JAMA | US Preventive Services Task Force | RECOMMENDATION STATEMENT

Screening for Breast Cancer
US Preventive Services Task Force Recommendation Statement

US Preventive Services Task Force

IMPORTANCE Among all US women, breast cancer is the second most common cancer and the second most common cause of cancer death. In 2023, an estimated 43 170 women died of breast cancer. Non-Hispanic White women have the highest incidence of breast cancer and non-Hispanic Black women have the highest mortality rate.

OBJECTIVE The USPSTF commissioned a systematic review to evaluate the comparative effectiveness of different mammography-based breast cancer screening strategies by age to start and stop screening, screening interval, modality, use of supplemental imaging, or personalization of screening for breast cancer on the incidence of and progression to advanced breast cancer, breast cancer morbidity, and breast cancer–specific or all-cause mortality, and collaborative modeling studies to complement the evidence from the review.

POPULATION Cisgender women and all other persons assigned female at birth aged 40 years or older at average risk of breast cancer.

EVIDENCE ASSESSMENT The USPSTF concludes with moderate certainty that biennial screening mammography in women aged 40 to 74 years has a moderate net benefit. The USPSTF concludes that the evidence is insufficient to determine the balance of benefits and harms of screening mammography in women 75 years or older and the balance of benefits and harms of supplemental screening for breast cancer with breast ultrasound or magnetic resonance imaging (MRI), regardless of breast density.

RECOMMENDATION The USPSTF recommends biennial screening mammography for women aged 40 to 74 years. (B recommendation) The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening mammography in women 75 years or older. (I statement) The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of supplemental screening for breast cancer using breast ultrasonography or MRI in women identified to have dense breasts on an otherwise negative screening mammogram. (I statement)

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Summary of Recommendations

Population	Recommendation	Grade
Women aged 40 to 74 years	The USPSTF recommends biennial screening mammography for women aged 40 to 74 years.	B
Women 75 years or older	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening mammography in women 75 years or older.	I
Women with dense breasts	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of supplemental screening for breast cancer using breast ultrasonography or magnetic resonance imaging (MRI) in women identified to have dense breasts on an otherwise negative screening mammogram.	I

See the "Practice Considerations" section for more information on the patient population to whom this recommendation applies and on screening mammography modalities. USPSTF indicates US Preventive Services Task Force.

See the Summary of Recommendations figure.

Pathway to Benefit

To achieve the benefit of screening and mitigate disparities in breast cancer mortality by race and ethnicity, it is important that all persons with abnormal screening mammography results receive equitable and appropriate follow-up evaluation and additional testing, inclusive of indicated biopsies, and that all persons diagnosed with breast cancer receive effective treatment.

Preamble

The US Preventive Services Task Force (USPSTF) makes recommendations about the effectiveness of specific preventive care services for patients without obvious related signs or symptoms to improve the health of people nationwide.

It bases its recommendations on the evidence of both the benefits and harms of the service and an assessment of the balance. The USPSTF does not consider the costs of providing a service in this assessment.

The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision-making to the specific patient or situation. Similarly, the USPSTF notes that policy and coverage decisions involve considerations in addition to the evidence of clinical benefits and harms.

The USPSTF is committed to mitigating the health inequities that prevent many people from fully benefiting from preventive services. Systemic or structural racism results in policies and practices, including health care delivery, that can lead to inequities in health. The USPSTF recognizes that race, ethnicity, and gender are all social rather than biological constructs. However, they are also often important predictors of health risk. The USPSTF is committed to helping reverse the negative impacts of systemic and structural racism, gender-based discrimination, bias, and other sources of health inequities, and their effects on health, throughout its work.

Importance

Among all US women, breast cancer is the second most common cancer and the second most common cause of cancer death. In 2023, an estimated 43 170 women died of breast cancer.[1] Non-Hispanic White women have the highest incidence of breast cancer (5-year age-adjusted incidence rate, 136.3 cases per 100 000 women) and non-Hispanic Black women have the second highest incidence rate (5-year age-adjusted incidence rate, 128.3 cases per 100 000 women).[2] Incidence gradually increased among women aged 40 to 49 years from 2000 to 2015 but increased more noticeably from 2015 to 2019, with a 2.0% average annual increase.[3] Despite having a similar or higher self-reported rate of mammography screening,[4] Black women are more likely to be diagnosed with breast cancer beyond stage I than other racial and ethnic groups, are more likely to be diagnosed with triple-negative cancers (ie, estrogen receptor–negative [ER–], progesterone receptor–negative [PR–], and human epidermal growth factor receptor 2–negative [HER2–], which are more aggressive tumors, compared with White women,[5] and are approximately 40% more likely to die of breast cancer compared with White women.[6]

USPSTF Assessment of Magnitude of Net Benefit

The USPSTF concludes with moderate certainty that biennial screening mammography in women aged 40 to 74 years has a **moderate net benefit**.

The USPSTF concludes that the **evidence is insufficient** to determine the balance of benefits and harms of screening mammography in women 75 years or older.

The USPSTF concludes that the **evidence is insufficient** to determine the balance of benefits and harms of supplemental screening for breast cancer with breast ultrasound or MRI, regardless of breast density.

See **Table 1** for more information on the USPSTF recommendation rationale and assessment and the eFigure in the Supplement for information on the recommendation grade. See the **Figure** for a summary of the recommendation for clinicians. For more details on the methods the USPSTF uses to determine the net benefit, see the USPSTF Procedure Manual.[7]

Practice Considerations

Patient Population Under Consideration

These recommendations apply to cisgender women and all other persons assigned female at birth (including transgender men and nonbinary persons) 40 years or older at average risk of breast cancer. This is because the net benefit estimates are driven by sex (ie, female) rather than gender identity, although the studies reviewed for this recommendation generally used the term "women." These recommendations apply to persons who have factors associated with an increased risk of breast cancer, such as a family history of breast cancer (ie, a first-degree relative with breast cancer) or having dense breasts. They do not apply to persons who have a genetic marker or syndrome associated with a high risk of breast cancer (eg, *BRCA1* or *BRCA2* genetic variation), a history of high-dose radiation therapy to the chest at a young age, or previous breast cancer or a high-risk breast lesion on previous biopsies. Of note, the USPSTF has a separate recommendation on risk assessment, genetic counseling, and genetic testing for *BRCA*-related cancer,[8] and family history is a common feature of risk assessment tools that help determine likelihood of *BRCA1* or *BRCA2* genetic variation.

Screening Tests

Both digital mammography and digital breast tomosynthesis (DBT, or "3D mammography") are effective mammographic screening modalities. DBT must be accompanied by traditional digital mammography or synthetic digital mammography, which is a 2-dimensional image constructed from DBT data[9,10]; hereafter, references to DBT will imply concurrent use with digital mammography or synthetic digital mammography. In general, studies have reported small increases in positive predictive value with DBT compared with digital mammography. Trials reporting on at least 2 consecutive rounds of screening have generally found no statistically

Table 1. Summary of USPSTF Rationale

Rationale	Assessment
Benefits of screening for breast cancer	• Adequate evidence that biennial screening mammography has a moderate benefit to reduce breast cancer mortality in women aged 40 to 74 years. • Inadequate evidence on the benefits of screening mammography in women 75 years or older. • Inadequate evidence on the benefits of supplemental screening for breast cancer using breast ultrasonography or MRI after a negative screening mammogram, regardless of breast density.
Harms of screening for breast cancer	• Adequate evidence that the harms of biennial screening mammography in women aged 40 to 74 years are small. • Inadequate evidence on the harms of supplemental screening for breast cancer using breast ultrasonography or MRI.
USPSTF assessment	• The USPSTF concludes with moderate certainty that biennial screening mammography in women aged 40 to 74 years has a moderate net benefit. • The USPSTF concludes that the evidence is insufficient to determine the balance of benefits and harms of screening mammography in women 75 years or older. • The USPSTF concludes that the evidence is insufficient to determine the balance of benefits and harms of supplemental screening for breast cancer with breast ultrasonography or MRI in women who have a negative screening mammogram result, regardless of breast density.

Abbreviations: MRI, magnetic resonance imaging; USPSTF, US Preventive Services Task Force.

significant difference in breast cancer detection or in tumor characteristics (tumor size, histologic grade, or node status) when comparing screening with DBT vs digital mammography.[4]

The Breast Cancer Surveillance Consortium (BCSC) is a network of 6 active breast imaging registries and 2 historic registries, providing a large observational database related to breast cancer screening.[11] Collaborative modeling, using inputs from BCSC data, suggests similar benefits and fewer false-positive results with DBT compared with digital mammography.[12,13]

Screening Interval

Available evidence suggests that biennial screening has a more favorable trade-off of benefits vs harms than annual screening. BCSC data showed no difference in detection of cancers stage IIB or higher and cancers with less favorable prognostic characteristics with annual vs biennial screening interval for any age group,[14] and modeling data estimate that biennial screening has a more favorable balance of benefits to harms (eg, life-years gained or breast cancer deaths averted per false-positive result) compared with annual screening.[12]

Treatment or Intervention

Breast cancer treatment regimens are highly individualized according to each patient's clinical status, cancer stage, tumor biomarkers, clinical subtype, and personal preferences.[15] Ductal carcinoma in situ (DCIS) is a noninvasive condition with abnormal cells in the breast duct lining with uncertainty regarding its prognostic significance. Consequently, there is clinical variability in the treatment approach when DCIS is identified at screening. It is unknown what proportion of screen-detected DCIS represents overdiagnosis (ie, a lesion that would not have led to health problems in the absence of detection by screening). In general, DCIS treatment, which may include surgery, radiation, and endocrine treatment, is intended to reduce the risk for future invasive breast cancer.

Disparities in Breast Cancer Outcomes and Implementation Considerations

Mortality from breast cancer is highest for Black women, even when accounting for differences in age and stage at diagnosis; mortality is approximately 40% higher for Black women (5-year age-adjusted mortality rate, 27.6 per 100 000 women) compared with White women (5-year age-adjusted mortality rate, 19.7 per 100 000 women).[6] While the underlying causes of this disparity are complex, the National Institute of Minority Health and Disparities has developed a framework that recognizes multiple determinants, including the health care system, the sociocultural and built environments, behavioral factors, and genetic factors, that can contribute to health inequities.[16] Inequities in breast cancer mortality can be examined at each step along the cancer screening, diagnosis, treatment, and survival pathway with these factors in mind. The higher mortality rate for Black women diagnosed with breast cancer in the US aligns with other health inequities that are attributed to the effects of structural racism, which include inequalities in resources, harmful exposures, and access to and delivery of high-quality health care.[17-19] Racial and economic residential segregation driven by discriminatory housing policies has been associated with increased exposure to toxic environments such as air pollution, industrial waste, and built environments that do not support health, and stressful life conditions. Residential segregation has also been associated with both an increased risk of triple-negative breast cancer and poorer breast cancer–specific survival in Black women.[20-22]

Black women have a higher incidence of breast cancer with at least 1 negative molecular marker, and the incidence of triple-negative cancers (ie, ER–, PR–, and HER2–) is twice as high in Black women compared with White women (24.2 vs 12.3 cases per 100 000 women).[5] The higher incidence of negative hormonal receptor status leads to worse outcomes because these subtypes are less readily detected through screening and less responsive to current therapy,[23] and triple-negative cancers are more likely to be aggressive and diagnosed at later stages than other subtypes. It is important to note that observed regional differences in the incidence of hormonal receptor–negative cancer within and between racial groups suggest that environmental factors and social determinants of health, including racism, are largely responsible for the differential risk of developing hormonal receptor–negative cancer.[24,25] Although variation in the incidence of cancer subtypes explains some of the differences in breast cancer mortality, racial differences in mortality within subtypes point to barriers to obtaining high-quality health care and disparities in screening follow-up and treatment initiation as contributors.[24]

Figure. Clinician Summary: Screening for Breast Cancer

What does the USPSTF recommend?	**Women aged 40 to 74 years:** The USPSTF recommends biennial screening mammography. Grade: B
	Women 75 years or older: The current evidence is insufficient to assess the balance of benefits and harms of screening mammography in women 75 years or older. Grade: I statement
	Women with dense breasts: The current evidence is insufficient to assess the balance of benefits and harms of supplemental screening for breast cancer using breast ultrasonography or magnetic resonance imaging (MRI) in women identified to have dense breasts on an otherwise negative screening mammogram. Grade: I statement
To whom does this recommendation apply?	These recommendations apply to cisgender women and all other persons assigned female at birth (including transgender men and nonbinary persons) 40 years or older at average risk of breast cancer. They also apply to women who have factors associated with an increased risk of breast cancer, such as a family history of breast cancer (ie, a first-degree relative with breast cancer) or having dense breasts. These recommendations do not apply to persons who have a genetic marker or syndrome associated with a high risk of breast cancer (eg, *BRCA1* or *BRCA2* genetic variation), a history of high-dose radiation therapy to the chest at a young age, or previous breast cancer or a high-risk breast lesion on previous biopsies.
What's new?	• For the current recommendation, the USPSTF recommends biennial screening mammography for women aged 40 to 49 years, rather than individualizing the decision to undergo screening for women in this age group. • This recommendation is otherwise consistent with the 2016 USPSTF recommendation on screening for breast cancer.
How to implement this recommendation?	• Screen women aged 40 to 74 years with a mammogram every 2 years. • Both digital mammography and digital breast tomosynthesis (or "3D mammography") are effective mammographic screening modalities. • To achieve the benefit of screening and mitigate disparities in breast cancer mortality by race and ethnicity, it is important that all persons with abnormal screening mammography findings receive equitable and appropriate follow-up evaluation and additional testing, inclusive of indicated biopsies, and that all persons diagnosed with breast cancer receive effective treatment. • There is insufficient evidence to recommend for or against screening for breast cancer in women 75 years or older. • There is insufficient evidence to recommend for or against supplemental screening using breast ultrasonography or MRI in women who have dense breasts. • Clinicians should use their clinical judgment regarding whether to screen for breast cancer in women 75 years or older and regarding whether to use supplemental screening in women who have dense breasts and an otherwise normal mammogram.
What additional information should clinicians know about this recommendation?	There are pronounced inequities in breast cancer stage at diagnosis, subtype, and mortality. Black women are more likely to be diagnosed with breast cancer beyond stage I, are more likely to be diagnosed with triple-negative cancers (ie, ER–, PR–, and HER2–), which are more aggressive tumors, and are approximately 40% more likely to die of breast cancer compared with White women.
Why is this recommendation and topic important?	Breast cancer is the second most common cancer and the second most common cause of cancer death among US women. In 2023, an estimated 43 170 women died of breast cancer.
What are other relevant USPSTF recommendations?	The USPSTF has issued recommendations on the use of medications to reduce women's risk for breast cancer, as well as risk assessment, genetic counseling, and genetic testing for *BRCA1*- or *BRCA2*-related cancer.
What are additional tools and resources?	• The National Cancer Institute has information on breast cancer screening for health care professionals (https://www.cancer.gov/types/breast/hp/breast-screening-pdq) and for patients (https://www.cancer.gov/types/breast/patient/breast-screening-pdq). • The Centers for Disease Control and Prevention has information on breast cancer screening (https://www.cdc.gov/cancer/breast/basic_info/screening.htm).
Where to read the full recommendation statement?	Visit the USPSTF website (https://www.uspreventiveservicestaskforce.org/) or the *JAMA* website (https://jamanetwork.com/collections/44068/united-states-preventive-services-task-force) to read the full recommendation statement. This includes more details on the rationale of the recommendation, including benefits and harms; supporting evidence; and recommendations of others.

The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision-making to the specific patient or situation.

ER– indicates estrogen receptor–negative; HER2–, human epidermal growth factor receptor 2–negative; and PR–, progesterone receptor–negative.

Of note, Black women have a rate of self-reported mammography screening similar to or higher than that for all women (84.5% vs 78%, respectively, in the past 2 years), based on 2020 data.[4] However, benefits from mammography screening require initiation and completion of appropriate and effective follow-up evaluation and treatment. Both screening and guideline-concordant treatment are essential for reducing breast cancer mortality,[26] highlighting the importance of timely and effective treatment at the earliest stage of diagnosis. Delays and inadequacies in the diagnostic and treatment pathway downstream from screening likely contribute to increased mortality compared with women receiving prompt, effective care.

Disparities in follow-up after screening and treatment have been observed for Asian, Black, and Hispanic women.[27-36] Adjuvant endocrine therapy reduces the risk of cancer recurrence among individuals with hormonal receptor–positive cancers, but long-term adherence can be difficult. Black women are more likely to discontinue adjuvant endocrine therapy compared with White women, in part due to greater physical (vasomotor, musculoskeletal, or cardiorespiratory) and psychological (distress or despair) symptom burdens.[35,36] Improvements in access to effective health care, removal of financial barriers, and use of support services to ensure equitable follow-up after screening and timely and effective treatment of breast cancer have the potential to reduce mortality for individuals experiencing disparities related to racism, rural location,[37] low income, or other factors associated with lower breast cancer survival.

Suggestions for Practice Regarding the I Statement

Potential Preventable Burden

Breast cancer incidence increases with age and peaks among persons aged 70 to 74 years, although rates in persons 75 years or older remain high (453.3 and 409.9 cases per 100 000 women aged 75 to 79 and 80 to 84 years, respectively, compared with 468.2 cases per 100 000 women aged 70 to 74 years), and mortality from breast cancer increases with increasing age.[38,39] However, no randomized clinical trials (RCTs) of breast cancer screening included women 75 years or older.[4] Collaborative modeling suggests that screening in women 75 years or older is of benefit,[12] but a trial emulation found no benefit with breast cancer screening in women aged 75 to 84 years.[40] Thus, there is insufficient evidence to recommend for or against screening mammography in women 75 years or older.

In women with dense breasts who have an otherwise normal mammogram result, there is insufficient evidence about the effect of supplemental screening using breast ultrasonography or magnetic resonance imaging (MRI) on health outcomes such as breast cancer morbidity and mortality. Dense breasts are associated with both reduced sensitivity and specificity of mammography and with an increased risk of breast cancer.[41,42] However, increased breast density itself is not associated with higher breast cancer mortality among women diagnosed with breast cancer, after adjustment for stage, treatment, method of detection, and other risk factors, according to data from the BCSC.[43]

Potential Harms

Potential harms of screening mammography include false-positive results, which may lead to psychological harms,[44] additional testing, and invasive follow-up procedures; overdiagnosis and overtreatment of lesions that would not have led to health problems in the absence of detection by screening; and radiation exposure.

Current Practice

Centers for Disease Control and Prevention data show that as of 2015, more than 50% of women 75 years or older reported having a mammogram within the past 2 years.[45] At present, 38 states and the District of Columbia require patient notification of breast density when mammography is performed; in some states, legislation also includes notification language informing women that they should consider adjunctive screening.[46] Starting in September 2024, the US Food and Drug Administration will require mammography centers to notify patients of their breast density, inform them that dense breast tissue increases the risk of breast cancer and makes it harder to detect on a mammogram, and that other imaging tests may help to find cancer.[47]

Additional Tools and Resources

The National Cancer Institute has information on breast cancer screening for health care professionals (https://www.cancer.gov/types/breast/hp/breast-screening-pdq) and for patients (https://www.cancer.gov/types/breast/patient/breast-screening-pdq).

The Centers for Disease Control and Prevention has information on breast cancer screening (https://www.cdc.gov/cancer/breast/basic_info/screening.htm).

Other Related USPSTF Recommendations

The USPSTF has made recommendations about the use of medications to reduce women's risk for breast cancer[48] as well as risk assessment, genetic counseling, and genetic testing for *BRCA1*- or *BRCA2*-related cancer.[8]

Update of Previous USPSTF Recommendation

This recommendation updates the 2016 recommendation on breast cancer screening. In 2016, the USPSTF recommended biennial screening mammography for women aged 50 to 74 years and individualizing the decision to undergo screening for women aged 40 to 49 years, based on factors such as individual risk and personal preferences and values. The USPSTF concluded that the evidence was insufficient to assess the benefits and harms of DBT as a primary screening method; the balance of benefits and harms of adjunctive screening for breast cancer using breast ultrasonography, MRI, or DBT in women identified to have dense breasts on an otherwise negative screening mammogram; and the balance of benefits and harms of screening mammography in women 75 years or older.[49] For the current recommendation, the USPSTF recommends biennial screening mammography for women aged 40 to 74 years. The USPSTF again finds that the evidence is insufficient to assess the balance of benefits and harms of supplemental screening for breast cancer using breast ultrasonography or MRI in women identified to have dense breasts on an otherwise negative screening mammogram and the balance of benefits and harms of screening mammography in women 75 years or older. Current evidence suggests that both digital mammography and DBT are effective primary screening modalities.

Supporting Evidence

Scope of Review

To update its 2016 recommendation, the USPSTF commissioned a systematic review[4,50] on the comparative effectiveness of different mammography-based breast cancer screening strategies by age to start and stop screening, screening interval, modality, use of supplemental imaging, or personalization of screening for breast cancer on the incidence of and progression to advanced breast cancer, breast cancer morbidity, and breast cancer–specific or all-cause mortality. To be included in the review, studies needed to report on detection and stage distribution of screen-detected invasive breast cancer over more than 1 round of screening, to allow assessment for evidence of stage shift (as evidence of potential benefit). Studies that reported only performance characteristics of testing (eg, sensitivity and specificity) or only detection rates were not eligible for inclusion. The review also assessed the harms of different breast cancer screening strategies.[4] Evidence from the trials that established breast cancer screening effectiveness with mammography has not been updated, as there are no new studies that include a group that is not screened. Analyses from prior reviews of that evidence were considered foundational evidence for the current recommendation.

In addition to the systematic evidence review, the USPSTF commissioned collaborative modeling studies from 6 CISNET (Cancer Intervention and Surveillance Modeling Network) modeling teams to provide information about the benefits and harms of breast cancer screening strategies that vary by the ages to begin and end screening, screening modality, and screening interval.[12] In alignment with the USPSTF's commitment to improve health equity, the USPSTF also commissioned modeling studies from 4 CISNET teams that have developed race-specific breast cancer models for Black women, to provide information about the effectiveness and harms of these different screening strategies in Black women. The USPSTF commissions decision modeling to help inform how best to target or implement a clinical preventive service when empirical evidence supports provision of the service.[51] The modeling studies complement the evidence that the systematic review provides.

Given the documented racial disparities in breast cancer outcomes, in addition to commissioning modeling studies specific to Black women, the evidence review included contextual questions on the drivers behind and approaches to address disparities in health outcomes related to breast cancer, particularly the higher mortality in Black women.

Benefits and Comparative Benefits of Early Detection and Treatment

Randomized trials that began enrolling participants more than 30 to 40 years ago have established the effectiveness of screening mammography to reduce breast cancer mortality. A meta-analysis conducted in support of the 2016 USPSTF breast cancer screening recommendation found that screening mammography was associated with relative risk (RR) reductions in breast cancer mortality of 0.88 (95% CI, 0.73-1.00; 9 trials) for women aged 39 to 49 years, 0.86 (95% CI, 0.68-0.97; 7 trials) for women aged 50 to 59 years, 0.67 (95% CI, 0.54-0.83; 5 trials) for women aged 60 to 69 years, and 0.80 (95% CI, 0.51-1.28; 3 trials) for women aged 70 to 74 years,[44] and an updated analysis of 3 Swedish screening trials reported a 15% relative reduction in breast cancer mortality for women aged 40 to 74 years (RR, 0.85 [95% CI, 0.73-0.98]).[52] Only 1 of these trials enrolled a significant proportion of Black women.[53] None of the trials nor the combined meta-analysis demonstrated a difference in all-cause mortality with screening mammography. The current USPSTF review focused on the comparative benefits of different screening strategies.

Age to Start or Stop Screening

The USPSTF did not identify any RCTs designed to test the comparative effectiveness of different ages to start or stop screening that reported morbidity, mortality, or quality-of-life outcomes. One trial emulation study (n = 264 274), using a random sample from Medicare claims data, estimated the effect of women stopping screening at age 70 years compared with those who continued annual screening after age 70 years. Based on survival analysis, this study reported that continued screening between the ages of 70 and 74 years was associated with a 22% decrease in the risk of breast cancer mortality, compared with a cessation of screening at age 70 years. While collaborative modeling estimated that, compared with a stopping age of 74, screening biennially starting at age 40 years until age 79 years would lead to 0.8 additional breast cancer deaths averted, the trial emulation study found that there was no difference in the hazard ratio or absolute rates of breast cancer mortality with continued screening vs discontinued screening from ages 75 to 79 years or ages 80 to 84 years.[40]

Collaborative modeling data estimated that compared with biennial screening from ages 50 to 74 years, biennial screening starting at age 40 years until 74 years would lead to 1.3 additional breast cancer deaths averted (median, 6.7 vs 8.2, respectively, across 6 models) per 1000 women screened over a lifetime of screening for all women (**Table 2**; note that the 1.3 deaths averted is the median of the differences in each of 6 models, which is not the same as the difference of the medians noted above and in the table). Models also estimated that screening benefits for Black women are similar for breast cancer mortality reduction and greater for life-years gained and breast cancer deaths averted compared with all women. Thus, biennial screening starting at age 40 years would result in 1.8 additional breast cancer deaths averted (median, 9.2 deaths averted for screening from ages 50 to 74 vs 10.7 deaths averted, across 4 models) per 1000 women screened for Black women (Table 2; note that the 1.8 deaths averted is the median of the differences in each of 4 models, which is not the same as the difference of the medians noted above and in the table).[12] Epidemiologic data has shown that the incidence rate of invasive breast cancer for 40- to 49-year-old women has increased an average of 2.0% annually between 2015 and 2019, a higher rate than in previous years.[3] These factors led the USPSTF to conclude that screening mammography in women aged 40 to 49 years has a moderate benefit by reducing the number of breast cancer deaths.

Screening Interval

The USPSTF did not identify any randomized trials directly comparing annual vs biennial screening that reported morbidity, mortality, or quality-of-life outcomes. One trial (n = 14 765) conducted

Table 2. Estimated Median Lifetime Benefits and Harms of Biennial Screening Mammography With Digital Breast Tomosynthesis for a Cohort of 1000 Women and a Cohort of 1000 Black Women by Starting Age of 40 vs 50 Years

Screening strategy (interval, start-stop ages in years)	Mammograms	Breast cancer deaths averted	Life-years gained	False-positive results	Overdiagnosis
All women (across 6 models)					
Biennial (40-74)	16 116	8.2	165.2	1376	14
Biennial (50-74)	11 208	6.7	120.8	873	12
Black women (across 4 models)					
Biennial (40-74)	15 801	10.7	228.9	1253	18
Biennial (50-74)	10 905	9.2	176.7	814	16

in Finland during the years 1985 to 1995 assigned participants aged 40 to 49 years to annual or triennial screening invitations based on birth year (even birth year: annual; odd birth year: triennial) and reported similar mortality from incident breast cancer and for all-cause mortality between the 2 groups, with follow-up to age 52 years.[54]

A nonrandomized study using BCSC data (n = 15 440) compared the tumor characteristics of cancers detected following annual vs biennial screening intervals.[14] The relative risk of being diagnosed with a stage IIB or higher cancer and cancer with less favorable characteristics was not statistically different for biennially vs annually screened women in any of the age categories. The risk of a stage IIB or higher cancer diagnosis and of having a tumor with less favorable prognostic characteristics was higher for premenopausal women screened biennially vs annually (RR, 1.28 [95% CI, 1.01-1.63] and RR, 1.11 [95% CI, 1.00-1.22], respectively). However, this study did not conduct formal tests for interaction in the subgroup comparisons and did not adjust for multiple comparisons.

One RCT (n = 76 022) conducted between 1989 and 1996 randomized individuals to annual or triennial screening and reported on breast cancer incidence. The number of screen-detected cancers was higher in the annual screening study group (RR, 1.64 [95% CI, 1.28-2.09]). However, the total number of cancers diagnosed either clinically or with screening was similar after 3 years of screening. Cancers occurring in the annual screening group (including clinically diagnosed cancers) did not differ by prognostic features such as tumor size, node positivity status, or histologic grade compared with those in the triennial screening group.[55]

Collaborative modeling estimated that biennial screening results in greater incremental life-years gained and mortality reduction per mammogram and has a more favorable balance of benefits to harms for all women and for Black women, compared with annual screening. While modeling suggests that screening Black women annually and screening other women biennially would reduce the disparity in breast cancer mortality,[12,13] trial or observational evidence is lacking that screening any group of women annually compared with biennial screening improves mortality from breast cancer.[4]

DBT vs Digital Mammography

The USPSTF did not identify any RCTs or observational studies that compared screening with DBT vs digital mammography and reported morbidity, mortality, or quality-of-life outcomes.

Three RCTs[56-58] and 1 nonrandomized study[59] compared detection of invasive cancer over 2 rounds of screening with DBT vs digital mammography. These trials screened all participants with the same screening modality at the second screening round—digital mammography in 2 trials and the nonrandomized study and DBT in 1 trial. Stage shift or differences in tumor characteristics across screening rounds could offer indirect evidence of potential screening benefit. The trials found no statistically significant difference in detection at the second screening round (pooled RR, 0.87 [95% CI, 0.73-1.05]; 3 trials [n = 105 064]).[4,50] The nonrandomized study (n = 92 404) found higher detection at round 1 for the group screened with DBT and higher detection at round 2 for the group screened with digital mammography at both rounds. There were no statistically significant differences in tumor diameter, histologic grade, and node status at the first or second round of screening in any of these studies.

Collaborative modeling data estimated that the benefits of DBT are similar to the estimated benefits of digital mammography (eg, approximately 5 to 6 more life-years gained per 1000 women screened).[12,13]

Supplemental Screening With MRI or Ultrasonography, or Personalized Screening

The USPSTF found no studies of supplemental screening with MRI or ultrasonography, or studies of personalized (eg, risk-based) screening strategies, that reported on morbidity or mortality or on cancer detection and characteristics over multiple rounds of screening.[4,50] Collaborative modeling studies did not investigate the effects of screening with MRI or ultrasonography. Modeling generally estimated that the benefits of screening mammography would be greater for persons at modestly increased risk (eg, the risk of breast cancer associated with a first-degree family history of breast cancer).[12,13]

Harms of Screening

For this recommendation, the USPSTF also reviewed the harms of screening for breast cancer and whether the harms varied by screening strategy. Potential harms of screening for breast cancer include false-positive and false-negative results, need for additional imaging and biopsy, overdiagnosis, and radiation exposure.

The most common harm is a false-positive result, which can lead to psychological harms such as anxiety or breast cancer–specific worry,[44] as well as additional testing and invasive follow-up procedures without the potential for benefit. Collaborative modeling data estimated that a strategy of screening biennially from ages 40 to 74

years would result in 1376 false-positive results per 1000 women screened over a lifetime of screening (Table 2).[12,13]

Overdiagnosis occurs when breast cancer that would never have become a threat to a person's health, or even apparent, during their lifetime is found due to screening. It is not possible to directly observe for any individual person whether they have or do not have an overdiagnosed tumor; it is only possible to indirectly estimate the frequency of overdiagnosis that may occur across a screened population. Estimates of the percentage of cancers diagnosed in a study that represent overdiagnosed cancers from RCTs that had comparable groups at baseline, had adequate follow-up, and did not provide screening to the control group at the end of the trial range from approximately 11% to 19%.[4,50] Collaborative modeling data estimate that a strategy of screening biennially from ages 40 to 74 years would lead to 14 overdiagnosed cases of breast cancer per 1000 persons screened over the lifetime of screening (Table 2), although with a very wide range of estimates (4 to 37 cases) across models.[12,13]

Age to Start or Stop Screening

One trial emulation (n = 264 274) compared discontinuation of mammography screening at age 70 years or older with continued annual screening beyond this age.[40] Overall, the 8-year cumulative risk of a breast cancer diagnosis was higher for the continued annual screening strategy after age 70 years (5.5% overall; 5.3% in women aged 70-74 years; 5.8% in women aged 75-84 years) compared with the stop screening strategy (3.9% overall; same proportion for both age groups). Fewer cancers were diagnosed under the stop screening strategy (ages 70-84 years), resulting in a lower risk of undergoing follow-up and treatment. For women aged 75 to 84 years, additional diagnoses did not contribute to a difference in the risk of breast cancer mortality, likely due to competing causes of death, raising the possibility that the additionally diagnosed cancers represent overdiagnosis.

Collaborative modeling data estimated that lowering the age to start screening to 40 years from 50 years would result in about a 60% increase in false-positive results, and 2 additional overdiagnosed cases of breast cancer (range, 0 to 4) per 1000 women over a lifetime of screening (Table 2).[12,13]

Screening Interval

Rates of interval cancers (cancer diagnosis occurring between screening) reported in screening studies reflect a combination of cancers that were missed during previous screening examinations (false-negative results) and incident cancers emerging between screening rounds. Evidence from studies comparing various intervals and reporting on the effect of screening interval on the rate of interval cancers is mixed. One RCT comparing annual vs triennial screening reported that the rate of interval cancers was significantly lower in the annual invitation group (1.84 cases per 1000 women initially screened) than in the triennial invitation group (2.70 cases per 1000 women initially screened) (RR, 0.68 [95% CI, 0.50-0.92]),[55] while a quasi-randomized study, also comparing annual vs triennial screening, found no difference in the number of interval cancers between the 2 groups.[54]

Based on 2 studies, false-positive results were more likely to occur with annual screening compared with longer intervals between screening.[60,61] One of these studies, using data from the BCSC, reported that biennial screening led to a 5% absolute decrease in the 10-year cumulative false-positive biopsy rate compared with annual screening, whether screening was conducted with DBT or digital mammography.[60] Collaborative modeling estimated that annual screening results in more false-positive results and breast cancer overdiagnosis. For example, a strategy of screening annually from ages 40 to 74 years would result in about 50% more false-positive results and 50% more overdiagnosed cases of breast cancer compared with biennial screening for all women and a similar increase in false-positive results and a somewhat smaller increase in overdiagnosed cases for Black women.[12,13]

DBT vs Digital Mammography

Three RCTs did not show statistically significant differences in the risk of interval cancer following screening with DBT or digital mammography (pooled RR, 0.87 [95% CI, 0.64-1.17]; 3 trials [n = 130 196]).[4,50] Five nonrandomized studies generally support the RCT findings. Three of the nonrandomized studies found no significant difference in the rate of interval cancers diagnosed following screening with DBT or digital mammography,[59,62,63] while 1 study found a slight increased risk with DBT screening[64] and 1 study found an unadjusted decreased risk with DBT screening.[65]

A pooled analysis of 3 RCTs (n = 105 244) comparing screening with DBT vs digital mammography did not find a difference in false-positive results at the second round of screening.[4,50] A nonrandomized study using BCSC data reported that the estimated cumulative probability of having at least 1 false-positive result over 10 years of screening was generally lower with DBT screening compared with digital mammography screening (annual screening: 10-year cumulative probability of a false-positive result was 49.6% with DBT and 56.3% with digital mammography; biennial screening: 10-year cumulative probability of a false-positive result was 35.7% for DBT and 38.1% for digital mammography). The risk of having a biopsy over 10 years of screening was slightly lower when comparing annual screening with DBT vs digital mammography but did not differ between DBT and digital mammography for biennial screening (annual screening: 10-year cumulative probability of a false-positive biopsy was 11.2% with DBT and 11.7% with digital mammography; biennial screening: 10-year cumulative probability of a false-positive biopsy was 6.6% for DBT and 6.7% for digital mammography). When results were stratified by breast density, the difference in false-positive result probability with DBT vs digital mammography was largest for women with nondense breasts and was not significantly different among women with extremely dense breasts.[60] Collaborative modeling, using inputs from BCSC data, estimated that screening women aged 40 to 74 years with DBT would result in 167 fewer false-positive results (range, 166-169) per 1000 persons screened, compared with digital mammography.[12,13]

In the 3 RCTs cited above, rates of DCIS detected did not differ between persons screened with DBT and digital mammography.[56-58]

Screening with DBT includes evaluation of 2-dimensional images, generated either with digital mammography or using a DBT scan to produce a synthetic digital mammography image.[9,10] Studies using DBT with digital mammography screening reported radiation exposure approximately 2 times higher compared with the digital mammography–only control group.[56,58,66] Differences in radiation exposure were smaller in studies using DBT/synthetic digital mammography compared with digital mammography.[67,68]

Supplemental Screening With Ultrasonography or MRI

The DENSE RCT, which compared invitation to screening with digital mammography plus MRI compared with digital mammography alone in participants aged 50 to 75 years with extremely dense breasts and a negative mammogram result, reported a significantly lower rate of invasive interval cancers—2.2 cases per 1000 women invited to screening with digital mammography plus MRI, compared with 4.7 cases per 1000 women invited to screening with digital mammography only (RR, 0.47 [95% CI, 0.29-0.77]).[69]

In that trial, the rate of recall among participants who underwent additional imaging with MRI was 94.9 per 1000 screens, the false-positive rate was 79.8 per 1000 women screened, and the rate of biopsy was 62.7 per 1000 women screened.[70] In a nonrandomized study using US insurance claims data, individuals who had an MRI compared with those receiving only a mammogram were more likely in the subsequent 6 months to have additional cascade events related to extramammary findings (adjusted difference between groups, 19.6 per 100 women screened [95% CI, 8.6-30.7]), mostly additional health care visits.[71]

In an RCT comparing screening with digital mammography plus ultrasonography vs digital mammography alone conducted in persons aged 40 to 49 years and not specifically among persons with dense breasts, the interval cancer rates reported were not statistically significantly different between the 2 groups (RR, 0.58 [95% CI, 0.31-1.08])[72]; similarly, in a nonrandomized study comparing digital mammography plus ultrasonography vs digital mammography alone using BCSC data, there was no difference in interval cancers (adjusted RR, 0.67 [95% CI, 0.33-1.37]),[73] although in both studies the confidence intervals were wide for this uncommon outcome. In the BCSC analysis, the rates of referral to biopsy and false-positive biopsy recommendations were twice as high and short interval follow-up was 3 times higher for the group screened with ultrasonography.[73]

Response to Public Comment

A draft version of this recommendation statement was posted for public comment on the USPSTF website from May 9, 2023, to June 6, 2023. The USPSTF received many comments on the draft recommendation and appreciates all the thoughtful views and perspectives that were shared. Many comments agreed with the draft recommendation. Several comments suggested that there should be no upper age limit for breast cancer screening or that an upper age should be based on life expectancy. In response, the USPSTF notes that no trials of breast cancer screening enrolled women 75 years or older and an emulated trial showed no benefit to screening women aged 75 to 79 or 80 to 84. Some comments suggested that breast cancer screening should start prior to age 40 years, either for all women or for women who are at increased risk of breast cancer. Relatedly, some comments expressed that risk-based screening should be recommended. In response, the USPSTF would like to reiterate that no trials of breast cancer screening enrolled women younger than 39 years. Additionally, the USPSTF found no evidence on the benefits or harms of individualized breast cancer screening based on risk factors. Several randomized trials of risk-based screening are underway (eg, the WISDOM trial) that may provide valuable information regarding this question.

Several comments expressed that breast cancer screening should be recommended annually. In response, the USPSTF would like to reiterate that it did not identify any randomized trials directly comparing annual vs biennial screening. Two trials conducted in the 1980s to 1990s reported no difference in breast cancer mortality or breast cancer features such as tumor size, node positivity status, or histologic grade when comparing annual vs triennial screening. The USPSTF considers both the benefits and harms of different screening intervals and notes that the modeling studies commissioned to support this recommendation found that biennial screening results in greater life-years gained and mortality reduction per mammogram and has a more favorable balance of benefits to harms compared with annual screening.

Many comments requested that the USPSTF recommend supplemental screening with MRI or ultrasound for women with dense breasts. Some comments expressed that this would improve health outcomes, while other comments requested this recommendation so that supplemental screening would be covered by insurance. In response, the USPSTF wants to restate that it found insufficient evidence on the effects of supplemental screening on health outcomes. No studies of supplemental screening reported on health outcomes or on the incidence of and progression to advanced breast cancer over more than 1 round of screening. The USPSTF wants all women to be able to get the care they need and would like to clarify that the I statement is not a recommendation for or against supplemental screening in women with dense breasts. It fundamentally means that there is insufficient evidence to assess the balance of benefits and harms, or to recommend for or against supplemental screening, and that women should talk with their clinicians about what is best given their individual circumstances. The USPSTF is also calling for more research to help close this important evidence gap.

Some comments requested clarification of the patient population included in this recommendation, particularly as it relates to women with a family history of breast cancer or those with a genetic predisposition to increased breast cancer risk. In response, the USPSTF clarified that this recommendation applies to women with a family history of breast cancer but not those who have a genetic marker or syndrome or chest radiation exposure at a young age associated with a high risk of breast cancer. The USPSTF also clarified that it has an existing recommendation on risk assessment, genetic counseling, and genetic testing for *BRCA*-related cancer.

Some comments expressed that racial and ethnic disparities in breast cancer outcomes, especially in Black women, need to be comprehensively addressed. Related comments expressed that the higher breast cancer mortality that Black women experience is primarily related to their not receiving follow-up evaluation and treatment of the same timeliness and quality as White women, and that starting screening at age 40 years will not remedy this inequity. The USPSTF agrees that mitigating disparities in breast cancer mortality is crucial and highlights these disparities in the Disparities in Breast Cancer Outcomes and Implementation Considerations section of this recommendation statement. The USPSTF also agrees that improvements across the entire spectrum of breast cancer care are needed to reduce mortality for individuals experiencing disparities associated with lower breast cancer survival. For this recommendation, current evidence shows that screening for breast cancer starting at age 40 years will be of significant benefit to Black women. The USPSTF is also calling for more research to understand the underlying causes of why Black women are more

Table 3. Research Needs and Gaps in Screening for Breast Cancer

To fulfill its mission to improve health by making evidence-based recommendations for preventive services, the USPSTF routinely highlights the most critical evidence gaps for creating actionable preventive services recommendations. The USPSTF often needs additional evidence to create the strongest recommendations for everyone, especially those with the greatest burden of disease. In some cases, clinical preventive services have been well studied, but there are important evidence gaps that prevent the USPSTF from making recommendations for specific populations. In this table, the USPSTF summarizes the gaps in the evidence for screening for breast cancer and emphasizes health equity gaps that need to be addressed to advance the health of the nation. Although the health equity gaps focus on Black women because they have the poorest health outcomes from breast cancer, it is important to note that all studies should actively recruit enough women of all racial and ethnic groups, including Asian, Black, Hispanic, Native American/Alaska Native, and Native Hawaiian/Pacific Islander participants, to investigate whether the effectiveness of screening, diagnosis, and treatment vary by group. For additional information on research needed to address these evidence gaps, see the Research Gaps Taxonomy table on the USPSTF website (https://www.uspreventiveservicestaskforce.org/home/getfilebytoken/a8JCGWKSgTjPT3fgKfRnRV).
Screening for breast cancer
Research is needed to determine the benefits and harms of screening for breast cancer in women 75 years or older.
Research is needed to help clinicians and patients understand the best strategy for breast cancer screening in women found to have dense breasts on a screening mammogram, which occurs in more than 40% of women screened. • Research is needed to determine the benefits and harms of supplemental screening (eg, ultrasonography, MRI, or contrast-enhanced mammography) compared with usual care (DBT or digital mammography alone) for women with dense breasts. Studies are needed that report outcomes such as the rates of advanced breast cancers diagnosed across consecutive screening rounds in addition to the rates of diagnosis of breast cancer, and health outcomes such as quality of life and breast cancer–associated morbidity and mortality.
Research is needed to understand and address the higher breast cancer mortality among Black women. • Research is needed to understand why Black women are more likely to be diagnosed with breast cancers that have biomarker patterns that confer greater risk for poor health outcomes. • Research is needed to understand how variations in care (including diagnosis and treatment) leads to increased risk of breast cancer morbidity and mortality in Black women, across the spectrum of stages and biomarker patterns, and on effective strategies to reduce this disparity. • Research is needed to determine whether the benefits differ for annual vs biennial breast cancer screening among women overall and whether there is a different balance of benefits and harms among Black women compared with all women.
Research is needed to identify approaches to reduce the risk of overtreatment of breast lesions identified through screening that may not be destined to cause morbidity and mortality. • Research is needed on the natural history of DCIS and to identify prognostic indicators to distinguish DCIS that is unlikely to progress to invasive breast cancer.

Abbreviations: DBT, digital breast tomosynthesis; DCIS, ductal carcinoma in situ; MRI, magnetic resonance imaging; USPSTF, US Preventive Services Task Force.

likely to be diagnosed with breast cancers that have biomarker patterns that confer greater risk for poor health outcomes, to understand the causes of and ways to mitigate the higher mortality from breast cancer that Black women experience.

Some comments disagreed with the USPSTF B recommendation for screening women between the ages of 40 and 49 years, questioned the evidence to support this, or expressed that the current recommendation downplays the harms of screening. In response, the USPSTF has clarified that it uses modeling to complement trial and observational evidence when there is empirical (ie, trial) evidence of the benefit of a preventive service on health outcomes, as there is for breast cancer screening. Decision modeling can assist the USPSTF in assessing the magnitude of the benefits and harms of different screening strategies. The USPSTF carefully weighs both the benefits and harms of a preventive service as it makes its recommendations and currently concludes, as it has in the past, that the benefits of breast cancer screening outweigh the harms for women between the ages of 40 and 49 years. The most recent epidemiologic data reviewed by the USPSTF show greater incidence of breast cancer at younger ages, and decision modeling shows a greater magnitude of benefit for screening women between the ages of 40 and 49 years. The USPSTF considered both these lines of evidence as it issued its current B recommendation for biennial screening mammography for women aged 40 to 74 years.

Last, in response to comments, the USPSTF added the breast cancer screening recommendations from the American College of Radiology to the Recommendations of Others section.

Research Needs and Gaps

See **Table 3** for research needs and gaps related to screening for breast cancer.

Recommendations of Others

The American Cancer Society recommends that women with an average risk of breast cancer should undergo regular screening mammography starting at age 45 years. It suggests that women aged 45 to 54 years should be screened annually, that women 55 years or older should transition to biennial screening or have the opportunity to continue screening annually, that women should have the opportunity to begin annual screening between the ages of 40 and 44 years, and that women should continue screening mammography as long as their overall health is good and they have a life expectancy of 10 years or longer.[74]

The American College of Obstetricians and Gynecologists recommends that women at average risk of breast cancer should be offered screening mammography starting at age 40 years, using shared decision-making, and if they have not initiated screening in their 40s, they should begin screening mammography by no later than age 50 years. It recommends that women at average risk of breast cancer should have screening mammography every 1 or 2 years and should continue screening mammography until at least age 75 years. Beyond age 75 years, the decision to discontinue screening mammography should be based on shared decision-making informed by the woman's health status and longevity.[75]

The American College of Radiology and the Society of Breast Imaging recommend annual screening mammography beginning at age 40 years for women at average risk. They recommend that screening should continue past age 74 years, without an upper age limit, unless severe comorbidities limit life expectancy.[76] The American College of Radiology also recommends breast cancer risk assessment by age 25 years for all individuals.[77]

The American Academy of Family Physicians supports the 2016 USPSTF recommendation on screening for breast cancer.[78]

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REFERENCES

1. Surveillance Epidemiology and End Results Program. Cancer Stat Facts: female breast cancer. National Cancer Institute. Accessed March 5, 2024. https://seer.cancer.gov/statfacts/html/breast.html

2. Surveillance Epidemiology and End Results Program. Breast: SEER 5-year age-adjusted incidence rates, 2016-2020, by race/ethnicity, female, all ages, all stages. National Cancer Institute. Accessed April 20, 2023. https://seer.cancer.gov/statistics-network/explorer/application.html?site=55&data_type=1&graph_type=10&compareBy=race&chk_race_6=6&chk_race_5=5&chk_race_4=4&chk_race_9=9&chk_race_8=8&series=9&sex=3&age_range=1&stage=101&advopt_precision=1&advopt_show_ci=on&hdn_view=0#resultsRegion0

3. Surveillance Epidemiology and End Results Program. SEER*Stat Database: incidence—SEER research limited-field data with delay-adjustment, 22 registries, malignant only, November 2021 submission (2000-2019)—linked to county attributes—time dependent (1990-2019) income/rurality, 1969-2020 counties. National Cancer Institute. 2022. Accessed March 26, 2024. https://seer.cancer.gov/data-software/documentation/seerstat/nov2021/

4. Henderson JT, Webber EM, Weyrich M, Miller M, Melnikow J. *Screening for Breast Cancer: A Comparative Effectiveness Review for the US Preventive Services Task Force. Evidence Synthesis No. 231*. Agency for Healthcare Research and Quality; 2024. AHRQ publication 23-05303-EF-1.

5. Surveillance Epidemiology and End Results Program. Breast: SEER 5-year age-adjusted incidence rates, 2016-2020, by subtype, female, all races/ethnicities, all ages, all stages. National Cancer Institute. Accessed March 5, 2024. https://seer.cancer.gov/statistics-network/explorer/application.html?site=55&data_type=1&graph_type=10&compareBy=subtype&chk_subtype_55=55&chk_subtype_622=622&chk_subtype_623=623&chk_subtype_620=620&chk_subtype_621=621&series=9&sex=3&race=1&age_range=1&stage=101&advopt_precision=1&advopt_show_ci=on&hdn_view=0

6. Surveillance Epidemiology and End Results Program. Breast: SEER 5-year age-adjusted mortality rates, 2016-2020, by race/ethnicity. National Cancer Institute. Accessed March 5, 2024. https://seer.cancer.gov/statistics-network/explorer/application.html?site=55&data_type=2&graph_type=10&compareBy=race&chk_race_6=6&chk_race_5=5&chk_race_4=4&chk_race_9=9&chk_race_8=8&series=9&sex=3&age_range=1&advopt_precision=1&advopt_show_ci=on&hdn_view=0&advopt_show_apc=on&advopt_display=2#resultsRegion0

7. US Preventive Services Task Force. US Preventive Services Task Force Procedure Manual. Published May 2021. Accessed March 5, 2024. https://www.uspreventiveservicestaskforce.org/uspstf/about-uspstf/methods-and-processes/procedure-manual

8. US Preventive Services Task Force. Risk assessment, genetic counseling, and genetic testing for BRCA-related cancer: US Preventive Services Task Force recommendation statement. *JAMA*. 2019;322(7):652-665. doi:10.1001/jama.2019.10987

9. Ciatto S, Houssami N, Bernardi D, et al. Integration of 3D digital mammography with tomosynthesis for population breast-cancer screening (STORM): a prospective comparison study. *Lancet Oncol*. 2013;14(7):583-589. doi:10.1016/S1470-2045(13)70134-7

10. Skaane P, Bandos AI, Eben EB, et al. Two-view digital breast tomosynthesis screening with synthetically reconstructed projection images: comparison with digital breast tomosynthesis with full-field digital mammographic images. *Radiology*. 2014;271(3):655-663. doi:10.1148/radiol.13131391

11. Breast Cancer Surveillance Consortium. About the BCSC. Accessed March 5, 2024. https://www.bcsc-research.org/about

12. Trentham-Dietz A, Chapman CH, Jinani J, et al. *Breast Cancer Screening With Mammography: An Updated Decision Analysis for the US Preventive Services Task Force*. Agency for Healthcare Research and Quality; 2024. AHRQ publication 23-05303-EF-2.

13. Trentham-Dietz A, Chapman CH, Jayasekera J, et al. Collaborative modeling to compare different breast cancer screening strategies: a decision analysis for the US Preventive Services Task Force. *JAMA*. Published April 30, 2024. doi:10.1001/jama.2023.24766

14. Miglioretti DL, Zhu W, Kerlikowske K, et al; Breast Cancer Surveillance Consortium. Breast tumor prognostic characteristics and biennial vs annual mammography, age, and menopausal status. *JAMA Oncol*. 2015;1(8):1069-1077. doi:10.1001/jamaoncol.2015.3084

15. Breast Cancer Treatment (PDQ®)—Health Professional Version. National Cancer Institute. Accessed April 10, 2024. https://www.cancer.gov/types/breast/hp/breast-treatment-pdq

16. Alvidrez J, Castille D, Laude-Sharp M, Rosario A, Tabor D. The National Institute on Minority Health and health disparities research framework. *Am J Public Health*. 2019;109(S1):S16-S20. doi:10.2105/AJPH.2018.304883

17. Williams DR, Priest N, Anderson NB. Understanding associations among race, socioeconomic status, and health: patterns and prospects. *Health Psychol*. 2016;35(4):407-411. doi:10.1037/hea0000242

18. Bailey ZD, Krieger N, Agénor M, Graves J, Linos N, Bassett MT. Structural racism and health inequities in the USA: evidence and interventions. *Lancet*. 2017;389(10077):1453-1463. doi:10.1016/S0140-6736(17)30569-X

19. Zavala VA, Bracci PM, Carethers JM, et al. Cancer health disparities in racial/ethnic minorities in the United States. *Br J Cancer*. 2021;124(2):315-332. doi:10.1038/s41416-020-01038-6

20. Bemanian A, Beyer KM. Measures matter: the local exposure/isolation (LEx/Is) metrics and relationships between local-level segregation and breast cancer survival. *Cancer Epidemiol Biomarkers Prev*. 2017;26(4):516-524. doi:10.1158/1055-9965.EPI-16-0926

21. Goel N, Westrick AC, Bailey ZD, et al. Structural racism and breast cancer–specific survival: impact of economic and racial residential segregation. *Ann Surg*. 2022;275(4):776-783. doi:10.1097/SLA.0000000000005375

22. Siegel SD, Brooks MM, Lynch SM, Sims-Mourtada J, Schug ZT, Curriero FC. Racial disparities in triple negative breast cancer: toward a causal architecture approach. *Breast Cancer Res*. 2022;24(1):37. doi:10.1186/s13058-022-01533-z

23. Niraula S, Biswanger N, Hu P, Lambert P, Decker K. Incidence, characteristics, and outcomes of interval breast cancers compared with screening-detected breast cancers. *JAMA Netw Open*. 2020;3(9):e2018179. doi:10.1001/jamanetworkopen.2020.18179

24. Jatoi I, Sung H, Jemal A. The emergence of the racial disparity in US breast-cancer mortality. *N Engl J Med*. 2022;386(25):2349-2352. doi:10.1056/NEJMp2200244

25. Davis Lynn BC, Chernyavskiy P, Gierach GL, Rosenberg PS. Decreasing incidence of estrogen receptor-negative breast cancer in the United States: trends by race and region. *J Natl Cancer Inst*. 2022;114(2):263-270. doi:10.1093/jnci/djab186

26. Plevritis SK, Munoz D, Kurian AW, et al. Association of screening and treatment with breast cancer mortality by molecular subtype in US women, 2000-2012. *JAMA*. 2018;319(2):154-164. doi:10.1001/jama.2017.19130

27. Fayanju OM, Ren Y, Stashko I, et al. Patient-reported causes of distress predict disparities in time to evaluation and time to treatment after breast cancer diagnosis. *Cancer*. 2021;127(5):757-768. doi:10.1002/cncr.33310

28. Selove R, Kilbourne B, Fadden MK, et al. Time from screening mammography to biopsy and from biopsy to breast cancer treatment among Black and White, women Medicare beneficiaries not participating in a health maintenance organization. *Womens Health Issues*. 2016;26(6):642-647. doi:10.1016/j.whi.2016.09.003

29. Nguyen KH, Pasick RJ, Stewart SL, Kerlikowske K, Karliner LS. Disparities in abnormal mammogram follow-up time for Asian women compared with non-Hispanic White women and between Asian ethnic groups. *Cancer*. 2017;123(18):3468-3475. doi:10.1002/cncr.30756

30. Warner ET, Tamimi RM, Hughes ME, et al. Time to diagnosis and breast cancer stage by race/ethnicity. *Breast Cancer Res Treat*. 2012;136(3):813-821. doi:10.1007/s10549-012-2304-1

31. Kovar A, Bronsert M, Jaiswal K, et al. The waiting game: how long are breast cancer patients waiting for definitive diagnosis? *Ann Surg Oncol*. 2020;27(10):3641-3649. doi:10.1245/s10434-020-08484-9

32. Elmore JG, Nakano CY, Linden HM, Reisch LM, Ayanian JZ, Larson EB. Racial inequities in the timing of breast cancer detection, diagnosis, and initiation of treatment. *Med Care*. 2005;43(2):141-148. doi:10.1097/00005650-200502000-00007

33. Emerson MA, Golightly YM, Aiello AE, et al. Breast cancer treatment delays by socioeconomic and health care access latent classes in Black and White women. *Cancer*. 2020;126(22):4957-4966. doi:10.1002/cncr.33121

34. Lawson MB, Bissell MCS, Miglioretti DL, et al. Multilevel factors associated with time to biopsy after abnormal screening mammography results by race and ethnicity. *JAMA Oncol*. 2022;8(8):1115-1126. doi:10.1001/jamaoncol.2022.1990

35. Hu X, Walker MS, Stepanski E, et al. Racial differences in patient-reported symptoms and adherence to adjuvant endocrine therapy among women with early-stage, hormone receptor–positive breast cancer. *JAMA Netw Open*. 2022;5(8):e2225485. doi:10.1001/jamanetworkopen.2022.25485

36. Hu X, Chehal PK, Kaplan C, et al. Characterization of clinical symptoms by race among women with early-stage, hormone receptor–positive breast cancer before starting chemotherapy. *JAMA Netw Open*. 2021;4(6):e2112076. doi:10.1001/jamanetworkopen.2021.12076

37. Clemons K, Blackford AL, Gupta A, et al. Geographic disparities in breast cancer mortality and place of death in the United States from 2003 to 2019. *J Clin Oncol*. 2022;40(16)(suppl):12034. doi:10.1200/JCO.2022.40.16_suppl.12034

38. Surveillance Epidemiology and End Results Program. Breast: SEER incidence rates by age at diagnosis, 2016-2020, by sex, delay-adjusted SEER incidence rate, all races/ethnicities. National Cancer Institute. Accessed March 5, 2024. https://seer.cancer.gov/statistics-network/explorer/application.html?site=55&data_type=1&graph_type=3&compareBy=sex&chk_sex_3=3&rate_type=2&race=1&advopt_precision=1&advopt_show_ci=on&hdn_view=0#resultsRegion0

39. Surveillance Epidemiology and End Results Program. Breast: US mortality rates by age at death, 2016-2020, by sex, all races/ethnicities. National Cancer Institute. Accessed March 5, 2024. https://seer.cancer.gov/statistics-network/explorer/application.html?site=55&data_type=2&graph_type=3&compareBy=sex&chk_sex_3=3&race=1&advopt_precision=1&advopt_show_ci=on&hdn_view=0#resultsRegion0

40. García-Albéniz X, Hernán MA, Logan RW, Price M, Armstrong K, Hsu J. Continuation of annual screening mammography and breast cancer mortality in women older than 70 years. *Ann Intern Med*. 2020;172(6):381-389. doi:10.7326/M18-1199

41. Kerlikowske K, Zhu W, Tosteson AN, et al; Breast Cancer Surveillance Consortium. Identifying women with dense breasts at high risk for interval cancer: a cohort study. *Ann Intern Med*. 2015;162(10):673-681. doi:10.7326/M14-1465

42. Price ER, Hargreaves J, Lipson JA, et al. The California Breast Density Information Group: a collaborative response to the issues of breast density, breast cancer risk, and breast density notification legislation. *Radiology*. 2013;269(3):887-892. doi:10.1148/radiol.13131217

43. Gierach GL, Ichikawa L, Kerlikowske K, et al. Relationship between mammographic density and breast cancer death in the Breast Cancer Surveillance Consortium. *J Natl Cancer Inst*. 2012;104(16):1218-1227. doi:10.1093/jnci/djs327

44. Nelson HD, Cantor A, Humphrey L, et al. *Screening for Breast Cancer: A Systematic Review to Update the 2009 US Preventive Services Task Force Recommendation. Evidence Synthesis No. 124*. Agency for Healthcare Research and Quality; 2016. AHRQ publication 14-05201-EF-1.

45. Centers for Disease Control and Prevention. Health, United States, 2018. Published 2018. Accessed March 5, 2024. https://www.cdc.gov/nchs/data/hus/hus18.pdf

46. State legislation map. Dense Breast-info. Accessed March 5, 2024. https://densebreast-info.org/legislative-information/state-legislation-map/

47. Mammography Quality Standards Act, 21 CFR §900 (2023).

48. US Preventive Services Task Force. Medication use to reduce risk of breast cancer: US Preventive Services Task Force recommendation statement. *JAMA*. 2019;322(9):857-867. doi:10.1001/jama.2019.11885

49. Siu AL; US Preventive Services Task Force. Screening for breast cancer: US Preventive Services Task Force recommendation statement. *Ann Intern Med*. 2016;164(4):279-296. doi:10.7326/M15-2886

50. Henderson JT, Webber EM, Weyrich MS, Miller M, Melnikow J. Screening for breast cancer: evidence report and systematic review for the US Preventive Services Task Force. *JAMA*. Published April 30, 2024. doi:10.1001/jama.2023.25844

51. Owens DK, Whitlock EP, Henderson J, et al; US Preventive Services Task Force. Use of decision models in the development of evidence-based clinical preventive services recommendations: methods of the US Preventive Services Task Force. *Ann Intern Med*. 2016;165(7):501-508. doi:10.7326/M15-2531

52. Nyström L, Bjurstam N, Jonsson H, Zackrisson S, Frisell J. Reduced breast cancer mortality after 20+ years of follow-up in the Swedish randomized controlled mammography trials in Malmö,

Stockholm, and Göteborg. *J Med Screen*. 2017;24(1):34-42. doi:10.1177/0969141316648987

53. Jones BA, Patterson EA, Calvocoressi L. Mammography screening in African American women: evaluating the research. *Cancer*. 2003;97(1)(suppl):258-272. doi:10.1002/cncr.11022

54. Parvinen I, Chiu S, Pylkkänen L, et al. Effects of annual vs triennial mammography interval on breast cancer incidence and mortality in ages 40-49 in Finland. *Br J Cancer*. 2011;105(9):1388-1391. doi:10.1038/bjc.2011.372

55. Breast Screening Frequency Trial Group; United Kingdom Co-ordinating Committee on Cancer Research. The frequency of breast cancer screening: results from the UKCCCR randomised trial. *Eur J Cancer*. 2002;38(11):1458-1464. doi:10.1016/S0959-8049(01)00397-5

56. Armaroli P, Frigerio A, Correale L, et al. A randomised controlled trial of digital breast tomosynthesis vs digital mammography as primary screening tests: screening results over subsequent episodes of the Proteus Donna study. *Int J Cancer*. 2022;151(10):1778-1790. doi:10.1002/ijc.34161

57. Hofvind S, Moshina N, Holen ÅS, et al. Interval and subsequent round breast cancer in a randomized controlled trial comparing digital breast tomosynthesis and digital mammography screening. *Radiology*. 2021;300(1):66-76. doi:10.1148/radiol.2021203936

58. Pattacini P, Nitrosi A, Giorgi Rossi P, et al; RETomo Working Group. A randomized trial comparing breast cancer incidence and interval cancers after tomosynthesis plus mammography versus mammography alone. *Radiology*. 2022;303(2):256-266. doi:10.1148/radiol.211132

59. Hovda T, Holen ÅS, Lång K, et al. Interval and consecutive round breast cancer after digital breast tomosynthesis and synthetic 2d mammography versus standard 2d digital mammography in BreastScreen Norway. *Radiology*. 2020;294(2):256-264. doi:10.1148/radiol.2019191337

60. Ho TH, Bissell MCS, Kerlikowske K, et al. Cumulative probability of false-positive results after 10 years of screening with digital breast tomosynthesis vs digital mammography. *JAMA Netw Open*. 2022;5(3):e222440. doi:10.1001/jamanetworkopen.2022.2440

61. McGuinness JE, Ueng W, Trivedi MS, et al. Factors associated with false positive results on screening mammography in a population of predominantly Hispanic women. *Cancer Epidemiol Biomarkers Prev*. 2018;27(4):446-453. doi:10.1158/1055-9965.EPI-17-0009

62. Conant EF, Beaber EF, Sprague BL, et al. Breast cancer screening using tomosynthesis in combination with digital mammography compared to digital mammography alone: a cohort study within the PROSPR consortium. *Breast Cancer Res Treat*. 2016;156(1):109-116. doi:10.1007/s10549-016-3695-1

63. Kerlikowske K, Su YR, Sprague BL, et al. Association of screening with digital breast tomosynthesis vs digital mammography with risk of interval invasive and advanced breast cancer. *JAMA*. 2022;327(22):2220-2230. doi:10.1001/jama.2022.7672

64. Richman IB, Long JB, Hoag JR, et al. Comparative effectiveness of digital breast tomosynthesis for breast cancer screening among women 40-64 years old. *J Natl Cancer Inst*. 2021;113(11):1515-1522. doi:10.1093/jnci/djab063

65. Johnson K, Lång K, Ikeda DM, Åkesson A, Andersson I, Zackrisson S. Interval breast cancer rates and tumor characteristics in the prospective population-based Malmö breast tomosynthesis screening trial. *Radiology*. 2021;299(3):559-567. doi:10.1148/radiol.2021204106

66. Zackrisson S, Lång K, Rosso A, et al. One-view breast tomosynthesis versus two-view mammography in the Malmö Breast Tomosynthesis Screening Trial (MBTST): a prospective, population-based, diagnostic accuracy study. *Lancet Oncol*. 2018;19(11):1493-1503. doi:10.1016/S1470-2045(18)30521-7

67. Heindel W, Weigel S, Gerß J, et al; TOSYMA Screening Trial Study Group. Digital breast tomosynthesis plus synthesised mammography versus digital screening mammography for the detection of invasive breast cancer (TOSYMA): a multicentre, open-label, randomised, controlled, superiority trial. *Lancet Oncol*. 2022;23(5):601-611. doi:10.1016/S1470-2045(22)00194-2

68. Aase HS, Holen ÅS, Pedersen K, et al. A randomized controlled trial of digital breast tomosynthesis versus digital mammography in population-based screening in Bergen: interim analysis of performance indicators from the To-Be trial. *Eur Radiol*. 2019;29(3):1175-1186. doi:10.1007/s00330-018-5690-x

69. Bakker MF, de Lange SV, Pijnappel RM, et al; DENSE Trial Study Group. Supplemental MRI screening for women with extremely dense breast tissue. *N Engl J Med*. 2019;381(22):2091-2102. doi:10.1056/NEJMoa1903986

70. Veenhuizen SGA, de Lange SV, Bakker MF, et al; DENSE Trial Study Group. Supplemental breast MRI for women with extremely dense breasts: results of the second screening round of the DENSE trial. *Radiology*. 2021;299(2):278-286. doi:10.1148/radiol.2021203633

71. Ganguli I, Keating NL, Thakore N, Lii J, Raza S, Pace LE. Downstream mammary and extramammary cascade services and spending following screening breast magnetic resonance imaging vs mammography among commercially insured women. *JAMA Netw Open*. 2022;5(4):e227234. doi:10.1001/jamanetworkopen.2022.7234

72. Ohuchi N, Suzuki A, Sobue T, et al; J-START Investigator Groups. Sensitivity and specificity of mammography and adjunctive ultrasonography to screen for breast cancer in the Japan Strategic Anti-cancer Randomized Trial (J-START): a randomised controlled trial. *Lancet*. 2016;387(10016):341-348. doi:10.1016/S0140-6736(15)00774-6

73. Lee JM, Arao RF, Sprague BL, et al. Performance of screening ultrasonography as an adjunct to screening mammography in women across the spectrum of breast cancer risk. *JAMA Intern Med*. 2019;179(5):658-667. doi:10.1001/jamainternmed.2018.8372

74. Oeffinger KC, Fontham ET, Etzioni R, et al; American Cancer Society. Breast cancer screening for women at average risk: 2015 guideline update from the American Cancer Society. *JAMA*. 2015;314(15):1599-1614. doi:10.1001/jama.2015.12783

75. Committee on Practice Bulletins—Gynecology. Practice Bulletin Number 179: breast cancer risk assessment and screening in average-risk women. *Obstet Gynecol*. 2017;130(1):e1-e16. doi:10.1097/AOG.0000000000002158

76. Monticciolo DL, Malak SF, Friedewald SM, et al. Breast cancer screening recommendations inclusive of all women at average risk: update from the ACR and Society of Breast Imaging. *J Am Coll Radiol*. 2021;18(9):1280-1288. doi:10.1016/j.jacr.2021.04.021

77. Monticciolo DL, Newell MS, Moy L, Lee CS, Destounis SV. Breast cancer screening for women at higher-than-average risk: updated recommendations from the ACR. *J Am Coll Radiol*. 2023;20(9):902-914. doi:10.1016/j.jacr.2023.04.002

78. American Academy of Family Physicians. Clinical Preventive Service Recommendation: breast cancer. Accessed March 5, 2024. https://www.aafp.org/family-physician/patient-care/clinical-recommendations/all-clinical-recommendations/breast-cancer.html