Cost-effectiveness analysis of trastuzumab in the adjuvant setting for treatment of HER2-positive breast cancer
Garrison L P, Lubeck D, Lalla D, Paton V, Dueck A, Perez E A

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 study considered the addition of trastuzumab to the standard adjuvant regimen of doxorubicin and cyclophosphamide followed by paclitaxel for the treatment of breast cancer.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis, cost-utility analysis

Study population
The study population comprised a hypothetical cohort of women aged 50 years with invasive breast cancer resected by lumpectomy or mastectomy and axillary dissection, with pathologically involved axillary nodes.

Setting
The clinical setting of the study was outpatient and inpatient care in tertiary care. The economic study was carried out in the USA.

Dates to which data relate
The clinical effectiveness and resource use data were modelled using data published between 2002 and 2005. The price year was 2006.

Modelling
A Markov model with a lifetime horizon was developed. The health states, transition probabilities and key model assumptions were described.

Study designs and other criteria for inclusion in the review
The clinical data used in the model included the probabilities of distant recurrence, disease-free survival, cardiac complications arising from trastuzumab, and mortality for patients with metastasis and those who were disease free.

Sources searched to identify primary studies
The data were taken from an analysis of two randomised controlled trials (RCTs).

Methods used to derive estimates of effectiveness
The authors did not state the methods used to identify the RCTs, or the methodology used to combine the data from them.

Measure of benefits used in the economic analysis
The measures of health benefit used were the life-years gained and quality-adjusted life-years (QALYs). These data were taken from the model. Valuations of the health states were taken from published studies. The methods used to value the utilities were not stated. Future health benefits were discounted at an annual rate of 3%.

Direct costs
The direct costs to the health care payer and the travel costs of the patient were identified in this study. The unit costs of diagnostic tests, cardiotoxicity and administration of drugs were taken from Medicare rates. The costs of disease recurrence were taken from a published study, whereas the unit costs of travel were taken from standard national sources. The resource use data were taken from the model that provided the clinical effectiveness information. Future costs were discounted at an annual rate of 3%. The price year was 2006.

**Statistical analysis of costs**
No statistical analysis of the quantities and costs was undertaken.

**Indirect Costs**
Productivity costs arising from time off work for treatment and sick leave were included in the study. The resource use data were taken from the model, whereas national sources were used for the unit costs. The price year was 2006. Future costs were discounted at an annual rate of 3%.

**Currency**
US dollars ($).

**Sensitivity analysis**
One-way and multi-way sensitivity analyses were undertaken in order to assess uncertainty in the data. The ranges used in the sensitivity analyses were plausible and were reported.

**Estimated benefits used in the economic analysis**
From both study perspectives, over a lifetime, the addition of trastuzumab to standard adjuvant treatment resulted in an additional 1.84 life-years and 1.70 QALYs.

**Cost results**
The total lifetime costs to the health care payer were $73,672 in the trastuzumab group and $28,749 in the standard treatment group.

From a societal perspective, the costs were $75,746 in the trastuzumab group and $28,729 in the standard treatment group.

**Synthesis of costs and benefits**
From a health care payer perspective, the incremental cost of adding trastuzumab to standard adjuvant treatment was $24,435 per life-year gained and $26,417 per QALY gained.

From a societal perspective, the incremental cost per life-year gained was $25,542 and the cost per QALY gained was $27,637.

Multi-way sensitivity analyses produced cost-effectiveness ranges of between $9,104 and $69,340 per QALY. The sensitivity analyses were most sensitive to variations in the discount rate, the price of trastuzumab and the probability of metastasis.

**Authors’ conclusions**
The authors concluded that the addition of trastuzumab to standard adjuvant treatment was cost-effective.

**CRD COMMENTARY - Selection of comparators**
This study compared the addition of trastuzumab to the standard adjuvant regimen of doxorubicin and cyclophosphamide followed by paclitaxel. This comparator appears to have been chosen in order to reflect current practice in the authors’ setting. You should consider how these treatment options compare with usual practice in your own setting before applying the results of this study.

**Validity of estimate of measure of effectiveness**
The clinical effectiveness model parameters were taken from two published RCTs, a study design that normally has a high level of internal validity. Although the authors indicated that they combined the data from these two studies, they did not specify the methods used to achieve this. No details of the search methods or inclusion criteria used to identify relevant studies were included in the paper.

Validity of estimate of measure of benefit

The measure of health benefits was taken from the model. The authors noted that the use of life-years gained and QALYs will enable the results of this study to be compared with those from studies involving other interventions. The methods used to evaluate the utilities were not stated, so it is not possible to assess the validity of the estimates. You should consider if the effectiveness outcomes and health states are sufficient to capture the health outcomes, e.g. no adverse events were mentioned.

Validity of estimate of costs

The economic analysis was undertaken from a health care payer perspective and a societal perspective. All appropriate costs from the health care payer perspective appear to have been included. The productivity gains arising from the additional life-years gained in the trastuzumab group were not included in the analysis, and the authors noted that this was likely to have led to an overestimation of the societal costs for this group. The cost estimates were not broken down into treatment, travel and time costs. Uncertainty in the cost data and the clinical outcomes was examined using sensitivity analyses. A breakdown of the unit costs was provided. Future costs were appropriately discounted. These factors enhance the generalisability of the study findings. A clear price year was reported, which will enable future reflation exercises.

Other issues

The authors do not appear to have presented their results selectively and their conclusion reflects the scope of the analysis. They compared their results with those from other relevant studies and discussed the reasons for differences.

Implications of the study

The authors did not make any recommendations for changes in practice or further research.

Source of funding

Partly funded by Genentech and the University of Washington.

Bibliographic details


PubMedID

17592827

DOI

10.1002/cncr.22806

Indexing Status

Subject indexing assigned by NLM

MeSH

Adult; Antibodies, Monoclonal /economics /therapeutic use; Antibodies, Monoclonal, Humanized; Antineoplastic Agents /economics /therapeutic use; Breast Neoplasms /drug therapy /economics /metabolism; Chemotherapy, Adjuvant; Cost-Benefit Analysis; Disease-Free Survival; Dose-Response Relationship, Drug; Drug Costs; Evaluation Studies as Topic; Female; Humans; Markov Chains; Middle Aged; Neoplasm Staging; Quality-Adjusted Life Years; Receptor, ErbB-2 /metabolism; Risk Assessment; Sensitivity and Specificity; Survival Rate; Trastuzumab; Treatment Outcome

AccessionNumber

22007001699