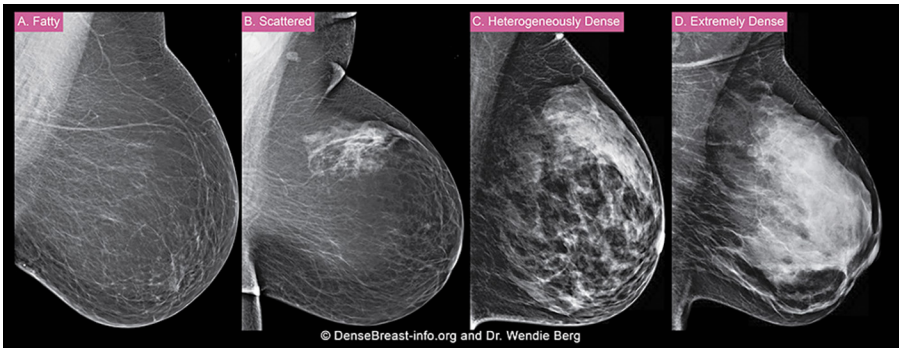
3D vs 2D mammography for detecting cancer in dense breasts

Robin Seitzman, PhD, MPH, and Wendie Berg, MD, PhD

Question

In which categories of breast density (FIGURE 1) does tomosynthesis/3D mammography increase cancer detection over standard digital mammography?

FIGURE 1 Standard digital mammographic images representative of the 4 BI-RADS breast density categories



CHOOSE ONE:

A	Fatty (category A) and scattered fibroglandular density (category B) only
B	Heterogeneously dense (category C) and extremely dense (category D) only
C	Fatty (category A), scattered fibroglandular density (category B), and heterogeneously dense (category C) only
D	All breast densities (categories A, B, C, and D)

RESOURCES

For more information, visit medically sourced **DenseBreast-info.org**. Comprehensive resources include a free CME opportunity, *Dense Breasts and Supplemental Screening*.

Dr. Seitzman is Director of Education and Epidemiology Research, DenseBreast-info.org.

Dr. Berg is Professor of Radiology, University of Pittsburgh School of Medicine and Magee-Womens Hospital of UPMC, Pittsburgh, Pennsylvania, and Chief Scientific Advisor, DenseBreast-info.org.

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Quiz developed in collaboration with DENSE® BREAST-info DenseBreast-info.org

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Answer

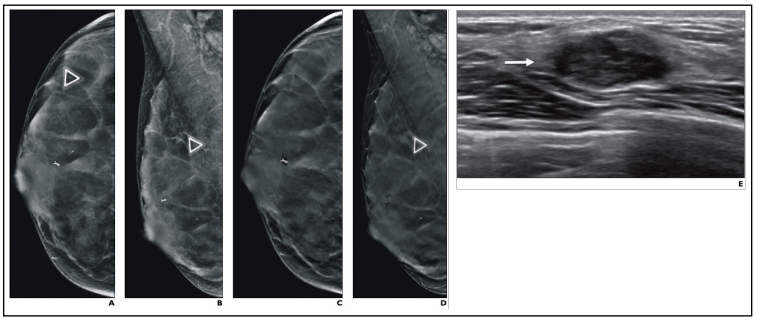
C. Overall, tomosynthesis depicts an additional 1 to 2 cancers per thousand women screened in the first round of screening when added to standard digital mammography;[1-3] however, this improvement in cancer detection is only observed in women with fatty breasts (category A), scattered fibroglandular tissue (category B), and heterogeneously dense breasts (category C). **Importantly, tomosynthesis does not significantly improve breast cancer detection in women with extremely dense breasts (category D).**[2,4]

Digital breast tomosynthesis, also referred to as "3-dimensional mammography" (3D mammography) or tomosynthesis, uses a dedicated electronic detector system to obtain multiple projection images that are reconstructed by the computer to create thin slices or slabs of multiple slices of the breast. These slices can be individually "scrolled through" by the radiologist to reduce tissue overlap that may obscure breast cancers on a standard mammogram. While tomosynthesis improves breast cancer detection in women with fatty, scattered fibroglandular density, and heterogeneously dense breasts, there is very little soft tissue contrast in extremely dense breasts due to insufficient fat, and some cancers will remain hidden by dense tissue even on sliced images through the breast.

FIGURE 2 shows an example of cancer that was missed on tomosynthesis in a 51-year-old woman with extremely dense breasts and right breast pain. The cancer was masked by extremely dense tissue on standard digital mammography and tomosynthesis; no abnormalities were detected. Ultrasonography showed a 1.6-cm, irregular, hypoechoic mass at the site of pain, and biopsy revealed a grade 3 triple-receptor negative invasive ductal carcinoma.

In women with dense breasts, especially extremely dense breasts, supplemental screening beyond tomosynthesis should be considered. Although tomosynthesis doesn't improve cancer detection in extremely dense breasts, it does reduce callbacks for additional testing in all breast densities compared with standard digital mammography. Callbacks are reduced from approximately 100-120 per 1,000 women screened with standard digital mammography alone[1,5] to an average of 80 per 1,000 women when tomosynthesis and standard mammography are interpreted together.[1-3] ●

FIGURE 2 Cancer masked on tomosynthesis by extremely dense breast tissue in a 51-year-old woman with right breast pain



A) Craniocaudal and **B**) Mediolateral oblique standard digital mammograms show extremely dense tissue (triangle marker at the site of pain) and ribbon clips at site of prior benign biopsy. No abnormality detected. **C**) Craniocaudal and **D**) Mediolateral oblique tomosynthesis views. No abnormality detected. **E**) Directed ultrasound image of area of focal pain shows 1.6-cm, irregular, hypoechoic mass (arrow). Ultrasound-guided core needle biopsy revealed a grade 3 triple-receptor negative invasive ductal carcinoma.

Figure reprinted with permission from Berg WA, Rafferty EA, Friedewald SM, et al. Screening algorithms in dense breasts: AJR expert panel narrative review. *AJR Am J Roentgenol*. 2021;216:275-294. doi: 10.2214/AJR.20.24436.

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