Cost-effectiveness of optimizing prevention in patients with coronary heart disease: the EUROASPIRE III health economics project


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 interventions to prevent secondary cardiovascular events, that were tailored to the individual's lifestyle. The authors concluded that optimising prevention was cost-effective, particularly for elderly patients, those with high blood pressure, and those who were physically inactive. The methods were adequate and the results were reported sufficiently. Given the scope of the study, the authors’ conclusions appear to be appropriate.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to assess the cost-effectiveness of interventions to prevent secondary cardiovascular events, that were tailored to the individual's lifestyle.

Interventions
The intervention aimed to optimise the secondary prevention of cardiovascular disease, for patients who were not on target for smoking cessation, cholesterol level, blood pressure level, and physical activity level, as defined by European guidelines. This intervention was compared with usual care, with no optimised secondary prevention.

Location/setting
Belgium, Bulgaria, Croatia, Finland, France, Italy, Poland and the UK/primary care.

Methods
Analytical approach:
An individual-based state-transition model was designed to quantify the costs and outcomes of the optimisation of secondary prevention. The time horizon was 10 years. The perspective was not explicitly reported.

Effectiveness data:
The clinical and effectiveness data were from published studies. The numbers and proportions of patients who were not on target, for at least one of the risk factors, for subsequent cardiovascular events, were from the European Action on Secondary and Primary Prevention by Intervention to Reduce Events (EUROASPIRE) III survey (see Other Publications of Related Interest). The effectiveness of optimising the intervention for each patient (the relative risk reduction in coronary heart disease, heart failure, and stroke) was from published clinical trials or meta-analyses. Framingham risk equations were used to generate the expected pattern of cardiovascular events, over the long-term, according to individual patient risk factors.

Monetary benefit and utility valuations:
The utility estimates were from the EUROASPIRE III database, for the initial disease states, and those for the subsequent coronary events were based on two published studies.

Measure of benefit:
The measure of benefit was quality-adjusted life-years (QALYs) gained.
Cost data:
The direct costs were those of the optimisation strategies, and treatment of cardiovascular events. The strategy costs included cholesterol treatment, blood pressure treatment, and smoking cessation and lifestyle interventions. These were from published studies, IMS (Bulgaria) retail data, national health insurance data, and medical agency prices. The cardiovascular event costs included acute and follow-up costs for coronary heart disease and stroke, and treatment for congestive heart failure. These were from published studies, ministries of health, national insurance agencies, hospital data, and reimbursement data. All costs were reported in Euros (EUR).

Analysis of uncertainty:
A probabilistic sensitivity analysis was undertaken, by varying each input parameter, over a defined probability distribution. The results were presented in cost-effectiveness acceptability curves.

Results
For the eight European countries, the optimised intervention yielded an average increase of 0.25 QALYs, compared with usual care, and additional costs of EUR 2,493 per patient.

Compared with the usual care, the optimisation of secondary prevention had an additional cost per QALY gained of EUR 12,484 for the eight European countries together, EUR 7,029 for Bulgaria, EUR 7,161 for Poland, EUR 8,406 for Croatia, EUR 11,660 for Finland, EUR 14,627 for Italy, EUR 16,939 for France, EUR 19,862 for Belgium, and EUR 23,491 for the UK.

The probabilistic sensitivity analysis showed that even in the countries where optimisation of secondary prevention had high incremental cost-utility ratios (Belgium and the UK), at a willingness-to-pay threshold of EUR 30,000 per QALY gained, the intervention was cost-effective in about 80% of simulations.

Authors’ conclusions
The authors concluded that optimising prevention was cost-effective, particularly for elderly patients, those with high blood pressure, and those who were physically inactive.

CRD commentary
Interventions:
The interventions were reported adequately.

Effectiveness/benefits:
The clinical and effectiveness estimates were from a European survey (EUROASPIRE III) and other published trials, meta-analyses, and studies. The authors did not report how these sources were identified and whether a systematic review was undertaken. As a result, it is not possible to determine if all relevant data were analysed. QALYs were a valid benefit measure, appropriate for the patient population, because coronary heart disease affects survival and quality of life. The sources for the utility values and the values used, were reported and appear to have been appropriate.

Costs:
The perspective was not explicitly reported, but all the major costs relevant to a health care system perspective were included. The sources for the cost information were reported, but the price year was not, which will hamper future inflationary exercises. Although a 10-year time horizon was adopted, it was not clear if future costs (and future benefits) were discounted.

Analysis and results:
A decision-analytic individual-based state-transition model was used to synthesise the cost and outcome information. The model structure was described and a diagram was given. Uncertainty in the model was tested, using a probabilistic sensitivity analysis. As the main limitation to the study the authors reported that their Markov model only included three cardiovascular states, and each subsequent event could only occur once per patient, potentially underestimating the costs and overestimating the QALYs.

Concluding remarks:
The methods were adequate and the results were reported sufficiently. Given the scope of the study, the authors’ conclusions appear to be appropriate.

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