Cost-effectiveness of atorvastatin in the primary prevention of major cardiovascular events in patients with type 2 diabetes in Canada

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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 cost-effectiveness of atorvastatin in the primary prevention of major cardiovascular events in patients with type 2 diabetes. The authors concluded that their study supported the cost-effectiveness of atorvastatin for these patients. There were some limitations to the reporting, especially concerning the costs, and the authors' conclusions should be regarded with caution.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to assess the cost-effectiveness of atorvastatin in the primary prevention of cardiovascular events in patients with type 2 diabetes.

Interventions
Atorvastatin 10mg per day was compared with placebo.

Location/setting
Canada/the setting was not reported.

Methods
Analytical approach:
The analysis was based on a Markov model with a 25-year time horizon, which allowed the evaluation of the long-term outcomes. The authors stated that a Canadian Ministry of Health perspective was taken.

Effectiveness data:
The clinical data on treatment efficacy were from the Collaborative Atorvastatin Diabetes Study (CARDS), which was a double-blind randomised controlled trial, of 2,838 patients with type 2 diabetes, with a median follow-up of 3.9 years (Colhoun, et al. 2004, see 'Other Publications of Related Interest' below for bibliographic details). Transition probabilities between various health states were from published literature. The main measure of effectiveness was the risk of cardiovascular events.

Monetary benefit and utility valuations:
The utilities were derived, using the Health Utilities Index (HUI), from a sample of the National Population Health Survey in Canada.

Measure of benefit:
The main measure of benefit was the quality-adjusted life-year (QALY) and these were discounted at an annual rate of 5%.

Cost data:
The costs associated with treatment and cardiovascular events were analysed. The drug costs were from the Ontario Drug Benefit formulary, while the cost of cardiovascular events was from the Ontario Case Costing Initiative and published studies. The frequency of cardiovascular events was from the CARDS trial. The price year was 2007 and all
costs were discounted at an annual rate of 5%. They were reported in Canadian dollars (CAD).

Analysis of uncertainty:
Both deterministic and probabilistic sensitivity analyses were undertaken. The results of the deterministic analysis were shown in tornado diagrams, while the results of the probabilistic sensitivity analysis were shown as cost-effectiveness acceptability curves.

Results
Over a 25-year period, the number of QALYs gained was 8.47 with atorvastatin and 8.22 with placebo. The total cost associated with atorvastatin was CAD 18,988 and that associated with placebo was CAD 18,646. The incremental cost per QALY gained with atorvastatin was CAD 1,362.

The sensitivity analysis showed that the results were sensitive to the risk of cardiovascular events. In the probabilistic sensitivity analysis, 98.3% of simulations showed a cost per QALY gained of less than CAD 50,000.

Authors’ conclusions
The authors concluded that their study supported the cost-effectiveness of atorvastatin in the primary prevention of major cardiovascular events in patients with type 2 diabetes.

CRD commentary
Interventions:
The interventions were clearly reported. They appear to have been relevant strategies in the authors' setting, as they had been included in randomised controlled trials and their cost-effectiveness had been evaluated in other settings. It was not clear if other relevant drugs were available and could have been considered in this analysis.

Effectiveness/benefits:
The clinical data on the efficacy of treatment were from a published randomised controlled trial and this design is generally considered to be a valid source of evidence. The full details of the trial were published elsewhere, but the authors provided some information, including the number of patients and the length of follow-up. From these details, the trial appears to have been of high quality, but to fully assess it the original publication would be required. The use of QALYs was appropriate as they capture the impact of the intervention on quality and length of life. Some information on the derivation of the utility scores was provided.

Costs:
The costs relevant to the Ministry of Health perspective appear to have been included. In general, the cost analysis was poorly reported, with the total costs associated with treatment and those of each complication, with its frequency, provided, rather than the unit costs and no further resource use data. Other adjustments including discounting and the price year were reported and appear to have been appropriate.

Analysis and results:
An incremental analysis was performed, and the full results were presented. The results of the sensitivity analysis were also clearly reported and discussed. Given that total, rather than unit, costs were reported, it might be difficult to generalise the results to other settings. The authors acknowledged some limitations to their analysis.

Concluding remarks:
There were some limitations to the reporting, especially concerning the costs, and the authors' conclusions should be regarded with caution.

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