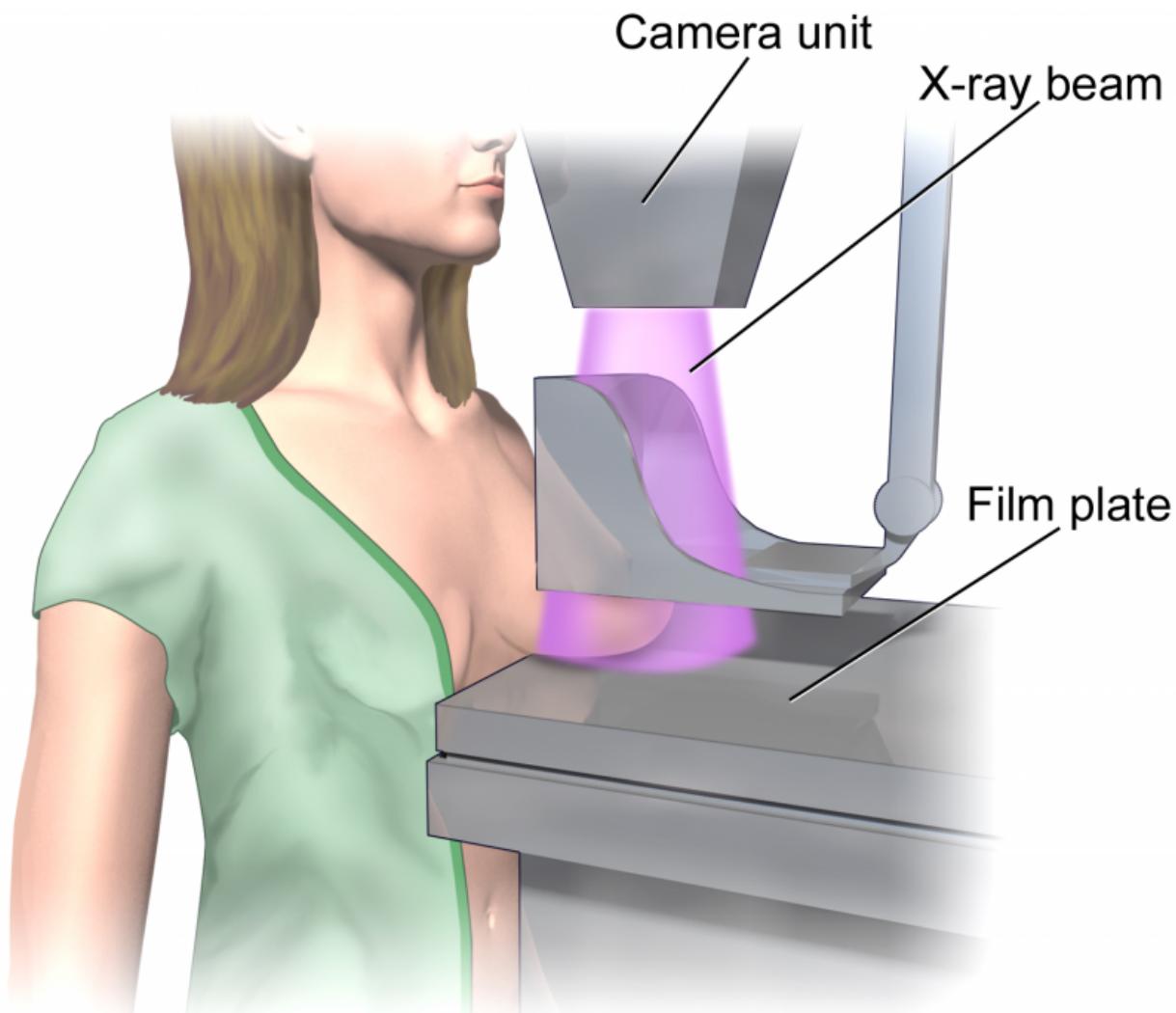


New analyses confirms biennial mammography starting at age 50 is optimal for average women

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Mammogram. Credit: Blausen.com staff. "Blausen gallery 2014". *Wikiversity Journal of Medicine*. DOI:10.15347/wjm/2014.010. ISSN 20018762. CC BY 3.0

New and comprehensive analyses from six independent research teams examining breast cancer screening intervals have produced a unanimous finding—that mammography screening every two years for average risk women ages 50 to 74 offers a favorable balance of benefits to harm.

The conclusion is consistent with the same groups' analyses published in 2009, even with newly added data from digital mammography, advanced treatments and molecular tumor subtypes.

The findings, presented to the U.S. Preventive Services Task Force as part of its evidence review for breast cancer [screening](#) recommendations, are published in the Jan. 12 issue of *Annals of Internal Medicine*.

The analyses were conducted by modeling research teams that are part of the Cancer Intervention and Surveillance Modeling Network (CISNET), funded by the National Cancer Institute. Researchers from the Breast Cancer Surveillance Consortium (BCSC) also contributed to the research.

"CISNET's charge is to create models that can test a large number of screening and treatment scenarios, and provide evidence that can be considered for public health recommendations for average risk women. But it's important to remember that none of us is the 'average' woman," says the paper's lead author, Jeanne S. Mandelblatt, MD, MPH, of Georgetown Lombardi Comprehensive Cancer Center, and a principal investigator with CISNET.

As first reported in the groups' technical report published online in April 2015, the CISNET/BCSC analyses used the six independent simulation models to analyze 10 different digital breast cancer screening strategies for the average risk U.S. female population.

The researchers examined screening strategies with different starting ages (40, 45 or 50), and one- or two-year intervals between screening exams. The modeling uses national data on breast cancer incidence, risks for breast cancer, mammography characteristics, treatment effects, and risk of dying from other diseases. Then, the lifetime impact including benefits and harms of [breast cancer screening](#) mammography is calculated.

"These new analyses include information not in our 2009 report," Mandelblatt says. "We added digital mammography outcomes and the most modern treatments including therapy based on tumor molecular subtypes such as HER2 and ER status. We also included additional results for risk levels, breast density, and women's other illnesses to help guide clinical practice considerations." (Studies have suggested that women with dense breasts are more prone to cancer development.)

With the new updated data, the CISNET results still demonstrate the same finding as in 2009—that screening average-risk women biennially from ages 50 to 74 provides a reasonable balance of avoiding deaths from breast cancer and potential screening harms, including over-diagnosis, false-positives, and benign biopsies.

The researchers found that for average risk populations, starting screening earlier or screening more often prevented a small number of additional deaths, but also caused a larger number of false positive mammograms and benign biopsies, and led to more over-diagnosis and over-treatment.

"Still, the bottom line is that mammography saves lives. When to start screening and how often to undergo mammography is a personal decision. No model can provide those answers," Mandelblatt says.

Other CISNET modeling findings include:

- In an unscreened population, the models predict a median 12.9 percent cumulative probability of having a breast cancer diagnosis from ages 40 to 100. Without screening, the median probability of dying of breast cancer is 2.5 percent. Thus, if a particular screening strategy leads to a 30 percent reduction in [breast cancer mortality](#), the probability of breast cancer mortality was reduced from 2.5 percent to 1.75 percent.
- Screening biennially (every two years) from ages 50-74 achieves a median 25.8 percent breast cancer mortality reduction—averting 7 breast cancer deaths per 1000 women screened—and leads to 953 false positives and 19 over-diagnosed cases, or 12% of all screen detected cases. (Over-diagnosis occurs when the cancer is small and was never destined to become life threatening or because a woman can die of other illnesses before her breast cancer surfaces.)
- In general, biennial strategies maintain an average of 81.2 percent of annual screening benefits with almost half the false positives and fewer over-diagnosed cases.
- Compared with biennial screening from ages 50-74, starting biennial screening at age 40 averts one more death per 1000 from breast cancer and generates 576 more false positive tests and two additional over-diagnosed cancers for every 1000 women screened.
- Annual screening from ages 50-74 averted 2 more deaths per 1000 compared to biennial screening, but had more substantially more harms, (845 more false positive tests and 6 more over-diagnosed cases) compared to biennial screening.
- For women with a two- to four-fold increase in breast cancer risk compared with the average population, annual screening starting at age 40 or 45 would have a similar or more favorable harm to benefit ratio as biennial screening of average risk women from 50-74. (A two-fold increase in risk is seen in groups of women with a mother, sister or daughter with [breast cancer](#).)

- For women with even a 1.3-fold increase in risk (the level seen with high vs. average breast density, for example), biennial screening starting at age 40 would have similar ratios of harms to benefits as biennial screening of average risk groups from ages 50-74.
- For healthy older women with an average remaining life expectancy of 17 years, screening would be reasonable through age 78 or 80 and would have a minimal increase in over-diagnosis compared with stopping at age 74. However, for women with moderate to severe illnesses, screening cessation at about age 68 offers a similar balance of harms and benefits as stopping at age 74 for women with average comorbidity.

More information: *Annals of Internal Medicine*,
annals.org/article.aspx?doi=10.7326/M15-1536

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