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CNE SERIES

Deciphering the Diagnostics of Breast Cancer

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Today's medical-surgical nurse working in the hospital, clinic, or community needs to understand the diverse diagnostic screening tools used to screen and evaluate breast cancer in the United States. Risk assessment models, mammography, ultrasound, breast MRI, genetic testing, and cancer prevention are discussed.

Breast cancer is a topic of concern for all women, regardless of family history. Hormonal and reproductive factors, such as early menarche and later age at menopause, nulliparity (and therefore a greater number of ovulations over the patient's lifetime), and later age at first pregnancy (greater than age 30 years), increase a woman's breast cancer risk (Lynch, 2002). The two most important risk factors for breast cancer are age at diagnosis and family history. Having one first-degree or second-degree relative with breast cancer can increase a woman's lifetime risk of breast cancer significantly (Srivasta, McKinnon, & Wood, 2001). Risk assessment may be used for screening as well as medical decision making about chemoprevention and prophylactic surgery, for clinical trial eligibility, and in genetic counseling for pretest decision making and posttest interpretation (Rubinstein, O'Neill, Peters, Rittmeyer, & Stadler, 2002).

One in eight women in the United States develops breast cancer; this translates to a 12.6% lifetime probability (Ries et al., 2004). Sponsored by the National Cancer Institute (NCI), the Surveillance Epidemiology and End Results (SEER, 2007) group collects cancer information from nine different geographic locations throughout the United States and has provided accurate demographic statistics on cancer every year since

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Table 1.
Incidence Rates by Race

Race/Ethnicity	Female
All Races	127.8 per 100,000 women
White	132.5 per 100,000 women
Black	118.3 per 100,000 women
Asian/Pacific Islander	89.0 per 100,000 women
American Indian/Alaska Native	69.8 per 100,000 women
Hispanic	89.3 per 100,000 women

Source: SEER, 2007.

1973. The group estimated that 178,480 women will be diagnosed with and 40,460 women will die of breast cancer in 2007 (SEER, 2007) (see Table 1).

Breast Cancer Risk Assessment Tools

Recent advances in the understanding of breast cancer have led to the use of tools that use mathematical methods to identify risk in the general population. The best scenario would be a risk assessment tool that gives a "yes" or "no" answer, indicating that the patient either will develop breast cancer in the future or not. None of the risk assessment tools can do that, but they do provide a *relative risk* of developing breast cancer in comparison to the general population (Constantino, Gail, & Pee, 1999).

The modified Gail model is the most widely used risk assessment model. It is available online without charge (http://www.cancer.gov/bcrisktool/Default.aspx) and does not require approval from insurance companies for its use, making it very attractive for anyone desiring to use the model. The modified Gail model is the only risk assessment tool that has been independently tested and validated, which provides evidence of accuracy (Constantino et al., 1999).

In a study by Constantino and colleagues (1999), the Gail model predicted that 159 women in a placebo group would be diagnosed with breast cancer; 155 actually developed breast cancer over a 5-year period. Of importance is the fact that women in the study were obtaining yearly mammograms and following other established NCI guidelines. The modified Gail model calculations/predictions work best on a population that is compliant with annual mammograms (Constantino et al., 1999). At the Arizona Cancer Center (an NCI-designated facility), the modified Gail model is used to calculate lifetime exposure to estrogen and calculate relative risk.

One limitation of the modified Gail model is its failure to account for second-degree relatives with breast cancer, or paternal relatives with breast cancer (Euhus, Leitch, Huth, & Peters, 2002). The model is slanted heavily toward risks associated with estrogen or hormone exposures.

The Food and Drug Administration (FDA) uses the modified Gail model to calculate risk. Tamoxifen (Nolvadex®) was approved by the FDA for *preventing* breast cancer in women whose risk is greater than 1.7% over 5 years using the modified Gail model. It is reported that tamoxifen can reduce breast cancer by 50% (only in tumors that are hormone receptor-positive), and prophylactic mastectomy can reduce incidence by 90% in patients who have either a strong family history or a genetic mutation for breast cancer (Euhus, 2001).

Another widely used risk assessment tool is the Claus model. The Claus model was developed prior to the onset of genetic testing and is a better model for predicting risk in patients with a strong family history (Euhus et al., 2002). The Claus model also uses the age of onset of relatives with breast cancer, which is a predictor for a genetic mutation. Because the Claus model only has been tested in Caucasian women, its reliability is less certain in other races. It assigns risk to women based only on their inherited predisposition to breast cancer, creating a limitation in not accounting for environmental causes of breast cancer such as estrogen exposure (Euhus et al., 2002).

Screening Mammography

Breast cancer survival has increased over time; at least some of the improvement is attributed to mammography (NCI, 2007). Screening mammography in the general population starting at age 40 is the gold standard in the United States, as supported by multiple research studies (Miller, To, Baines, & Wall 2002; Moss et al. 2006; Shapiro, 1988; Zahl, Strand, & Maehlen, 2004). The "absolute mortality benefit for women screened annually starting at age 40 is 4 per 10,000 at 10.7 years" (NCI, 2007). Also, the reduction in breast cancer mortality was estimated using seven different statistical methods that attributed a 7%-23% reduced rate (mean 15%) of breast cancer death due to screening mammography (Berry et al., 2005). Screening mammography in women age 40-49 leads to a decrease of 15%-20% in breast cancer mortality, with 15%-35% mortality decrease in women age 50-69. A screening mammogram is particularly effective in decreasing mortality in women who are asymptomatic (NCI, 2006). This is important because earlier detection leads to earlier treatment. It will detect about 2 cancers per 1,000 exams (NCI, 2007). Although the screening

Table 2.
Breast Imaging Reporting and Database System (BI-RADS)

Category	Assessment	Follow-up
0	Need additional imaging evaluation	Additional imaging needed before a category can be assigned
1	Negative	Continue annual screening mammography (for women over age 40)
2	Benign (noncancerous) finding	Continue annual screening mammography (for women over age 40)
3	Probably benign	Receive a 6-month follow-up mammogram
4	Suspicious abnormality	May require biopsy
5	Highly suggestive of (cancer)	Requires biopsy
6	Known biopsy – proven malignancy (cancer) <	Biopsy confirms presence of cancer before treatment begins

Source: NCI, 2006.

mammogram is recommended for every female starting at age 40, it is not a perfect diagnostic test because approximately 10%-15% of breast cancers will not be detected by mammography (NCI, 2006). Mammograms should always be compared to an earlier mammogram to increase sensitivity (Berry et al., 2005). At the Arizona Cancer Center, patients are encouraged to get copies of their earlier films for comparison over time. They also should take copies of prior mammograms with them when relocating.

Many women report being frightened of possible pain when getting their annual mammogram (Andrews, 2001). The best time to get the mammogram is 1 week after the onset of menses (Andrews, 2001). Along with the use of a breast cushion, administration of oral nonopioid analgesics prior to the exam may decrease pain or discomfort associated with the mammogram (Andrews, 2001). The most important issue is to encourage the yearly mammogram in women age 40 or older. The baseline or annual mammogram may be done earlier in patients who have a primary relative (mother or sister) with breast cancer occurring before age 40 (NCI, 2007).

Mammogram results should be reported to both the patient and the primary physician. Results follow a standard established by the American College of Radiology (ACR) called the Breast Imaging Reporting and Database System, which divides the mammogram into seven different categories (NCI, 2006) (see Table 2).

Diagnostic Mammography

Diagnostic mammography consists of a screening mammogram with additional views of a particular area of concern. The ACR (2002) identified the following indications for a diagnostic mammography: a breast lump, nipple discharge, new nipple inversion, skin dimpling or skin retraction, localized breast pain, or a questionable abnormality on the screening mammogram, such as microcalcifications.

According to Fletcher and Elmore (2003), only about 10% of woman who have a screening mammogram will need additional tests such as a diagnostic mammogram or a breast ultrasound. Of the women needing additional testing, about 10% will require a breast biopsy; 80% of the breast biopsy group will not have cancer.

Digital Mammography vs. Film Mammography

In a 2-year trial conducted by the ACR Imaging Network, 49,528 asymptomatic women in 33 sites throughout the United States and Canada received both a digital and a film mammogram (Posano et al., 2005). Two different radiologists read the mammograms separately. All participants in the study were asked to follow up in 1 year with a repeat mammogram. The breast cancer status of any participant who received a positive breast biopsy within 15 months of the mammograms was included. The results showed that in the overall population, film mammography was *diagnostically equivalent* to digital mammography. However, among women under age 50, premenopausal, perimenopausal, or with particularly dense breasts, the digital mammogram offered a slight diagnostic advantage (Posano et al., 2005). The digital film allows the radiologist, and the medical and surgical oncologists to change the contrast and thus make a denser breast appear clearer (Posano et al., 2005).

A dense breast is much harder to read on a mammogram, making mammography a less sensitive diagnostic tool for woman under age 40 who have denser breasts. Women over age 40 taking hormone replacement therapy also may have denser breasts, which will decrease the sensitivity of mammography (Carney et al., 2003).

The way in which a mammogram is stored (digital vs. film) is not as important as the overall quality of the mammogram (Carney et al. 2003). As previously discussed, the digital film may be manipulated by changing the contrast. The digital film will not be overexposed or underexposed, thus decreasing call-back rates.

Digital film also uses a lower radiation dose. However, the digital mammogram is more expensive than the film mammogram. In a patient with large breasts, it also may need to be repeated more often and thus expose the patient to higher radiation doses (Samei, Saunders, Baker, & Delong, 2007). Although comparing current mammograms to earlier studies may be helpful, a comparison between a digital mammogram and a film mammogram may be more difficult (Samei et al., 2007). The use of a digital mammogram allows a facility to use computer-aided detection, with software that identifies asymmetries in the bilateral images (Samei et al., 2007). For the *majority* of the population, the film mammogram is acceptable; a digital mammogram offers a small advantage to woman under age 50 with denser breasts (Samei et al., 2007).

Breast Ultrasound

The breast ultrasound is a wonderful imaging tool that allows the physician to take a closer look at an area of concern. The ultrasound is not used as a general screening tool, but it can be useful in women under age 40 or women with particularly dense breasts (Alvarez et al., 2006). The breast ultrasound can help determine if a breast lump is a solid tumor or a fluid-filled cyst (Alvarez et al. 2006). It is used as a problem-solving tool to give instantaneous information that can be used when evaluating a suspicious area on a mammogram. In most high-risk breast cancer clinics, ultrasound is used any time a lump or an unusual thickening is detected during the breast exam. Ultrasound also is used to examine any enlarged lymph nodes in the axillary area (Alvarez et al., 2006).

Breast MRI

Breast magnetic resonance imaging (MRI) is not designed as a general screening tool for the whole population. It is the *most sensitive* tool available, but also has a high rate of false positives and therefore is less specific. The breast MRI is the most expensive diagnostic test and only should be used for specific indications. The American Cancer Society Guidelines (Saslow et al., 2007) for the use of breast MRI identify patients who should obtain this study (see Table 3).

The strongest recommendations for MRI breast screening are for patients who carry a genetic mutation for breast cancer; they are based on numerous international studies. The Netherlands (Kriege et al., 2004), Canada (Warner et al., 2004), United Kingdom (Leach et al., 2005), Germany (Kuhl, Scrading, & Leutner, 2005), Italy (Sardanelli & Podo, 2007), and the United States (Lehman et al., 2005) contributed studies to support recommendations for breast MRI screening. The ACR also developed guidelines for the use of breast MRI (Saslow et al., 2007). Breast MRI is a valuable diagnostic tool for staging existing breast cancer patients when the tumor may have invaded the chest wall. It is advantageous in tumor

Table 3.
Recommendations for Breast MRI Screening as an Adjunct to Mammography

Recommend Annual MRI Screening (Based on Evidence*)
BRCA mutation
First-degree relative of BRCA carrier, but untested
Lifetime risk ~20-25% or greater, as defined by risk models that are largely dependant on family history
Recommend Annual MRI Screening (Based on Expert Consensus Opinion†)
Radiation to chest between ages 10 and 30 (Hodgkin's disease)
Li-Fraumeni syndrome and first-degree relatives
Cowden and Bannayan-Riley-Ruvalcaba syndromes and first-degree relatives
Insufficient Evidence to Recommend for or Against MRI Screening‡
Lifetime risk 15%-20%, as defined by risk models that are largely dependant on family history
Lobular carcinoma *in situ* (LCIS) or atypical lobular hyperplasia (ALH)
Atypical ductal hyperplasia (ADH)
Heterogeneously or extremely dense breast on mammography
Women with a personal history of breast cancer, including ductal carcinoma *in situ* (DCIS)
Recommend Against MRI Screening (Based on Expert Consensus Opinion)
Women at <15% lifetime risk

* Evidence from nonrandomized screening trials and observational studies.
† Based on evidence of lifetime risk for breast cancer.
‡ Payment should not be a barrier. Screening decisions should be made on a case-by-case basis, as there may be particular factors to support MRI. More data on these groups are expected to be published soon.

Source: Saslow et al., 2007.

types that did not show up on mammogram or in very dense breasts. Additionally, the MRI can be used to locate a possible breast tumor in patients who present with axillary adenopathy (enlarged axillary lymph node[s]), but with no known breast tumor (Saslow et al., 2007).

Most recently, women with newly diagnosed breast cancer are referred for breast MRI on the contralateral (opposite) breast prior to surgery (Lehman et al., 2007). Up to 3% of women who develop breast cancer may have a co-existing tumor on the other breast that was not detected by mammogram or self-exam (Lehman et al., 2007). The existence of contralateral or ipsilateral disease can affect treatment choices, including lumpectomy plus radiation versus mastectomy (Lehman et al., 2007).

Genetic Counseling and Testing

Referral (either for the patient or for family members) for genetic counseling and/or genetic testing for hereditary breast cancer should be considered for the following (both maternal and paternal sides of a patient's family):

- Female breast cancer before age 50
- Two or more women, on the same side of the family, diagnosed with breast cancer before age 50
- Multiple primary tumors (breast/ovary, breast/thyroid, breast/sarcoma, breast/breast)
- Ovarian cancer
- Ashkenazi Jewish ancestry and one relative diagnosed with either breast or ovarian cancer (Ashkenazi Jewish ancestry refers to the Eastern European Jewish population primarily from Germany, Poland, Lithuania, Ukraine, and Russia, as opposed to the Sephardic Jewish population primarily from Spain, parts of France, Italy, and North Africa.)
- Male breast cancer (any age)
- Early-onset breast cancer (before age 50) and ovarian cancer in the same blood line
- Pancreatic cancer and a family history of breast cancer before age 50
- Early-onset prostate cancer (before age 55) and a family history of breast cancer before age 50
- Family member with a known mutation in a breast cancer susceptibility gene

Genetic Susceptibility

At least 90% of breast cancer cases occur in a multifactorial manner, with a partial genetic and a partial environmental influence (Nordin, Liden, Hansson, Rosenquist, & Berglund, 2002). In other words, cancer is not due to a single gene effect; most often, an individual does not inherit a gene predisposing him or her to cancer. The remaining 5%-10% of cancer cases are due to a single cancer susceptibility gene, and are considered to be hereditary cancers.

Hereditary breast and ovarian cancer (HBOC) accounts for 5% of all breast cancers (Levine & Gemignani, 2003). The rapid development of human genetics research has shown two highly penetrant breast and ovarian cancer susceptibility genes, BRCA1 and BRCA2 (*BRCA* – "BReast CAncer"). *Penetrance* refers to the proportion of people with a mutation who exhibit clinical manifestations, in this case a diagnosis of breast cancer (Levine & Gemignani, 2003).

The greatest lifetime risk of breast cancer is conferred by mutations in either BRCA1 or BRCA2 (Nicoletto et al., 2001). BRCA genes are involved in regulating transcription and maintaining gene integrity by monitoring or repairing DNA mutations. They therefore play a role as indirect tumor suppressor genes, perhaps explaining the high, but sometimes incomplete, penetrance of their mutations. Although mutations in a BRCA gene yield a high probability of developing a tumor, it is estimated to be 50%-85% rather than 100% penetrance for breast cancer.

Hereditary cancer tends to occur at a younger age than sporadic cancer, often before age 50 (Narod et al., 2002). Some carriers develop bilateral breast cancer or both breast and ovarian cancer (Haber, 2002). Mutations in BRCA1 and BRCA2 are the predominant causes of HBOC, conferring a lifetime breast cancer risk of 50%-85% (Barnes-Kedar & Plon, 2002; Morris, Johnson, Krasikov, Allen, & Dorsey, 2001). The increased risk of developing contralateral breast cancer in gene mutation carriers is as high as 48% and 64% by age 50 and 70 respectively (Barnes-Kedar & Plon, 2002). Men with mutations in BRCA2 have a 6% lifetime risk of breast cancer (Srivasta et al., 2001). While mutations in BRCA 1 or 2 account for 70% of HBOC (Srivasta et al., 2001), a small percentage of the remaining forms of hereditary breast cancer are due to mutations in the gene TP53 (responsible for Li-Fraumeni syndrome), ATM (responsible for ataxia-telangectasia), and PTEN (responsible for Cowden syndrome) (Nicoletto et al., 2001).

Hundreds of BRCA mutations have been documented, mostly *nonsense* and *frameshift* mutations which can be found throughout the entire DNA sequences of the genes (Nicoletto et al., 2001). First identified in 1994, BRCA1 has been localized on chromosome 17 (17q21). It is believed to explain approximately 50% of inherited breast cancer families and 90% of inherited breast and ovarian cancer families. BRCA2, identified in 1995 and localized to chromosome 13 (13q12), shares structural and functional similarities with BRCA1. This second gene is thought to account for approximately 30% of inherited breast cancer families.

Founder mutations are genetic abnormalities that are commonly seen in a specific population. Clinically important examples of this phenomenon are the three founder mutations (two in BRCA1 and one in BRCA2) that exist in the Ashkenazi Jewish population. Approximately 30% of Ashkenazi Jewish women diagnosed with breast cancer prior to age 45, and 30%-60% of Ashkenazi Jewish women diagnosed with ovarian cancer, will harbor one of the three common mutations (Srivasta et al., 2001). These three mutations (BRCA1 – 185delAG and 5382insC, BRCA2 – 617delT) account for more than 90% of all BRCA mutations in the Ashkenazi Jewish population (Barnes-Kedar & Plon, 2002).

Genetic alterations or mutations can be sporadic and occur randomly, or they can follow an inheritance pattern in a family and reoccur. BRCA mutations are inherited via autosomal dominant transmission. Autosomal dominant inheritance describes a pattern where one parent, either the father or the mother, is affected with a genetic condition and carries an altered gene on one of their chromosomes. This parent has a 50% chance of passing this altered gene to each of the children (Haber, 2002).

As a result of recent developments in DNA testing, genetic counseling is now offered routinely to people within identified "cancer families" to inform them about their assumed increased risk for developing cancer. One of the most important components in genetic counseling is providing information, including risk estimates for cancers, genetic testing, medical or surgical treatment options if testing positive for mutations, informed consent for clinical trials, and aspects of heredity involving family members (Nordin et al., 2002). Younger women (below age 50) and women with no previous diagnosis of cancer are most likely to change their screening practices following genetic counseling risk assessment and testing (Metcalfe et al., 2002). Levels of psychological distress both before and after genetic counseling in women with a strong family history of breast cancer have been studied. High-risk women express many concerns, including a fear of dying of cancer, concern over their children's emotional and physical health, and guilt about the possibility of transmitting a faulty gene (Randall, Butow, Kirk, & Tucker, 2001). Often, women with a family history of breast cancer perceive themselves to be at high risk and may seek genetic advice to reduce anxiety regarding their personal risk. Some evidence suggests that these women overestimate their risk of developing breast cancer (Brain et al., 2002). A certain amount of anxiety is associated with *optimal* compliance with health care behavior; the extremes of too much or too little anxiety need to be addressed (Hopwood, Shenton, Lalloo, Evans, & Howell, 2001). Genetic counseling aims to clarify some of these issues; however, uncertainty will remain because not all mutation carriers develop cancer. Also, failure to detect mutation does not exclude the presence of an as yet unidentified mutation (Nordin et al., 2002).

The recommendation is first to pursue genetic testing in an individual already affected with cancer before testing an unaffected relative. When a BRCA1 or BRCA2 mutation is found in an individual previously affected with cancer, and an at-risk relative who has not had cancer does not to carry the mutation, the report is of a *true negative*. Therefore, this is reassuring to the unaffected individual who learns that he or she is not at an increased risk of developing various cancers. However, a recent study (Smith et al., 2007) suggested that even if all cancer cases in a particular family are explained by an identified BRCA1 or BRCA2 gene mutation, women testing negative for that mutation may still face an increased risk and should be considered for continued surveillance.

Some families clearly demonstrate an autosomal dominant pattern of inheritance for cancer; however, individuals in such a family may not test positive for any of the known breast cancer genes. Other hereditary genes are likely to be found in the next several years that will explain some of these families. A negative BRCA1 or BRCA2 mutation test does not reduce an individual's risk for breast cancer to that of the general population in the presence of a significant number of affected relatives (Smith et al., 2007). Also, an individual who has not been affected with cancer, but who carries a BRCA1 or BRCA2 mutation, may not develop cancer.

The information that a person receives from a genetic counselor has potentially life altering consequences, including both positive and negative effects on interpersonal relationships. Ideally, genetic counselors make their patients aware of these effects and offer support when necessary. Individuals who are told they have a germline mutation express a variety of reactions, including acceptance because the results are not a surprise to them, relief from anxiety with the removal of uncertainty about their genetic risk status, a positive attitude with regard to prevention, and feelings of both sadness and anger (Metcalf et al., 2002).

Finally, adherence to surveillance measures such as breast self-exam and mammography appears to be influenced by levels of anxiety, intrusive thoughts about cancer, psychological distress, education, employment, and age (Metcalfe et al., 2002). This again stresses the need to address both clinical and psychological issues surrounding surveillance options in the genetic counseling session.

Cancer Prevention

The management of cancer risk falls into four categories: screening and close surveillance,

prophylactic surgery, chemoprevention, and risk avoidance. Screening and surveillance involves monitoring to detect cancer as early as possible, when the chances for cure are greatest. High-risk women, including BRCA1 and BRCA2 mutation carriers, should have more frequent breast exams starting at a younger age than women of the general population. The current screening recommendations proposed by an NIH panel include a clinical breast exam every 6 months and mammograms every 6-12 months beginning at age 25 (NCI, 2002). At the Arizona Cancer Center, alternating a mammogram with a breast MRI at 6-month intervals is the recommended screening program for women who are determined to have a higher risk for breast cancer.

Women at increased risk for breast cancer may consider bilateral prophylactic mastectomies as a risk-reduction measure. A woman's decision to undergo a prophylactic mastectomy certainly may be influenced by family history, genetic testing results, genetic counseling, perceptions of cancer risk, anxiety, and available prevention alternatives. Decision analyses of prophylactic mastectomy for patients with BRCA mutations suggest that this surgery might extend life expectancy up to 5 years (Levine & Gemignani, 2003).

Women who undergo prophylactic mastectomy can reduce their risk of breast cancer by 90%; additionally, premenopausal prophylactic oophorectomy in women who carry BRCA1/2 mutations decreases the risk of breast cancer by at least 50% (Srivasta et al., 2001). Timing of life events can play an important role in prevention decision making for many women. For example, if a woman is planning to have children in the future, an oophorectomy is not a risk reduction measure she is likely to opt for.

Chemoprevention involves taking a medicine, vitamin, or other substance to reduce the risk of cancer. A recent study (Gronwald et al., 2006) found a 50% reduction in the risk of contralateral breast cancer in BRCA1 and a 42% reduction in BRCA2 carriers who were treated premenopausally with tamoxifen for their first breast cancer (hormone receptor-positive disease). The Study of Tamoxifen and Raloxifene (STAR) clinical trial showed that raloxifene (Evista®) is as effective as tamoxifen in reducing the incidence of breast cancer in postmenopausal woman with hormone receptor-positive disease (Vogel et al., 2006). The STAR trial included over 19,700 postmenopausal women at over 500 centers in the United States, Puerto Rico, and Canada, and is one of the largest cancer prevention clinical trials ever conducted.

Reducing dietary fat intake is one example of risk avoidance, although the evidence supporting this strategy is controversial (Chlebowski et al., 2006; Pierce et al., 2007). The Women's Intervention Nutrition Study (WINS) was the first large randomized clinical trial to demonstrate a reduction in the relative risk of breast cancer recurrence in postmenopausal women by decreasing fat intake (Chlebowski et al., 2006). The study showed a 42% reduction in breast cancer recurrences in women who had estrogen receptor-negative disease and a 24% reduction in relative risk in women who had estrogen receptor-positive disease. The women in the reduced dietary fat intake group decreased their fat intake by 24 grams per day, or about 13% of their dietary intake. This is an important finding because estrogen receptor-negative disease typically has a worse prognosis than hormone receptor-positive disease (Chlebowski et al., 2006). Unclear from this study is whether the low-fat diet or the weight loss associated with the low-fat diet was more important in reducing the risk of breast cancer recurrence. Another recent study (Pierce et al., 2007) included 3,088 women who had been treated for early-stage breast cancer. The intervention group consumed a 65% increase in vegetables, a 25% increase in fruit, a 30% increase in fiber, and a 13% decrease in fat intake in comparison to the control group. This study did *not* show a decrease in breast cancer events over a 7.3-year follow up. Researchers cautioned that the intervention group did not lose weight in the study, which may explain the positive results of the WINS study compared to their negative findings. It is also possible that another risk-avoidance measure such as exercise influenced the positive findings in the WINS study.

Nursing Implications for the Medical-Surgical Nurse

The evidence offered by the NCI (2007) suggests that breast cancer screening reduces both the morbidity and mortality of breast cancer. Access to health care for poor or indigent populations may be an obstruction to breast cancer screening. Some states provide access to free mammograms through county health departments or local clinics. Handouts for both health care providers and patients are available on the NCI breast cancer Web site (http://www.cancer.gov/cancertopics/factsheet/Prevention/breast-cancer) in both English and Spanish (NCI, 2005). Medical-surgical nurses have a responsibility to educate the community about and promote compliance with various screening tools in the general population. They also can promote screening in their colleagues, daughters, other family members, and friends. ■

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Answer/Evaluation Form:
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1. If you applied what you have learned from this activity into your practice, what would be different?

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Evaluation	Strongly disagree				Strongly agree
2. By completing this activity, I was able to meet the following objectives:					
a. Identify breast cancer risk assessment tools.	1	2	3	4	5
b. Describe different methods of screening mammography.	1	2	3	4	5
c. Discuss genetic susceptibility and breast cancer screening.	1	2	3	4	5
d. Review cancer prevention methods.	1	2	3	4	5
3. The content was current and relevant.	1	2	3	4	5
4. The objectives could be achieved using the content provided.	1	2	3	4	5
5. This was an effective method to learn this content.	1	2	3	4	5
6. I am more confident in my abilities since completing this material.	1	2	3	4	5

7. The material was (check one) ___new ___review for me

8. Time required to complete the reading assignment: _____minutes

I verify that I have completed this activity: _____

Comments

_____

_____

Objectives

This continuing nursing educational (CNE) activity is designed for nurses and other health care professionals who care for and educate patients and their families regarding breast cancer screening. For those wishing to obtain CNE credit, an evaluation follows. After studying the information presented in this article, the nurse will be able to:

1. Identify breast cancer risk assessment tools.
2. Describe different methods of screening mammography.
3. Discuss genetic susceptibility and breast cancer screening.
4. Review cancer prevention methods.

CNE Instructions

1. To receive continuing nursing education credit for individual study after reading the article, complete the answer/evaluation form to the left.
2. Photocopy and send the answer/evaluation form along with a check or credit card order payable to **AMSN** to *MEDSURG Nursing*, CNE Series, East Holly Avenue Box 56, Pitman, NJ 08071–0056.
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Anthony J. Jannetti, Inc. is a provider approved by the California Board of Registered Nursing, Provider Number, CEP 5387.

This article was reviewed and formatted for contact hour credit by Dottie Roberts, MSN, MACI, RN, CMSRN, OCNS-C, ***MEDSURG Nursing*** Editor; and Sally S. Russell, MN, CMSRN, AMSN Education Director.