Authors' objectives
To determine the efficacy of screening mammography by age, number of mammographic views per screen, screening interval and duration of follow-up.

Searching
MEDLINE was searched from January 1966 to October 31 1993 for English language publications using the terms 'breast neoplasm', 'mortality', 'mass screening' and 'female'. Reference lists in relevant papers were searched manually, and colleagues and experts were consulted for additional material.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) and case-control studies with at least 5 years' follow-up and a minimum of 10 breast cancer deaths, were included. Hospital based case-control studies and cohort studies without controls, were excluded.

Specific interventions included in the review
Mammography screening for breast cancer.

Reference standard test against which the new test was compared
The review did not include any diagnostic accuracy studies that compared the performance of the index test with a reference standard of diagnosis.

Participants included in the review
Women aged 35 to 74 years were included.

Outcomes assessed in the review
The outcome measure was breast cancer mortality.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the authors performed the selection.

Assessment of study quality
The authors do not state that they assessed validity.

Data extraction
The data were extracted for review by two authors, and any disagreements were settled through review by a third.

Methods of synthesis
How were the studies combined?
The RCTs were combined by a meta-analysis. Fixed-effect models were used to calculate summary estimates of relative risks (RR) and odds ratio. Case-control studies had a significantly lower summary RR estimate than RCTs (0.62 versus 0.79), and for this reason the authors excluded case-control trials from other summary estimates, when analysing studies by number of views, screening interval, duration of screening and follow-up, clinical breast examination and study start date.
How were differences between studies investigated?
Study differences were investigated using a fixed-effect model, heterogeneity tests, and critical value of probability (P=0.20). Separate estimates were calculated for experimental and non-experimental studies.

Results of the review
There were 9 RCTs and 4 case-control studies.

Women aged 40 to 74 years:

RR of breast cancer death among women who underwent screening mammography, compared to those who did not, was 0.75 (95% confidence interval, CI: 0.68, 0.83).

Comparison of patients in the RCTs revealed there was no difference in outcome when various screening techniques, screening intervals or inclusion of clinical breast examination were taken into consideration.

Number of mammographic views:

single view, RR 0.76 (95% CI: 0.64, 0.9); two views, RR 0.80 (95% CI: 0.70, 0.92).

Screening interval:

12 months, RR 0.77 (95% CI: 0.64, 0.90); 18 to 33 months, RR 0.79 (95% CI: 0.70, 0.89).

Clinical breast examination included with screening:

yes, RR 0.79 (95% CI: 0.67, 0.95); no, RR 0.78 (95% CI: 0.68, 0.89).

Results were similar when duration of follow-up, duration of screening and study start date (pre- or post-1980) were considered.

Women aged 50 to 74 years:

Results from 10 (8 RCTs and 2 case-control) of the 13 identified trials showed a RR of mortality from breast cancer of 0.74 (95% CI: 0.66, 0.83) in the screened group.

Number of mammographic views: one view mammography appeared to have sufficient sensitivity to reduce breast cancer mortality in this group of women. Single view, RR 0.70 (95% CI: 0.58, 0.84); two view, RR 0.83 (95% CI: 0.71, 0.97).

Screening interval: screening every 18 to 33 months, or every 12 months, resulted in 23% reduction in breast cancer mortality.

Clinical breast examination: clinical examination did not decrease breast cancer mortality beyond the reduction achieved by mammography alone.

Women aged 40 to 49 years:

results in 9 (8 RCTs and 1 case-control) of the 13 identified trials showed a RR of mortality from breast cancer of 0.93 (95% CI 0.76, 1.13) in the screened group.

Number of mammographic views:

single view mammography RR 1.02 (95% CI 0.73, 1.44); two view, RR 0.87 (95% CI ; 0.68, 1.12).

Follow-up:
in those followed for 7 to 9 years there was a non-significant increase in mortality of 2% (95% CI -18%, 27%), RR 1.02 (95% CI 0.82, 1.27); in those followed for 10 to 12 years there was a non significant mortality reduction of 17% (95% CI: -35, 6), RR 0.83 (95% CI: 0.65, 1.06).

Overall mortality reduction for 7-12 years is 7% (95% CI -24%, 13%).

Screening interval: results are based on the fact that only 2 studies (that were heterogeneous X2 =0.09) screened patients every 12 months. The comparison of these studies with those using longer intervals (12 to 33 months) did not show a difference in breast cancer mortality.

No differences were shown in the overall analysis or the age-specific analysis in relation to duration of screening, clinical breast examination or start date of the study.

Cost information
The authors allude to monetary savings if screening intervals are extended to 2 years from the current 1 year, but no figures or substantiating data are included.

Authors' conclusions
Given the variation in screening results for younger women, the authors recommend routine screening every 2 years for women who are over 50 years, or have commenced menopause, and that this screening includes one view mammography.

The authors also comment on various aspects of the studies reviewed. It was felt by the authors that the quality of clinical breast examinations was suboptimal in some studies. An additional point of interest is that the authors cite one study where clinical breast examination alone was as effective in decreasing breast cancer mortality as mammographic screening combined with examination.

The authors believe there is some indication that two view screening for women in the 40 to 49 age group may be more advantageous than in the older group, since breast cancer death rates reduced by 13% in the two view group and only 4% in the one view group. This difference from findings in women in the older age group may be related to the higher sensitivity of two view mammography in younger women who have breast tissue that has a higher fat content. Additionally, the authors felt that the mixed results found in this age group may be related to the difference in incidence of breast cancer in women who have commenced menopause, and those that have not.

CRD commentary
The authors have chosen to exclude the results of the 4 case-control studies from the analysis except for the overall RR calculation; it is unclear whether this was done because of the greater benefit shown by these studies. The number of women included in each of the studies is not given. The review was restricted to English language literature.

The results of this review are similar to another review included on this database (see Other Publications of Related Interest).

Bibliographic details

PubMedID
7799496

Other publications of related interest
This additional published commentary may also be of interest.

**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Adult; Age Factors; Aged; Breast Neoplasms /mortality /prevention & control; Female; Humans; Mammography /standards /statistics & numerical data; Mass Screening /statistics & numerical data; Middle Aged; Odds Ratio; Risk; Technology Assessment, Biomedical; Treatment Outcome

**AccessionNumber**
11995000297

**Date bibliographic record published**
08/08/1995

**Date abstract record published**
08/08/1995

**Record Status**
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.