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CLINICAL GUIDELINE

Screening for Breast Cancer in Asymptomatic, Average-Risk Adult Females: A Guidance Statement From the American College of Physicians (Version 2)

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Description: The purpose of this updated guidance statement is to guide internal medicine physicians and other clinicians on screening for breast cancer in asymptomatic, average-risk adult females.

Methods: The American College of Physicians updated its guidance statement on screening for breast cancer using high-quality clinical guidelines from national guideline developers around the world.

Guidance Statement 1: *In asymptomatic, average-risk females aged 40 to 49 years, clinicians should discuss the female's risk of breast cancer, values and preferences, and uncertainty around benefits and harms of screening for breast cancer. Following shared decision making, if a female in this population prefers to get screened for breast cancer, clinicians should then initiate screening mammography every 2 years (biennial).*

Guidance Statement 2: *In asymptomatic, average-risk females aged 50 to 74 years, clinicians should use biennial mammography for screening for breast cancer.*

Guidance Statement 3: *In asymptomatic, average-risk females aged 75 years or older or asymptomatic, average-risk females with a limited life expectancy, clinicians should discuss discontinuation of breast cancer screening based on shared decision making that includes the female's risk of breast cancer, values and preferences, and uncertainty around benefits and harms of screening for breast cancer.*

Guidance Statement 4: *In asymptomatic, average-risk adult females with breast density of Breast Imaging Reporting and Data System (BI-RADS) category C or D, clinicians should consider using supplemental digital breast tomosynthesis based on benefits, harms, additional radiation exposure, availability, values and preferences, and cost.*

Guidance Statement 5: *In asymptomatic, average-risk adult females with breast density of BI-RADS category C or D, clinicians should not use supplemental magnetic resonance imaging or ultrasound.*

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Breast cancer is the most common cancer type and almost exclusively affects females (1). A female has about a 13% risk for developing breast cancer in her lifetime (2). There were an estimated 316 950 breast cancer cases in the United States in 2025, making up 15.5% of all cancer cases (1, 2). Breast cancer incidence increases with age (**Supplement Figure 1**, available at Annals.org), and incidence differs by race and ethnicity. The absolute differences are small but are more apparent when race and ethnicity are considered by age groups. For example, the incidence of breast cancer is 345 cases per 100 000 in non-Hispanic Asian or Pacific Islander females aged 65 years or older and 488 per 100 000 in non-Hispanic White females (3). Despite having the highest incidence among cancer types, breast cancer ranks fourth in cancer deaths (42 170 deaths, or 6.8% of cancer deaths in 2025) (1, 2). There are also differences, likely driven by social determinants of health, in breast cancer mortality by race and ethnicity, with non-Hispanic Black females having the highest mortality (26 cases per 100 000) (3).

About 80% of females aged 50 to 74 years undergo biennial mammography (4). Adult females who receive annual mammography over 10 years have a 50% to 60% chance of receiving a false-positive result (5), which affects quality of life and reduces future adherence to screening (6). Cancer screening

See also:

Web-Only
Supplemental material

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in the United States costs an estimated $43 billion per year, with breast cancer screening accounting for $9 billion to $11 billion of those costs (7, 8). Because of these factors, it is vital that screening recommendations account for the balance of benefits and harms, patients' values and preferences, and costs.

Scope, Population, and Intended Audience

The goals of this American College of Physicians (ACP) guidance statement on breast cancer screening are to guide internal medicine physicians and other clinicians on the ages at which to start and discontinue screening, the frequency and modality of screening, and whether females with Breast Imaging Reporting and Data System (BI-RADS) category C or D (females with dense breasts) should undergo different or supplemental screening. The population is asymptomatic, average-risk adult females. Average risk is defined as the absence of a personal history of breast cancer or diagnosis of a high-risk breast lesion, a known genetic abnormality such as BRCA 1 or 2, another familial breast cancer risk syndrome, or a history of high-dose radiation therapy to the chest at a young age (9).

Methods

The ACP Clinical Guidelines Committee (CGC) developed this guidance statement according to ACP's published methods on the guidance statement development process (10, 11) and its policy on disclosures of interest and management of conflicts of interest (12). Guidance statements differ from ACP clinical guidelines, as detailed in the **Supplement** (available at Annals.org).

Search Results

Our literature search yielded 5 eligible guidelines (**Table 1**), from the American College of Obstetricians and Gynecologists (ACOG) (13, 14); the Brazilian College of Radiology and Diagnostic Imaging, the Brazilian Society of Mastology, and the Brazilian Federation of Associations of Gynecology and Obstetrics (Brazilian Society) (15); the Canadian Task Force on Preventive Health Care (CTFPHC) (*draft*) (16); the European Commission Initiative on Breast Cancer (ECIBC) (17); and the U.S. Preventive Services Task Force (USPSTF) (9). Additional details about eligibility are provided in the **Supplement**. For example, the American Cancer Society's guideline was not published within the past 5 years, and the American College of Radiology's evidence review did not meet criteria of a systematic review.

Clinical Guidelines Quality Ratings

The guidelines from the CTFPHC, the ECIBC, and the USPSTF were rated by all 5 authors using the AGREE II (Appraisal of Guidelines for Research & Evaluation II) instrument as "recommend with or without modifications," with overall guideline assessment scores of 5 to 5.6 out of 7, and were used to develop the guidance statements (**Table 1**). The guidelines from ACOG and the Brazilian Society had lower scores and were not further considered.

Evidence From Eligible Guidelines

Supplement Table 1 (available at Annals.org) provides a summary of recommendations, and **Supplement Table 2** (available at Annals.org) shows full recommendations from eligible guidelines. **Tables 2** to **5** summarize the evidence of benefits and harms of screening from the evidence reviews and decision modeling used in eligible guidelines. Full evidence tables are provided in **Supplement Tables 3 to 16** (available at Annals.org). The ACP only considered evidence from the systematic reviews and modeling studies from eligible guidelines.

Age at Which to Start Screening

Mammography With or Without Clinical Breast Examination vs. No Screening or Usual Care

Benefits. The ECIBC and the USPSTF did not report on all-cause mortality in recent updates (17, 18). The ECIBC reported that "other [than breast cancer] cause mortality" had insufficient evidence or did not differ across age groups (17). The USPSTF only commissioned an update of its comparative effectiveness review of breast cancer screening (18). The USPSTF found that, compared with no screening or usual care, mammography resulted in no difference in all-cause mortality regardless of age in the prior evidence review and data cited in the most recent guideline (9, 18). The CTFPHC found no differences in all-cause mortality (insufficient- to low-certainty evidence by age group) (**Table 2**; **Supplement**) (16).

The CTFPHC found lower risk for breast cancer mortality with mammography in females aged 40 to 69 years (insufficient- to low-certainty evidence) (16). The ECIBC (high-certainty evidence) and the USPSTF (not rated) found lower risk for breast cancer mortality with mammography in those aged 50 to 69 years (17, 18). The ECIBC also found moderate-certainty evidence that mammography reduced breast cancer mortality in females aged 40 to 49 years (17). However, stratified data indicate that females aged 40 to 44 years had only a marginal, nonsignificant reduction in breast cancer mortality with screening (risk ratio, 0.92 [95% CI, 0.83 to 1.02]), while a statistically significant reduction was found in females aged 45 to 49 years (risk ratio, 0.86 [CI, 0.76 to 0.97]) (17). The CTFPHC and the ECIBC reported on invasive cancer (stage IIA or higher or tumor ≥20 mm) and found insufficient evidence across age groups (16, 17), except that the ECIBC reported a lower risk with mammography in females aged 70 to 74 years (low-certainty evidence) (17). The CTFPHC found insufficient evidence across age groups for advanced breast cancer (stage III or higher or tumor ≥40 mm) (16),

Table 1. Scaled AGREE II Domain Scores and Overall Assessment of Included Clinical Guidelines

Variable	Clinical Guideline				
	ACOG (13, 14)	Brazilian Society (15)	CTFPHC (16)	ECIBC (17)	USPSTF (9)
Scaled domain score (0% to 100%)*					
Scope and purpose	49	41	81	83	93
Stakeholder involvement	20	18	72	72	49
Rigor of development	35	23	85	78	73
Clarity of presentation	60	59	74	82	53
Applicability	15	2	57	37	33
Editorial independence	30	18	65	62	80
Overall guideline assessment					
Average overall quality of the guideline (1 to 7)†	2.4	2.4	5.6	5.4	5.0
Would you recommend this guideline for use (yes; yes, with modifications; or no)?	5: No	5: No	4: Yes 1: Yes, with modifications‡	1: Yes 4: Yes, with modifications‡	5: Yes, with modifications‡

ACOG = American College of Obstetricians and Gynecologists; AGREE II = Appraisal of Guidelines for Research & Evaluation II; Brazilian Society = Brazilian College of Radiology and Diagnostic Imaging, Brazilian Society of Mastology, and Brazilian Federation of Associations of Gynecology and Obstetrics; CTFPHC = Canadian Task Force on Preventive Health Care; ECIBC = European Commission Initiative on Breast Cancer; USPSTF = U.S. Preventive Services Task Force.

* Each domain is calculated using this equation: (obtained score − minimum possible score) / (maximum possible score − minimum possible score) × 100.

† Average overall score for the quality of the guideline among 5 raters. Score ranges from 1 (lowest possible quality) to 7 (highest possible quality).

‡ In general, raters who selected "yes, with modifications" believed there was an overreliance on indirect evidence derived from statistical models and nonrandomized studies of interventions that led to the recommendation of screening for breast cancer.

while the ECIBC found that mammography decreased the risk for advanced breast cancer in females aged 50 to 74 years but not in those aged 40 to 49 years (low-certainty evidence) (17).

Harms. Overdiagnosis (screen-detected breast cancer that would not otherwise have been diagnosed in the female's lifetime) can only be measured in people who are screened and results in unnecessary treatment that does not improve patient outcomes (19). The ECIBC found moderate-certainty evidence of more overdiagnosis with mammography across age groups (17), while the CTFPHC found insufficient evidence in females aged 40 to 49 and 60 to 69 years but low-certainty evidence for more overdiagnosis in females aged 50 to 59 and 70 to 74 years (16). Occurrence of overtreatment (treatment of cancer that would not have negatively affected health in the female's lifetime) likely resembles overdiagnosis, as nearly all females diagnosed with breast cancer receive treatment, such as surgery, radiation, hormone therapy, or chemotherapy (19, 20).

The CTFPHC reported on interval cancers (false-negative result on prior mammography that can only be measured in those who received screening), which occurred in 3.9 per 1000 females with mammography over 7 years (low-certainty evidence) (16). The CTFPHC found moderate-certainty evidence for mammography leading to additional testing with or without biopsy across age groups (16). The ECIBC found insufficient evidence for females aged 40 to 49 and 70 to 74 years but low-certainty evidence for mammography resulting in more biopsies and surgeries through additional testing in females aged 50 to 69 years (17). The ECIBC also found low-certainty evidence of false-positive–related psychological distress being greater with screening across age groups (17).

Decision modeling by the USPSTF used 6 different models and reported median estimates (not rated for certainty) comparing starting screening at age 40, 45, or 50 years until age 74 or 79 years (21). Starting at age 40 versus 50 years showed an approximately 4% reduction in breast cancer mortality and 40 life-years gained per 1000 screened but resulted in more mammograms, false-positive recalls, biopsies, and overdiagnosis (**Supplement**) (21).

Digital Breast Tomosynthesis vs. Mammography

Benefits

The ECIBC found high-certainty evidence that digital breast tomosynthesis (DBT) plus synthesized 2-dimensional images (SM) or mammography resulted in greater breast cancer detection in the first round of screening but mixed findings in the second round (low-certainty evidence) (17). The CTFPHC, the ECIBC, and the USPSTF found that DBT identified more invasive cancer cases in the first round of screening but found no difference in invasive cancers in the second round (low- to moderate-certainty evidence) (16–18). The CTFPHC found no difference in screening modalities to detect invasive cancer in females aged 45 to 49 years; however, in those aged 50 to 69 years, more invasive cancers were detected in the first round of screening, with no difference in the second round (low-certainty evidence) (16). The CTFPHC and the USPSTF found low- to moderate-certainty evidence that advanced breast cancers did not differ between screening modalities (**Table 3**; **Supplement**) (16, 18).

Table 2. Summary of Evidence for Screening Mammography With or Without Clinical Breast Examination vs. No Screening or Usual Care*†

Outcome by Guideline	All Ages	40–49 Years‡	50–59 Years	60–69 Years	70–74 Years
All-cause mortality					
CTFPHC	NR	No difference ⊕○○	No difference ⊕○○	○○○	○○○
ECIBC (other-cause mortality)	NR	○○○	No difference ⊕○○		No difference ⊕○○
USPSTF		No difference Not rated			
Breast cancer mortality					
CTFPHC	NR	Lower with screening ⊕○○‖	Lower with screening ○○○ to ⊕○○‖	Lower with screening ○○○ to ⊕○○‖	○○○
ECIBC	NR	Aged 40–44 y: no difference Aged 45–49 y: lower with screening ⊕⊕○‖	Lower with screening ⊕⊕⊕		No difference ⊕⊕⊕
USPSTF	Lower with screening in females aged 40–74 y§ Not rated	Aged 39–49 y: no difference Not rated	Lower with screening Not rated	Lower with screening Not rated	No difference Not rated
Invasive breast cancer (stage IIA or higher or tumor ≥20 mm)					
CTFPHC	○○○	○○○	○○○	NR	NR
ECIBC	NR	○○○	○○○		Lower with screening ⊕○○
Advanced breast cancer (stage III or IV or tumor ≥40 mm)					
CTFPHC	NR	○○○	NR	○○○	NR
ECIBC	NR	No difference (stage III or higher or tumor ≥40 mm) ⊕○○	Lower with screening (stage III or higher or tumor ≥40 mm) ⊕○○		Lower with screening (tumor ≥50 mm) ⊕○○
Overdiagnosis and overtreatment					
CTFPHC (overdiagnosis [invasive or in situ cancers])	NR	○○○	Higher with screening ○○○ to ⊕○○‖	○○○	Higher with screening ○○○ to ⊕○○‖ Aged ≥75 y: higher with screening ○○○ to ⊕○○
ECIBC¶	NR	Higher with screening ⊕⊕○	Higher with screening ⊕⊕○		Higher with screening ⊕⊕○
Interval (false-negative) cancer**					
CTFPHC	Higher with screening ○○○ to ⊕○○	Aged 39–49 y: higher with screening ⊕○○	Higher with screening ⊕○○	NR	NR
Additional testing with or without biopsy					
CTFPHC††	NR	Higher with screening ⊕⊕○	Higher with screening ⊕⊕○	Higher with screening ⊕⊕○	Aged 70–79 y: higher with screening ⊕⊕○
ECIBC‡‡	NR	○○○	False-positive result on screening results in higher risk for biopsies and surgeries ⊕○○		○○○

Continued on following page

Table 2–Continued

Outcome by Guideline	All Ages	40–49 Years‡	50–59 Years	60–69 Years	70–74 Years
False-positive-related psychological distress					
ECIBC	NR	False-positive result on screening results in higher risk for psychological distress ⊕◯◯			

CTFPHC = Canadian Task Force on Preventive Health Care; ECIBC = European Commission Initiative on Breast Cancer; GRADE = Grading of Recommendations Assessment, Development and Evaluation; NR = not reported; USPSTF = U.S. Preventive Services Task Force.
* The Supplement (available at Annals.org) provides full details and additional decision modeling data used by the CTFPHC, the ECIBC, and the USPSTF. The American College of Physicians Clinical Guidelines Committee determined "higher," "lower," and "no difference" designations based on clinical and statistical significance for the body of evidence for each outcome.
† GRADE certainty of evidence: ◯◯◯ = Insufficient; ⊕◯◯ = Low; ⊕⊕◯ = Moderate; ⊕⊕⊕ = High.
‡ The USPSTF reported this group as aged 39 to 49 years.
§ Reported in an updated analysis of 3 trials in Sweden. The USPSTF did not update other analyses with a "no screening" comparator.
‖ GRADE rating is for short- and long-case accruals in randomized controlled trials or just randomized controlled trials.
¶ Although the ECIBC sought the data, overtreatment was not reported in the evidence used by the ECIBC.
** Interval cancers cannot be measured in nonscreening comparators.
†† Estimates were based on Canadian Partnership Against Cancer and British Columbia data. Data were consistent for additional testing 1) with or without biopsy, 2) with biopsy, and 3) without biopsy.
‡‡ The ECIBC defined this outcome as adverse events related to false-positive results via biopsies and surgeries required because of a false-positive screening result. A range of GRADE ratings indicate different screening rounds, magnitude of effect thresholds, or outcomes or comparators that had subtle differences, but they were combined for this summary table. Data for "all ages" were included only if they were reported as aggregate data and not just by age groups.

Harms

The CTFPHC, the ECIBC, and the USPSTF found no difference between screening modalities for interval cancers (insufficient- to moderate-certainty evidence) (16–18). The CTFPHC reported mixed findings in the first round of screening between DBT and mammography for additional testing with or without biopsy but no difference in the second round (low-certainty evidence) (16). The ECIBC found that false-positive recalls were lower with DBT plus SM or mammography versus mammography alone in the first round of screening, with no difference in the second round (low- to high-certainty evidence) (17). The USPSTF found no difference between DBT and mammography for overdetection (screen-detected lesions), recall rates, false-positive recalls, biopsies, and false-positive biopsies (low-certainty evidence) (18). The ECIBC reported that radiation exposure varied between DBT and mammography, while the USPSTF reported that DBT plus mammography had higher radiation exposure than mammography alone but there was no difference between DBT plus SM and mammography alone (insufficient- to moderate-certainty evidence) (17, 18).

Decision modeling by the USPSTF that compared starting screening at different ages by DBT and mammography had similar results for benefits and harms (Supplement) (21).

Screening in Females With Dense Breasts

Digital Breast Tomosynthesis

The USPSTF identified insufficient evidence for breast cancer screening with DBT versus mammography in adult females with dense breasts (18). The ECIBC found that, compared with mammography alone, DBT plus SM led to greater detection of breast cancer, but there was no difference in a subsequent round of screening (low- to moderate-certainty evidence) (17). The direction and certainty in findings were also consistent with invasive breast cancers. Low-certainty evidence showed that false-positive recall and interval cancers did not differ between DBT plus SM and mammography alone. The CTFPHC reported low- to moderate-certainty evidence of no differences between DBT and mammography in invasive and interval cancers and mixed findings for additional testing (16).

The ECIBC found that supplemental DBT detected more breast cancers (high-certainty evidence) and invasive cancers (low-certainty evidence) in females with dense breasts than mammography alone. However, low-certainty evidence showed that supplemental DBT detected fewer breast cancers in a subsequent round of screening but showed no difference in invasive cancers. The ECIBC also found that supplemental DBT showed no difference in false-positive recalls (low-certainty evidence) (17). Evidence on radiation exposure included females with and without dense breasts and was interpreted in the prior section (Tables 3 and 4; Supplement).

Supplemental Magnetic Resonance Imaging and Ultrasonography

The ECIBC found low-certainty evidence that supplemental magnetic resonance imaging (MRI) detected more breast cancers and invasive cancers in the first round of screening, but data were insufficient for the second round (17). The CTFPHC and the USPSTF found low-certainty evidence that supplemental MRI in females with dense breasts reduced interval cancers (16, 18) but led to additional recalls, false-positive recalls, and biopsies (18). The ECIBC found low-certainty evidence that supplemental MRI reduced overdiagnosis but resulted in more serious adverse events during or immediately after the MRI (for example, allergic reaction to contrast agent) (17).

Table 3. Summary of Evidence for DBT vs. DM*†

Outcome by Guideline	All Ages	39–49 Years	50–59 Years	60–69 Years	70–74 Years
Breast cancer and other mortality					
ECIBC	◯◯◯		NR		
Breast cancer detection					
ECIBC	Higher with DBT + SM or DM at round 1, but no difference (DBT + SM) or lower (DM alone) at round 2 ⊕◯◯ to ⊕⊕⊕		NR		
Invasive breast cancer					
CTFPHC (screen-detected invasive cancer)	Higher with DBT at round 1 and no difference at round 2 ⊕◯◯	Aged 45–49 y: no difference ⊕◯◯	Higher with DBT at round 1 and no difference at round 2 ⊕◯◯		NR
CTFPHC (invasive breast cancer [stage II or higher])	No difference ⊕◯◯		NR		
ECIBC (invasive breast cancer)	Higher with DBT + SM or DM at round 1 and no difference (DBT + SM) at round 2 ⊕◯◯		NR		
USPSTF (screen-detected invasive cancer)	Higher with DBT at round 1 and no difference at round 2 ⊕◯◯ to ⊕⊕◯	Aged 45–49 y: ◯◯◯	◯◯◯	NR	NR
USPSTF (screen-detected invasive cancer ([stage II or higher])	No difference ⊕◯◯ to ⊕⊕◯		NR		
Advanced breast cancer (stage III or higher)					
CTFPHC (advanced breast cancer)	No difference ⊕◯◯		NR		
USPSTF (screen-detected invasive cancer [grade 3])	No difference ⊕◯◯ to ⊕⊕◯		NR		
Interval (false-negative) cancer					
CTFPHC	No difference ⊕⊕◯		No difference ⊕⊕◯		
ECIBC	DBT + SM ◯◯◯ DBT + DM: no difference ⊕◯◯		NR		
USPSTF	No difference ⊕⊕◯		◯◯◯		
Additional testing with or without biopsy					
CTFPHC	Mixed findings at round 1 and no difference at round 2 ⊕◯◯	Aged 45–49 y: no difference ⊕◯◯	No difference ⊕◯◯		NR
CTFPHC (with biopsy)	No difference ⊕◯◯		NR		
Recalls and false-positive recalls					
ECIBC (false-positive recalls)	Lower with DBT + SM at round 1 and no difference at round 2 ⊕◯◯ Lower with DBT + DM at round 1 ⊕⊕⊕		NR		
USPSTF (recall rates)	No difference ⊕◯◯		NR		
USPSTF (false-positive recalls)	No difference‡ ⊕◯◯		NR		
USPSTF (biopsy and false-positive biopsy)	No difference ⊕◯◯		NR		

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Table 3–Continued

Outcome by Guideline	All Ages	39-49 Years	50-59 Years	60-69 Years	70-74 Years
Overdetection and overtreatment					
USPSTF (DCIS diagnosis in study)	No difference ⊕◯◯‡			NR	
Radiation exposure					
ECIBC	Varies ⊕◯◯ DBT + DM ◯◯◯			NR	
USPSTF	Higher with DBT + DM DBT + SM: no difference ⊕⊕◯			NR	

CTFPHC = Canadian Task Force on Preventive Health Care; DBT = digital breast tomosynthesis; DCIS = ductal carcinoma in situ; DM = digital mammography; ECIBC = European Commission Initiative on Breast Cancer; GRADE = Grading of Recommendations Assessment, Development and Evaluation; NR = not reported; SM = synthesized 2-dimensional images; USPSTF = U.S. Preventive Services Task Force.
* The Supplement (available at Annals.org) provides full details and additional decision modeling data used by the CTFPHC, the ECIBC, and the USPSTF. The American College of Physicians Clinical Guidelines Committee determined "higher," "lower," and "no difference" designations based on clinical and statistical significance for the body of evidence for each outcome.
† GRADE certainty of evidence: ◯◯◯ = Insufficient; ⊕◯◯ = Low; ⊕⊕◯ = Moderate; ⊕⊕⊕ = High.
‡ Conclusion is for evidence from randomized controlled trials. A range of GRADE ratings indicate different screening rounds, magnitude of effect thresholds, or outcomes or comparators that had subtle differences, but they were combined for this summary table.

The USPSTF found that supplemental ultrasonography had no difference in interval cancers but had additional recalls and biopsies versus mammography alone (insufficient- to low-certainty evidence) (18). The ECIBC found that supplemental ultrasonography detected more breast cancers than mammography alone (insufficient- to moderate-certainty evidence), and no interval cancers were detected over 1 year with automated ultrasonography (low-certainty evidence). The ECIBC also found that supplemental automated ultrasonography identified more invasive cancers but led to more recalls (low-certainty evidence) (17). The CTFPHC found low-certainty evidence that supplemental ultrasonography had no difference in interval cancers but resulted in more additional testing with biopsy than mammography alone (16).

Age at Which to Discontinue Screening

Evidence for discontinuing screening was limited, but the CTFPHC found that screening females aged 75 to 84 years did not reduce breast cancer mortality compared with those who discontinued screening (insufficient- to low-certainty evidence) (16). The CTFPHC also found more overdiagnosis with screening in females aged 75 years or older and additional testing with or without biopsy in those aged 70 to 79 years (insufficient- to moderate-certainty evidence) (**Table 2**) (16). Decision modeling of continuing screening to age 79 years, compared with discontinuing at age 74 years, showed little to no additional benefit and the presence of more harms, such as overdiagnosis (**Supplement**) (21).

Screening Intervals

The ECIBC rated all outcomes comparing screening intervals as insufficient except for annual versus triennial screening for breast cancer mortality, which resulted in no difference (moderate-certainty evidence) (17). The CTFPHC and the USPSTF found moderate-certainty evidence that annual screening resulted in more false-positive recalls and biopsies than biennial screening but low-certainty evidence for more invasive cancers and fewer interval cancers than triennial screening (16, 18).

Decision modeling used by the USPSTF (21) indicated that for females aged 40 to 74 years, compared with no screening, biennial mammography reduced breast cancer mortality by 24.3% to 28.4%, hybrid screening (annual early on, then biennial) reduced breast cancer mortality by 29.3% to 31.7%, and annual screening reduced breast cancer mortality by 29.4% to 35.2%. In all evaluated screening intervals, breast cancer mortality reductions were higher in those who were screened for longer periods than in those screened for shorter periods. This trend continued when decision modeling expanded to screening until age 79 years. However, nearly all confidence intervals for these estimates overlapped (21). More intense and longer screening periods also resulted in more false-positive recalls, benign biopsy results, overdiagnosis, and radiation exposure (**Table 5**; **Supplement**) (21).

Differences by Race or Ethnicity

Data stratified by race and ethnicity were infrequently reported. Decision modeling used by the USPSTF compared Black females with females overall by different screening strategies (21). The USPSTF concluded that despite all screening strategies resulting in more deaths averted and life-years gained for Black females, none fully addressed disparities between Black females and females overall (21). Additional screening would also result in more mammograms and false-positive results (**Supplement**).

Table 4. Summary of Evidence for Breast Cancer Screening in Females With Dense Breasts (BI-RADS C or D)*†

Outcome by Guideline	Breast Cancer Mortality	Breast Cancer Detection	Invasive Breast Cancer	Interval (False-Negative) Cancer	Additional Testing With or Without Biopsy	Recalls and False-Positive Recalls	Other Outcomes
Supplemental DBT, DBT + SM, or DBT vs. DM alone							
CTFPHC	NR	NR	DBT vs. DM: no difference ⊕○○	DBT vs. DM: no difference ⊕⊕○	DBT vs. DM: no difference at rounds 1 or 2 ⊕○○ DBT vs. DM with biopsy: higher with DBT at round 1 and no difference at round 2 ⊕○○	NR	NR
ECIBC	NR	Higher with supplemental DBT and DBT + SM ⊕⊕○ to ⊕⊕⊕ Subsequent round: lower with supplemental DBT and no difference with DBT + SM ⊕○○	Higher with supplemental DBT and DBT + SM ⊕○○ to ⊕⊕○ Subsequent round: no differences with supplemental DBT and DBT + SM ⊕○○	Supplemental DBT ○○○ DBT + SM: no difference ⊕○○	NR	Supplemental DBT and DBT + SM: no differences in false-positive recalls ⊕○○	Radiation exposure‡: DBT vs. DM: varies ⊕○○ DBT + DM vs. DM ○○○
USPSTF	NR	NR	DBT vs. DM ○○○	DBT vs. DM ○○○	NR	NR	Radiation exposure‡: higher with DBT + DM vs. DM; no difference for DBT + SM vs. DM ⊕⊕○
Supplemental MRI							
CTFPHC	NR	NR	NR	Lower with MRI ⊕○○	NR	NR	NR
ECIBC	○○○	Higher with MRI at round 1 ⊕○○ Round 2 ○○○	Higher with MRI at round 1 ⊕○○ Round 2 ○○○	○○○	NR	Recall rate ○○○	Overdiagnosis: lower with MRI ⊕○○ SAEs: higher with MRI ⊕○○
USPSTF	NR	NR	NR	Lower with MRI ⊕○○	NR	Recall, false-positive recall, and biopsy: higher with MRI ⊕○○	AEs and SAEs ○○○
Supplemental US							
CTFPHC	NR	NR	NR	No difference ⊕○○	With biopsy: higher with US ⊕○○	NR	NR
ECIBC	NR	Higher with US ○○○ to ⊕⊕○	Higher with US ⊕○○	0 cases over 1 y with US ⊕○○	NR	Recall rate: higher with US ⊕○○	NR

Continued on following page

Table 4–Continued

Outcome by Guideline	Breast Cancer Mortality	Breast Cancer Detection	Invasive Breast Cancer	Interval (False-Negative) Cancer	Additional Testing With or Without Biopsy	Recalls and False-Positive Recalls	Other Outcomes
USPSTF	NR	NR	NR	No difference ◯◯◯ to ⊕◯◯	NR	Recall, false-positive recall, and biopsy: higher with US ⊕◯◯	NR

AE = adverse event; BI-RADS = Breast Imaging Reporting and Data System; CTFPHC = Canadian Task Force on Preventive Health Care; DBT = digital breast tomosynthesis; DM = digital mammography; ECIBC = European Commission Initiative on Breast Cancer; GRADE = Grading of Recommendations Assessment, Development and Evaluation; MRI = magnetic resonance imaging; NR = not reported; SAE = serious adverse event; SM = synthesized 2-dimensional images; US = ultrasonography; USPSTF = U.S. Preventive Services Task Force.

* Outcomes of all-cause mortality and advanced breast cancer were not reported for females with dense breasts in any of the reviewed guidelines. The **Supplement** (available at Annals.org) provides full details and additional decision modeling data used by the CTFPHC, the ECIBC, and the USPSTF. The American College of Physicians Clinical Guidelines Committee determined "higher," "lower," and "no difference" designations based on clinical and statistical significance for the body of evidence for each outcome. A range of GRADE ratings indicate different screening rounds, magnitude of effect thresholds, or outcomes or comparators that had subtle differences, but they were combined for this summary table.

† GRADE certainty of evidence: ◯◯◯ = Insufficient; ⊕◯◯ = Low; ⊕⊕◯ = Moderate; ⊕⊕⊕ = High.

‡ Evidence on radiation exposure was from females with and without dense breasts. Additional radiation exposure is anticipated in females with dense breasts in order to obtain a clear image.

Costs of Screening

The cost of breast cancer screening in the United States can vary based on individual circumstances, such as insurance. Mammography ($139 to $252), DBT ($195 to $360), and ultrasonography ($109) all had similar costs, and MRI had the highest cost ($545 to $1498) (**Supplement Table 17**, available at Annals.org). The USPSTF was precluded from considering costs in its guideline, and the CTFPHC and the ECIBC based their data and perspectives on non-U.S. sources (16, 17).

ACP Guidance Statements

The **Figure** summarizes this updated (version 2) guidance statement and includes clinical considerations, which are also shown in **Table 6**.

Guidance Statement 1: In asymptomatic, average-risk females aged 40 to 49 years, clinicians should discuss the female's risk of breast cancer, values and preferences, and uncertainty around benefits and harms of screening for breast cancer. Following shared decision making, if a female in this population prefers to get screened for breast cancer, clinicians should then initiate screening mammography every 2 years (biennial).

The ACP CGC concluded that the harms of screening for breast cancer, such as false-positive results and related psychological distress, interval cancers, overdiagnosis, overtreatment, additional testing, and radiation exposure, may outweigh the uncertain benefits in most asymptomatic, average-risk females aged 40 to 49 years.

Starting screening in females aged 40 to 49 years resulted in no difference in all-cause mortality compared with no screening or usual care (16, 18). The CTFPHC found low-certainty evidence of a reduction in breast cancer mortality in females aged 40 to 49 years, but the difference was small (risk ratio, 0.82 [CI, 0.71 to 0.94]; absolute risk difference, −0.32 per 1000 screened) (16). The CTFPHC and the ECIBC found insufficient evidence for screening on invasive cancer in females aged 40 to 49 years and insufficient evidence or no difference in advanced breast cancer (low-certainty evidence) (16, 17). However, starting screening at age 40 years resulted in more overdiagnosis, interval cancers, additional testing with or without biopsy, and psychological distress related to false-positive results (low– to moderate-certainty evidence) (16, 17). Test accuracy is lower in younger age groups, which increases false-positive results (17). A false-positive result reduces adherence to breast cancer screening (6), which underscores that recommendations must optimize benefits and reduce harms of screening.

Decision modeling used by the USPSTF indicated a larger percentage of breast cancer mortality reductions with screening initiation at age 40 years across various strategies; however, outcomes typically had overlapping confidence intervals with initiation of screening at ages 45 and 50 years (21). The modeling also predicted more harms, such as undergoing additional screening and more false-positive recalls, biopsies, and overdiagnosis (21). The modeling assumed 100% screening adherence, which does not reflect screening monitoring data (4).

The evidence supporting starting screening at age 40 years has not meaningfully changed since the USPSTF previously recommended biennial screening at age 50 years (20). The USPSTF's rationale for initiating screening at age 40 years was driven by decision modeling and incidence of breast cancer. However, since the USPSTF's prior guideline, the incidence of breast cancer increased from 130.3 to 141.9 per 100 000 screened in females aged 40 to 44 years and from 196 to 209.7 per 100 000 screened in those aged 45 to 49 years (**Supplement Figure 1**) (3). Although research is needed to better understand why these increases are occurring, the differences are small. Furthermore, surveillance data

Table 5. Summary of Evidence for Breast Cancer Screening Intervals*†

Outcome by Guideline	Screening Interval and Modality (If Defined)	All-Cause Mortality	Breast Cancer Mortality	Invasive Breast Cancer‡	Interval (False-Negative) Cancer	Additional Testing With or Without Biopsy§	Overdiagnosis
Annual vs. annual							
USPSTF	Annual DBT vs. annual DM	NR	NR	NR	NR	Lower with annual DBT ⊕⊕○	NR
Annual vs. biennial							
CTFPHC	Annual vs. biennial	NR	NR	○○○	○○○	Higher with annual ⊕⊕○	NR
USPSTF	Annual DM or DBT vs. biennial DM or DBT	NR	NR	○○○	○○○	Higher with annual DM or DBT ⊕⊕○	NR
Annual vs. triennial							
CTFPHC	Annual vs. triennial	○○○	○○○	Higher with annual ⊕○○	Lower with annual ⊕○○	NR	○○○
USPSTF	Annual DM vs. triennial DM	○○○	○○○	Higher with annual DM ⊕○○	Lower with annual DM ⊕○○	NR	NR
Biennial vs. biennial							
USPSTF	Biennial DBT vs. biennial DM	NR	NR	NR	NR	○○○	NR
Continue vs. discontinue							
CTFPHC	Age at which to discontinue screening	NR	Aged 70–74 y ○○○ Aged 75–84 y: no difference ○○○ to ⊕○○	NR	NR	NR	NR
USPSTF	Age at which to discontinue screening	NR	○○○	NR	NR	NR	NR

CTFPHC = Canadian Task Force on Preventive Health Care; DBT = digital breast tomosynthesis; DM = digital mammography; ECIBC = European Commission Initiative on Breast Cancer; GRADE = Grading of Recommendations Assessment, Development and Evaluation; NR = not reported; USPSTF = U.S. Preventive Services Task Force.

* Decision modeling and individual studies of screening intervals reported by the ECIBC were rated as having insufficient certainty for all outcomes across age groups, except for annual versus triennial screening and breast cancer mortality in females aged 50 to 69 years, which resulted in no difference (moderate-certainty evidence). The **Supplement** (available at Annals.org) provides full details and additional decision modeling data used by the CTFPHC, the ECIBC, and the USPSTF. The American College of Physicians Clinical Guidelines Committee determined "higher," "lower," and "no difference" designations based on clinical and statistical significance for the body of evidence for each outcome.

† GRADE certainty of evidence: ○○○ = Insufficient; ⊕○○ = Low; ⊕⊕○ = Moderate; ⊕⊕⊕ = High.

‡ Invasive cancer can be detected by screening or during follow-up.

§ If reported, all data were consistent for additional testing 1) with or without biopsy, 2) with biopsy, and 3) without biopsy unless otherwise stated. A range of GRADE ratings indicate different screening rounds, magnitude of effect thresholds, or outcomes or comparators that had subtle differences, but they were combined for this summary table.

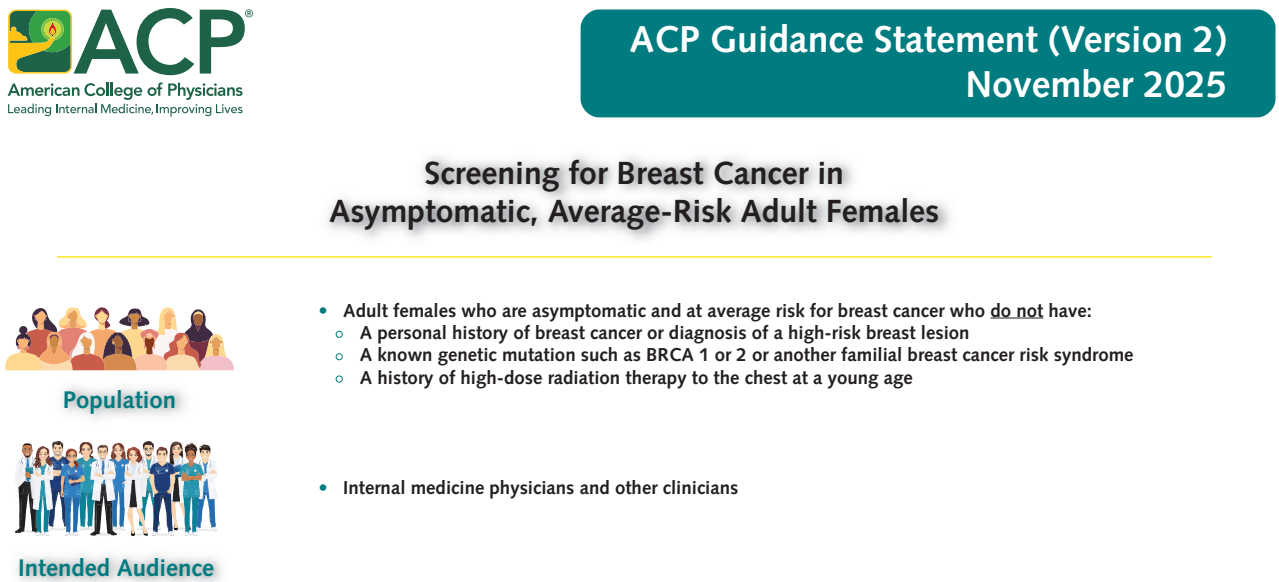
indicated that while breast cancer incidence slightly increased in younger age groups, breast cancer mortality decreased (3). Thus, slight increases in breast cancer incidence have not translated to increases in mortality.

The ACP CGC concluded that biennial screening in all asymptomatic, average-risk females aged 40 to 49 years is not justified by the marginal benefits compared with the harms. Instead, this population should be informed about breast cancer screening as it is a personal choice. Those who do not have a clear preference for screening should not be screened. If a female in this population still prefers to be screened after shared decision making, biennial mammography should be offered. Clinicians may offer DBT if it is available, accessible, and preferred by the patient. If an adult female declines screening, her preference should be noted and shared decision making should not be repeated during her 40s unless she expresses interest or new information about her breast cancer risk becomes known.

Guidance Statement 2: In asymptomatic, average-risk females aged 50 to 74 years, clinicians should use biennial mammography for screening for breast cancer.

The ACP CGC concluded that breast cancer screening benefits outweigh harms in most asymptomatic, average-risk females aged 50 to 74 years. The risk

Figure. Summary of guidance statement and clinical considerations.



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for developing breast cancer is higher in females aged 50 to 74 years than in younger age groups (**Supplement Figure 1**) (3). Mammography had the greatest benefits in females aged 50 to 69 years through reducing risk for breast cancer mortality and invasive and advanced breast cancers (16–18). The ECIBC showed that mammography had a directional reduction in breast cancer mortality in females aged 70 to 74 years (high-certainty evidence), but the difference was not statistically significant, while invasive and advanced cancers were lower with screening (low-certainty evidence) (17).

Figure–Continued.

Clinical Considerations
Assess a patient's current risk for breast cancer before implementing breast cancer screening. A goal of breast cancer screening, in addition to getting screened, is to get into a high-quality screening program, in which best practices in screening, such as comparing current images with prior imaging, are followed.
Breast cancer screening and the guidance statements do not apply to adult females who have breast cancer symptoms or a higher risk for breast cancer, such as those with a personal history of breast cancer or diagnosis of a high-risk breast lesion, a known genetic abnormality (e.g., BRCA 1 or 2), another familial breast cancer risk syndrome, or a history of high-dose radiation therapy to the chest at a young age.
About 40% to 50% of females aged 40 years or older have dense breasts (BI-RADS category C or D). Breast density decreases with increasing age. Having dense breasts is an independent risk factor for developing breast cancer but is still a part of being at average risk. Clinicians should be cognizant of the masking effect (dense breast tissue obscuring breast cancer).
As of September 2024, the U.S. Food and Drug Administration Mammography Quality Standards Act requires that clinicians provide information on breast density in females who undergo screening.
Breast cancer screening has harm, and more screening may not translate to better outcomes. False-positive results are more likely in younger females and can reduce adherence to screening. They are more likely in younger females because younger females have denser breast tissue. Overdiagnosis and overtreatment increase with age and are particularly high in females aged 70 years or older. Overdiagnosis is more likely to occur in older adults because they are more likely to have slow-growing tumors that would not be symptomatic in their lifetime.
Adult females should not be encouraged to perform breast self-examination because of its unknown benefit and the risk for false-positive findings. As with all health issues, ACP encourages patients to be aware of their body and let their internal medicine physician know if they have lumps or any changes or have concerns or questions.
In version 1 (2019) of this guidance statement, the ACP Clinical Guidelines Committee provided guidance against clinicians using clinical breast examination as the sole screening modality. Clinical breast examination may be considered in low-resource settings with inadequate health systems.

 ACP = American College of Physicians; BI-RADS = Breast Imaging Reporting and Data System.

Harms are also present with mammography in females aged 50 to 74 years, including overdiagnosis, interval cancers, additional testing with or without biopsy, and psychological distress related to false-positive results (low- to moderate-certainty evidence) (16, 17).

There were generally few or no differences in benefits and harms between DBT and mammography (**Supplement**). However, DBT is more expensive and may be less accessible. Annual screening resulted in more false-positive recalls and biopsies than biennial screening but identified more invasive cancers and fewer interval cancers than triennial screening (low- to moderate-certainty evidence) (16, 18, 21). Annual screening would create additional patient burden and costs and does not provide clear evidence of added benefit over biennial screening. Therefore, the ACP CGC guides clinicians to initiate biennial mammography in asymptomatic, average-risk females aged 50 to 74 years. If DBT is available, accessible, and preferred by the patient, clinicians may offer it through shared decision making.

Guidance Statement 3: In asymptomatic, average-risk females aged 75 years or older or asymptomatic, average-risk females with a limited life expectancy, clinicians should discuss discontinuation of breast cancer screening based on shared decision making that includes the female's risk of breast cancer, values and preferences, and uncertainty around benefits and harms of screening for breast cancer.

It is important to engage in shared decision making about when to discontinue screening in asymptomatic, average-risk females aged 75 years or older and those with limited life expectancy due to comorbid conditions (such as chronic obstructive pulmonary disease, heart failure, end-stage liver disease, end-stage renal failure, or dementia). The time it takes for breast cancer to develop and become detectable by mammography depends on several factors, including whether it is a slow-growing or aggressive tumor (22, 23). People are unlikely to benefit from cancer screening if they have a life expectancy of less than 5 years (24). Furthermore, overdiagnosis and likely overtreatment are particularly high in females aged 70 years or older (25). Continuing screening beyond age 74 years showed no difference in breast cancer mortality but resulted in more additional testing with or without biopsy and overdiagnosis (low- to moderate-certainty evidence) (16). Indirectly, the benefits of screening, such as reduced mortality or detection of invasive and advanced cancers, were lower in females aged 70 to 74 years than

Table 6. ACP Clinical Guidelines Committee Clinical Considerations for Breast Cancer Screening

- Assess a patient's current risk for breast cancer before implementing breast cancer screening. A goal of breast cancer screening, in addition to getting screened, is to get into a high-quality screening program, in which best practices in screening, such as comparing current images with prior imaging, are followed.
- Breast cancer screening and the guidance statements do not apply to adult females who have breast cancer symptoms or a higher risk for breast cancer, such as those with a personal history of breast cancer or diagnosis of a high-risk breast lesion, a known genetic abnormality (e.g., BRCA 1 or 2), another familial breast cancer risk syndrome, or a history of high-dose radiation therapy to the chest at a young age.
- About 40% to 50% of females aged 40 years or older have dense breasts (Breast Imaging Reporting and Data System category C or D). Breast density decreases with increasing age. Having dense breasts is an independent risk factor for developing breast cancer but is still a part of being at average risk. Clinicians should be cognizant of the masking effect (dense breast tissue obscuring breast cancer).
- As of September 2024, the U.S. Food and Drug Administration Mammography Quality Standards Act requires that clinicians provide information on breast density in females who undergo screening.
- Breast cancer screening has harm, and more screening may not translate to better outcomes. False-positive results are more likely in younger females and can reduce adherence to screening. They are more likely in younger females because younger females have denser breast tissue. Overdiagnosis and overtreatment increase with age and are particularly high in females aged 70 years or older. Overdiagnosis is more likely to occur in older adults because they are more likely to have slow-growing tumors that would not be symptomatic in their lifetime.
- Adult females should not be encouraged to perform breast self-examination because of its unknown benefit and the risk for false-positive findings. As with all health issues, ACP encourages patients to be aware of their body and let their internal medicine physician know if they have lumps or any changes or have concerns or questions.
- In version 1 (2019) of this guidance statement, the ACP Clinical Guidelines Committee provided guidance against clinicians using clinical breast examination as the sole screening modality. Clinical breast examination may be considered in low-resource settings with inadequate health systems.

ACP = American College of Physicians.

in those aged 60 to 69 years (16, 18). This indicated that benefits of breast cancer screening may not be linear with age. Decision modeling from the USPSTF found that continuing screening to age 79 years versus discontinuing it at age 74 years resulted in few or no additional benefits in breast cancer mortality and life-years gained and resulted in more false-positive recalls, benign biopsy results, overdiagnosis, and overtreatment (21). If an asymptomatic, average-risk female aged 75 years or older still prefers to be screened after shared decision making, she should be offered biennial mammography. Clinicians may offer DBT if it is available, accessible, and preferred by the patient. The decision to continue screening should be reassessed every 2 years because of the uncertainty in the balance of benefits and harms.

Guidance Statement 4: In asymptomatic, average-risk adult females with breast density of BI-RADS category C or D, clinicians should consider using supplemental digital breast tomosynthesis based on benefits, harms, additional radiation exposure, availability, values and preferences, and cost.

There are no data on the effect of supplemental DBT on mortality or harm outcomes, such as overdiagnosis, in asymptomatic, average-risk females with dense breasts. The ECIBC reported that supplemental DBT was more likely to identify breast cancer (high-certainty evidence) and invasive cancer with no difference in false-positive recalls compared with mammography alone (low-certainty evidence) (17). The benefits of supplemental DBT were mainly observed in the first round of screening; more data are needed on subsequent rounds. The USPSTF found that supplemental DBT had more radiation exposure than mammography alone (moderate-certainty evidence) (18). Radiation exposure varies by manufacturer and protocol; however, additional radiation is expected in females with dense breasts in order for clear images to be obtained. Beyond benefits and harms, the ACP CGC is concerned about the additional cost and potential availability issues of DBT. As a result, clinicians should consider supplemental DBT in asymptomatic, average-risk females with dense breasts and should discuss the benefits, harms, additional radiation exposure, availability, values and preferences, and cost. Supplemental DBT should be considered after a negative mammography result that shows a female has dense breasts. For subsequent screening, if DBT alone is preferred by the patient, clinicians may offer it.

Guidance Statement 5: In asymptomatic, average-risk adult females with breast density of BI-RADS category C or D, clinicians should not use supplemental magnetic resonance imaging or ultrasound.

There was insufficient evidence for the effects of supplemental MRI on mortality outcomes in asymptomatic, average-risk adult females with dense breasts (16–18). The ECIBC found low-certainty evidence for supplemental MRI compared with mammography alone, with detection of more breast cancers and invasive cancers in the first round of screening, but the evidence was insufficient for the second round (17). Supplemental MRI reduced interval cancers and overdiagnosis in females with dense breasts but resulted in more recalls, false-positive recalls, and biopsies (low-certainty evidence) (16–18). The rate of false-positive recalls was particularly concerning (80 per 1000 screened [8%]) (18). Furthermore, supplemental MRI led to more serious adverse events during or immediately after the MRI (for example, vasovagal reaction and allergic reaction to contrast agent) (low-certainty evidence) (17). Supplemental MRI might also result in access and availability issues and additional cost.

There was no evidence for the effect of supplemental ultrasonography on mortality outcomes in asymptomatic, average-risk females with dense breasts (16–18). The ECIBC found that supplemental ultrasonography detected more breast cancers, but certainty of evidence ranged from insufficient to moderate depending on the study design and whether the ultrasound was automated or handheld (17). Low-certainty evidence indicated that

supplemental ultrasonography led to greater detection of invasive cancers (17) and had no difference in interval cancers (16–18). Supplemental ultrasonography resulted in more recalls and additional testing, biopsies, and false-positive results (low-certainty evidence) (16–18). It might also result in access issues and additional cost.

In adult females with dense breasts, supplemental MRI and ultrasonography had lower-certainty evidence for benefit than supplemental DBT and additional harms, such as false-positive results, which cause psychological distress and reduce adherence to screening; serious adverse events; or both. No supplemental screening modality had supportive evidence for reducing mortality, but DBT had fewer harms and higher certainty of benefit, which is why it should be considered by clinicians, and MRI and ultrasonography should currently not be used in asymptomatic, average-risk adult females with dense breasts.

Evidence Gaps and Research Needs

More breast cancer screening studies (such as TMIST [Tomosynthesis Mammographic Imaging Screening Trial] [26]) are needed to evaluate the accuracy of different modalities, the benefits and harms of screening intervals, and adult females with dense breasts, particularly those receiving supplemental screening. Additional, long-term trials are needed, focusing on asymptomatic, average-risk females aged 40 to 49 years and those older than 70 years.

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Note: Guidance statements are meant to guide care based on the best available evidence and may not apply to all patients or individual clinical situations. They should not be used as a replacement for a clinician's judgment. Any reference to a product or process contained in a guidance statement is not intended as an endorsement of any specific commercial product. All ACP guidance statements are considered automatically withdrawn or invalid 5 years after publication or once an update has been issued.

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