Cost-effectiveness of telbivudine versus lamivudine for chronic hepatitis B
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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
This study examined the cost-effectiveness of telbivudine versus lamivudine for the treatment of chronic hepatitis B, from the perspective of the Brazilian health care system. The authors concluded that telbivudine was slightly more effective than lamivudine, but lamivudine was more cost-effective. The cost-effectiveness methods were conventional and the authors' conclusions appear to be robust, but a more thorough analysis of uncertainty could have corroborated the findings.

Type of economic evaluation
Cost-utility analysis

Study objective
This study examined the cost-effectiveness of telbivudine versus lamivudine for the treatment of chronic hepatitis B in adults.

Interventions
Telbivudine (600mg per day) was compared with lamivudine (100mg per day). Treatment lasted for 24 weeks and switching of therapy was not considered.

Location/setting
Brazil/primary or secondary care.

Methods
Analytical approach:
The analysis was based on a Markov model, with a 10-year horizon. Two analyses were performed, one for hepatitis B e antigen (HBeAg)-positive and one for HBeAg-negative patients. The authors stated that the analysis was carried out from the perspective of the Brazilian public health system.

Effectiveness data:
A systematic review of the literature was undertaken to identify the sources for the drug efficacy data, which were a key input for the model. Head-to-head trials of the two drugs were sought in commonly used electronic databases. Two RCTs met the inclusion criteria and were used. The data on disease progression were from other published studies, including an economic evaluation.

Monetary benefit and utility valuations:
The utility values were from published sources and expert opinion.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the summary benefit measure and a 5% annual discount rate was applied.

Cost data:
The economic analysis included the direct medical costs of treatment (drugs, laboratory tests, and medical consultations) and the costs of the disease, which depended on the patient's health state. The five health states were clinical follow-up, compensated and decompensated cirrhosis, hepatocarcinoma, and hepatic transplant. The unit costs of treatment were from official tariffs set by the public health system, while the disease costs were from published studies. All costs were in US dollars ($) and were discounted at an annual rate of 5%. The price year was 2010.
Analysis of uncertainty:
Deterministic sensitivity analyses were carried out on the key inputs to the model, varying them by ±20%.

Results
In HBeAg-positive patients, the expected costs were $19,065 with lamivudine and $50,284 with telbivudine. The QALYs were 12.79 with lamivudine and 13.81 with telbivudine. The incremental cost per QALY gained with telbivudine was $30,575, which was above the conventional cost-effectiveness threshold.

In HBeAg-negative patients, the expected costs were $22,649 with lamivudine and $58,619 with telbivudine. The QALYs were 10.44 with lamivudine and 11.33 with telbivudine. The incremental cost per QALY gained with telbivudine was $40,457, which was above the cost-effectiveness threshold.

In the sensitivity analyses, these results were robust to the changes in some of the model parameters.

Authors’ conclusions
The authors concluded that telbivudine was slightly more effective than lamivudine, but lamivudine was more cost-effective.

CRD commentary
Interventions:
The selection of the comparators was appropriate, as lamivudine was the first nucleoside analogue approved for the treatment of chronic hepatitis B while, at the time of the study, telbivudine was not included in the Brazilian therapeutic guidelines for chronic hepatitis B, but had shown superior efficacy.

Effectiveness/benefits:
A valid approach was used to identify the relevant sources of evidence, as a systematic review of the literature was conducted. The authors reported the key details and results of the literature review. The selection of head-to-head clinical trials ensured that the study had high internal validity. Little information was provided on the other sources for disease progression, which appear to have been published economic models. QALYs were an appropriate benefit measure, as they allow cross-disease comparisons and capture the impact of the interventions on a patient's health. The methods used to elicit the preferences were not reported.

Costs:
The cost categories appear to have been consistent with the perspective. The unit costs and their sources were clearly reported for treatment, but for disease the category totals, without the unit costs, were given and the sources were not described. The authors stated that typical Brazilian sources were used for all cost categories. The price year was clearly stated, allowing deflation exercises for other time periods. The impact of variations in the cost estimates was assessed in the sensitivity analyses.

Analysis and results:
The results were clearly reported and an appropriate incremental approach was used to combine the costs and benefits of the two treatments. The uncertainty was partly investigated in a deterministic analysis that varied individual inputs one at a time. A probabilistic analysis could have more thoroughly assessed the uncertainty. Conventional discounting was applied to both the costs and benefits. The authors stated that a ratio higher than $30,000 per QALY was not considered to be cost-effective in Brazil. The findings cannot be transferred to other countries with different income-levels and cost structures.

Concluding remarks:
The cost-effectiveness methods were conventional and the authors’ conclusions appear to be robust, but a more thorough analysis of uncertainty could have corroborated the findings.

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