

Risk-based Breast Cancer Screening

Implications of Breast Density



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KEYWORDS

• Risk-based screening • Mammography • Breast density • Supplemental screening

KEY POINTS

- Breast density is just one factor that should be considered when physicians discuss risk-based breast cancer screening options with women.
- Digital mammography remains the primary screening tool for women with dense breasts.
- Based on early evidence, digital breast tomosynthesis, or three-dimensional mammography, may hold promise for improving screening accuracy among women with dense breasts, although studies are ongoing.
- Most women with dense breasts and no other risk factors are likely to experience more harms than benefits with supplemental screening ultrasonography.
- Women with dense breasts and additional risk factors that place them at high lifetime risk for developing breast cancer (>20%) should undergo breast MRI rather than supplemental screening ultrasonography.

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INTRODUCTION

With the recently revised recommendations for routine mammography screening from both the US Preventive Services Task Force (USPSTF) and the American Cancer Society (ACS),^{1,2} there is growing consensus in the medical community that screening regimens should be tailored to patient risk. Overall, routine mammography screening has been shown to reduce mortality and, for patients at average risk, routine screening should begin around age 45 or 50 years. However, for those at increased risk, the start age and screening interval remain uncertain. Moreover, the increasing availability of new screening modalities beyond mammography further complicates the landscape of breast cancer screening.

Patient advocacy groups have brought personalized, risk-based screening to the forefront, focusing on breast density as a common risk factor for developing breast cancer. Given the widespread press coverage regarding breast density and a growing number of US state-level density reporting laws, women are increasingly bringing their questions about density as a risk factor to primary care physicians. Common concerns include the accuracy of screening mammography and whether they should have ultrasonography or other supplemental screening. To inform these discussions, this article describes the current state of risk-based breast cancer screening with a focus on breast density. It reviews the evidence regarding its impact relative to other known risk factors for developing breast cancer, and the evidence for and against supplemental screening for women with dense breasts. It also discusses current modalities for supplemental screening beyond mammography, and recommendations for physicians having shared decision-making discussions with women who have dense breasts.

BREAST CANCER RISK FACTORS

The strongest risk factors for breast cancer include age and genetic mutations. Additional known risk factors include breast density, family history, and reproductive history. These risk factors are outlined in [Table 1](#), along with their associated relative

Table 1 Relative risks of developing breast cancer for women aged 40 to 49 years	
Risk Factor	Breast Cancer Risk Ratio (95% CI)
Two first-degree relatives with breast cancer	3.84 (2.37–6.22)
First-degree relative with breast cancer at age <40 y	3.0 (1.8–4.9)
First-degree relative with breast cancer at age <50 y	2.17 (1.86–2.53)
One first-degree relative with breast cancer	2.14 (1.92–2.38)
Extremely dense breasts on mammography	2.04 (1.84–2.26)
Prior benign breast biopsy	1.87 (1.64–2.13)
Second-degree relative with breast cancer	1.7 (1.4–2.0)
Heterogeneously dense breasts on mammography	1.62 (1.51–1.75)
Current oral contraceptive use	1.30 (1.13–1.49)
Nulliparity	1.25 (1.08–1.46)
Age at first birth ≥30 y	1.20 (1.02–1.42)

Abbreviation: CI, confidence interval.
Adapted from Nelson HD, Zakher B, Cantor A, et al. Risk factors for breast cancer for women age 40 to 49: a systematic review and meta-analysis. *Ann Intern Med* 2012;156(9):644; with permission.

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