Women’s Health: Breast Cancer Screening

K. Rast, MD and E. McNany, MD
<table>
<thead>
<tr>
<th>Screening modality</th>
<th>American Academy of Family Physicians&lt;sup&gt;20&lt;/sup&gt;</th>
<th>American Cancer Society&lt;sup&gt;10&lt;/sup&gt;</th>
<th>American College of Obstetricians and Gynecologists&lt;sup&gt;9&lt;/sup&gt;</th>
<th>American College of Radiology&lt;sup&gt;22&lt;/sup&gt;</th>
<th>Canadian Task Force on Preventive Health Care&lt;sup&gt;21&lt;/sup&gt;</th>
<th>National Comprehensive Cancer Network&lt;sup&gt;8&lt;/sup&gt;</th>
<th>U.S. Preventive Services Task Force&lt;sup&gt;18&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast self-examination</td>
<td>Recommends against</td>
<td>Counsel about benefits and limitations</td>
<td>Breast self-awareness encouraged</td>
<td>—</td>
<td>Recommends against</td>
<td>Breast self-awareness encouraged</td>
<td>Recommends against</td>
</tr>
<tr>
<td>Clinical breast examination</td>
<td>Insufficient evidence</td>
<td>Every three years from 20 to 39 years of age, and annually thereafter</td>
<td>Every one to three years from 20 to 39 years of age, and annually thereafter</td>
<td>—</td>
<td>Every one to two years beginning at 40 years of age</td>
<td>Every one to three years from 20 to 39 years of age, and annually thereafter</td>
<td>Insufficient evidence</td>
</tr>
<tr>
<td>Magnetic resonance imaging</td>
<td>Insufficient evidence</td>
<td>Offer annually to women at high risk</td>
<td>Offer annually to women at high risk</td>
<td>—</td>
<td>Offer annually to women at high risk</td>
<td>Offer annually to women at high risk</td>
<td>Insufficient evidence</td>
</tr>
<tr>
<td>Mammography</td>
<td>Routine biennial screening for women 50 to 74 years of age</td>
<td>Routine annual screening beginning at 40 years of age</td>
<td>Routine annual screening beginning at 40 years of age</td>
<td>Routine annual screening beginning at 40 years of age</td>
<td>Routine annual screening beginning at 40 years of age</td>
<td>Routine annual screening beginning at 40 years of age</td>
<td>Routine biennial screening for women 50 to 74 years of age</td>
</tr>
</tbody>
</table>
2017 Update:

American Cancer Society Recommendations for the Early Detection of Breast Cancer
Guideline for women at average risk for breast cancer

- Ages 40 – 44
  Woman should have the choice to start annual breast cancer screening with mammograms if they wish to do so.

- Ages 45 – 54
  Woman should get mammograms every year.

- Age 55 and older
  Women can switch to mammograms every two years, or can continue yearly screening. Screening should continue as long as a woman is in good health and is expected to live 10 more years or longer.

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# Final Recommendation Statement

## Breast Cancer: Screening

Recommendations made by the USPSTF are independent of the U.S. government. They should not be construed as an official position of the Agency for Healthcare Research and Quality or the U.S. Department of Health and Human Services.

## Recommendation Summary

<table>
<thead>
<tr>
<th>Population</th>
<th>Recommendation</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woman aged 50 to 74 years</td>
<td>The USPSTF recommends biennial screening mammography for women aged 50 to 74 years.</td>
<td>B</td>
</tr>
</tbody>
</table>
| Women aged 40 to 49 years | The decision to start screening mammography in women prior to age 50 years should be an individual one. Women who place a higher value on the potential benefit than the potential harms may choose to begin biennial screening between the ages of 40 and 49 years.  
  • For women who are at average risk for breast cancer, most of the benefit of mammography results from biennial screening during ages 50 to 74 years. Of all of the age groups, women aged 60 to 69 years are most likely to avoid breast cancer death through mammography screening. While screening mammography in women aged 40 to 49 years may reduce the risk for breast cancer death, the number of deaths averted is smaller than that in older women and the number of false-positive results and unnecessary biopsies is larger. The balance of benefits and harms is likely to improve as women move from their early to late 40s.  
  • In addition to false-positive results and unnecessary biopsies, all women undergoing regular screening mammography are at risk for the diagnosis and treatment of noninvasive and invasive breast cancer that would otherwise not have become a threat to their health, or even apparent, during their lifetime (known as “overdiagnosis”). Beginning mammography screening at a younger age and screening more frequently may increase the risk for overdiagnosis and subsequent overtreatment.  
  • Women with a parent sibling, or child with breast cancer are at higher risk for breast cancer and thus may benefit more than average-risk women from beginning screening in their 40s. | C     |

Go to the Clinical Considerations section for information on implementation of the C recommendation.
## Table 1. Primary Screening for Breast Cancer with Conventional Mammography: Clinical Summary of the USPSTF Recommendation

<table>
<thead>
<tr>
<th>Population</th>
<th>Women aged 40 to 49 years</th>
<th>Women aged 50 to 74 years</th>
<th>Women aged ≥ 75 years</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommendation</strong></td>
<td>The decision to start screening should be an individual one. Grade: C</td>
<td>Screen every 2 years. Grade: B</td>
<td>No recommendation. Grade: 1 statement (insufficient evidence)</td>
</tr>
<tr>
<td><strong>Risk assessment</strong></td>
<td>These recommendations apply to asymptomatic women aged ≥ 40 years who do not have preexisting breast cancer or a previously diagnosed high-risk breast lesion and who are not at high risk for breast cancer because of a known underlying genetic mutation (such as a BRCA1 or BRCA2 gene mutation or other familial breast cancer syndrome) or a history of chest radiation at a young age. Increasing age is the most important risk factor for most women.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Screening tests</strong></td>
<td>Conventional digital mammography has essentially replaced film mammography as the primary method for breast cancer screening in the United States. Conventional digital screening mammography has about the same diagnostic accuracy as film overall, although digital screening seems to have comparatively higher sensitivity but the same or lower specificity in women aged &lt; 50 years.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Starting and stopping ages</strong></td>
<td>For women who are at average risk for breast cancer, most of the benefit of mammography results from biennial screening during ages 50 to 74 years. While screening mammography in women aged 40 to 49 years may reduce the risk for breast cancer death, the number of deaths averted is smaller than that in older women and the number of false-positive results and unnecessary biopsies is larger. The balance of benefits and harms is likely to improve as women move from their early to late 40s.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Screening interval</strong></td>
<td>For most women, biennial mammography screening provides the best overall balance of benefit and harms.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Treatment and interventions</strong></td>
<td>These recommendations apply to asymptomatic women aged ≥ 40 years who do not have preexisting breast cancer or a previously diagnosed high-risk breast lesion and who are not at high risk for breast cancer because of a known underlying genetic mutation (such as a BRCA1 or BRCA2 gene mutation or other familial breast cancer syndrome) or a history of chest radiation at a young age. Increasing age is the most important risk factor for most women.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Balance of benefits and harms</strong></td>
<td>The net benefit of screening mammography in women aged 40 to 49 years, while positive, is small.</td>
<td>The net benefit of screening mammography in women aged 50 to 74 years is moderate.</td>
<td>Evidence on mammography screening in women aged ≥ 75 years is insufficient, and the balance of benefits and harms cannot be determined.</td>
</tr>
</tbody>
</table>
Cases and Practice Questions
Question 1
A 40 year old female comes to your office for a well woman exam and asks about getting a mammogram. She has no family history of breast cancer and has no breast complaints. Appropriate advise for this patient includes which of the following? (Mark all that are true)

A. Mammography screening for women in their 40’s reduces mortality from breast cancer
B. Up to 60% of women in their 40’s who have a mammogram will be called back for extra views
C. American Cancer Society recommends annual mammograms for all women starting at age 40
D. ACOG recommends annual mammograms for all women starting at age 40
E. American College of Radiology recommends annual mammograms for all women starting at age 40
F. USPSTF recommends against mammograms for all women in their 40’s
A 40 year old female comes to your office for a well woman exam and asks about getting a mammogram. She has no family history of breast cancer and has no breast complaints. Appropriate advise for this patient includes which of the following? (Mark all that are true)

A. Mammography screening for women in their 40’s reduces mortality from breast cancer ***(by 1 in 1000)

B. Up to 60 % of women in their 40’s who have a mammogram will be called back for extra views ***(TRUE!)

C. ACS recommends annual mammograms for all women starting at age 40 ***(Age 45) [2017 UPDATE]

D. ACOG recommends annual mammograms for all women starting at age 40

E. ACR recommends annual mammograms for all women starting at age 40

F. USPSTF recommends against mammograms for all women in their 40’s
Question 2
During a routine health maintenance visit a 38-year-old female expresses concern about her risk of breast cancer because her mother and another relative have had breast cancer. She is asymptomatic and your clinical breast examination reveals no masses.

For this patient, the U.S. Preventive Services Task Force recommends which one of the following?

A. Administering a familial risk stratification tool
B. BRCA mutation testing
C. Bilateral screening mammography
D. MRI of the breasts
E. Referral for genetic counseling
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A. Administering a familial risk stratification tool
B. BRCA mutation testing
C. Bilateral screening mammography
D. MRI of the breasts
E. Referral for genetic counseling
• Mammographic screening is not recommended at the age of 38.
• USPSTF promotes a policy of individualized shared decision making for women between ages of 40 and 49.
• Mammography every 2 years is recommended for women between the ages of 50 and 74 (B recommendation).
• USPSTF recommends any of several familial risk stratification tools for use in women who have a family member with breast, ovarian, tubal, or peritoneal cancer, to assess for an increased risk of a BRCA1 or BRCA2 mutation.
  • If the screen is positive, a referral for genetic counseling is recommended to determine if BRCA testing is indicated (B recommendation).
• MRI of the breasts is not recommended for screening by the USPSTF
USPSTF recommends any of several familial risk stratification tools...

Table 2. Factors in the Breast Cancer Risk Assessment Tool

| Age | History of breast biopsy |
| Age at first menstrual period | Number of breast biopsies (positive or negative) |
| Age at first live delivery | At least one biopsy with atypical hyperplasia |
| Number of first-degree relatives (mother, sisters, daughters) who have had breast cancer | Race/ethnicity |

NOTE: The Breast Cancer Risk Assessment Tool calculates the five-year and lifetime risks of breast cancer. However, it should not be used in women who have already been diagnosed with breast cancer, or with lobular or ductal carcinoma in situ.

Information from reference 37.
Question 3
A 51 year old premenopausal female sees you to discuss chemoprevention after having a breast biopsy that showed atypical ductal hyperplasia. She is still having periods and her family history includes invasive breast cancer in a sister at age 48. After a conversation about risks and benefits of chemoprevention and possible side effects she decides to start medication to reduce her risk.

Which of the following do you recommend for this patient?

A. Combined oral contraceptives
B. Letrozole (Femara)
C. Medroxyprogesterone (Provera)
D. Raloxifene (Evista)
E. Tamoxifen (Soltamox)
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A. Combined oral contraceptives
B. Letrozole (Femara)
C. Medroxyprogesterone (Provera)
D. Raloxifene (Evista)
E. Tamoxifen (Soltamox)
- **Tamoxifen**, a systemic estrogen reuptake inhibitor, was FDA approved in 1998 for primary prevention of breast cancer in high-risk PREMENOPAUSAL women
  - It can decrease the risk of developing breast cancer by up to 48%

- **Raloxifen**, another systemic estrogen reuptake inhibitor, is approved for the prevention of breast cancer in POSTMENOPAUSAL women

- **Letrozole**, an aromatase inhibitor, are approved for prevention of breast cancer in POSTMENOPAUSAL women

- **Combined OCP’s** can be used for the prevention of ovarian cancer, not breast

- **Progesterone** does not reduce the risk of breast cancer
Question 4
A 29 year old female comes to your office after discovering a mass in her left breast 2 weeks ago. She says it does not hurt and she has no other breast complaints. On exam you detect a 3-cm smooth mass in the upper outer quadrant of the left breast. The rest of the exam, including of the right breast, is normal.

Which of the following is the most appropriate next step?

A. Observation only and follow up in 2 months
B. Referral for diagnostic mammography
C. Referral for ultrasonography of the breast
D. MRI of the breast
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A. Observation only and follow up in 2 months
B. Referral for diagnostic mammography
C. Referral for ultrasonography of the breast
D. MRI of the breast
**Approach to the Patient with a Palpable Breast Mass**

Patient presents with breast mass

- **Obtain history and perform clinical breast examination**
  - **Examination suggests no mass**
    - Repeat clinical examination in two to three months
  - **Examination suggests indeterminate lesion**
    - Patient younger than 30 years
      - Order directed ultrasonography
    - Patient 30 years or older
      - Order diagnostic mammography with or without directed ultrasonography
  - Examination suggests suspicious mass
    - Order diagnostic mammography and directed ultrasonography
    - Biopsy (image-guided core needle biopsy preferred)

*Figure 1. Algorithm for the diagnostic evaluation of women with palpable breast masses.*

For women younger than 30

<table>
<thead>
<tr>
<th>Radiologic Procedure</th>
<th>Rating</th>
<th>Comments</th>
<th>RRL</th>
</tr>
</thead>
<tbody>
<tr>
<td>US breast</td>
<td>9</td>
<td>See references [25-29,62].</td>
<td>O</td>
</tr>
<tr>
<td>Mammography diagnostic</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital breast tomosynthesis diagnostic</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MRI breast without and with IV contrast</td>
<td>1</td>
<td>See references [4,49].</td>
<td>O</td>
</tr>
<tr>
<td>MRI breast without IV contrast</td>
<td>1</td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>FDG-PEM</td>
<td>1</td>
<td></td>
<td>****</td>
</tr>
<tr>
<td>Tc-99m sestamibi MBI</td>
<td>1</td>
<td></td>
<td>****</td>
</tr>
<tr>
<td>Image-guided core biopsy breast</td>
<td>1</td>
<td></td>
<td>Varies</td>
</tr>
<tr>
<td>Image-guided fine-needle aspiration breast</td>
<td>1</td>
<td></td>
<td>Varies</td>
</tr>
</tbody>
</table>

**Rating Scale:** 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

*Relative Radiation Level*
For women 30 to 40

**Variant 11:** Palpable breast mass. Woman 30 to 39 years of age, initial evaluation. (See Appendix 3 for additional steps in the workup of these patients.)

<table>
<thead>
<tr>
<th>Radiologic Procedure</th>
<th>Rating</th>
<th>Comments</th>
<th>RRL*</th>
</tr>
</thead>
<tbody>
<tr>
<td>US breast</td>
<td>8</td>
<td>If imaged initially with US, see Variants 7-10 for additional imaging.</td>
<td>O</td>
</tr>
<tr>
<td>Mammography diagnostic</td>
<td>8</td>
<td>If imaged initially with mammography, see Variants 2-5. See references [14,15].</td>
<td>⭐⭐⭐⭐⭐</td>
</tr>
<tr>
<td>Digital breast tomosynthesis diagnostic</td>
<td>8</td>
<td>See references [16-20].</td>
<td></td>
</tr>
<tr>
<td>MRI breast without and with IV contrast</td>
<td>2</td>
<td>See references [4,49].</td>
<td>O</td>
</tr>
<tr>
<td>MRI breast without IV contrast</td>
<td>1</td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>FDG-PEM</td>
<td>1</td>
<td></td>
<td>⭐⭐⭐⭐☆</td>
</tr>
<tr>
<td>Tc-99m sestamibi MBI</td>
<td>1</td>
<td></td>
<td>⭐⭐⭐⭐</td>
</tr>
<tr>
<td>Image-guided core biopsy breast</td>
<td>1</td>
<td>Varies</td>
<td></td>
</tr>
<tr>
<td>Image-guided fine-needle aspiration breast</td>
<td>1</td>
<td>Varies</td>
<td></td>
</tr>
</tbody>
</table>

**Rating Scale:** 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

*Relative Radiation Level*
For women greater than 40

<table>
<thead>
<tr>
<th>Radiologic Procedure</th>
<th>Rating</th>
<th>Comments</th>
<th>RRL*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammography diagnostic</td>
<td>9</td>
<td>See references [13-15].</td>
<td>☑️</td>
</tr>
<tr>
<td>Digital breast tomosynthesis diagnostic</td>
<td>9</td>
<td>See references [16-18,20,85].</td>
<td>☑️</td>
</tr>
<tr>
<td>US breast</td>
<td>4</td>
<td>If she had recent mammogram (i.e., past 6 months), US may be appropriate.</td>
<td>O</td>
</tr>
<tr>
<td>MRI breast without and with IV contrast</td>
<td>2</td>
<td>See references [4,49].</td>
<td>O</td>
</tr>
<tr>
<td>MRI breast without IV contrast</td>
<td>1</td>
<td></td>
<td>O</td>
</tr>
<tr>
<td>FDG-PEM</td>
<td>1</td>
<td></td>
<td>☑️</td>
</tr>
<tr>
<td>Tc-99m sestamibi MBI</td>
<td>1</td>
<td></td>
<td>☑️</td>
</tr>
<tr>
<td>Image-guided core biopsy breast</td>
<td>1</td>
<td>Varies</td>
<td></td>
</tr>
<tr>
<td>Image-guided fine-needle aspiration breast</td>
<td>1</td>
<td>Varies</td>
<td></td>
</tr>
</tbody>
</table>

**Variant 1:** Palpable breast mass. Woman 40 years of age or older, initial evaluation. (See Appendices 1A-1B for additional steps in the workup of these patients.)

**Rating Scale:** 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

*Relative Radiation Level*
Question 5
A 55-year-old female receives a gynecologic and breast examination from a nurse practitioner, who also orders a routine mammogram. Who is legally responsible for ensuring that the patient is notified of the results of the mammogram?

A. The nurse practitioner
B. The supervising physician
C. The facility performing the mammogram
D. The patient
A 55-year-old female receives a gynecologic and breast examination from a nurse practitioner, who also orders a routine mammogram. Who is legally responsible for ensuring that the patient is notified of the results of the mammogram?

A. The nurse practitioner
B. The supervising physician
C. **The facility performing the mammogram**
D. The patient
• While it is certainly appropriate for the nurse practitioner or physician who ordered the test to notify the patient of mammography results, the facility performing the test is legally responsible.

• This is specified by the federal Mammography Quality Standards Act, first passed by Congress in 1992.

Ref: Mammography Quality Standards Act Regulations. US Food and Drug Administration, 2009, sec 900.12(c)
Question 6
Regular breast self-examinations to screen for breast cancer

A. are performed by most American women
B. reduce mortality due to breast cancer
C. reduce all-cause mortality in women
D. are recommended by the U.S. Preventive Services Task Force
E. increase the number of breast biopsies performed
Regular breast self-examinations to screen for breast cancer

A. are performed by most American women
B. reduce mortality due to breast cancer
C. reduce all-cause mortality in women
D. are recommended by the U.S. Preventive Services Task Force
E. increase the number of breast biopsies performed
Most women do not regularly perform breast self-examinations (BSE). Evidence from large, well designed, randomized trials of adequate duration has shown that the performance of regular BSE by trained women does not reduce breast cancer–specific mortality or all-cause mortality.

The 2009 update to the U.S. Preventive Services Task Force breast cancer screening recommendations recommended against teaching BSE (D recommendation).

The rationale for this recommendation is that there is moderate certainty that the harms outweigh the benefits.
Question 7
Mutations in BRCA1 or BRCA2 tumor suppressor genes are associated with which types of cancer? (Mark all that are true)

A. Breast
B. Lung
C. Ovarian
D. Pancreatic
E. Renal Cell
Mutations in BRCA1 or BRCA2 tumor suppressor genes are associated with which types of cancer?

A. Breast (BRCA 1 and BRCA 2)
B. Lung
C. Ovarian (BRCA 1)
D. Pancreatic (BRCA 1)
E. Renal Cell
Question 8
Exercise and physical activity in women have been associated with improvement in which of the following? (Mark all that are true)

A. Menopausal hot flashes
B. Depression
C. Breast cancer risk
D. Colon cancer risk
E. Osteoporotic fracture risk
Exercise and physical activity in women have been associated with improvement in which of the following? (Mark all that are true)

A. Menopausal hot flashes
B. Depression
C. Breast cancer risk
D. Colon cancer risk
E. Osteoporotic fracture risk
References

  • https://acsearch.acr.org/docs/69495/Narrative/

  • https://www.aafp.org/afp/2012/0815/p343.pdf

  • https://www.aafp.org/afp/2016/0415/od1.pdf

• ABFM Intraining Exams 2010 - 2017