

Benefits of Screening Mammography: Data from Population Service Screening

By: Mary Newell MD, FSBI, and Peter R Eby MD, FSBI, and the Breast Screening Leadership Group

While randomized controlled trials (RCTs) are the most stringent way to assess whether a certain test or treatment decreases death from a disease, there are other data that can be used to further understand the effect of a test as well. Delivering screening mammograms to the community, i.e., service screening, provides an opportunity to evaluate the effect the test has on the general population when widely used by women.

After RCTs showed that screening mammography saves lives, population-based national screening programs were put in place in the 1980s and 90s throughout the world. Screening mammography is now a routine part of health care in at least 26 countries (1). Data from many of these programs have been analyzed to see if they confirm the RCT results—that invitation to mammography screening, and more directly, exposure to mammography screening, decreases breast cancer deaths.

There are several ways of studying the effect of screening. Trend studies compare death rates from breast cancer in a population in two time periods, before and after screening programs were put in place, to see if there is a difference. Cohort studies compare death rates from breast cancer among women who underwent screening mammography versus those who did not within a single time period. Case-control studies compare the frequency of screening between patients who died of breast cancer (called a “case”) and those who did not (called a “control”). Controls are randomly selected from the population but are similar to case patients in age, location of residence, socioeconomic status, risk factors, and other important parameters. A comparison between a large number of cases and controls can measure the effect of screening mammography on breast cancer deaths (2).

Trend, cohort, and case-control studies have advantages and disadvantages that may appear to increase or decrease the real benefit of screening mammography. For example, trend studies are subject to biases caused by other changes that could occur between the periods before and after screening is introduced, such as improved treatment or increased breast cancer awareness. A major shortcoming of trend studies is lack of data on exposure to screening, and contamination in the screening era from deaths linked to incident cancer before the screening program began. Cohort and case-control studies generally provide more accurate results about how a screening mammography program performs in real life.

The results of cohort studies and case-control studies of service screening confirm the results of RCTs: deaths from breast cancer decrease when widespread screening programs are introduced. In a case-control trial in Western Australia by Nickson and colleagues, death from breast cancer decreased by 52% among women choosing to be screened compared to women who did not (3). A meta-analysis (summary of many

different studies) of Australian and European case-control trials showed that breast cancer deaths decreased by 49% in groups of women who used screening mammography compared to those who did not (3). A cohort study published by Coldman and associates reported that groups of women who participated in Canadian service screening programs had a 40% lower death rate from breast cancer than women who did not (4). A different analysis of cohort studies found that breast cancer deaths were reduced by 43% in populations of women who were screened with mammography (5).

Service studies demonstrate that the benefit of screening mammography in terms of lives saved is even higher than RCTs indicated. This is in part because they measure the effect of screening on women who actually *had* mammograms, not just those who were *invited* to have a mammogram. Service screening studies also tend to measure the effect of more recent screening practices that have benefited from improved mammography technology, better breast positioning techniques, and improved interpretive skills. While RCTs laid the foundation decades ago, data from recent studies of the effects of widespread screening programs confirm that mammograms save lives.

References:

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