An economic evaluation of adjuvant trastuzumab therapy in HER2-positive early breast cancer
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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.

CRD summary
The objective was to assess the long-term cost-effectiveness of adjuvant trastuzumab for patients with human epidermal growth factor receptor 2 (HER2)-positive early breast cancer. The authors concluded that one year of adjuvant trastuzumab was cost-effective in the long term. The reporting of the methods was limited and it is not clear if the authors’ conclusions are appropriate.

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

Study objective
The objective was to assess the long-term cost-effectiveness of adjuvant trastuzumab for patients with human epidermal growth factor receptor 2 (HER2)-positive early breast cancer.

Interventions
The two interventions were one-year of adjuvant trastuzumab (in addition to standard chemotherapy) after surgery versus standard chemotherapy (a combination of docetaxel, doxorubicin, and cyclophosphamide) after surgery.

Location/setting
China/in-patient secondary care.

Methods
Analytical approach:
A Markov health-state transition model was constructed to assess the cost-effectiveness of adjuvant trastuzumab compared with standard treatment. The time horizon was the lifetime of the patient. The authors reported that the perspective was that of China’s health insurance system.

Effectiveness data:
The clinical and effectiveness data were from published studies, with authors’ assumptions made for the trend over time for the effectiveness estimates. The main estimate was the impact of trastuzumab on disease progression, which was measured using the hazard rate for the risk of recurrence. This was from the HERceptin Adjuvant (HERA) trial (Piccart-Gebhart, et al. 2005, see ‘Other Publications of Related Interest’ below for bibliographic details).

Monetary benefit and utility valuations:
The utilities were from published UK studies and they were verified by a Delphi panel of Chinese clinical experts.

Measure of benefit:
Life-years and quality-adjusted life-years (QALYs) gained were the benefit measures. Future benefits were discounted at an annual rate of 3%.

Cost data:
The direct costs included those of out-patient visits; hospitalisations; examinations; lab tests; and all other treatments, including surgery, hormonal therapy, chemotherapy, and radiotherapy. The resource use was from a survey of Chinese clinical experts, using a structured questionnaire, and each expert was asked for a second estimate based on the averages.
of the responses in the first questionnaire. The unit costs were from fee schedules of medical services and pharmaceuticals from hospitals in Beijing, Shanghai, and Guangzhou. All costs were reported in US dollars ($) and future costs were discounted at an annual rate of 3%.

Analysis of uncertainty:
The authors reported that a series of univariate sensitivity analyses were undertaken, by varying the discount rate; recurrence rates; cost of trastuzumab; and medical costs. A probabilistic sensitivity analysis was also undertaken and the results were presented in a cost-effectiveness acceptability curve.

Results
The life-years gained per patient were 15.30 with standard treatment and 18.17 with trastuzumab. The QALYs gained per patient were 11.45 with standard treatment and 14.28 with trastuzumab. The average cost per patient given standard treatment was $61,210 in Shanghai, $68,082 in Beijing, and $63,529 in Guangzhou. The average cost per patient treated with trastuzumab was $83,967 in Shanghai, $89,782 in Beijing, and $86,276 in Guangzhou.

Compared with standard therapy, trastuzumab was associated with an incremental cost per life-year gained of around $7,900 in all three cities and an incremental cost per QALY gained of around $8,000 in all three cities.

The authors reported that trastuzumab remained cost-effective with the variations tested in the sensitivity analysis.

Authors’ conclusions
The authors concluded that one year of adjuvant trastuzumab was cost-effective in the long term.

CRD commentary
Interventions:
The interventions were reported adequately. There might be interventions that are relevant in other settings and that could have been included.

Effectiveness/benefits:
The authors did not provide the methods used to identify clinical and effectiveness data, which makes it impossible to determine if all the relevant information was included. The main measure of effectiveness was derived from a well-known study published in a high-impact journal and should have been reliable. All the data were reported in supplementary tables online and the methods used to derive them were generally not reported. They might have all been from the HERA trial, but this was not clear. The authors did not explicitly discuss adverse events, but a cardiac event was included in the model.

Costs:
The perspective was clearly reported and it appears that all the major relevant costs were included for the national insurance perspective. The methods and sources used to obtain the resource use and unit costs were appropriately reported and appear to have been valid. The authors did not explain how the resource use estimates related to the resource use in the HERA trial. The time horizon and discount rate were reported, but the price year was not, which will hamper any future inflationary exercises.

Analysis and results:
The costs and outcomes were synthesised using a Markov model and adequate details of its structure were reported, with a diagram given in the online material. A univariate sensitivity analysis and a probabilistic sensitivity analysis were used to assess the impact of uncertainty, but the methods of the probabilistic sensitivity analysis were not provided. The authors reported the main limitations of their study, which were that there was no long-term evidence on the effectiveness of trastuzumab and that the utilities were from UK rather than Chinese studies.

Concluding remarks:
The reporting of the methods was limited and it is not clear if the authors’ conclusions are appropriate.
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