

Analysis Too Much Medicine

Overdiagnosis in mammography screening: a 45 year journey from shadowy idea to acknowledged reality

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Screening doesn't reduce the occurrence of advanced cancers

In her paper on mammography screening, Alexandra Barratt writes that “rates of advanced cancer have declined only modestly or remained stable.” Barratt has one reference for the no-change finding (1), which is important, as it reviews data from several countries, and six for a decline, which are all problematic.

A study by Kalager et al. from Norway didn't find a decline caused by screening (2), as it found exactly the same decline of 24% in stage III and IV disease in screened and non-screened groups, which were women in the same age group and time period. This study took advantage of the staggered introduction of breast screening in Norway in creating a reliable control group, and the decline was therefore caused by factors other than screening, most likely increased awareness.

This is a sound study, in contrast to the other study from Norway, by Hofvind et al. (3), which is fundamentally flawed, as we have explained (4). The authors compared attendees with non-attendees within the screened areas, which cannot say anything about whether a screening programme leads to more favourable prognostic features in the detected cancers, as those who attend are different from those who don't attend.

A US study reported an 8% decline in late-stage cancer over 30 years (5), but there was no control group and this decline could easily have been caused by greater breast cancer awareness alone, as was likely the case in Norway (2). In Denmark, the average size of the tumors was 33 mm in 1978-79, which decreased to 24 mm ten years later (6). This change had nothing to do with screening, as it occurred before screening started.

Another US report, by Esserman et al., cannot provide evidence for an effect of screening either, as it also spans 30 years and lacks a reliable control group (7). Bar charts show that the percentage of local cancers out of total cancers has increased, but it is highly misleading to use percentages, as overdiagnosed cancers are predominantly small, and the change in percentage is therefore inevitable, even without any decline in incidence of advanced cancers.

A systematic review by Bisheuvel et al. (8) is irrelevant, as it is about overdiagnosis. We couldn't find anything about rates of advanced cancers having gone down in this paper. Apart from this, the review has important shortcomings, which we have explained in the same journal (9).

The last paper, from the Netherlands, (7) reported a 12% decline in stage III and IV after implementation of screening in women aged 70 to 75 in 1998, but used data for only three years

prior to screening which is not sufficient to estimate a trend. In fact, the figure in the paper suggests that some years after screening was introduced, the incidence of advanced cancers was about the same as in these three pre-screening years. The authors quoted another study from the Netherlands, which found that the rates of advanced cancer remained stable over a 12-year period (11).

Screening doesn't seem to reduce the occurrence of advanced cancers, which means it doesn't work. In an accompanying interview, Alexandra Barratt argues that the dispute over overdiagnosis in breast screening must be solved through consensus between the two sides in the debate, as the current disagreement is confusing to women, clinicians and politicians. We disagree. Science is not about reaching consensus but about finding the most reliable facts.

1 Autier P, Boniol M, Middleton R, et al. Advanced breast cancer incidence following population-based mammographic screening. *Ann Oncol* 2011;22:1726-35.

2 Kalager M, Adami HO, Bretthauer M, et al. Overdiagnosis of invasive breast cancer due to mammography screening: results from the Norwegian screening program. *Ann Intern Med* 2012;156:491-9.

3 Hofvind S, Lee CI, Elmore JG. Stage-specific breast cancer incidence rates among participants and non-participants of a population-based mammographic screening program. *Breast Cancer Res Treat* 2012;135:291-9.

4 Jørgensen KJ, Kalager M, Zahl PH, et al. Comparing attendees with non-attendees in breast screening does not provide useful information about an effect on prognostic features or mortality. *Breast Cancer Res Treat* 2012;136:617-8.

5 Bleyer A, Welch HG. Effect of three decades of screening mammography on breast-cancer incidence. *N Engl J Med* 2012;367:1998-2005.

6 Rostgaard K, Vaeth M, Rootzén H, et al. Why did the breast cancer lymph node status distribution improve in Denmark in the pre-mammography screening period of 1978–1994? *Acta Oncol* 2010;49:313–21.

7 Esserman L, Shieh Y, Thompson I. Rethinking screening for breast cancer and prostate cancer. *JAMA* 2009;302:1685-92.

8 Biesheuvel C, Barratt A, Howard K, et al. Effects of study methods and biases on estimates of invasive breast cancer overdiagnosis with mammography screening: a systematic review. *Lancet Oncol* 2007;8:1129-38.

9 Zahl PH, Jørgensen KJ, Maehlen J, et al. Biases in estimates of overdiagnosis due to mammography screening. *Lancet Oncol* 2008;9:199-201.

10 De Glas NA, de Craen AJ, Bastiaannet E, et al. Effect of implementation of the mass breast cancer screening programme in older women in the Netherlands: population based study. *BMJ* 2014;349:g5410.

11 Nederend J, Duijm LE, Voogd AC, et al. Trends in incidence and detection of advanced breast cancer at biennial screening mammography in The Netherlands: a population based study. *Breast Cancer Res* 2012;14:R10.

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