Cost-effectiveness of early detection of breast cancer in Catalonia (Spain)
Carles M, Vilaprinyo E, Cots F, Gregori A, Pla R, Roman R, Sala M, Macia F, Castells X, Rue M

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.

CRD summary
The objective was to assess the cost-effectiveness of breast cancer screening strategies in the Catalonia region of Spain. The authors concluded that they had presented a reduced number of screening strategies for consideration by decision makers, and mathematical models were useful for assessing breast cancer screening. The methods were adequate and appropriate details were provided. The results were reported in detail. Given the scope of the analysis, the authors' conclusions appear to be appropriate.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The objective was to assess the cost-effectiveness of breast cancer screening strategies in the Catalonia region of Spain.

Interventions
The authors assessed the cost-effectiveness of 20 possible screening strategies, which varying in the intervals between screening and the ages at which women were screened. The screening intervals were biennial or annual and the screening age ranges started at 40, 45, or 50 years and ended at 69, 70, 74, or 79 years. These strategies were compared with no screening. The usual screening in Spain (including Catalonia), targeted women aged 50 to 69 years, and used biennial mammograms.

Location/setting
Spain/out-patient secondary care.

Methods
Analytical approach:
A published probabilistic model was used to assess the costs and outcomes of each strategy. The model population was 100,000 women born between 1948 and 1952, and the time horizon was from 40 to 79 years old. The authors stated that the perspective of the national health system was adopted.

Effectiveness data:
The clinical and effectiveness data were from a number of different sources, including published clinical trials, cohort studies, and life tables. The main estimate of effectiveness was the probability of having a breast cancer diagnosis. This was estimated as the sum of the probabilities of being detected by the screening and being diagnosed in the interval between any two screenings. This evidence was from published studies.

Monetary benefit and utility valuations:
Quality of life estimates (for the cancer health states) were from a US study, which used the European Quality of life (EQ-5D) questionnaire.

Measure of benefit:
The measures of benefit were life-years and quality-adjusted life-years (QALYs), which were discounted at an annual rate of 3%. The number of lives extended was reported.

Cost data:
The direct costs included those of the screening mammogram (including administration), early recall mammogram, non-
invasive complementary tests, invasive tests, the treatment of breast cancer (including hospital admission, ambulatory visits, chemotherapy, laboratory and radiology tests, radiotherapy, and hormone therapy), and advanced care (including palliative care). The treatment costs for breast cancer were from a database of 592 women, who were consecutively diagnosed in a hospital in Barcelona, Spain, over a period of three years. The costs of screening were from a breast cancer screening programme in a hospital in Barcelona. Future costs were discounted at an annual rate of 3%. The price year was 2005 and all costs were reported in Euros (EUR).

Analysis of uncertainty:
One-way sensitivity analyses were undertaken by varying the initial treatment cost by stage, the follow-up costs, the advanced care costs, the years of follow-up, the screening participation, and the use of invasive and non-invasive tests.

Results
For the cohort of 100,000 women, the costs of no screening were EUR 127 million. Biennial screening was less costly than annual screening, and the costs of screening were lower for a narrower age range of women being screened. Biennial screening for women aged 50 to 69 years cost EUR 143 million, and annual screening for women aged 40 to 79 years cost EUR 210 million.

Compared with no screening, the life-years gained were 4,691 with biennial screening for women aged 50 to 69 years, and 9,390 with annual screening for women aged 40 to 79 years. The QALYs gained were 3,614 with biennial screening for women aged 50 to 69 years, and 6,987 with annual screening for women aged 40 to 74 years.

Compared with no screening, biennial screening for women aged 50 to 69 years had an incremental cost-utility ratio (ICUR) of EUR 4,469 per QALY gained. The ICURs increased for each more effective strategy, compared with the previous strategy. Annual screening for woman aged 40 to 74 years had the highest ICUR of EUR 26,720 per QALY gained, compared with annual screening for women aged 40 to 69 years.

The sensitivity analysis showed that the base-case results were not affected by small or moderate changes in the model inputs.

Authors' conclusions
The authors concluded that they had presented a reduced number of screening strategies for consideration by decision makers, and mathematical models were useful for assessing breast cancer screening. Strategies starting at 40 to 45 years and ending at 69 years were best and the incremental cost-effectiveness ratio increased with annual rather than biennial screening.

CRD commentary
Interventions:
The interventions were reported clearly and the usual screening option and no screening were considered.

Effectiveness/benefits:
The clinical and effectiveness data were from a number of published sources. No systematic review was reported to identify these sources, and it is unclear if the best available evidence was used. Life-years and QALYs were appropriate measures of benefit, given the impact of cancer on quality of life and survival. The authors reported the data source and the methods used to derive the utility estimates, and the health states, but the source population was US not Spanish. The details of the methods were reported in an online appendix, and this and the original clinical studies should be consulted to assess the quality of the evidence.

Costs:
The perspective was explicitly reported and all the major cost categories relevant to the health care system perspective appear to have been included. The sources for the unit costs and resource use were reported, which enhances the transparency of the analysis. The time horizon, discount rate, currency, and price year were all reported.

Analysis and results:
The authors used a model to assess the cost-effectiveness of breast screening and a diagram would have been helpful.
The uncertainty in this model was assessed in one-way sensitivity analyses, but no probabilistic sensitivity analysis was performed. This could have captured the overall model uncertainty more comprehensively. The authors discussed some limitations to their study. For instance, they used Catalan or Spanish data, where available, but acknowledged that some data and model assumptions might not have fitted the Spanish setting. Also the costs of diagnosing and treating breast cancer came from one public hospital, which might not be representative of other hospitals in the Catalonia region.

Concluding remarks:
The methods were adequate and appropriate details were provided. The results were reported in detail. Given the scope of the analysis, the authors’ conclusions appear to be appropriate.

Funding
Funding received from the Spanish Ministry of Health, and the Catalan Agency for Health Technology Assessment.

Bibliographic details

PubMedID
21605383

DOI
10.1186/1471-2407-11-192

Original Paper URL
http://www.biomedcentral.com/1471-2407/11/192/abstract/

Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Aged; Aged, 80 and over; Breast Neoplasms /diagnosis /economics /mortality /therapy; Cost-Benefit Analysis; Early Detection of Cancer /economics; Female; Humans; Life Expectancy; Mammography; Middle Aged; Models, Statistical; Quality-Adjusted Life Years; Spain

AccessionNumber
22011001293

Date bibliographic record published
21/09/2011

Date abstract record published
02/02/2012