

True or false: Breast density increases breast cancer risk

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Which of the following statements about breast density is TRUE?

CHOOSE ONE:

- | | |
|---|---|
| A | As breast density increases, the sensitivity of mammography decreases |
| B | As breast density increases, the risk of developing breast cancer increases |
| C | Breast density can be determined by the way a breast feels |
| D | Answers A and B |
| E | Answers A, B, and C |

RESOURCES

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

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Quiz developed in collaboration with



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Answer

D. The risks associated with dense breast tissue are 2-fold: Dense tissue can mask cancer on a mammogram, and having dense breasts also increases the risk of developing breast cancer. **As breast density increases, the sensitivity of mammography decreases, and the risk of developing breast cancer increases.**

A woman’s breast density is usually determined by a radiologist’s visual evaluation of the mammogram. Breast density also can be measured quantitatively by computer software or estimated on computed tomography scan or magnetic resonance imaging. **Breast density cannot be determined by the way a breast looks or feels.**

Breast density and mammographic sensitivity

Cancers can be hidden or “masked” by dense tissue. On a mammogram, cancer is white. Normal dense tissue also appears white. If a cancer develops in an area of normal dense tissue, it can be harder or sometimes impossible to see it on the mammogram, like trying to see a snowman in a blizzard. As breast density **increases**, the ability to see cancer on mammography **decreases** (FIGURE 1).

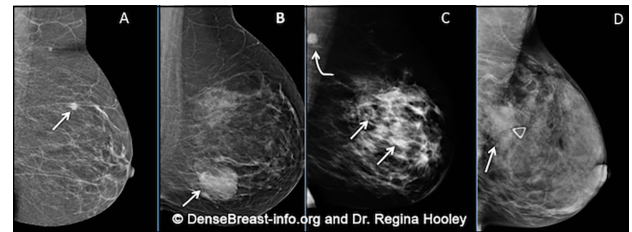
Standard 2D mammography has been shown to miss about 40% of cancers present in women with extremely dense breasts and 25% of cancers present in women with heterogeneously dense breasts.¹⁻⁶ A cancer still can be masked on tomosynthesis (3D mammography) if it occurs in an area of dense tissue (where breast cancers more commonly occur), and tomosynthesis does not improve cancer detection appreciably in women with extremely dense breasts. To find cancer in a woman with dense breasts, additional screening beyond mammography should be considered.

Breast density and breast cancer risk

Dense breast tissue not only reduces mammography effectiveness, it also is a risk factor for the development of breast cancer: **the denser the breast, the higher the risk.**⁷ A meta-analysis across many studies concluded that magnitude of risk increases with each increase in density category, and women with extremely dense breasts (category D) have a 4-fold greater risk of developing breast cancer than do women with fatty breasts (category A), with upper limit of nearly 6-fold greater risk (FIGURE 2).⁸

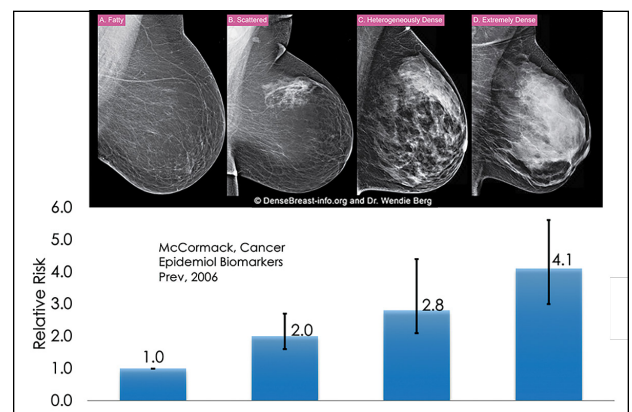
Most women do not have fatty breasts, however. More women have breasts with scattered fibroglandular density.⁹ Women with heterogeneously dense breasts (category C) have about a 1.5-fold greater risk of developing

FIGURE 1 Mammographic images showing how cancer looks in each of the breast density categories



A) Fatty breast: A small cancer (arrow) is easily seen. B) Scattered fibroglandular density: A large cancer is easily seen (arrow) in the relatively fatty portion of the breast, although a small cancer could have been hidden by areas of normal dense tissue. C) Heterogeneously dense breast: A 4-cm cancer (arrows) is hidden by the dense breast tissue. Note the metastatic node in the left axilla (curved arrow). D) Extremely dense breast: A palpable cancer is seen because part of it is located in the back of the breast where there is a small amount of dark fat making it easier to see (arrow and triangle marker indicating lump). If this cancer had been located near the nipple and completely surrounded by white (dense) tissue, it probably would not have been seen on mammography.

FIGURE 2 Breast cancer risk by BI-RADS breast density category



Relative risks compared with fatty breasts: Scattered fibroglandular density, 2.04 (95% CI, 1.56–2.67); Heterogeneously dense, 2.81 (95% CI, 2.13–3.71); Extremely dense, 4.08 (95% CI, 2.96–5.63).

Abbreviations: BI-RADS, Breast imaging-reporting and data system; CI, confidence interval.

breast cancer than those with scattered fibroglandular density (category B), while women with extremely dense breasts (category D) have about a 2-fold greater risk.

There are probably several reasons that dense tissue increases breast cancer risk. One is that cancers arise microscopically in the glandular tissue. The more

glandular tissue, the more susceptible tissue where cancer can develop. Glandular cells divide with hormonal stimulation throughout a woman's lifetime, and each time a cell divides, "mistakes" can be made. An accumulation of mistakes can result in cancer. **The more glandular the tissue, the greater the breast cancer risk.** Women who have had breast reduction

experience a reduced risk for breast cancer: thus, even a reduced absolute amount of glandular tissue reduces the risk for breast cancer. The second is that the local environment around the glands may produce certain growth hormones that stimulate cells to divide, and this is observed with fibrous breast tissue more than fatty breast tissue. ● Text copyright DenseBreast-info.org.

References

1. Berg WA, Zhang Z, Lehrer D, et al. Detection of breast cancer with addition of annual screening ultrasound or a single screening MRI to mammography in women with elevated breast cancer risk. *JAMA*. 2012;307:1394-1404. doi:10.1001/jama.2012.388.
2. Destounis S, Johnston L, Highnam R, et al. Using volumetric breast density to quantify the potential masking risk of mammographic density. *AJR Am J Roentgenol*. 2017;208:222-227. doi: 10.2214/AJR.16.16489.
3. Kerlikowske K, Scott CG, Mahmoudzadeh AP, et al. Automated and clinical breast imaging reporting and data system density measures predict risk for screen-detected and interval cancers: a case-control study. *Ann Intern Med*. 2018;168:757-765. doi: 10.7326/M17-3008.
4. Kolb TM, Lichy J, Newhouse JH. Comparison of the performance of screening mammography, physical examination, and breast US and evaluation of factors that influence them: an analysis of 27,825 patient evaluations. *Radiology*. 2002;225:165-175. doi: 10.1148/radiol.2251011667.
5. Mandelson MT, Oestreicher N, Porter PL, et al. Breast density as a predictor of mammographic detection: comparison of interval- and screen-detected cancers. *J Natl Cancer Inst*. 2000;92:1081-1087. doi: 10.1093/jnci/92.13.1081.
6. Wanders JOP, Holland K, Karssemeijer N, et al. The effect of volumetric breast density on the risk of screen-detected and interval breast cancers: a cohort study. *Breast Cancer Res*. 2017;19:67. doi: 10.1186/s13058-017-0859-9.
7. Society AC. Breast Cancer Facts & Figures 2019-2020. American Cancer Society, Inc. <https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/breast-cancer-facts-and-figures/breast-cancer-facts-and-figures-2019-2020.pdf>. Published 2019. Accessed September 23, 2021.
8. McCormack VA, dos Santos Silva I. Breast density and parenchymal patterns as markers of breast cancer risk: a meta-analysis. *Cancer Epidemiol Biomarkers Prev*. 2006;15:1159-1169. doi: 10.1158/1055-9965.EPI-06-0034.
9. Kerlikowske K, Cook AJ, Buist DS, et al. Breast cancer risk by breast density, menopause, and postmenopausal hormone therapy use. *J Clin Oncol*. 2010;28:3830-3837. doi: 10.1200/JCO.2009.26.4770.