Long-term impact on healthcare resource utilization of statin treatment, and its cost effectiveness in the primary prevention of cardiovascular disease: a record linkage study


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 evaluated the costs and benefits of initial treatment for five years, with pravastatin, for men aged 45 to 64 years, with hypercholesterolaemia and no evidence of previous myocardial infarction. The authors concluded that pravastatin significantly reduced the costs and increased QALYs. The reported methods appear to have been appropriate, but the comparators were limited, as was the reporting in some areas. The conclusions reached are uncertain.

Type of economic evaluation
Cost-utility analysis

Study objective
This study evaluated the costs and benefits of initial treatment, for five years, with pravastatin, for men aged 45 to 64 years, with hypercholesterolaemia and no evidence of previous myocardial infarction.

Interventions
Pravastatin 40mg per day for five years was compared with no medication.

Location/setting
UK/secondary care.

Methods
Analytical approach:
The economic evaluation was based on a clinical trial. The time horizon was 15 years, covering the duration of treatment (five years) and 10 years of follow-up. The authors stated that the perspective was that of the UK NHS.

Effectiveness data:
The primary outcomes of the randomised controlled trial were death from coronary heart disease, or nonfatal myocardial infarction. The time to an event for incident cancers, and composite cardiovascular outcomes, were also analysed. The economic evaluation focused on cardiovascular admissions, the subsequent treatment pathway, and its impact on quality of life. Cumulative incidence was used for the events. Cause-specific Cox proportional hazards were fitted, and adjusted for treatment group and baseline risk factors. Hazard ratios and 95% confidence intervals were presented. Utility decrements were applied to events, for each patient, over the 15 years. In the 10 years of follow-up, lipid-lowering therapy was used by 38.7% of the pravastatin group and 35.2% of the placebo group.

Monetary benefit and utility valuations:
The utility of a patient was assumed to reduce by age according to an equation. Disutilities as a percentage of the starting utility were applied for admissions due to stroke, myocardial infarction, heart failure, or other coronary heart disease. These disutilities were from a published Health Technology Assessment.

Measure of benefit:
The measure of benefit was the quality-adjusted life-year (QALY). QALYs were discounted at a rate of 3.5% per year.

Cost data:
The costs of pravastatin, repeated liver function and cholesterol tests, each acute hospital episode, and care after discharge from hospital following an event, were analysed. Hospital episode costs were from the individual patient data from the trial. NHS Scotland staff, blinded to treatment, assigned Health Resource Grouping codes to each acute hospital episode. NHS Scotland tariffs (2012) were used. The costs of care after discharge were from a published Health Technology Assessment. These costs were updated to 2011 values, using the Hospital and Community Health Services Index. All costs were reported in UK £, and were discounted at an annual rate of 3.5% per year.

Analysis of uncertainty:
Bootstrapping was conducted. The cost and QALY estimates for each patient were sampled and re-sampled to produce 95% confidence intervals, and a scatter plot of these cost and benefit results, on a cost-effectiveness plane, was presented. Key parameters were varied in sensitivity analyses; these included hospital admission costs, disutilities for an event, and the prescribing and monitoring costs.

Results
The incremental cardiovascular disease costs in £ millions, per 1,000 people, were -0.71 (95% CI -1.09 to -0.32) for pravastatin, compared with placebo. The reduction in costs was £7.1 million with pravastatin.

The incremental QALYs gained, per 1,000 people, was 136 (95% CI 25 to 247) for pravastatin, compared with placebo.

The only scenario in which pravastatin was not cost saving was when the prescribing and monitoring costs were multiplied by five.

Authors' conclusions
The authors concluded that pravastatin significantly reduced the costs and increased QALYs, but there was uncertainty about the risk of diabetes, with treatment for more than five years.

CRD commentary
Interventions:
The intervention was described. The authors referred to alternative treatments that were not included, and it was unclear if either pravastatin or no treatment was the usual care, so the analysis may have been incomplete.

Effectiveness/benefits:
The analysis was based on a randomised controlled trial, which could have high validity, but too few details were reported for a full assessment, and the trial publication should be consulted. The authors acknowledged that treatment was only continued for two thirds of patients for five years, but it could continue for much longer, and the time horizon was limited to the 10-year follow-up, so the full outcomes may not have been captured. The relevant health outcomes appear to have been included and valued, but the details of the utilities and how they were calculated were not reported. The source for the utilities was given.

Costs:
The relevant costs appear to have been included. The resources were matched as closely as possible to the events in the trial, by staff who were blind to treatment allocation, which was appropriate. The costs were from a source relevant to the study population. The price year appeared to be 2011 to 2012; and prices were appropriately adjusted, where necessary.

Analysis and results:
The analysis appears to have been appropriately conducted and the results were sufficiently reported. Uncertainty in the results was adequately evaluated. The authors appeared to have given a reasonable review of the limitations of their analysis, and they presented a comprehensive overview of their analysis and results.

Concluding remarks:
The reported methods appear to have been appropriate, but the comparators were limited, as was some of the reporting. The conclusions reached are uncertain.
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