Counseling your patients about screening mammograms

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Denver Health Medical Center
Learning Objectives

• Describe the rationale for current USPSTF guidelines for breast cancer screening
• Assess individual breast cancer risk in patients
• Effectively counsel a patient regarding risks and benefits of and when to start screening mammography
Case History #1

A.S. is a 44 year old woman with no breast complaints who comes in to discuss breast cancer screening. She has never had a screening mammogram. She read on the internet that women who are under 50 should see their doctor before getting a mammogram.
Case History #1

PMHx: None.
PSHx: No previous breast biopsies.
POB/GYN Hx: Onset of menses age 13, regular menses q 30 da, G3 P3, singleton births at age 24, 31, and 33.
SH: No tobacco, 1 – 2 drinks of alcohol weekly on average, no illicit drug use or HIV risk.
FH: + Unilateral breast cancer in paternal grandmother, onset late 60’s. No ovarian, colon, prostate, male breast cancer, or bilateral breast cancers or other cancer.
PE: AA woman in NAD. Her BMI is 24.5 and her clinical breast exam is normal.
Case History #1 Questions

- What is the breast cancer screening recommendation for this woman?
- What risks and benefits will breast cancer screening give her?
- What is her risk for breast cancer?
- How can you help her to decide when to start getting breast cancer screening?
Incidence of Breast Cancer

• In 2009 in the United States, an estimated 193,370 women will develop breast cancer, and an estimated 40,170 women will die of breast cancer.

USPSTF Guidelines:

Summary of Recommendations

- The USPSTF recommends biennial screening mammography for women aged 50 to 74 years.
  Grade: [B recommendation](#).

- The decision to start regular, biennial screening mammography before the age of 50 years should be an individual one and take patient context into account, including the patient's values regarding specific benefits and harms.
  Grade: [C recommendation](#).
The USPSTF concludes that the current evidence is insufficient to assess the additional benefits and harms of screening mammography in women 75 years or older. Grade: I Statement.

The USPSTF recommends against teaching breast self-examination (BSE). Grade: D recommendation.

The USPSTF concludes that the current evidence is insufficient to assess the additional benefits and harms of clinical breast examination (CBE) beyond screening mammography in women 40 years or older. Grade: I Statement.

Breast Cancer Screening

- The USPSTF concludes that the current evidence is insufficient to assess the additional benefits and harms of either digital mammography or magnetic resonance imaging (MRI) instead of film mammography as screening modalities for breast cancer.

Grade: I Statement.
Update on summary of the evidence: November, 2009

• Key questions regarding:
  – population for screening
  – outcomes and harm associated with screening
  – screening interval
  (for women at average risk of breast cancer)

Key Question: Does screening mammography reduce breast cancer mortality in women aged 39-49:

![Diagram showing pooled relative risk for breast cancer mortality from mammography screening trials compared with control for women aged 39 to 49 years.](image)

**Figure.** Pooled relative risk for breast cancer mortality from mammography screening trials compared with control for women aged 39 to 49 years.

<table>
<thead>
<tr>
<th>Study/Author, Year (Reference)</th>
<th>Relative Risk for Breast Cancer Mortality (95% CI)</th>
<th>Events/Total, n/n</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIP/Habbema et al, 1986 (27)</td>
<td>0.78 (0.56-1.08)</td>
<td>64/13 740 82/13 740</td>
</tr>
<tr>
<td>Kopparberg et al, 1995 (31)</td>
<td>0.72 (0.38-1.37)</td>
<td>22/9582 16/5031</td>
</tr>
<tr>
<td>CNBSS-1/Miller et al, 2002 (28)</td>
<td>0.97 (0.74-1.27)</td>
<td>105/25 214 108/25 216</td>
</tr>
<tr>
<td>Malmö/Nyström et al, 2002 (26)</td>
<td>0.73 (0.51-1.04)</td>
<td>53/13 568 66/12 279</td>
</tr>
<tr>
<td>Stockholm/Nyström et al, 2002 (26)</td>
<td>1.47 (0.77-2.78)</td>
<td>34/14 303 13/8021</td>
</tr>
<tr>
<td>Östergötland et al, 2002 (26)</td>
<td>1.05 (0.64-1.73)</td>
<td>31/10 285 30/10 459</td>
</tr>
<tr>
<td>Gothenburg/Bjurstam et al, 2003 (30)</td>
<td>0.70 (0.46-1.06)</td>
<td>34/11 724 59/14 217</td>
</tr>
<tr>
<td>Age/Moss et al, 2006 (29)</td>
<td>0.83 (0.66-1.04)</td>
<td>105/53 884 251/106 956</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>0.85 (0.75-0.96)</strong></td>
<td><strong>448/152 300 625/195 919</strong></td>
</tr>
</tbody>
</table>

CNBSS-1 = Canadian National Breast Screening Study-1; CI = credible interval; HIP = Health Insurance Plan of Greater New York.
* Swedish Two-County trial.

Key Question: Harms Associated with Breast Cancer Screening

- **Radiation exposure:**
  - Most x-rays are considered low-dose, low-energy radiation, with the mean glandular dose of bilateral, 2-view mammography averaging 7 mGy. (High dose exposure: 300-43400 mGy RR 1.33-11.39).
  - Women aged 40 to 49 years, yearly mammography screening for 1 decade with potential additional imaging would expose an individual to approximately 60 mGy.
  - High levels of radiation exposure (4 Gy to 40Gy) in childhood/early adulthood associated with increased risk for breast cancer.*

*Exposure is low-dose. Inconsistent association with increased risk for breast cancer.*

Key Question: Harms and Outcomes Associated with Screening

- Pain associated with mammography screening
- Anxiety and distress: False-positive mammography results had no consistent effect on most women's general anxiety and depression but increased breast cancer-specific distress, anxiety, apprehension, and perceived breast cancer risk for some.
- Overdiagnosis (rates from 1-10%)
### Harms Associated With Mammography Screening (Key Question 2a) (continued)

#### Table 2. Age-Specific Screening Results From the BCS

<table>
<thead>
<tr>
<th>Screening Result</th>
<th>Age Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40-49y</td>
</tr>
<tr>
<td>False-negative mammography result</td>
<td>1.0</td>
</tr>
<tr>
<td>False-positive mammography result</td>
<td>97.8</td>
</tr>
<tr>
<td>Additional imaging</td>
<td>84.3</td>
</tr>
<tr>
<td>Biopsy</td>
<td>9.3</td>
</tr>
<tr>
<td>Screening-detected invasive cancer</td>
<td>1.8</td>
</tr>
<tr>
<td>Screening-detected DCIS</td>
<td>0.8</td>
</tr>
</tbody>
</table>

**Yield of screening per screening round, n**

| Patients undergoing mammography to diagnose 1 case of invasive breast cancer | 556 | 294 | 200 | 154 | 143 |
| Patients undergoing additional imaging to diagnose 1 case of invasive breast cancer | 47  | 22  | 14  | 10  | 8   |
| Patients undergoing biopsy to diagnose 1 case of invasive breast cancer | 5   | 3   | 2   | 2   | 1.5 |

BCSC = Breast Cancer Surveillance Consortium; DCIS = ductal carcinoma in situ.

* Calculated from BCSC data of regularly screened women on the basis of results from a single screening round. Rates of additional imaging and biopsies may be underestimated because of incomplete capture of these examinations by the BCSC.

† Rate of screening-detected invasive cancer.

‡ Rate of additional imaging per rate of screening-detected invasive cancer.

§ Rate of biopsy per rate of screening-detected invasive cancer.

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False positive and negative results and additional procedures

False-positive mammography results are common in all age groups but are most common among women aged 40 to 49 years (97.8 per 1000 women per screening round).

False-negative mammography results occur least among women aged 40 to 49 years (1.0 per 1000 women per screening round).

Rates of additional imaging are highest among women aged 40 to 49 years (84.3 per 1000 women per screening round) and decrease with age, whereas biopsy rates are lowest among women aged 40 to 49 years (9.3 per 1000 women per screening round) and increase with age.

For every case of invasive breast cancer detected by mammography screening in women aged 40 to 49 years, 556 women have mammography, 47 have additional imaging, and 5 have biopsies.
Summary

Mammography screening reduces breast cancer mortality by 15% for women aged 39 to 49 years (relative risk, 0.85 [95% CI, 0.75 to 0.96]; 8 trials).

Data are lacking for women aged 75 years or older. Radiation exposure from mammography is low.

Patient adverse experiences are common and transient and do not affect screening practices.

Overdiagnosis ranges from 1-10%.

Younger women have more false-positive mammography results and additional imaging.

Mammography in Older Women

- Relative risk for breast cancer mortality for women screened for breast cancer aged 70-74: 1.12 (CI 0.73-1.72)

Clinical Breast Exam

- No clear additional benefit to doing clinical breast exam with mammography compared to clinical breast exam alone

Self Breast Exam

- Relative risk of all cause mortality in women doing self-breast exam diagnosed with breast cancer: 1.07 (CI 0.88 to 1.29)

Key Clinical Question: Screening Interval for Screening mammography

• Evaluate U.S. Breast Cancer Screening Strategies (6 models using common data elements)

http://www.uspreventiveservicestaskforce.org/uspstf09/breastcancer/brcanart.htm
**Interval for screening mammography**

Table 2. Percentage of Reduction in Breast Cancer Mortality Maintained When Moving From an Annual Screening Interval to a Biennial Interval, by Screening Strategy and Model

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<thead>
<tr>
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<tbody>
<tr>
<td>D</td>
<td>76</td>
<td>75</td>
<td>78</td>
<td>79</td>
<td>82</td>
<td>83</td>
<td>79</td>
<td>81</td>
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<td>83</td>
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<td>E</td>
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<td>85</td>
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<tr>
<td>W</td>
<td>68</td>
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<td>71</td>
<td>70</td>
<td>72</td>
<td>70</td>
<td>73</td>
</tr>
</tbody>
</table>

* Model group abbreviations: D = Dana-Farber Cancer Institute; E = Erasmus Medical Center; G = Georgetown University; M = M.D. Anderson Cancer Center; S = Stanford University; W = University of Wisconsin/Harvard.

† Differences in the range of results reflect differences in modeling approaches. For example, the benefit of screening in model M is modeled through stage shift, as with most other models, but also includes a “beyond stage shift” factor based on a cure fraction for small tumors. However, because many of these “cures” occur among women with invasive cancer that is not fatal, finding such cancer 1 year earlier confers very little mortality advantage to annual (vs. biennial) screening.

Table 3. Incremental Changes in Percentage of Reduction in Breast Cancer Mortality and Life-Years Gained per 1000 Women, by Age of Screening Initiation and Cessation

<table>
<thead>
<tr>
<th>Model*</th>
<th>Start at Age 40 y vs. 50 y†</th>
<th>Stop at Age 79 y vs. 69 y†</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Difference in Percentage of Reduction in Breast Cancer Mortality</td>
<td>Difference in Life-Years Gained per 1000 Women</td>
</tr>
<tr>
<td></td>
<td>Annual</td>
<td>Biennial</td>
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<tr>
<td>D</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>E</td>
<td>8</td>
<td>5</td>
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<tr>
<td>G</td>
<td>3</td>
<td>3</td>
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<tr>
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<td>3</td>
</tr>
<tr>
<td>S</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>W</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Median across models</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

* Model group abbreviations: D = Dana-Farber Cancer Institute; E = Erasmus Medical Center; G = Georgetown University; M = M.D. Anderson Cancer Center; S = Stanford University; W = University of Wisconsin/Harvard.
† Incremental difference between screening from 40 to 69 y versus 50 to 69 y.
‡ Incremental difference between screening from 50 to 79 y versus 50 to 69 y.

## Interval for screening mammography

### Table 4. Benefits and Harms Comparison of Different Starting and Stopping Ages Using the Exemplar Model*

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Average Screenings per 1000 Women</th>
<th>Potential Benefits (vs. No Screening)</th>
<th>Potential Harms (vs. No Screening)†</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Percentage of Mortality Reduction</td>
<td>Cancer Deaths Averted per 1000 Women</td>
</tr>
</tbody>
</table>
|### Comparison of different starting ages
| Biennial screening|                                  |                                      |                                     |                                   |                                      |                                    |
| 40-69 y           | 13 865                           | 16†                                  | 6.1                                 | 120‡                              | 1250                                 | 88                                  |
| 45-69 y           | 11 771                           | 17‡                                  | 6.2                                 | 1164†                             | 1050                                 | 74                                  |
| 50-69 y           | 8944                             | 15†                                  | 5.4                                 | 99                                | 780                                  | 55                                  |
| 55-69 y           | 6941                             | 13†                                  | 4.9                                 | 80                                | 590                                  | 41                                  |
| 60-69 y           | 4246                             | 9†                                   | 3.4                                 | 52                                | 340                                  | 24                                  |
| Annual screening  |                                  |                                      |                                     |                                   |                                      |                                    |
| 40-69 y           | 27 583                           | 22‡                                  | 8.3                                 | 164†                              | 2250                                 | 158                                 |
| 45-69 y           | 22 623                           | 22‡                                  | 8.0                                 | 152‡                              | 1800                                 | 126                                 |
| 50-69 y           | 17 759                           | 20‡                                  | 7.3                                 | 132‡                              | 1350                                 | 95                                  |
| 55-69 y           | 13 003                           | 16‡                                  | 6.1                                 | 102‡                              | 950                                  | 67                                  |
| 60-69 y           | 8406                             | 12‡                                  | 4.6                                 | 68‡                               | 600                                  | 42                                  |

|### Comparison of different stopping ages
| Biennial          |                                  |                                      |                                     |                                   |                                      |                                    |
| 50-69 y           | 8944                             | 15†                                  | 5.4                                 | 99                                | 780                                  | 55                                  |
| 50-74 y           | 11 109                           | 20‡                                  | 7.5                                 | 121†                              | 940                                  | 66                                  |
| 50-79 y           | 12 347                           | 25‡                                  | 9.4                                 | 130                               | 1020                                 | 71                                  |
| 50-84 y           | 13 836                           | 26‡                                  | 9.6                                 | 138                               | 1130                                 | 79                                  |
| Annual            |                                  |                                      |                                     |                                   |                                      |                                    |
| 50-69 y           | 17 759                           | 20‡                                  | 7.3                                 | 132‡                              | 1350                                 | 95                                  |
| 50-74 y           | 21 257                           | 26‡                                  | 9.5                                 | 156‡                              | 1570                                 | 110                                 |
| 50-79 y           | 24 439                           | 30‡                                  | 11.1                                | 170                               | 1740                                 | 122                                 |
| 50-84 y           | 26 913                           | 33‡                                  | 12.2                                | 178                               | 1880                                 | 132                                 |

* Results are from model S (Stanford University). Model S was chosen as an exemplar model to summarize the balance of benefits and harms associated with screening 1000 women under a particular screening strategy.

† Overdiagnosis is another significant harm associated with screening. However, given the uncertainty in the knowledge base about ductal carcinoma in situ and small invasive tumors, we felt that the absolute estimates are not reliable. In general, overdiagnosis increases with age across all age groups but increases more sharply for women who are screened in their 70s and 80s.

‡ Strategy is dominated by other strategies; the strategy that dominates may not be in this table.

Summary of Screening Interval

• Biennial screening achieves most of the benefit of annual screening with less harm. Decisions about the best strategy depend on program and individual objectives and the weight placed on benefits, harms, and resource considerations.

Current USPSTF Guidelines:

"So, what does this mean if you are a woman in your 40s? You should talk to your doctor and make an informed decision about whether mammography is right for you based on your family history, general health, and personal values."

Diana Petitti, MD, MPH
Vice Chair, U.S. Preventive Services Task Force
November 19, 2009
American College of Physicians Guidelines

• **Recommendation 1:** *In women 40 to 49 years of age, clinicians should periodically perform individualized assessment of risk for breast cancer to help guide decisions about screening mammography.*

  The 5-year breast cancer risk can vary from 0.4% for a woman age 40 years with no risk factors to 6.0% for a woman age 49 years with several risk factors.
American College of Physicians Guidelines

- Recommendation 2: Clinicians should inform women 40 to 49 years of age about the potential benefits and harms of screening mammography.
Recommendation 3: For women 40 to 49 years of age, clinicians should base screening mammography decisions on benefits and harms of screening, as well as on a woman's preferences and breast cancer risk profile.
American College of Physicians Guidelines

- Recommendation 4: We recommend further research on the net benefits and harms of breast cancer screening modalities for women 40 to 49 years of age.

http://www.acponline.org/pressroom/mam_guideline.htm
Counseling your patient

- Risk assessment and perception of risk
- Personal values and self-efficacy in decision making
General Health

- Personal History
- Breast complaints (pain, discharge, mass, skin changes)
- Risk Factors, including family history
- Life expectancy
Risk Factors

- Female
- Age >40
- Family History (Maternal and Paternal)
- Previous malignancy, esp. Breast/ovarian
- Exposure to endogenous hormonal cycling (parity, onset of menarche/menopause, breast feeding, nulliparity or 1st child after age 30)
- Exposure to supradiaphragmatic radiation (RR 4.1*)
- Proliferative histology on previous biopsy
- Obesity/alcohol use/hormone replacement

Age as a risk factor for breast cancer

Figure 1. Female Breast Cancer – Age-Specific Incidence and Death Rates, by Race, United States, 1996-2000


Modifiable Risk Factors

- Exercise 1.5 to 4 hours weekly
- BMI below 25
- Low alcohol consumption
- Having children before age 30
- Breastfeeding more than 7 months
- Use of hormone replacement therapy
## Family History

### Table 4

Standardised incidence ratios (SIRs) of breast cancer by the number of first-degree relatives diagnosed with breast cancer at ≤ 50 years

<table>
<thead>
<tr>
<th></th>
<th>Observed (rate per 10⁶)</th>
<th>Expected (rate per 10⁶)</th>
<th>SIRs</th>
<th>95% CI</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No first-degree relative with breast cancer of ≤ 50 years (N=607)</td>
<td>25 (678.2)</td>
<td>7.11 (192.9)</td>
<td>3.52</td>
<td>2.38–5.19</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>One first-degree relative with breast cancer of ≤ 50 years (N=677)</td>
<td>27 (646.9)</td>
<td>6.29 (150.7)</td>
<td>4.29</td>
<td>2.95–6.25</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Two or more first-degree relatives with breast cancer of ≤ 50 years (N=207)</td>
<td>12 (965.4)</td>
<td>3.06 (247.8)</td>
<td>3.90</td>
<td>2.23–6.81</td>
<td>0.0006</td>
</tr>
</tbody>
</table>

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*Metcalfe, KA et al. Breast cancer risks in women with a family history of breast or ovarian cancer who have tested negative for a BRCA1 or BRCA2 mutation. Br J Cancer. 2009 Jan 27;100(2):421-5. Epub 2008 Dec 16*
Assessing High vs. Average Risk

- Women treated with chest irradiation in childhood or young adulthood
- Women with multiple relatives with breast/ovarian cancer, or personal history suggestive of risk:
  - Young age at diagnosis
  - Bilateral breast cancer
  - Both ovarian and breast cancer
  - Multiple family cases of cancer (breast and ovarian)
  - Ashkenazi Jewish heritage
Breast Cancer Risk Assessment

The Breast Cancer Risk Assessment Tool is an interactive tool designed by scientists at the National Cancer Institute (NCI) and the National Human Genome Research Institute (NHGRI) to estimate a woman's risk of developing invasive breast cancer. The tool has been updated for African American women based on the Contraceptive and Reproductive Experiences (CRE) Study. See About the Tool for more information.

Before using the tool, please note the following:

- The Breast Cancer Risk Assessment Tool was designed for use by health professionals. If you are not a health professional, you are encouraged to discuss the results and your personal risk of breast cancer with your doctor.
- The tool should not be used to calculate breast cancer risk for women who have already had a diagnosis of breast cancer, lobular carcinoma in situ (LCIS), or ductal carcinoma in situ (DCIS).
- The BCRA risk calculator may be updated periodically as new data or research becomes available.
- Although the tool has been used with success in clinics for women with strong family histories of breast cancer, more specific methods of estimating risk are appropriate for women known to have breast cancer-producing mutations in the BRCA1 or BRCA2 genes.
- Other factors may also affect risk and are not accounted for by the tool. These factors include previous radiation therapy to the chest for the treatment of Hodgkin lymphoma or an increased risk from a region with low breast cancer rates, such as rural China. The tool's risk calculations assume that a woman is screened for breast cancer as in the general U.S. population. A woman who does not have mammograms will have somewhat lower chances of a diagnosis of breast cancer.
- For information to help your patients understand cancer risk visit http://understandingrisk.cancer.gov. This interactive Web site will help your patients make informed decisions about how to lower their risk.

Risk Calculator

(Click a question number for a brief explanation, or read all explanations.)

1. Does the woman have a medical history of any breast cancer or ductal carcinoma in situ (DCIS) or lobular cancer? [ ]
   - Select
What is her risk for breast cancer?
How can you help guide her decision?

- Personal values: Risk of false positive versus risk of failure to diagnose
  - Understanding of risks/benefits of screening mammography
  - Clarify understanding of personal risk
  - Assess personal values
Now versus later? 1 (wait) to 10 (screen now)

Per 1000 women screened every 2 years from age 40 to age 50:

- 740 correctly reassured
- 240 have “false alarms” with extra tests
- 9 women get cancer in between screenings found by symptoms
- 7 women have cancer detected by screening
- 0.5 women do not die from breast cancer

Australian Screening Mammography Decision Aid Trial
(http://www.mammogram.med.usyd.edu.au)
Screening Mammography Risk Assessment and Decision Guides

- **Australian Screening Mammography Decision Aid:**

- **Risk Assessment Algorithms**
  [www.QAP.sdsu.edu](http://www.QAP.sdsu.edu)

- **Gail Model**
  [www.cancer.gov/bcrisktool](http://www.cancer.gov/bcrisktool)
Mush for the Cure
Case History #2

M.H. is a 42 y.o. G1P1 Caucasian woman who comes in for a routine annual exam without any breast complaints and a normal clinical breast exam. Her family history: Daughter with ovarian cancer, 2 paternal aunts: one with breast and one with ovarian cancer, sister with known BRCA1 mutation. She has no Askenazi Jewish heritage.
Case #2 Questions

• Should M.H. be referred for genetic testing?
• What type of screening and prevention is available for women at high risk of breast cancer?
Genetic Testing

- U.S. Preventative Task Force recommends against routine referral for genetic counseling or routine breast cancer susceptibility gene (BRCA) testing. Grade D.
- USPSTF recommends that women whose family history is associated with an increased risk for BRCA1 or BRCA2 genes be referred for genetic counseling and evaluation for BRCA testing. Grade B
### Recommendations from the United States Preventive Services Task Force on who should be offered genetic testing for BRCA mutations

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<tbody>
<tr>
<td><strong>For non-Ashkenazi Jewish women:</strong></td>
<td></td>
</tr>
<tr>
<td>• Two first-degree relatives with breast cancer, one of whom was diagnosed at age 50 or younger</td>
<td></td>
</tr>
<tr>
<td>• A combination of three or more first or second-degree relatives with breast cancer regardless of age at diagnosis</td>
<td></td>
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<tr>
<td>• A combination of both breast and ovarian cancer among first and second-degree relatives</td>
<td></td>
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<tr>
<td>• A first-degree relative with bilateral breast cancer</td>
<td></td>
</tr>
<tr>
<td>• A combination of two or more first or second degree relatives with ovarian cancer, regardless of age at diagnosis</td>
<td></td>
</tr>
<tr>
<td>• A first or second-degree relative with both breast and ovarian cancer at any age</td>
<td></td>
</tr>
<tr>
<td>• History of breast cancer in a male relative</td>
<td></td>
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<tr>
<td><strong>For women of Ashkenazi Jewish descent:</strong></td>
<td></td>
</tr>
<tr>
<td>• Any first-degree relative (or two second degree relatives on the same side of the family) with breast or ovarian cancer</td>
<td></td>
</tr>
</tbody>
</table>

Assessing High vs. Average Risk

- Women treated with chest irradiation in childhood or young adulthood
- Women with multiple relatives with breast/ovarian cancer, or personal history suggestive of risk:
  - Young age at diagnosis
  - Bilateral breast cancer
  - Both ovarian and breast cancer
  - Multiple family cases of cancer (breast and ovarian)
  - Ashkenazi Jewish heritage
Models Assessing Risk

- BRCAPRO/Cancer Gene
  [http://www4.utsouthwestern.edu/breasthealth/cagene/default.asp](http://www4.utsouthwestern.edu/breasthealth/cagene/default.asp)
- Claus Model (BreastCa for Palm available at [www.palmgear.com](http://www.palmgear.com))
- Tyrer-Cuzick (IBIS Breast Cancer Risk Evaluation Tool contact: ibis@cancer.org.uk).

Algorithm 1: Assessment of Risk

1. History

   - Assess Personal Risk Factors
     - Personal History of ADH, LCIS, DCIS, or Breast Cancer?
     - Member of a Family with a Known Mutation in a Breast Cancer Susceptibility Gene?
     - History of Radiation Therapy to Upper Torso?

   - Assess Family History Risk Factors
     - Positive maternal or paternal family history of:
       - ≥ 1 w/ Breast Cancer Before Age 50?
       - ≥ 2 w/ Breast or Ovarian Cancer?
       - ≥ 1 w/ Breast Ca and ≥ 1 w/ an Associated Cancer***?
       - ≥ 1 w/ Breast Ca and a Second Primary Breast Ca or Associated Cancer***?
       - ≥ 1 Ashkenazi Jewish Relative w/ Ovarian Cancer?
       - ≥ 1 w/ Male Breast Cancer?

   If none of the above are true, continue...

2. Assess Age and Other Risk Factors

   - Current Age ≥ 65 yrs?
   - Any Age with:
     - ≥ 2 Previous Breast Biopsies? (positive or negative)
   - Aged 55 - 65 with:
     - 1 Previous Breast Biopsy? (positive or negative)
     - OR
     - No Live Births Before Age 30?
   - Aged 45 - 55 with:
     - 1 Previous Breast Biopsy? (positive or negative)
     - and No Live Births Before Age 30?

   If none of the above are true...

Increased Risk: Further Follow-up

*Further Follow-up* could include consideration and/or implementation of the following as appropriate: lifestyle counseling; increased surveillance; referral to a breast specialist; genetic risk assessment, chemoprevention (e.g. tamoxifen); prophylactic surgery

**Associated cancers:** ovarian; thyroid; colorectal; prostate; endometrial, pancreatic; adrenocortical; melanoma; childhood sarcoma; leukemia/lymphoma; brain tumor

California Department of Health Services, 2005
Gail Model

Results (Breast Cancer Risk)

Reminder: The Breast Cancer Risk Assessment Tool was designed for use by health professionals. If you are not a health professional, you are encouraged to discuss these results and your personal risk of breast cancer with your doctor.

Race/Ethnicity:
White

5 Year Risk

- This woman (age 43): 2.3%
- Average woman (age 43): 0.8%

Explanation

Based on the information provided (see below), the woman’s estimated risk for developing invasive breast cancer over the next 5 years is 2.3% compared to a risk of 0.8% for a woman of the same age and race/ethnicity from the general U.S. population. This calculation also means that the woman’s risk of NOT getting breast cancer over the next 5 years is 97.7%.

Lifetime Risk

- This woman (to age 90): 22.4%
- Average woman (to age 90): 12.1%

Explanation

Based on the information provided (see below), the woman’s estimated risk for developing invasive breast cancer over her lifetime (to age 90) is 22.4% compared to a risk of 12.1% for a woman of the same age and race/ethnicity from the general U.S. population.
DOE
11123
Ashkenazi: NO

[Genetic pedigree diagram]
Claus Family History Model

The Claus table used in this calculation is:

One first-degree relative

<table>
<thead>
<tr>
<th>Age</th>
<th>29</th>
<th>39</th>
<th>49</th>
<th>59</th>
<th>69</th>
<th>79</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>0.2</td>
<td>0.8</td>
<td>2.3</td>
<td>4.9</td>
<td>8.2</td>
<td>11.0</td>
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</tbody>
</table>

Probability of Developing Breast Cancer by Age

<table>
<thead>
<tr>
<th>Age</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>47</td>
<td>.76</td>
</tr>
<tr>
<td>52</td>
<td>1.85</td>
</tr>
<tr>
<td>57</td>
<td>3.17</td>
</tr>
<tr>
<td>62</td>
<td>4.7</td>
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<tr>
<td>67</td>
<td>6.37</td>
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<tr>
<td>72</td>
<td>7.89</td>
</tr>
<tr>
<td>77</td>
<td>9.31</td>
</tr>
</tbody>
</table>

To Age 79: 9.5

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BRCAPRO: BayesMendel

Carrying Probabilities

BRCA1: 0.021
BRCA2: 0.806
BRCA 1 or 2: 0.817

Probability of Breast or Ovarian Cancer by Age

<table>
<thead>
<tr>
<th>Age</th>
<th>Breast Probabilities</th>
<th>Ovarian Probabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>47</td>
<td>[0.066]</td>
<td>[0.009]</td>
</tr>
<tr>
<td>52</td>
<td>0.135</td>
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<tr>
<td>82</td>
<td>0.399</td>
<td>0.226</td>
</tr>
</tbody>
</table>

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Risk Assessment in Women at High Risk of Breast Cancer

- Genetic Risk Assessment (Counseling/Testing)
- Interventions/Referral:
  - Adjunctive Screening/Surveillance
  - Chemoprevention
  - Prophylactic Surgery
Increased surveillance

- Yearly MRI in addition to mammography can be considered for women high risk (20-25% or greater lifetime risk using Claus of BRCApro)

Chemoprevention

- The U.S. Preventive Services Task Force (USPSTF) recommends against routine use of tamoxifen or raloxifene for the primary prevention of breast cancer in women at low or average risk for breast cancer. Grade: D Recommendation.

- The USPSTF recommends that clinicians discuss chemoprevention with women at high risk for breast cancer and at low risk for adverse effects of chemoprevention. Clinicians should inform patients of the potential benefits and harms of chemoprevention. Grade: B Recommendation.
Chemoprevention

- Has been evaluated in women with a 1.5% or greater 5 year risk by the Gail Model and women at high risk of breast cancer
- Associated with thromboembolic events
- Of benefit to women in their 40’s at high risk and without thromboembolic risks
- Of benefit to women in their 50’s at high risk and without a uterus or thromboembolic risks
- Of more benefit to BRCA2 carriers than BRCA1 carriers
Prophylactic Surgery

- Prophylactic mastectomy can reduce breast cancer incidence by 85-100%
- Prophylactic oopherectomy can reduce risk for ovarian cancer by 85% or more and can reduce risk for breast cancer

Questions?