Cost-effectiveness of cardiac rehabilitation program delivery models in patients at varying cardiac risk, reason for referral, and sex
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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
This study examined the cost-effectiveness of a standard three-month versus a distributed one-year cardiac rehabilitation programme. There was a high degree of uncertainty in the results, but the standard intervention was slightly more cost-effective than the distributed one. The distributed intervention should only be offered to patients with a lower risk of disease progression and female patients. The methods were valid, especially in the analysis of uncertainty, and this should ensure the validity of the authors’ conclusions.

Type of economic evaluation
Cost-utility analysis

Study objective
This study examined the cost-effectiveness of a standard three-month secondary prevention cardiac rehabilitation programme versus the same programme delivered over a year (distributed). The impact of variation in patient demographics and clinical risk factors (cardiac risk, cardiac diagnosis, and sex) was also assessed.

Interventions
The standard intervention consisted of 33 sessions delivered twice-weekly over a three-month period. The distributed intervention consisted of 33 sessions delivered over a year, with fewer sessions later in the year. Sessions were of four types: behavioural modification delivered by a case manager; medical management of risk factors by a physician; group educational workshops; and supervised exercise classes.

Location/setting
USA and Canada/secondary care.

Methods
Analytical approach:
The analysis was based on a single study with a two-year time horizon. The authors stated that the perspective of the health care system was adopted.

Effectiveness data:
The clinical data were from a randomised controlled trial (RCT) with a two-year follow-up (Reid, et al. 2005, see 'Other Publications of Related Interest' below for bibliographic details). The sample consisted of 392 patients, with 196 in each group, but this analysis considered only the 307 patients who provided follow-up data. The mean age was 58.4 years in each group and 84.5% of patients were male in the standard group and 89.3% were male in the distributed group. Follow-up data were collected at three, six, 12, 15, and 24 months. The key endpoint was the number of patients with a primary adverse cardiac event during follow-up.

Monetary benefit and utility valuations:
The utility values were elicited, using time trade-off preference-based scores.

Measure of benefit:
Quality-adjusted life-years (QALYs) were the summary benefit measure.
Cost data:
The economic analysis included those costs associated with the delivery of the cardiac rehabilitation programme and the use of cardiac-specific health care resources. A bottom-up approach was used to estimate the cost of the programme delivery. Other resource use data were assessed, during the clinical trial, using a 10-item questionnaire delivered to patients at each of the follow-up points. The costs were based on institutional data and published analyses. They were presented in US dollars ($) and the price year was 2004.

Analysis of uncertainty:
A bootstrapping approach was undertaken to examine the uncertainty underlying the outcomes and cost-effectiveness acceptability curves were generated. The impact of changes in risk factors (cardiac risk, risk of disease progression, referring diagnosis, and sex) was considered.

Results
In the base case, the standard intervention was less expensive (by $103) and more effective (by 0.009 QALYs) than the distributed intervention, and was therefore dominant. These differences in costs and QALYs were not statistically significant.

The probabilistic analysis showed that at a cost per QALY threshold of $50,000, the probability of the standard intervention being cost-effective was 67% and at a willingness-to-pay of zero it was 63%.

Differences were observed in the mean QALYs gained and the mean costs across patient subgroups. The standard intervention was dominant in patients with a very high risk of disease progression and in patients with a referring diagnosis of percutaneous coronary intervention. In general, the cost-utility ratios favoured the standard intervention, but the distributed intervention was more cost-effective for patients with a lower risk of disease progression and for female patients.

Authors' conclusions
The authors concluded that the standard intervention was slightly more cost-effective than the distributed one, but resources could be utilised better by the triage of patients to different cardiac rehabilitation programmes, with the distributed intervention only offered to those with a lower risk of disease progression and female patients. There was high uncertainty in these results.

CRD commentary
Interventions:
The rationale for the selection of the comparators was clear and the authors discussed their reasons for choosing the one-year versus the three-month programme. A clear description of the two interventions was provided.

Effectiveness/benefits:
The evidence was from a RCT, which is generally considered to be a valid source, given the strengths of its design. The two groups were comparable at baseline in their key characteristics. The follow-up was appropriate and loss to follow-up was not very high (22%). The methods and results of the trial were not reported in detail as the study was published elsewhere. It was not clear whether the utility values were from the patients included in this trial or from another study. Little information on their derivation was given and this limits the possibility of judging their validity. QALYs were a valid benefit measure as they assess survival and quality of life, which are relevant dimensions of health for these patients.

Costs:
The economic analysis was consistent with the viewpoint. The categories of costs were reported and the total for each category was given for the two programmes. This showed which categories were more relevant and differed between the two options, but unit costs and quantities of resources were not presented separately, which limits the ability to replicate the analysis. The price year and currency conversions were reported. Conventional statistical analyses of costs were carried out and the use of a bottom-up approach for the programme costs was appropriate.
The incremental analysis was appropriate as it allowed the identification of the most cost-effective strategy. The results were presented extensively. The sensitivity analysis was appropriate as both partial and global uncertainty were investigated. The key findings of the subgroup analyses were clearly reported and discussed. The authors stated that a limitation of their analysis was the low number of women in the clinical trial, which was due to the high number of women who refused to participate.

Concluding remarks:
The methods were valid, especially for the analysis of uncertainty, and this should ensure the validity of the authors’ conclusions.

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