of whether density is just barely in that category or at the very high end of it. That's where Volpara® Scorecard™ Volumetric Breast Density (VBD%) stands apart, because its risk value is personalized and represents the patient's actual percentage of dense tissue.

When you transition from a qualitative to a quantitative measure of breast density, you will often see a change in your patient's risk scores, as well as recommended care plans.

Differing ways to assess breast density

When breast density is entered into the TC8 risk model, you must specify if you are using a visual analog scale (% VAS Percentage Density), BI-RADS Atlas Density, or the % Volpara Volumetric Density (VBD%).

Definitions of TC8 Breast Density Inputs

BI-RADS Atlas Density (Qualitative, visual assessment)

What it is: A subjective, categorical assessment by a radiologist using the 5th edition of the ACR BI-RADS Atlas.

Format: Categories: A-D

In TC8: This method is the most commonly used, but has limitations because it doesn't provide a precise quantitative input. BI-RADS density reflects masking risk (the likelihood that cancer is hidden by dense tissue), not direct cancer risk, and buckets density into four categories A, B, C, and D.

Volpara Volumetric Density – VBD% (Fully quantitative, AI-automated assessment)

What it is: An automated, objective, and reproducible measurement from AI that calculates the true volumetric percentage of dense tissue using raw mammographic data.

Format: A numeric value (e.g., 6.2%) representing the volume of dense tissue as a percent of total breast volume.

In TC8: Volpara's volumetric percent breast density (VBD%) is specifically designed for use in TC8. It is preferred because it provides a standardized, continuous variable that directly correlates with breast cancer risk—not just masking.

VAS Percentage Density (Semi-quantitative, visual assessment)

What it is: A visual analog scale (VAS) where radiologists estimate the percentage of dense tissue in the breast.

Format: A number between 0-100% based on the radiologist's visual estimation.

In TC8: This input is accepted and directly compatible. VAS provides a quantitative percent density, which aligns with the risk-based input that TC8 expects. However, accuracy can vary due to human estimation.

Volpara Density Grade – VDG (Quantitative-to-qualitative, AI-supported BI-RADS-style assessment)

What it is: A consistent, automated breast density category derived from Volpara's volumetric analysis, mapped to BI-RADS-like categories (A-D) based on population data and clinical relevance.

Format: A letter grade (A, B, C, or D) indicating density category, aligned with the ACR BI-RADS Atlas style.

In TC8: Volpara Density Grade is not used in the Tyrer-Cuzick v8 model. Instead, the model relies on VBD%, which offers a continuous, risk-correlated measure preferred for quantitative risk assessment.

Make the personalized choice

TC8 includes breast density as a risk factor—unlike earlier versions. A validation study showed that adding density made risk scores more accurate, reducing the number of women categorized as intermediate risk and increasing identification of high- and low-risk women.¹ If you have been calculating your patients' risk scores using either the VAS or BI-RADS density categories, the density value was entered in the Tyrer-Cuzick model as A, B, C, or D.

When you begin using VBD%, you will transition from a categorical value to a precise value from a continuous model. The mathematical impact on the risk score calculation is a more personalized assessment. A precise value more accurately reflects a patient's current risk prediction, but can also capture 'between-category' changes in density, and risk over time.

The following examples demonstrate how the way breast density is entered into TC8 can have a major impact on the risk calculation.

A breast center in New York State using TC8 with Volpara's VBD% reported a change in clinical management in 4.5% of their patient population.²

The example below shows a 55-year-old patient, Mary, with some typical breast cancer risk factors. Each graphic shows the difference between her lifetime risk score and the population risk score when just the density input changes.

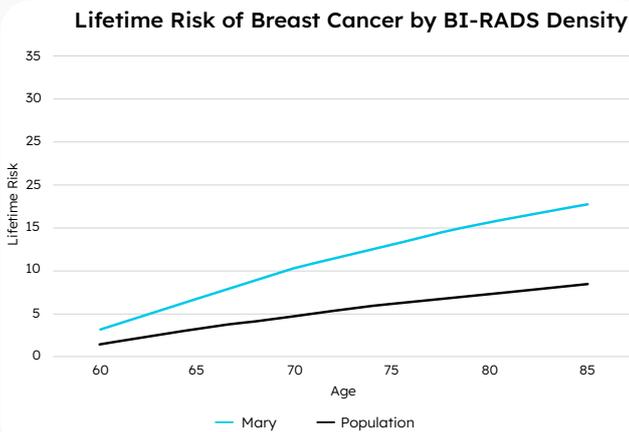
The lifetime score is represented as 17.8% using BI-RADS and 32.7% using VBD. Using the BI-RADS category may underestimate her lifetime risk of developing breast cancer.

BI-RADS vs. Volpara Breast Density (VBD%)

Meet Mary

- 55 years old
- Menopause at 52
- Mother BC at 60
- BI-RADS: C

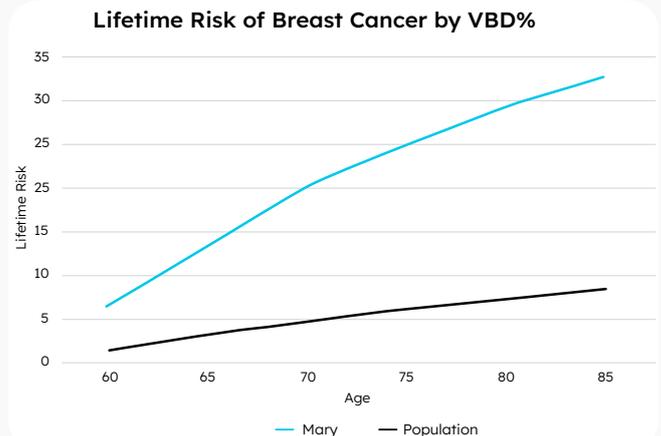
Lifetime risk: 17.8%



Meet Mary

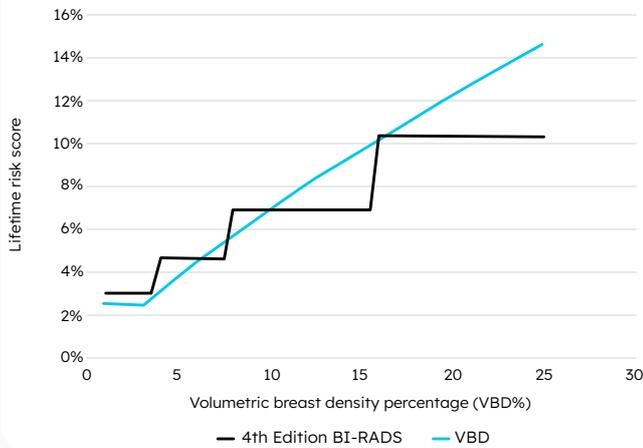
- 55 years old
- Menopause at 52
- Mother BC at 60
- VBD: 14.9%

Lifetime risk: 32.7%



The following graphs are specific to a 50-year-old, 5'4" woman weighing 125 pounds (or 57 kgs). Her lifetime risk score is shown on the y-axis and VBD% is the x-axis. You can see that if her low VBD% (on the x-axis) was 8% but you enter 'C' into the risk calculator, her lifetime risk may be overestimated. Whereas if her VBD% (on the x-axis) was anything over 17%, and you enter 'D' into TC8, then her risk may be underestimated.

Lifetime risk score: BI-RADS vs. VBD%
50 yr, 5'4", 125 lbs



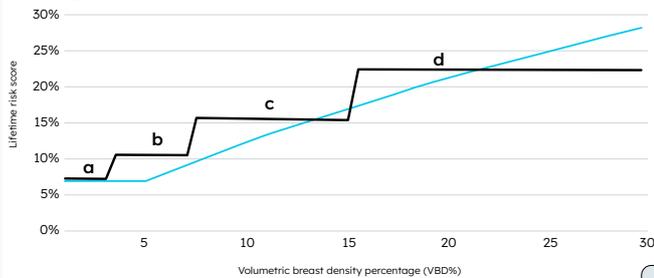
Based on a 50-year-old with no other risk factors

| Visual BI-RADS | C | C | C |
|----------------|------------|-----------|-------------|
| Lifetime Risk | 17.1% | 17.1% | 17.1% |
| VBD% | 8.2 | 10 | 13.9 |
| Lifetime Risk | 15.9% | 18.6% | 23.8% |

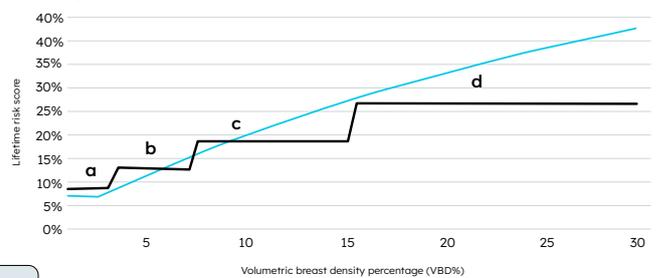
Volumetric breast density gives a true reflection of risk because of the continuous nature of both the risk and density calculation.

Meet Sue, a 44-year-old woman who is 5'6" and has a mother with breast cancer. The difference in lifetime risk resulting from measuring breast density using VBD% vs. BI-RADS depends on age and BMI, and therefore varies from patient to patient.

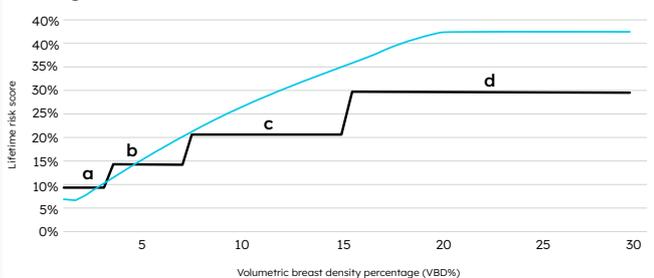
Weight 110 lbs



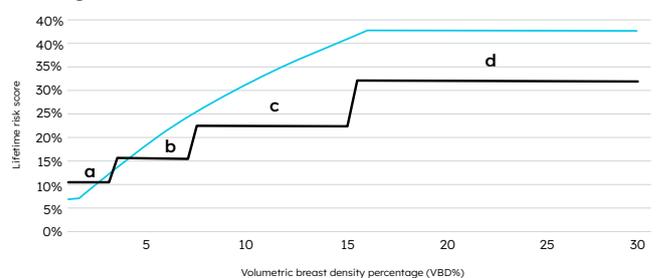
Weight 150 lbs



Weight 210 lbs

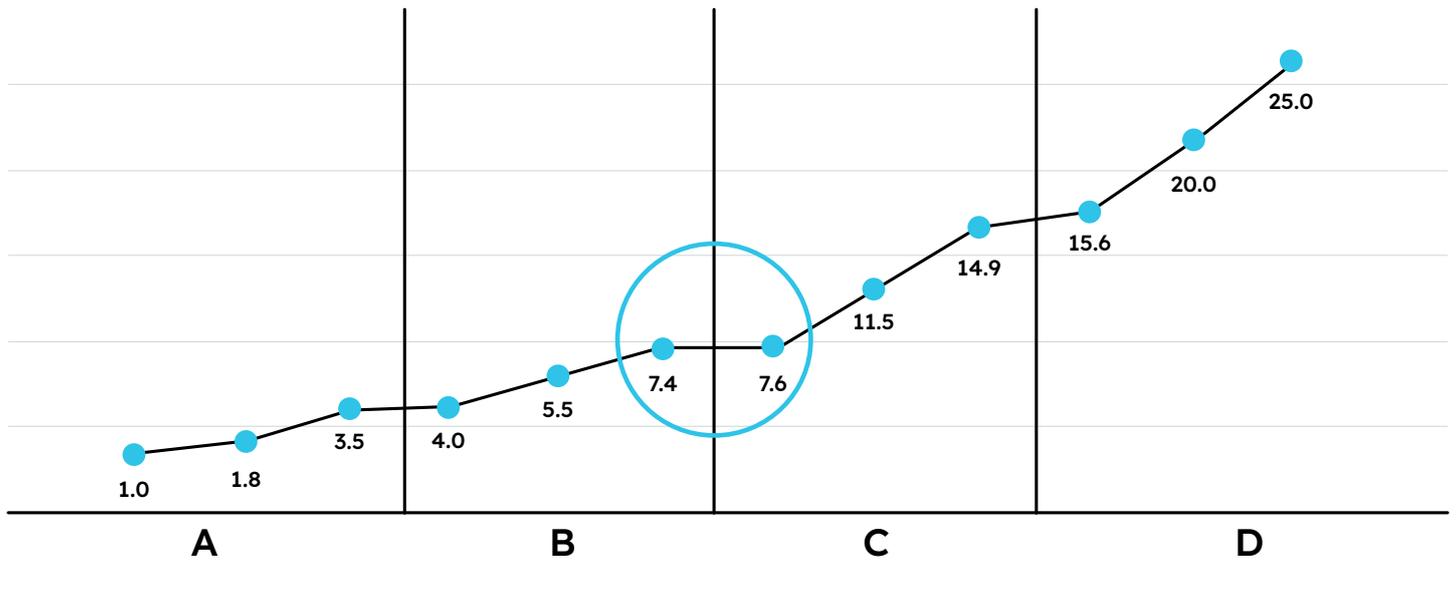


Weight 210 lbs



— VBD
— 4th Edition BI-RADS

The example below represents a borderline case, which is hard to appreciate with a visual assessment, and is especially vulnerable to over- or under-estimation when using the BI-RADS or VDG category. This chart shows the VBD% thresholds between each of the BI-RADS or VDG categories. Since VBD% is a continuous measurement, this scale displays where the patient's breast density is located within the density grade. You can see if patients are on the high or low end of a category or sitting near a threshold.



With the release of BI-RADS 5th Edition, the ACR shifted toward a qualitative description of breast density. The goal was to better communicate mammogram sensitivity, particularly for women with dense breasts, rather than focusing on risk assessment. This qualitative approach of BI-RADS speaks more to masking risk. It may not align as well with quantitative models like TC8, which is designed for risk assessment and does not compromise mammogram sensitivity regarding density, particularly in women with dense breasts.

More than just a score

Leading organizations—including NCCN[®], ACS, ACR, and ACOG—agree that breast cancer risk assessment is essential. Historically, the focus has been on family history. But recent updates from NCCN now recognize breast density as an independent risk factor, while still emphasizing the importance of family history.³

Risk scores are dynamic—they shift as women age, experience menopause, use hormone therapy, or have changes in weight. Breast density usually declines over time and these subtle shifts are captured more precisely with VBD%'s continuous scale than with BI-RADS categories. Switching from a BI-RADS density input to VBD% often changes a woman's risk score—and may change her recommended care plan.

Preparing for VBD%

1. Understand how risk models work so you can explain changes in scores.
2. Educate patients, staff, and referring providers to expect evolving scores over time as personal risk factors change.
3. Ensure you're comparing apples to apples: same risk model, same factors, and consistent density input.
4. Consider using multiple models to give patients a fuller picture and support shared decision-making.

1. Brentnall AR, Cohn WF, Knaus WA, Yaffe MJ, Cuzick J, Harvey JA. A case-control study to add volumetric or clinical mammographic density into the Tyrer-Cuzick breast cancer risk model. *J Breast Imaging*. 2019;1(2):99–106. doi:10.1093/jbi/wbz006.

2. Destounis SV. Impact on risk categorization with inclusion of mammographic density in the Tyrer-Cuzick model. Presented at: Radiological Society of North America (RSNA) 2021 Annual Meeting; November 30, 2021; Chicago, IL. Session SSB05-5.

3. National Comprehensive Cancer Network. NCCN Clinical Practice Guidelines in Oncology: Breast Cancer Screening and Diagnosis. Version 2.2025. Available at: <https://www.nccn.org/guidelines/guidelines-detail?category=1&id=1421>. Accessed 08 MAY 2025.

©2025 copyright Lunit International. All rights reserved.

Third-party trademarks are the property of their respective owners.

BI-RADS is a registered trademark of the American College of Radiology and American College of Radiology Association.

Volpara and Volpara Scorecard are trademarks of Volpara Health Technologies, Inc.

Document number: mkt19172-3