Cost-effectiveness of breast cancer screening in Spain

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Screening for breast cancer. The screening procedure was divided into two stages: (a) mammography and clinical examination and (b) medical re-examination and biopsy (a biopsy was undertaken in those women with a positive medical re-examination).

Type of intervention
Screening.

Economic study type
Cost-effectiveness analysis.

Study population
A hypothetical cohort of women aged 50-64 in Spain.

Setting
Institution (primary health care centres). The economic analysis was carried out in Spain.

Dates to which data relate
The years during which data were collected for the effectiveness analysis and resource use were not explicitly stated, but the effectiveness data was derived from the results of two publications in 1990 and 1992. 1990 prices were used.

Source of effectiveness data
The evidence for final outcomes was based on a synthesis of previously completed studies.

Link between effectiveness and cost data
The costing was undertaken retrospectively on the same patient sample as that used in the effectiveness study.

Outcomes assessed in the review
The outcome measure used was the percentage of breast cancers detected in a screening programme and the compliance risk to the programme.

Study designs and other criteria for inclusion in the review
Not stated.
Sources searched to identify primary studies
Not stated.

Criteria used to ensure the validity of primary studies
Not stated.

Methods used to judge relevance and validity, and for extracting data
Not stated.

Number of primary studies included
Four studies were included in the review.

Methods of combining primary studies
Not stated.

Investigation of differences between primary studies
Not stated.

Results of the review
It was assumed that, as the percentage of breast cancers detected in a screening programme in the United Kingdom was 0.55 per 100 women screened and the incidence and mortality rates were 34% lower in Catalonia than in the UK, 0.36 breast cancers per 100 women screened could be detected in Catalonia. It was assumed from one study in the review that the sensitivity and specificity of the screening procedures would be 92% and 94%, respectively. It was assumed, again from one earlier study, that 21.4% of women with a mammogram suspicious for cancer have a positive medical re-examination. Based on three of the studies a participation rate of 70% was assumed.

Measure of benefits used in the economic analysis
Cancers detected were used as the outcome measure in the economic analysis.

Direct costs
Health services costs were calculated for each of the screening stages using information obtained from the primary health care centres and the Medical Association of Catalonia. Costs for mammography were divided into variable and fixed costs. Variable costs included mammographic films, staff time, medical supplies, recruitment, overhead expenses and repairs. To screen 70,000 women the authors calculated that 280,000 mammographic films (4 per woman), 17,500 litres of fixer liquid and 22,750 litres of developer liquid should be used. The authors considered that the medical staff needed 15 minutes per woman to take and read the images, with an additional 12 minutes per woman necessary for the technical activities, and 4 minutes per woman for the administrative activities. Fixed mammographic costs were those associated with capital costs and overhead expenses which included heating, lighting, and water supply. The authors estimated that a total investment of $893,550 in medical equipment was necessary to develop the programme: this investment was amortised annually at a 20% rate. 1990 prices were used.

Currency
US dollars ($).

Sensitivity analysis

Sensitivity analysis of the cost-effectiveness results was carried out to assess the robustness of cost-effectiveness analysis according to the variation in the following variables: sensitivity, specificity, participation rate, breast cancer detection rate, positive medical re-examination rate, and first and second screening stage costs.

**Estimated benefits used in the economic analysis**
If the program is implemented it was estimated that 252 cases of breast cancer could be detected in a cohort of 100,000 women. Other estimated screening results were 4,184 false-positive exams, 65,542 true negative readings, and 22 false-negative readings. The total number of women with a positive finding suspicious for cancer was 4,436 in the first stage of screening and 949 in the medical re-examination. Side effects of treatment were not considered in the economic analysis.

**Cost results**
For a cohort of 100,000 women a cost of $1.42 million for the first screening stage has been estimated. The estimated cost for the second stage was $700,724. Therefore, the total cost of the screening program was $2.12 million and the cost per woman screened was $30.

**Synthesis of costs and benefits**
The cost-effectiveness ratio obtained in this study was $8,424 per cancer detected. If an average increase in life expectancy of 3.2 years in women screened in Spain is assumed, then the cost-effectiveness ratio in terms of cost per life year gained obtained in this study would be $7,020. Cost-effectiveness was sensitive to the variations in the following variables: specificity, breast cancer detection rate, and mammographic costs. Cost-effectiveness was less sensitive to variation in the participation rate, sensitivity, positive medical re-examination rate, and second stage costs.

**Authors' conclusions**
Breast cancer screening should be considered one of the priorities in Catalonia. Health resources should be increased and the number of histopathologists and surgeons should be sufficient to cope with an increase demand for health services. A rapid diagnosis and treatment procedure is needed to reduce the negative psychological consequences of false-positive screening results.

**CRD Commentary**
This was a relatively simple attempt to model the cost-effectiveness of breast cancer screening in Catalonia based on a limited number of earlier studies from the UK's breast cancer screening programme. It is unclear why only certain studies relating to breast cancer screening in the UK were included in the review. The resources costed were thorough but the potential costs of side effects of screening for breast cancer and its treatment were not costed although the potentially negative psychological side effects were discussed by the authors.

The costs and effectiveness related to no screening programme were not considered (3.2 life-years gained were assumed). The sensitivity analysis around the key assumptions was adequate.

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