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## Some more evidence of long-term psychosocial harms from receiving false-positive screening mammography results

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### Context

A systematic review published 6 years ago concluded that receiving false-positive mammography results had harmful and long-term psychosocial consequences.<sup>1-3</sup> At the time, the harms of screening tests were well known only to researchers, some groups in charge of various guidelines and, perhaps, a few journalists. The world has fundamentally changed. Today we have social movements, like ‘Choosing Wisely’ and entire books, like ‘Overdiagnosed: Making People Sick in the Pursuit of Health’, that are devoted to helping the public understand that screening tests can harm as well as help. Harms from screening tests are potentially a very large problem. In the USA, around half of women screened by mammography regularly over a 10-year period can expect to receive abnormal results at least once, and 9 in 10 of these results will be false-positives. The popularity of cancer screening coupled with the high likelihood of receiving false-positive results, add urgency to the important task of understanding the physical and psychological consequences that can result from the screening cascade. Researchers have extensively studied the physical harms resulting from screening, but they have given little attention to the psychological harms of cancer screening tests other than mammography. Furthermore, we know much less about the trajectory of harm over years.

### Methods

Brodersen and colleagues conducted a study of 454 adult women in Denmark screened in the same time period who had normal mammography screening results, false-positives or breast cancer diagnoses. The study used the revised Psychological Consequences (PCQR) Scale that Brodersen and colleagues now call the Consequences of Screening-Breast Cancer Scale (COS-BC), which assessed 12 psychosocial outcomes at 1, 6, 18 and 36 months after screening.

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## Findings

False-positives were associated with small, but reliable elevations in adverse breast cancer-related outcomes for all 12 psychosocial measures. For example, women with false-positive results had higher scores on the PCQr anxiety scale than women with normal results at all time periods studied. Findings were similar, persistent and diminished little after 6 months for most outcomes, and the women reported greater negative psychosocial consequences 3 years after being told they were cancer free.

## Commentary

The study's strengths include the use of population-based samples and multidimensional breast cancer-specific outcomes. Another major strength is the inclusion of cohorts of women with different screening results, which permitted informative comparisons to women with false-positives. Perhaps the largest contribution is their use of 3-year follow-ups.

Limitations include that some PCQr subscales mix multiple constructs. For example, the anxiety subscale contains items that measure feeling 'scared' and 'terrified' that make it closer to a less precise negative effect measure. To put the comparisons of women receiving false-positives to normal test results into proper context, we reanalysed the authors' data using standard methods for calculating effect sizes that we have used in previous research.<sup>12</sup> Using the PCQr anxiety outcome as an example, effect sizes were  $r=0.08$  at 6 months and  $r=0.07$  at 36 months. These effect sizes are much smaller than our meta-analysis of 22 studies showed for breast cancer-specific anxiety,  $r=0.22$  (95% CI 0.18 to 0.27). The effect size for the PCQr anxiety subscale is closer to that previously seen for breast cancer-specific fear ( $r=0.08$ ), perhaps because of the subscale includes fear items.

Other limitations include that the PCQr has a subscale for breast self-examination, a behaviour that many guidelines now recommended against. The second half of the PCQr assesses how patients think the testing affected them and uses an uncommon scoring system. Finally, the absence of analyses that demonstrate whether changes over time differed by test results, the internal consistency of measures and their reliability over time. Study findings would be strengthened by the inclusion of outcomes assessed before screening or learning of test results.

False-positive mammography results cause small but persistent effects on women's thoughts and well-being. These effects are most salient in the months immediately after the receipt of test results, but for some women, persist for years. Psychological distress caused by an imperfect screening test is an important harm that we should not accept as the norm. While these effects are unlikely to meet clinical thresholds for psychopathology, they are unnecessarily disruptive for many women, shifting whole populations from a presumption of wellness to a presumption of disease. Screening providers should alert women to the possibility of false-positive test results and offer interventions to help diminish the psychological distress screening can cause. Understanding the psychological effects of screening should extend to other commonly used tests that produce false-positives, such as screenings for prostate and cervical cancers.

## References

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