Screening for Breast Cancer: Evidence and Recommendations

Suzanne M. Mahon, RN, DNSc, AOCN®, APNG

Guidelines for the early detection of breast cancer vary across agencies. This article compares available breast cancer screening guidelines for women of average or increased risk, as well as for older women. Nurses are challenged to explain risk factors, discuss variations in guidelines, and assist women in understanding the strengths and limitations of various screening modalities for the early detection of breast cancer.

Suzanne M. Mahon, RN, DNSc, AOCN®, APNG, is a professor in the Division of Hematology/Oncology in the Department of Internal Medicine and a professor of adult nursing in the School of Nursing at Saint Louis University in Missouri. The author takes full responsibility for the content of the article. The author did not receive honoraria for this work. No financial relationships relevant to the content of this article have been disclosed by the author or editorial staff. Mahon can be reached at mahonsm@slu.edu, with copy to editor at CJONEditor@ons.org.

Digital Object Identifier: 10.1188/12.CJON.567-571

The American Cancer Society ([ACS], 2012) estimated that 226,870 new cases of invasive breast cancer and 63,300 new cases of in situ breast cancer will be diagnosed in the United States in 2012. Breast cancer is the second leading cause of cancer death among women, with an estimated 39,920 deaths expected in 2012 (ACS, 2012). The widespread use of screening mammography combined with treatment advances has been credited with significant reductions in breast cancer mortality. A cancer screening program should be implemented only when the magnitude of benefits exceeds the harms to a degree that justifies the costs and effort of the program (Harris, Yeatts, & Kinsinger, 2011). Because breast cancer is a significant problem, screening is an appropriate consideration. Screening modalities that have demonstrated some sensitivity and specificity used in the early detection of breast cancer in asymptomatic women include breast self-examination, clinical breast examination, mammography and, in some women, breast magnetic resonance imaging (MRI).

Breast cancer risk is an important consideration in the application of screening guidelines. Most guidelines provide recommendations for women at average risk; to date, the lifetime risk for developing breast cancer in the United States is 12.15%, which means one in eight women will develop breast cancer in her lifetime (to age 85) (ACS, 2011). The health benefits and cost utility of screening mammography are influenced by a woman's risk factors for breast cancer, particularly her age, breast density on an initial mammogram, history of breast biopsy, and family history of the disease (Boyd et al., 2011; Schousboe, Kerlikowske, Loh, & Cummings, 2011). Breast density is best categorized with the Breast Imaging Reporting and Data System, which classifies breast density with a score ranging from 1 (almost entirely fatty breast tissue) to 4 (extremely dense breast tissue); a rating of 3 or 4 suggests increased density and risk (Schousboe et al., 2011). Family history of breast cancer, particularly those with a history suggestive of a hereditary cancer syndrome, and a previous breast biopsy showing atypia also indicate increased risk (Nelson et al., 2012).

Understanding relative risk for developing cancer is important to selecting the proper breast cancer screening modality. Relative risk is a comparison of a risk factor to someone who does not have it (see Table 1). Screening recommendations may be modified based on risk factor profile for some women. Common models for calculating the lifetime risk of developing breast cancer and the risk of having a mutation associated with hereditary breast cancer syndromes include the following.

- Lifetime risk only: Modified Gail model or Breast Cancer Risk Assessment Tool (www.cancer.gov/bcrisktool) and the Claus model (Claus, Risch, & Thompson, 1994)
- Lifetime and mutation risk: CancerGene (www4.utsouthwestern.edu/breasthealth/cagene) and the Tyrer-Cuzick model or International Breast Cancer Intervention Study Breast Cancer Risk Evaluation Tool (www.ems-trials.org/riskevaluator)
- Mutation risk only: *BRCA* Risk Calculator (www.myriadpro.com/brca-risk-calculator)

Each model considers different risk factors, and the clinician is responsible for selecting a model that will most accurately summarize risk. Those models help to identify women with significantly increased risk for developing breast cancer compared to women of the same age without risk factors.

Accuracy of Screening Tests

In screening, sensitivity measures the proportion of actual positive test results that are correctly identified as a positive screen, whereas specificity measures the proportion of correctly identified negative test results. A perfect breast cancer screening test would have 100% sensitivity (i.e., identifies all women with breast cancer—no false negatives) and 100% specificity (i.e., would not have false positives resulting in unnecessary workup). Any test usually has a trade-off between sensitivity