

Breast Cancer Screening – A Guide for Physicians and Patients

If cancer screening rates could be improved, death from cancers could be decreased.

Breast Cancer Facts

With the exception of skin cancer, breast cancer is the most commonly diagnosed cancer among women and the second leading cause of cancer death after lung cancer [2].

A U.S. woman has a 12.32 % chance of developing breast cancer in her lifetime and a 2.69 % chance of dying from the disease [3].

Age is the most significant non-modifiable risk factor for breast cancer. The older a woman becomes, the greater her chance of developing breast cancer. [1]

Other non-modifiable risk factors include genetic alterations (BRCA1/BRCA2), mammographic breast density, race, and family history [1].

Studies have shown a positive association between the amount of time a woman is exposed to circulating estrogen and breast cancer risk but it is not yet known if circulating estrogen is a cause of breast cancer. [4-7]

Age	Per Population
30	1 in 227
40	1 in 68
50	1 in 42
60	1 in 28
70	1 in 26

Modifiable risk factors for breast cancer include alcohol consumption, physical activity, and body weight [1].

Screening mammograms are recommended by all three Recommendation Generating Entities, however recommendations across the three groups lack consensus on when to screen, causing anxiety for physicians and patients.

U.S. Preventive Services Task Force (USPSTF)
American Cancer Society (ACS)
American College of Obstetricians and Gynecologists (ACOG)

Risk vs. Benefit – Why the Guidelines are Changing?

It is estimated that for every 2,000 women screened for breast cancer over a 10 year period, one woman will avoid dying from the disease and 10 healthy women – who would not have been diagnosed if not for screening – will receive unnecessary treatment. Another, 200 women will undergo psychological distress for years as a result of false-positive results. [8] When it comes to breast cancer some tumors grow rapidly, some slowly, and others grow not at all. Mammography cannot tell the between a breast cancer that is fatal and one that is harmless [9]. As a result, when a woman receives a diagnosis of breast cancer - regardless of the type – she is more likely to have lumps or breasts removed and to receive unnecessary radiotherapy [8].

The National Cancer Institute (NCI) has concluded that screening mammography may lead to the following harms:[10]
Overdiagnosis and resulting treatment of insignificant cancers: Screening can result in a diagnosis of cancer that would never have caused symptoms or death during the woman’s lifetime, thereby exposing the woman to the risks of therapy (e.g., surgical deformity, radiation therapy, chemotherapy).

False-positives with additional testing and anxiety: On average 10% of women who undergo screening will be recalled for further testing. Only five out of 100 will have cancer. Of U.S. women screened annually over 10 years, approximately 50% will experience a false-positive, with between seven to 17% undergoing biopsies.

False negatives with false sense of security and potential delay in cancer diagnosis: Six to 46% of women with invasive cancer will have negative mammograms.

Radiation-induced breast cancer: Breast cancer can be caused from radiation-induced mutations, especially if a woman is exposed before age 30 and if the radiation is delivered in high doses.

Explaining Risk and New Screening Guidelines

Both physicians and patients are being presented with new information that may change what has become an accepted preventative practice. When discussing mammography screening it is important to focus on the harm versus the modest benefit and recognize the uncertainty surrounding the relevant importance of each for individual patients [11].

Questions and answers to start the discussion [11]:

Q: It has been stated that mammography is not a perfect screening test. Why?

A: Mammography is not a perfect screening test because a review of the research has shown that:

- Not all cancers will be found
- Regardless of whether or not a woman is screened some women will still die
- Though cancer may be found, most diagnosed women will be cured regardless of whether or not the cancer was discovered by mammography
- Overdiagnosis may occur when some cancers are found that would never have caused problems
- False-positive results may occur because of a non-cancerous abnormality

Q: What are the benefits of mammography?

A: Studies have shown several benefits to mammography. For instance,

- The number of women who die from breast cancer is decreased through mammography; however the benefit is greatest for those who are at a higher risk because of age or other risk factors.
- The number of lives saved varies by age. Based on the best evidence available uncertainty remains about how exact this number is.
- For every 10,000 women who undergo screening mammography for the next 10 years, the number of lives saved by age is estimated at:
 - 5 of 10 000 women aged 40 to 49 years
 - 10 of 10 000 women aged 50 to 59 years
 - 42 of 10 000 women aged 60 to 69 years
- If a woman's risk for breast cancer is higher than the average patient, she may benefit more from a mammogram.

Q: What are the harms of mammography?

A: Studies have shown that mammography does not come without risk or harm. These harms include the fact that:

- More than 50 % of women who undergo mammography screening for 10 years will have a false-positive result. Of those with a false-positive result, 20 % will need a biopsy.
- If a woman decides to have a mammogram, it is expected that she will have at least one false-positive result where she will be called back for additional imaging and perhaps a biopsy. Most times, nothing is found.
- Regular screening may result in overdiagnosis when the results reveal a noninvasive condition or a cancer that would never cause a problem. As it is not possible to tell which cancers will cause a problem and which ones won't, all cancers are treated the same, which leads to unnecessary treatment for some women.

Q. How is the Decision Made?

A. The US Preventive Services Task Force offers the following guidance:

- Women aged 50-74 should have a screening mammography every two years

- The benefit of starting screening earlier depends on the patient’s individual risk factors, values, and preferences.
- The feeling of having a false-positive result from screening or being diagnosed with and treated for cancer that would never have caused a problem is different for each woman. Each patient should consider what the experience may mean for her.
- Consider what it might feel like to forgo screening and later be diagnosed with breast cancer, even when it is likely the mammography would have made little difference.

The decision to start biennial mammography screening before 50 years of age should be an individual one and should be made with consideration to the patient’s values [11]. The USPSTF states that “Women deserve to be aware of what the science says so they can make the best choice for themselves, together with their doctor.” [12]

References

1. National Cancer Institute. *Breast cancer risk in American women*. Breast Cancer 2012; Available from: <http://www.cancer.gov/types/breast/risk-fact-sheet#r1>.
2. DeSantis, C., et al., *Breast cancer statistics: 2013*. CA Cancer J Clin, 2014. **64**(1): p. 62-62.
3. National Cancer Institute. *SEER Cancer Statistics Review 1975-2012*. Surveillance, Epidemiology, and End Results Program 2014; Available from: http://seer.cancer.gov/csr/1975_2012/browse_csr.php?sectionSEL=4&pageSEL=sect_04_table.17.html.
4. Nelson, H.D., et al., *Risk factors for breast cancer for women aged 40 to 49 Years: A systematic review and meta-analysis*. Annals of Internal Medicine, 2012. **156**(9): p. 635-648.
5. Endogenous Hormones and Breast Cancer Collaborative Group, *Sex hormones and risk of breast cancer in premenopausal women: a collaborative reanalysis of individual participant data from seven prospective studies*. Lancet Oncology, 2013. **14**: p. 1009-1019.
6. Endogenous Hormones and Breast Cancer Collaborative Group, *Endogenous sex hormones and breast cancer in postmenopausal women: reanalysis of nine prospective studies*. J Natl Cancer Inst, 2002. **94**(8): p. 606-616.
7. Zhang, X., et al., *Postmenopausal plasma sex hormone levels and breast cancer risk over 20 years of follow-up*. Breast Cancer Research and Treatment, 2013. **137**(3): p. 883-892.
8. Gøtzsche, P.C. and K. Jørgensen, *Screening for breast cancer with mammography (Review)*. The Cochrane Collaboration, 2013. **Cochrane Review**(6): p. 1-81.
9. Elmore, J.G. and S.W. Fletcher, *Overdiagnosis in breast cancer screening: Time to tackle an underappreciated harm* Annals of Internal Medicine, 2012. **156**(7): p. 536-537.
10. National Cancer Institute. *Breast cancer screening—for health professionals (PDQ®)*. Breast Cancer 2015; Available from: <http://www.cancer.gov/types/breast/hp/breast-screening-pdq>.
11. Pace, L.E. and N.L. Keating, *A systematic assessment of benefits and risks to guide breast cancer screening decisions*. Jama, 2014. **311**(13): p. 1327-1335.
12. USPSTF. *Breast cancer screening draft recommendations*. 2015; Available from: <http://screeningforbreastcancer.org/>.