Surveillance mammography after treatment of primary breast cancer: a systematic review
Grunfeld E, Noorani H, McGahan L, Paszat L, Coyle D, van Walraven C, Joyce J, Sawka C

Authors' objectives
To elucidate the effect of routine surveillance mammograms on detecting ipsilateral recurrence (IR) and contralateral breast cancer (CBC), and on disease outcomes after the treatment of primary breast cancer.

Searching
MEDLINE, HealthSTAR, Cancerlit, EMBASE, Pascal, the Cochrane Library and the U.S. National Cancer Institute's clinical trials database (PDQ) were searched from 1980 to August 1999; the search terms were reported. Documents in the library of the Canadian Coordinating Office for Health Technology Assessment were reviewed, as was a list of current projects from the International Network of Agencies for Health Technology Assessment (to December 1999). Selected journals and the bibliographies of retrieved papers were handsearched. Alerts were established in Current Contents, Clinical Medicine and DIALOG Current Contents Search to update the literature. No language restrictions were applied.

Study selection
Study designs of evaluations included in the review
Studies with over 100 patients that were published from 1980 onwards were eligible for inclusion. Six studies included in the review were cohort or case-control studies, while in nine the evidence was from expert opinion on the basis of clinical experience, descriptive studies, or reports of expert committees. The authors acknowledged that these studies are vulnerable to important sources of bias.

Specific interventions included in the review
Studies of routine surveillance mammography were eligible for inclusion in the review. The actual mammography regimen used in the included studies varied from twice a year to every 2 years, where reported.

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
Patients of any age who had received treatment for primary breast cancer were eligible for inclusion. Patients with ductal carcinoma in situ as their primary diagnosis were excluded from the review. The actual patients included in the review had various stages of disease at initial diagnosis, ranging from benign disease to invasive stage IV disease, where reported. Where stated, the initial treatment that patients had received was a combination of breast-conserving therapy, radiotherapy, chemotherapy and hormone therapy.

Outcomes assessed in the review
Studies measuring the impact of surveillance mammography on disease outcomes were eligible for inclusion. The actual outcomes included in the review were the range and median number of years to recurrence, and the detection rate by mammography alone.

How were decisions on the relevance of primary studies made?
The research team independently reviewed the titles and abstracts of the identified articles to assess their relevance to the review. For those deemed relevant, the full-text article was retrieved and assessed for inclusion based on predefined criteria.

Assessment of study quality
The authors did not state that they assessed validity, only that they ranked studies according to criteria established by

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the Canadian Task Force on the Periodic Health Examination. They did not state how they ranked the studies. The authors discussed aspects of the validity of the primary studies.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. Data were extracted on the number of patients included in the primary studies, their stage of disease at initial diagnosis and their initial treatment, the mammography regimen, time to recurrence, and the detection rate by mammography alone.

Methods of synthesis
How were the studies combined?
A narrative synthesis of the studies was undertaken.

How were differences between studies investigated?
Heterogeneity between the studies was not formally investigated, although the authors stated that the studies were highly heterogeneous in methodology, mammography surveillance regimens and patient populations.

Results of the review
Fifteen observational studies with over 23,653 participants (2 studies did not report the number of participants) were included in the review.

IR.
IR was detected by mammography alone in 8 to 50% of cases (10 studies). Other diagnoses of IR were detected by physical examination alone in 12 to 88% of cases, or by a combination of physical examination and mammography in 8 to 41% of cases. No difference was found in the median interval to detection of IR by mammography alone compared with other methods (3 studies). The method of detection did not influence overall survival (2 studies) or disease-free survival (1 study). IR detected by mammography resulted in better 5-year survival (1 study).

CBC.
CBC was detected by mammography alone in 8 to 87% of cases (9 studies), and by physical examination alone in 20 to 61% of cases. CBC was first detected by patient symptoms in 36 to 80% of cases. The method of detection and distant recurrence did not influence overall survival (1 study that combined patients with CBC and those with distant recurrence).

Authors' conclusions
The authors concluded that their systematic review highlights the need for further research to help better define the optimum surveillance mammography regimen.

CRD commentary
The review question was clear in terms of the intervention, participants and outcomes of interest. The search strategy was extensive and included relevant sources and no language restrictions were applied, thus minimising the possibility of relevant studies being missed. The study selection procedure was undertaken by more than one reviewer, which reduces the potential for error or reviewer bias. However, the methods of data extraction were not reported, so the potential for error or reviewer bias cannot be assessed. The authors do not appear to have systematically assessed the validity of the primary studies, although the studies were ranked according to their study design and aspects of their validity were discussed. The authors acknowledged that the study designs included in the review are vulnerable to important sources of bias. Sufficient details of the primary studies were tabulated. A narrative synthesis was appropriate given the differences in study design, participants and the mammography regimen used. The authors'
conclusions appear appropriate in view of the lack of robust research evidence examining the use of surveillance mammography after treatment for breast cancer.

**Implications of the review for practice and research**

Practice: The authors stated that knowledge of current standard practice, guidelines and clinical judgement must guide the clinician until further research evidence becomes available on the use of surveillance mammography after the treatment of breast cancer.

Research: The authors stated that there is a need for a randomised controlled trial to evaluate the benefit of surveillance mammography after the treatment of primary breast cancer, although they acknowledged that there are serious impediments to conducting such a trial. For example, the question of ethics, the acceptability to practitioners and patients, and the size and expense required, in order to stratify for important disease and patient factors. They further stated that other methods, such as decision analysis and larger population-based cohort studies, may have to be relied upon.

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