Cost-effectiveness of rosuvastatin 20mg for the prevention of cardiovascular morbidity and mortality: a Swedish economic evaluation of the JUPITER trial

Ohsfeldt RL, Olsson AG, Jensen MM, Gandhi SK, Paulsson T

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 study examined cost-effectiveness of rosuvastatin for primary prevention of major cardiovascular disease for various risk levels. The authors concluded that primary prevention of cardiovascular disease with rosuvastatin was a cost-effective strategy from the perspective of the health care payer. Over a lifetime horizon, rosuvastatin led to health benefits and cost savings over no active treatment. The analysis used a valid cost-effectiveness framework that considered key areas of uncertainty and enhanced the robustness of the conclusions.

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

Study objective
The study examined the cost-effectiveness of rosuvastatin for primary prevention of major cardiovascular disease for various risk levels over a long-term horizon.

Interventions
Daily rosuvastatin (20mg) was compared to no active treatment. Rosuvastatin was given over lifetime unless discontinued for efficacy or safety reasons. In the no active treatment arm a statin was also given.

Location/setting
Sweden/primary care.

Methods
Analytical approach:
The analysis was based on a decision analytic model with a lifetime horizon. The perspective was that of the health care payer.

Effectiveness data:
A selective approach was used to identify relevant sources of evidence. Most data on treatment effect were taken from the JUPITER trial (Justification for the Use of Statins in Prevention: an Intervention Trial Evaluating Rosuvastatin). The base case analysis considered a subgroup of 17,802 patients enrolled in this trial and followed for up to four years. These patients were characterised by no hyperlipidaemia but elevated high-sensitivity C-reactive protein (hsCRP) levels and a Framingham risk above 20%. The primary endpoint was the probability of cardiovascular events (fatal and non-fatal myocardial infarction, fatal and non-fatal stroke, coronary artery revascularisation, unstable angina and death from cardiovascular disease). Estimates after four years were based on survival curves and assumed constant relative risk between rosuvastatin and no treatment. Additional data were based on published evidence, including a Health Technology Assessment and the West of Scotland Coronary Prevention (WOSCOP) trial. Swedish life tables were used for mortality data.

Monetary benefit and utility valuations:
Utility valuations were taken from published sources.

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

Cost data:
The economic analysis included treatment costs (drugs, initial physician visit and monitoring) and event-related treatment costs (hospitalisation and physician visits associated with coronary heart disease). Official list prices were used for drug costs. The analysis took into account the generic costs of rosuvastatin (after nine years) and atorvastatin (at the start of therapy). Other treatment costs were based on tariffs in southeast Sweden. Other direct medical costs came from Swedish databases. Costs were in Swedish kroner (SEK). Costs refer to 2008 and 2009 prices. A 3% annual discount rate was applied.

Analysis of uncertainty:
An alternative analysis considered the full JUPITER population. One-way sensitivity analyses were performed on selected inputs such as rosuvastatin discontinuation, statin initiation, event costs, event disutilities, discounting, event risk and event relative risk. Ranges of values were based on plausible estimates observed in clinical practice. A probabilistic sensitivity analysis was carried out using conventional distributions for model inputs.

Results
In a base case population of 100,000 patients with no history of cardiovascular disease, no hyperlipidaemia, elevated hsCRP levels and Framingham risk more than 20%, the analysis associated no active treatment with 1,304,320 life-years, 982,048 QALYs and SEK 168,490,000 and rosuvastatin with 1,341,185 life-years, 1,024,170 QALYs and SEK 146,313,000 (an estimated gain of 42,122 QALYs and 36,865 life-years with rosuvastatin and a saving of SEK 22,177). Rosuvastatin was dominant as it saved costs and led to health benefits over no active treatment.

The same conclusion was reached in the secondary analysis that considered the whole JUPITER population and in the sensitivity analyses. The most influential input was the cost of treatment for cardiovascular disease events.

Changes in model parameters did not alter the conclusions of the analysis and rosuvastatin remained either dominant or highly cost-effective in all cases. Reducing the time-horizon of the analysis led to a reduction in the value for money of rosuvastatin, but it remained cost-effective at a 10-year time horizon. The probabilistic sensitivity analysis showed that rosuvastatin had a 100% likelihood of being cost-effective even at a very low willingness to pay threshold of SEK 25,000 per QALY.

Authors' conclusions
The authors concluded that primary prevention of cardiovascular disease with rosuvastatin was a cost-effective strategy from the perspective of the health care payer. Over a lifetime horizon, rosuvastatin led to health benefits and cost-savings compared with no active treatment.

CRD commentary
Interventions:
Selection of the comparators was appropriate as no active treatment was a possible pattern of care for this patient population. A comparison with other active treatment would have been interesting, as acknowledged by the authors.

Effectiveness/benefits:
That most clinical inputs were taken from a very large head-to-head clinical trial should have ensured high internal validity. Results were similar for a subgroup of this trial population and the full trial population. The authors used appropriate statistical tools to extrapolate four-year results to lifetime and some assumptions were needed, but the results were stable to changes in these parameters. Adverse events were not similar between groups.

The clinical analysis was conducted satisfactorily. Life-years and QALYs were appropriate benefit measures for the burden of disease on patients' health. Limited information was provided on the derivation of utility valuations.

Costs:
The economic analysis was appropriate to the authors' stated perspective. Treatment costs were broken down into individual items. Costs for cardiovascular disease were presented as macro-categories. Data sources were reported and appeared consistent with the viewpoint of the health care payer. Alternative scenarios in which different drug costs...
based on full prices instead of generic prices were considered and did not alter the study results. Costs were treated stochastically in the probabilistic sensitivity analysis. Other details such as price year and discount rate were reported.

Analysis and results:
An incremental approach was used to identify the optimal strategy. The study results were presented extensively. Deterministic and probabilistic sensitivity analyses were carried out to deal with the issue of uncertainty and the results were illustrated clearly. Conventional discounting was applied to costs and benefits. The impact of alternative discount rates or no discounting was taken into account in the sensitivity analyses. The authors compared their results with those of other published economic evaluations that had generally showed the value for money of rosuvastatin or other statins. The study results may be relevant in other developed countries.

Concluding remarks:
The analysis used a valid cost-effectiveness framework that considered key areas of uncertainty and enhanced the robustness of the authors’ conclusions.

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