Cost-effectiveness of raising HDL cholesterol by adding prolonged-release nicotinic acid to statin therapy in the secondary prevention setting: a French perspective
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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 study determined the cost-effectiveness of add-on nicotinic acid to raise high-density lipoprotein cholesterol (HDL-C) in statin-treated patients with coronary heart disease and low HDL-C, in comparison with statin monotherapy, as a secondary prevention strategy in the French setting. The analysis demonstrated the cost-effectiveness of nicotinic acid supplements from the perspective of the third-party payer. The study methodology was good and the authors’ conclusions are quite robust, as the sensitivity analysis showed, although few details of economic and some clinical sources were provided.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The study aimed to determine the cost-effectiveness of using an add-on nicotinic acid to raise high-density lipoprotein cholesterol (HDL-C) in statin-treated patients with coronary heart disease (CHD) and low HDL-C, in comparison with the current pattern of care (statin alone), as a secondary prevention strategy in the French setting.

Interventions
The study examined a prolonged-release (PR) formulation of nicotinic acid (1 g/day). This was added to usual therapy with statins for patients with CHD and low HDL-C on statin alone. This strategy was compared with statin treatment alone.

Location/setting
France. Primary/secondary care.

Methods
Analytical approach:
The economic evaluation was based on two analytic decision submodels. The first model, a standard decision tree based on a second-order Monte Carlo simulation, generated a cohort of 2,000 patients in which lipid changes were simulated. The second model, a Markov simulation, projected the long-term clinical and economic impact of the two strategies. A lifetime horizon (i.e. 40 years) was considered. The authors stated that the analysis was carried out from the perspective of the French health care system.

Effectiveness data:
The approach used to derive the clinical data was not reported, but more information may be found in the primary publication of the decision model. However, the authors provided extensive details of the source of treatment effectiveness and baseline patient characteristics, which were derived from a clinical trial, the ARterial Biology for the Investigation of the Treatment Effects of Reducing cholesterol (Taylor et al.2004, see ‘Other Publications of Related Interest’ below for bibliographic details). The model was populated with a cohort of patients with the same demographics and clinical characteristics as those in this study. The long-term clinical effect was estimated using Framingham risk equations populated with US data.

Monetary benefit and utility valuations:
None.
Measure of benefit:
The summary benefit measure that was combined with the costs was the life-years (LYs). These were estimated using the decision model. LYs were discounted at an annual rate of 3%.

Cost data:
The analysis of the costs included the study drug (PR nicotinic acid) and the treatment of complications (angina, myocardial infarction and CHD death). The costs of statins were not included as they were common to both strategies. The drug costs were based on public prices. Resources used and costs for coronary complications were derived from published studies. The price year was 2004 and the costs were in euros (EUR). An annual discount rate of 3% was used.

Analysis of uncertainty:
A deterministic univariate sensitivity analysis was undertaken to assess the impact of variations on key model inputs such as treatment effectiveness, cost of coronary complications, discount rates, age of starting treatment and gender distribution of the population. The authors arbitrarily set the ranges of values used. A further simulation was performed in which the whole population had additional risk factors (i.e. smoking, diabetes, or both).

Results
The LYs were 11.99 with statin monotherapy and 12.16 with statin plus PR nicotinic acid. The expected costs were EUR 30,522 with statin monotherapy and EUR 34,111 with statin plus PR nicotinic acid.

Incremental cost-effectiveness ratios (ICERs; i.e. the incremental cost per LY gained) were calculated in order to combine the costs and benefits. The ICER with statin plus PR nicotinic acid over statin monotherapy was EUR 20,645, a figure that is usually considered affordable in western Europe.

The sensitivity analysis showed the robustness of the base-case findings. The ICER was more favourable in diabetic patients or smokers (EUR 16,076 if all patients had diabetes and EUR 15,712 if all patients were smokers with diabetes).

Authors' conclusions
The authors concluded that a strategy of raising HDL-C by adding PR nicotinic acid to statin therapy in CHD patients was a cost-effective secondary prevention strategy in France. This strategy was even more cost-effective in patients with Type 2 diabetes or in smokers.

CRD commentary
Interventions:
The rationale for the choice of the two strategies was clear. Statin monotherapy was considered the basic comparator and is likely to represent the relevant default strategy in several settings. The authors justified the choice of excluding other potential second-line treatments, such as ezetimibe, as they were found to be less cost-effective in a preliminary analysis.

Effectiveness/benefits:
The authors did not state whether the primary studies were identified through a systematic review of the literature. The key study used to obtain data on treatment efficacy was a randomised clinical trial, which was appropriate given the robustness of this design and the high internal validity. However, the authors used the basic characteristics of the patient population enrolled in this trial to populate the decision model, which can reduce the external validity of the study. To address this issue the authors conducted some alternative analyses, making some changes in the baseline characteristics of these patients, and this represents a strength of the study. The long-term data were derived from US data, although using standard equations. The authors acknowledged that this represents a limitation of the analysis, as not all US clinical data can be transferred to France; they attempted to deal with this issue in the sensitivity analysis.

Costs:
The reporting of the costs was restricted to essential aspects, such as the main categories of costs, price year and discounting. In effect, the sources of the costs were not described and the costs were presented as macro-categories.
with no distinction between the unit costs and quantities of resources used, except for the study drug. The exclusion of some categories of costs, such as those of treating side-effects, was justified by the low proportion of patients experiencing them. Again, more details might be found in the primary publication of the decision model.

**Analysis and results:**
The synthesis of the costs and benefits was appropriate. The results of the study were presented clearly. The issue of uncertainty was addressed in the sensitivity analysis. Although the use of a broader sensitivity analysis (i.e. probabilistic or multi-way) would have been helpful, the authors’ conclusions are robust. The authors acknowledged that the main limitation of their study was the exclusion of some cost categories and data obtained from foreign studies, as already mentioned.

**Concluding remarks:**
Overall, the study methodology was good, although few details of the economic sources were provided since the model had been published elsewhere. The results of the analysis were presented clearly and the authors' conclusions appear robust, as shown in the sensitivity analysis.

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**Other publications of related interest**


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**MeSH**
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