Cost effectiveness of mammography screening for Chinese women

Wong I O, Kuntz K M, Cowling B J, Lam C L, Leung G 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 study objective was to determine the cost-effectiveness of biennial screening with mammography, compared with no screening, for the detection of breast cancer in 40-year-old Chinese women. The authors concluded that when using epidemiological data for Chinese women, biennial screening was not a cost-effective alternative to no screening, given the low incidence of disease in this specific ethnic group. The study methodology appears satisfactory with good reporting of the clinical data. The authors' conclusions appear valid and are enhanced by the extensive sensitivity analysis.

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

Study objective
The objective was to determine the cost-effectiveness of biennial screening with mammography, compared with no screening, for the detection of breast cancer (BC) in 40-year-old Chinese women.

Interventions
The screening strategies under examination were biennial 2-view film mammography every 2 years, beginning at ages 40 or 50 years and ending at ages 69 or 79 years. Thus, four screening options were considered. Each screening strategy was compared with no screening.

Location/setting
China/primary care.

Methods
Analytical approach:
This economic evaluation was based on a state-transition Markov model which illustrated BC progression and determined the costs and benefits of the alternative strategies. A lifetime horizon was considered. The authors stated that a societal perspective was adopted in the study.

Effectiveness data:
The clinical data appear to have been derived from a selection of known relevant studies. Specifically, data on BC incidence without screening, stage distribution, all-cause and BC-related mortality were obtained from the Hong Kong Cancer Registry. Data on the incidence of BC with screening were derived from the Surveillance, Epidemiology and End Results trial, using US estimates. The accuracy of screening came from 8 randomised clinical trials (RCTs) and represented the key model inputs. All-cause mortality data were obtained from the Hong Kong Census and Statistics Department, while BC-related mortality data were generated based on the output of the authors' model.

Monetary benefit and utility valuations:
The utility weights were derived from a published study, details of which were not provided. Utility weights were associated with each health state of the model.

Measure of benefit:
The summary benefit measures were the life-years (LYs) and quality-adjusted life-years (QALYs). These were obtained from the decision model. The total number of deaths avoided was also reported. The benefits were discounted at an annual rate of 3%.
Cost data:
The key cost categories were screening mammography, evaluation of abnormal results, treatment of cancer and terminal care. The costs were derived from local public sector costs and private sector charges. The cost of time lost due to screening attendance and BC treatment was also included. The costs were in US dollars ($). An annual discount rate of 3% was applied to future costs. The price year was 2005.

Analysis of uncertainty:
A probabilistic sensitivity analysis was undertaken by assigning probabilistic distributions to clinical inputs. Cost-effectiveness acceptability curves were then generated. In alternative scenarios, 8 cohorts starting at different ages (5-year intervals between the ages of 40 and 79 years) were considered. While the base-case analysis referred to the Chinese setting, a US analysis was also carried out, using clinical and economic parameters derived from US sources.

Results
The expected costs in a hypothetical cohort of 100,000 women were $54.14 million with no screening. These ranged from $170.75 million to $296.62 million with biennial screening, depending on the starting and ending age.

The expected LYs in the hypothetical cohort of 100,000 women were 2,373,740 with no screening. These ranged from 2,375,330 to 2,377,140 with biennial screening, depending on the starting and ending age.

The incremental analysis showed that biennial screening was dominated for the age groups 50 to 69 years and 50 to 79 years. The incremental cost per LY gained with screening over no screening was $64,400 ($61,600 per QALY gained) for the group 40 to 69 years and $260,300 ($178,800 per QALY gained) in the age group 40 to 79 years. Similar findings were achieved when different age cohorts were considered.

The cost-effectiveness acceptability curves indicated that the probability that the least costly non-dominated screening option was cost-effective was less than 15.3% in terms of the cost per QALY and less than 14.6% in terms of the cost per LY. More favourable findings were observed when US data were used, given the higher incidence of BC.

Authors' conclusions
The authors concluded that when using epidemiological data for Chinese women, biennial screening with mammography for the detection of BC was not a cost-effective alternative to no screening, given the low incidence of disease in this specific ethnic group.

CRD commentary
Interventions:
The selection of the comparators was appropriate as alternative screening strategies for different age groups were compared in order to cover all possible options.

Effectiveness/benefits:
The sources of the clinical data were identified selectively in order to use the most relevant epidemiological data for the decision model. The use of a local database ensured the appropriateness of data on BC. Similarly, the effectiveness of screening was based on RCTs, which are usually considered a valid source of evidence. The issue of heterogeneity among the sources used was not addressed, but clinical estimates were investigated in depth in the probabilistic sensitivity analysis. Both LYs saved and QALYs were used as benefit measures, which represents a strength of the analysis.

Costs:
The analysis of the costs appears to have been consistent with the perspective adopted in the study. The costs were presented as macro-categories and a detailed breakdown of the cost items was not given. Furthermore, the sources of the economic data were mentioned but not described, which reduces the transparency of the cost analysis. The price year and use of discounting were reported. Statistical analyses of the costs were not performed, and the cost estimates appear not to have been varied in the probabilistic sensitivity analysis.

Analysis and results:
The synthesis of the costs and benefits was appropriately carried out and was presented for different age groups and alternative scenarios. The expected QALYs were not reported. The issue of uncertainty was satisfactorily addressed and the results of the sensitivity analysis were discussed clearly. The authors pointed out some limitations of their analysis, such as the need for some overseas data given the lack of local evidence and the uncertainty surrounding some cost estimates.

Concluding remarks:
The study methodology appears satisfactory with good reporting of the clinical data. The authors' conclusions appear valid and are enhanced by the extensive sensitivity analysis.

Funding
Health and Health Services Research Fund; Health, Welfare, and Food Bureau; Government of the Hong Kong Special Administrative Region, China (grant 03040751).

Bibliographic details

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Adult; Age Factors; Aged; Aged, 80 and over; Asian Continental Ancestry Group /statistics & numerical data; Breast Neoplasms /diagnosis /economics /ethnology; Cost-Benefit Analysis; Female; Hong Kong /epidemiology; Humans; Incidence; Mammography /economics; Markov Chains; Mass Screening /economics /methods; Middle Aged; Models, Theoretical

AccessionNumber
22007001838

Date bibliographic record published
11/10/2007

Date abstract record published
23/12/2008