Efficacy of breast-cancer screening for female relatives of breast-cancer-index cases:  
Taiwan multicentre cancer screening (TAMCAS)  
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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
The health technology investigated was breast cancer screening female relatives of breast -cancer index cases using mammography.

Type of intervention
Screening.

Economic study type
Cost-effectiveness analysis.

Study population
The study comprised a hypothetical cohort of 10,000 female relatives of women treated for breast cancer in hospitals, who were aged at least 35 years, and 10,000 non-high-risk women aged from 40 to 74 years.

Setting
The study setting was a hospital. The economic study was carried out in Taiwan.

Dates to which data relate
The effectiveness and resource use data were derived from a trial undertaken from 1992 to 1997, and from studies published between 1994 and 1997. The dates over which the cost data were obtained, and the price year, were not reported.

Source of effectiveness data
The effectiveness data were derived from a review of the literature.

Modelling
The disease natural history was modified using left-censored (first screen) and interval-censored (second screen) Markov models. The parameters were estimated using a non-linear regression procedure, and the 95% confidence intervals (CIs) were calculated according to an asymptomatic method.

Outcomes assessed in the review
For the high-risk and mass screen populations, the review assessed: the frequency of screen-detected breast cancers by first screen and second screen, after one year; and information on lymph node spread, tumour size, mortality, probability of treatment and life expectancy.
Study designs and other criteria for inclusion in the review
The effectiveness estimates were mainly taken from the Taiwan Multicentre Cancer Screening Study.

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
Summary statistics from individual studies were used.

Number of primary studies included
Four primary studies were included.

Methods of combining primary studies
Not applicable since only one study was used per parameter estimate.

Investigation of differences between primary studies
Not stated.

Results of the review
The pre-clinical incidence rate for female relatives of women with breast cancer was 0.0057 (95% CI: 0.0026 - 0.0088). The estimate of mean sojourn time was 1.9 years (95% CI: 1.18 - 4.86).

The proportion of breast tumours without regional lymph-node spread was 67.9%, while 59.3% of breast tumours diagnosed by mammography were smaller than 2 cm in diameter.

The estimates of mean sojourn time were 0.90 years (95% CI: 0.64 - 1.14) and 2.96 years (95% CI: 2.30 - 4.58) for breast tumours with and without regional lymph-node spread, respectively.

The average life expectancy for women aged at least 35 years was 21.38 years.

Measure of benefits used in the economic analysis
The measure of benefits used was the number of life-years saved.

Direct costs
The direct costs were discounted at an annual rate of 5%. The quantities and costs were reported separately. The direct costs were those due to screening, treatment, and terminal care attributable to deaths from breast cancer. The quantity/cost boundary adopted was that of the hospital. The sources of the cost and quantity estimates, and the price year, were not reported.

Statistical analysis of costs
No statistical analysis of costs was reported.
Indirect Costs
Indirect costs were not included.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analyses were conducted.

Estimated benefits used in the economic analysis
The number of lives saved was 20.21 in the high-risk group and 1.11 with mass screening, assuming a population of 10,000 per group. The number of life-years saved was 432.09 years in the high-risk group and 23.73 years with mass screening.

Cost results
The total costs were $2,096,473 in the high-risk group and $1,717,775 with mass screening, assuming a population of 10,000 per group.

Synthesis of costs and benefits
The cost per life-year saved was $4,851 in the high-risk group and $72,480 with mass screening. Based on a discount rate of 5%, the cost per life-year saved was $7,196 in the high-risk group and $106,806 with mass screening.

Authors' conclusions
The authors suggested that a 33% reduction in breast cancer mortality could be achieved by annual breast cancer screening of female relatives of women with breast cancer. Such efficacy, coupled with a more rapid progression to the clinical phase, suggest that an annual screening interval is appropriate for this high-risk group. Breast cancer screening of the high-risk group is more cost-effective than mass screening for countries with intermediate or low incidence rates of breast cancer. This approach may be applied in other countries where the breast cancer incidence rate is intermediate or low.

CRD COMMENTARY - Selection of comparators
A justification was given for the comparator used; namely that it represented a currently employed strategy. You, as a user of the database, should decide if annual, 2-yearly, and 3-yearly screening programmes are relevant to your own setting.

Validity of estimate of measure of effectiveness
The authors did not state whether a systematic review of the literature had been undertaken. More information about the design of the review would have been useful.

Validity of estimate of measure of benefit
The benefits were estimated directly from the effectiveness analysis. The authors used the number of life-years saved as the primary health benefit.

Validity of estimate of costs
The commendable features of the cost analysis were that all relevant direct cost categories were included, and that the
quantities and costs were reported separately. However, the sources of the costs and quantity data, and the price year, were not reported. This would make it difficult to test the model in other settings.

**Other issues**

The authors made appropriate comparisons of their findings with those from other studies. The issue of generalisability to other settings was addressed by selection of hospital systems. The authors do not seem to have presented their results selectively. The study compared the screening of female relatives of women with breast cancer with mass screening of the general population, and this was reflected in the authors’ conclusions.

No sensitivity analyses were conducted on the effectiveness or cost estimates, to account for variation in the estimates. In addition, the rate of high-risk women in the general population was not taken into consideration, which would make the estimate of effectiveness and cost much lower for this technology. In fact, by screening only high-risk women, fewer cases would be detected than by mass screening, given that some lower risk women would still get breast cancer. The appropriate question to ask is whether it is worth spending the extra amount on mass screening in order to detect the extra number of cases.

**Implications of the study**

The study predicted a 33% reduction in breast cancer mortality by the annual breast cancer screening of female relatives of women with breast cancer. Such efficacy, combined with a more rapid progression to the clinical phase, lead the authors to suggest that an annual screening interval is appropriate for this high-risk group. The authors claimed that breast cancer screening based on the high-risk group approach is more cost-effective than mass screening for countries with intermediate or low incidence rates of breast cancer, and may be applied in such countries. However, their claim cannot be justified by the results presented, since they did not conduct an incremental analysis and account for the rate of high-risk women tested.

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