

Probability model estimates proportion of women who survive breast cancer detected through screening

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A model used to estimate breast cancer survival rates found that the probability that a woman with screen-detected breast cancer will avoid a breast cancer death because of screening mammography may be lower than previously thought, according to a report published Online First by *Archives of Internal Medicine*.

"Today, more people are likely to know a [cancer survivor](#) than ever before," the authors write. "Between 1971 and 2007, the number of cancer survivors in the United States more than doubled, from 1.5 percent to 4 percent of the population. [Breast cancer](#) survivors are particularly common: they now represent approximately 2.5 million, or one-fifth of the current survivor population." The authors also note, however, that although "perhaps the most persuasive messages promoting [screening mammography](#) come from women who argue that the test 'saved my life,'" other possibilities for breast cancer survival exist.

H. Gilbert Welch, M.D., M.P.H., and Brittney A. Frankel, both of Dartmouth Institute for [Health Policy](#) and Clinical Practice, Hanover, N.H., developed a method to estimate the probability that a woman with screen-detected breast cancer had her life saved because of the screening. The authors used DevCan, the National Cancer Institute's software for analyzing data, to estimate the 10-year risk of diagnosis and the 20-year risk of death. This probability approach also relies on two

estimated possibilities for a woman in the general population of the United States: the probability of having breast cancer detected by screening and the probability of avoiding [breast cancer mortality](#) (death) because of the screening.

The authors estimated that for a 50-year old woman, the risk of developing breast cancer in the next 10 years is 2,990 per 100,000. In this age group, 64 percent of breast cancers are found by mammography, suggesting that the risk of having a screen-detected breast cancer during the same period is 1,910 per 100,000. The woman's observed 20-year probability of breast [cancer death](#) is 990 per 100,000. Assuming that screening mammography has already reduced risk of breast cancer death by 20 percent, the risk of death in the absence of screening would be 1,240 per 100,000, suggesting that the estimated benefit of screening amounted to 250 per 100,000. Therefore, the authors estimate that the probability that a woman with screen-detected breast cancer avoids breast cancer death because of mammography is 13 percent (250/1910).

The probability of the same 50-year-old woman avoiding breast cancer death increases to 17 percent if screening mammography reduces breast cancer mortality by 25 percent; however, probability decreases to 3 percent if screening mammography reduces breast cancer mortality by 5 percent. Similar analyses conducted for women of varying ages all yield probability estimates below 25 percent.

"We considered a range of values: namely, that screening mammography reduces breast cancer mortality anywhere from 5 percent to 25 percent. The values toward the high end (20 to 25 percent) reflect the randomized trial data from more than a quarter century ago," the authors conclude.

"Consequently, we believe that readers should focus on the values toward the low end (5 to 10 percent) and recognize that the probability that a woman with screen-detected breast cancer has, in fact, avoided a breast cancer death because of screening mammography is now likely to

be well below 10 percent."

In an invited commentary, Timothy J. Wilt, M.D., M.P.H., and Melissa R. Partin, Ph.D., both of the Minneapolis Veterans Administration for Chronic Disease Outcomes Research and the University of Minnesota, Minneapolis, note that in their study, Welch and Frankel, "express concerns that overly inflated perceptions of the benefits of mammography may lead to a self-perpetuating cycle of unwarranted demand for screening, overdiagnosis, overtreatment, and a continually growing population of [breast cancer survivors](#) who advocate mammography. The demographics of survivorship suggest that their concern is legitimate."

"Preventive health care services like cancer screening can result in tremendous individual and public health benefits by identifying disease at early, more treatable stages or lowering a patient's risk of developing a disease altogether," write Wilt and Partin. However, the authors do caution that, "they do not always provide the expected benefit and cause harms such as overdiagnosis and overtreatment."

"Numerous studies have documented that the strongest predictor of mammography utilization is physician recommendation," the authors write. "Therefore, simple, highly effective and accurate messages can come directly from clinicians."

"In conclusion, a simple science-based message can and should be delivered to many individuals considering early disease detection and treatment," the authors note. "The opportunity and challenge for clinicians is to be that reliable source of information that ensures that our patients are able to make well-informed decisions that incorporate the best evidence into their personal values."

More information:

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