Debate

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Population based breast cancer screening by mammography: more harm than good?

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It is an attractive principle to find cancer early, before it spreads, and mammography screening is propagated in several countries with the claims that it saves lives and breasts. It is not that simple, however.

We reported a number of methodological problems in an extensive systematic review of the screening trials (1-3). The better trials, from Canada and Malmö, did not find a reduction in breast cancer mortality after 13 years of follow-up (RR 0.93, 95% CI 0.80-1.09) whereas the other Swedish trials found a 30% reduction (RR 0.70, 0.61-0.81).

We, and others, have shown that breast cancer mortality is an unreliable outcome that is biased in favour of screening. Since deaths are primarily missclassified as other cancer deaths or cardiac deaths, it is interesting that screening failed to reduce all-cancer mortality and all-cause mortality (which cannot be biased if all randomised women are accounted for). An overview of the Swedish trials from 2000 confirmed this (RR 1.00, 0.98-1.02 for all-cause mortality). It is therefore surprising that an updated Swedish overview from 2002 reported a (non-significant) reduction in all-cause mortality of 2% (RR 0.98; 0.96-1.00), since the differences from the previous overview in follow-up and included trials were too few to explain this, and since a 2% reduction corresponds to a 10% reduction in all-cancer mortality which agrees badly with the results that have been reported for all-cancer mortality.

The claimed survival benefit has not been proved and important questions to the Swedish trials remain unanswered (4-5). Observational studies are not the solution to the uncertainty. They should not be trusted as they suffer from lead time bias (cancers are found earlier), length bias (cancers found at screening are relatively slow-growing), overdiagnosis of cancers that will never progress (e.g. most cases of carcinoma in situ); and they cannot separate effects of screening from improvements in therapy.

Overdiagnosis is not confined to the initial screening rounds as it is often claimed. It can be studied reliably in those trials that were not flawed and that did not screen the control group early on. After 7-9 years of follow-up, the level of overdiagnosis was 30% and the level of overtreatment, correspondingly, 31%.

It can be calculated from the most optimistic Swedish estimate (a 30% reduction in breast cancer mortality), and from other results, that for every 1000 women screened regularly throughout 10 years,

1 breast cancer death is avoided (or the woman dies from something else), 5 extra women will get a cancer diagnosis, 3 extra women will get a tumourectomy, 2 extra women will get a mastectomy, and more than 100 women will experience important psychological distress for many months because of false positive findings.

These findings make screening a lottery with no certain winners but many losers.

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Mammographic screening and the reduction in breast cancer mortality

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The results of well conducted randomised trials have demonstrated unequivocally that mammographic screening can reduce the mortality from breast cancer among women aged 50 to 70 years who are regularly screened by at least 30%. Since these trials were initiated 20 to 25 years ago, the improvements in mammographic quality that have occurred in the past two decades would suggest that mammography as currently practised may in the future yield an even larger reduction. Much of this reduction in mortality in women aged 50 to 69 can be achieved with a 3 year screening interval. Results from public health screening programmes in, for example, Sweden, the Netherlands and the U.K. indicate that the benefits observed in the trial situation can be replicated in routine screening. For women aged 40 to 49, the benefits of mammographic screening are less, and require more frequent screening. The sensitivity of screening is directly related to the radiological density of breast tissue, which decreases with age particularly at and after the menopause. Mammographic screening is associated with the diagnosis of more invasive cancers than one would expect to see in an unscreened population. This is partly due to the advance in the time of diagnosis achieved by screening, but also in part to diagnosis of invasive breast cancers which apparently would never surface clinically in the woman's lifetime. These cancers can be considered overdiagnosis, and their treatment constitutes the major harm associated with screening. From the results of the Swedish 2-County trial, this overdiagnosis is confined to the initial prevalence screening test.