Breast Cancer Screening Goes Personalized

Research on individual risk will point to better decisions about who gets mammography tests and when they should get them.

In 2009, the U.S. Preventive Services Task Force (PSTF) created a controversy with its revised guidelines for screening mammography, which asserted that women between the ages of 50 and 74 should undergo routine biannual screening, while younger women could choose to be screened based on how they valued mammography's possible benefits and harms. The previous guidelines had recommended screening for all women older than 40 years, and critics attacked the updates as vague and disparaging of mammography's life-saving payback. But the task force cited clinical data and models showing that, for younger women, the small mortality reductions from mammography do not justify the unnecessary treatments resulting from false-positive findings.

Fueled by a seemingly endless series of studies, the same controversy simmers today. In November 2011, Canada's Task Force on Preventive Health Care issued guidelines that essentially mirror the PSTF's position: no screening until age 50, and then mammograms every 2 to 3 years until age 74.

The American Cancer Society (ACS), meanwhile, recommends annual screening for all women starting at age 40 until they reach 10 years of life expectancy (typically 74 years). “The ACS's position is that all women between the ages of 40 and 50 should be told that mammography isn't a good test, but they should get it anyway, while the PSTF recommends these women should be told mammography isn't a good test, but they can get it if they want it,” explains ACS chief medical officer, Otis Brawley, MD.

Now the debate is shifting toward individual risk factors.

AN INDIVIDUALIZED APPROACH

Karla Kerlikowske, MD, a professor at the University of California's Helen Diller Comprehensive Cancer Center in San Francisco, says older studies behind the 2009 guidelines considered mammography outcomes only in relation to age.

Studies conducted more recently also looked at other risk factors; those factors evaluated in a screening context so far include breast density, family history, and the history of prior biopsies. According to Kerlikowske, those studies are shaping a more personalized landscape for determining who should be screened with mammography and when they should be screened. “We want to maximize the benefits from screening by focusing it on the women who really need it,” she says.

In July 2011, Kerlikowske and colleagues reported analyses showing that biannual mammograms make sense mainly for women in their 40s who have high breast density and at least one other cancer risk factor (Ann Intern Med 2011;155:10–20). Women aged 50 to 79 with no additional risk factors apart from age need only be screened every 3 to 4 years, the authors concluded. “I know of at least 2 other studies slated to come out soon that support the same concept,” Kerlikowske remarks.

Diana Pettiti, MD, MPH, a professor in the department of biomedical informatics at Arizona State University in Metro Phoenix, who was vice chair on the PSTF task force, feels that Kerlikowske's data provide a useful step in the right direction. “We need screening recommendations tailored to each woman’s individual risk profile,” Pettiti says. “These results are excellent on a population basis, but they still need to be validated for individual predictive value.”

Validation efforts are ongoing through a 5-year, multicenter, prospective study funded last September by NCI's Division of Cancer Control and Population Sciences (DCCPS). Codirected by Kerlikowske and Diana Miglioretti, PhD, a senior investigator at Group Health Research Institute, in Seattle, WA, the study will compare age- to risk-based screening according to factors including breast density, family history, results of prior biopsy, hormonal status, and genetic variations.

“The study aims to determine if a risk-based approach detects more invasive breast cancers while also reducing false-positive findings compared with age-based screening alone,” says Stephen Taplin, MD, PhD, acting chief in the DCCPS’s Process of Care Research Branch.

BEYOND MAMMOGRAPHY

Pettiti says it will not be easy to replace mammography, which has 40 years of data and clinical history behind it. But alternatives that address its chief drawbacks—a limited ability to detect tumors in dense-breasted women (who make up 25% of the female population) and excessive biopsies for findings that turn out to be benign—are making progress.

Film-screen mammography has been largely replaced with digital mammography, which does a moderately better job on dense breast tissue, says Kerlikowske.

Other promising techniques include tomosynthesis, which takes 3-dimensional pictures of the breast using X-rays; ultrasound; MRI; and an early-stage technology called molecular breast imaging (MBI) geared specifically for dense tissue.

“Tomosynthesis seems to be making the most headway,” comments Kerlikowske. “But we’re not going to get to where we need to be just with fancy imaging modalities. The real issue now is defining who meets a high enough threshold to get a screening test in the first place.” — Charles Schmidt

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Updated version Access the most recent version of this article at: doi:10.1158/2159-8290.CD-ND2012-007

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