Trastuzumab in early stage breast cancer: a cost-effectiveness analysis for Belgium

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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 estimate the cost-effectiveness and budget impact of reimbursing trastuzumab for the treatment of early stage breast cancer. The authors concluded that a nine-week initial treatment regimen with trastuzumab showed promising results and justified the initiation of a large comparative trial with a one-year regimen. Overall the methodology was appropriate and both the methods and results were reported clearly and fully. Given the scope of the analysis, the authors’ conclusions appear to be valid.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to estimate the cost-effectiveness and budget impact of reimbursing trastuzumab for the treatment of early stage breast cancer.

Interventions
Early stage breast cancer treatment with trastuzumab, for either nine weeks or one year, in combination with standard breast cancer treatment, was compared with standard breast cancer treatment alone.

Location/setting
Belgium/in-patient care.

Methods
Analytical approach:
A published decision analytic model (Neyt, et al. 2006, see ’Other Publications of Related Interest’ below for bibliographic details) was used to assess the costs and outcomes of the interventions. The time horizon was the lifetime of the patient. The authors reported that a payer perspective was adopted.

Effectiveness data:
The effectiveness and clinical data were derived from a number of different sources including: the published literature, expert opinion, national breast cancer patient surveys, and university hospital samples. No details were reported in the present paper on the methods used to identify the relevant studies or those used to elicit expert opinion, but these details can be obtained from the full HTA report (Huybrechts et al 2006, see ’Other Publications of Related Interest’ below for bibliographic details). A link to the HTA report is provided below under ’URL for additional data’. The main effectiveness estimate was the probability of progression to cancer metastasis with each of the three interventions. This information was obtained from the Finland Herceptin (FinHer) trial (Joensuu, et al. 2006, see ’Other Publications of Related Interest’ below for bibliographic details) and Herceptin Adjuvant (HERA) trial (Piccart-Gebhart, et al. 2005, see ’Other Publications of Related Interest’ below for bibliographic details). The FinHer trial compared nine weeks of treatment with trastuzumab with no trastuzumab and the HERA trial compared one year of trastuzumab treatment with no trastuzumab.

Monetary benefit and utility valuations:
None.

Measure of benefit:
The measure of benefit was life-years gained.
Cost data:
Both the direct health care costs paid by the national health insurance and the patient's out-of-pocket contributions were included. The costs were those relating to: diagnostic tests, drug and drug administration, treatment of heart failure, treatment of breast cancer metastasis, cancer recurrence treatment, and follow-up costs (including: out-patient visits, blood tests, screening, scans and oncology care programmes). The majority of the cost data were derived from the Belgian national health insurance. As costs were incurred over the lifetime of the patient, future costs were discounted at an annual rate of 3%. All costs were reported in Euros (EUR). The budget impact of trastuzumab treatment was also evaluated by calculating the number of patients in Belgium with non-metastatic breast cancer, who could be treated with trastuzumab.

Analysis of uncertainty:
A probabilistic sensitivity analysis was completed by applying probability distributions to the model parameters and running the model 1,000 times using Monte Carlo simulation.

Results
Compared with no trastuzumab, nine weeks of treatment was associated with incremental costs of EUR 668 (95% confidence interval, CI: -2,033 to 3,040) for stage I patients, savings of EUR 1,045 (95% CI: -3,244 to 1,100) for stage II patients, and savings of EUR 6,869 (95% CI: -9,522 to -4,327) for stage III patients. The incremental life expectancy was 20.35 months (95% CI: 10.21 to 30.13) for stage I patients, 36.09 months (95% CI: 19.12 to 50.15) for stage II patients, and 70.33 months (95% CI: 38.63 to 94.54) for stage III patients.

Compared with no trastuzumab, one year of treatment was associated with incremental costs of EUR 32,320 (95% CI: 29,244 to 35,103) for stage I patients, EUR 30,608 (95% CI: 28,152 to 33,093) for stage II patients, and EUR 24,202 (95% CI: 21,301 to 26,813) for stage III patients. The incremental life expectancy was 11.99 months (95% CI: 6.48 to 18.06) for stage I patients, 23.88 months (95% CI: 15.91 to 32.85) for stage II patients and 49.74 months (95% CI: 35.48 to 63.98) for stage III patients.

These costs and outcomes were combined using an incremental cost-effectiveness ratio (ICER), which was the additional cost per life-year gained. Compared with no trastuzumab, one year of treatment was associated with an ICER of EUR 34,999 (95% CI: 19,493 to 64,322) for stage I patients, EUR 16,026 (95% CI: 10,553 to 24,064) for stage II patients, and EUR 5,994 (95% CI: 4,160 to 8,540) for stage III patients. Nine weeks of trastuzumab was found to be dominant over no trastuzumab treatment, which means it was both more effective and less costly.

Results from the budgetary impact analysis showed that treating all relevant women in Belgium with nine weeks of trastuzumab would generate additional costs of EUR 5.17 million, whereas one year of trastuzumab treatment would generate additional costs of EUR 19.96 million.

Authors’ conclusions
The authors concluded that a nine-week initial treatment regimen with trastuzumab showed promising results and justified the initiation of a large comparative trial with a one-year regimen.

CRD commentary
Interventions:
The interventions were clearly reported. An explicit justification for using treatment with no trastuzumab as the comparator was given, which was that it represented standard breast cancer treatment.

Effectiveness/benefits:
The authors reported that the effectiveness and clinical data were derived from several sources, but they did not report the methods used to identify these sources. For example, they did not report if a systematic review of the literature was undertaken. They did report the sources from which the principal measures of effectiveness were derived, which were two recent clinical randomised controlled trials. The lack of detail surrounding the identification and selection of the clinical data makes it difficult to ascertain if the best available evidence was used.

Costs:
The perspective, that of the third party payer, was explicitly reported and all the major relevant cost categories and costs appear to have been included. The sources from which these costs were derived were adequately and transparently reported. The time horizon, discount rate, and currency were also reported, but the price year was not explicitly reported, which will hamper any future inflationary exercises. As additional analyses, the budgetary impacts of adopting the two interventions in Belgium were calculated.

Analysis and results:
Although no diagram of the model was given, the authors referred readers to another publication for more details on the model structure (Neyt, et al. 2006). The uncertainty in the results was adequately investigated using probabilistic sensitivity analysis. All the incremental costs, effects, and ICERs were reported with 95% confidence intervals. The use of this type of sensitivity analysis is currently the gold standard in the UK as the overall uncertainty in the model is taken into account. The limitations of the authors' study were clearly reported in the discussion, with the main limitation being that the two trials, used to derive the measures of effectiveness, had relatively short follow-up periods (one and three years).

Concluding remarks:
Overall, the methodology was appropriate and both the methods and results were reported clearly. Given the scope of the analysis, the authors' conclusions appear to be valid.

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