Mammography: Yet Another Challenge[1]

Daniel B. Kopans, MD

Mammographic screening is one of the major, unrecognized, medical advances of the past 35 years. Prior to 1990, the death rate from breast cancer had remained unchanged in the United States for at least 50 years. In the middle of the 1980s, the decrease in breast cancer deaths reported from the Swedish Two-County Trial, which was a randomized, controlled trial, led to the onset of widespread screening in the United States that involved enough women to influence national statistics (1). There was a sudden increase in the incidence of breast cancer that began around 1985–1986 that, initially, raised concern that there was an "epidemic" of breast cancer. It was soon recognized that this sudden increase was due to the fact that, with screening, we were finding "future" cancers years earlier. At the same time, the incidence of ductal carcinoma in situ also began to increase. Since ductal carcinoma in situ is, virtually, only found by using mammography, this increase confirmed the fact that mammographic screening had begun on a large scale. Periodic screening is unlikely to affect the fast-growing cancers (length bias), but it is likely to interrupt the moderately growing and slower-growing cancers. Thus, it is not surprising that the death rate from breast cancer began to decrease in 1990, 5–7 years after the onset of screening (2,3).

This decrease in deaths has continued as more and more women participate in screening so that the death rate has decreased by almost 30% since 1990 (4). Some suggest that better therapy is responsible for the decline. In 2005, seven computer models were used to try to determine what percentage of the decline in deaths resulted from better therapy and what percentage resulted from early detection (5). The modeling gave a range for the contribution of early detection from 28% to 65%. Citing the lower estimate, this computer modeling has been used to suggest that therapy is the reason for fewer deaths. It is surprising that so much reliance has been placed on computer modeling when there are actually several direct measures that have been published that aided analysis of actual population-based data that clearly show that mammographic screening is the major reason for the decline in breast cancer deaths. A review of the data from the "two counties" from the Swedish Two-County Trial showed that the death rate declined over time in direct proportion to the number of women participating in screening, while those who did not participate, but had access to the latest therapies, had only a very small decline in death rate (6). A subsequent study of seven counties, which included 30% of the Swedish population, confirmed the fact that screening accounted for most of the decline in deaths (7). The benefit from screening mammography has also been demonstrated in the Netherlands, where despite access to modern therapy, the death rate from breast cancer had continued to increase in the various Dutch health care districts. It was not until screening became available that the death rates began to decline (8).

To those of us who have been involved from the very early years of mammographic screening, it would appear that the challenges never end. We are now entering a new era, with a major reassessment of health care. Interventions will be evaluated with even greater scrutiny, and the benefits of mammography will once again be challenged. The articles by Miglioretti et al (9) and Elmore et al (10), in this issue of *Radiology*, provide important information on the sensitivity and specificity of mammographic screening and how they vary with the train-

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See also the articles by Elmore et al and Miglioretti et al in this issue.

positive rates that were in the highest quartile of interpretive performance to determine the criteria that they used so that these criteria could be taught to all of us to benefit those with lower sensitivity and specificity and to continue to drive down the breast cancer death rate.

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