Heart failure disease management programs: a cost-effectiveness analysis
Chan DC, Heidenreich PA, Weinstein MC, Fonarow GC

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 determine the long-term cost-effectiveness of disease management programmes in high- and low-risk populations of patients with heart failure. The authors concluded that these programmes were likely to be cost-effective across the spectrum of patient risk over the long term. Overall, the methodology seems to have been appropriate and the reporting was clear and transparent. The results appear to be reliable and the authors’ conclusions reflect the evidence presented.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to determine the long-term cost-effectiveness of heart failure disease management programmes in high- and low-risk populations, in order to identify appropriate target groups for these programmes in future.

Interventions
Heart failure disease management programmes, designed to overcome barriers to successful treatment through patient education and the co-ordination of multi-disciplinary teams, were compared with usual care.

Location/setting
USA/primary and secondary care.

Methods
Analytical approach:
A published state-transition Markov model (Delea, et al. 1999, see ‘Other Publications of Related Interest’ below for bibliographic details) was adapted to determine the clinical and economic impact of disease management programmes, using published evidence. A 15-year time horizon was adopted and the authors did not specify the perspective.

Effectiveness data:
The clinical data came from the published literature; primarily from the Studies Of Left Ventricular Dysfunction (SOLVD) trial (The SOLVD Investigators. 1991, see ‘Other Publications of Related Interest’ below for bibliographic details), which was used in the development of the Markov model. The key clinical parameters were hospitalisation and survival, and the number of previous hospitalisations, which was a key determinant of both of the former parameters.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The measure of benefit was the number of life-years gained. This outcome was discounted at 3% per year.

Cost data:
The analysis considered the costs of enrolment to disease management programmes, hospitalisation costs, out-patient heart failure treatment costs, and non heart failure health care costs. These costs were derived from published sources, which included a systematic review and meta-analysis for enrolment, a range of studies for hospitalisation, a clinical study and the original Markov model study (Delea, et al. 1999) for out-patient costs, and national estimates for non heart failure health care. All costs were in US dollars ($) and were discounted at 3% per year. The price year was 2005.
and all costs and inputs were standardised using the consumer price index for health care.

**Analysis of uncertainty:**
Sensitivity analyses were performed using conservative parameter estimates and a combination of these to provide a worst-case analysis. Probabilistic sensitivity analysis was conducted with 10,000 Monte Carlo simulation trials.

**Results**
Disease management programmes prolonged the average life expectancy by 0.55 life-years for high-risk patients and 0.42 life-years for low-risk patients (average population risk).

Compared with usual care, disease management programmes cost an additional $5,300 per high-risk patient and an additional $4,000 per low-risk patient.

Over 15 years, the cost-effectiveness ratio of disease management, compared with usual care, was dominated (more costly and less effective) for over 80% targeting (delivered to 20% at highest risk only), $9,500 per life-year gained for 70% targeting, and $9,700 per life-year gained for targeting at 60% or lower.

The worst-case analysis resulted in a cost-effectiveness ratio of $110,000 per life-year saved over the 15-year horizon. Probabilistic sensitivity analysis provided a mean cost-effectiveness of $12,882 (95% CI 6,486 to 29,293) per life-year saved, with 99.7% of trials resulting in cost-effectiveness ratios less than $50,000 per life-year saved.

**Authors’ conclusions**
The authors concluded that disease management programmes were likely to be cost-effective across the spectrum of patient risk over the long term.

**CRD commentary**

**Interventions:**
The authors compared the use of disease management programmes with usual care, which was likely to be the status quo. The description of the intervention was restricted to the background and was brief and non-specific, and the usual care was not described. It may be difficult to interpret these results for your setting.

**Effectiveness/benefits:**
The effectiveness evidence was obtained from a number of published sources. The main clinical data were derived from a randomised controlled trial (RCT), which had previously been used to develop the model, and the authors provided details of this trial. RCTs are considered to be the gold standard in experimental design, which enhances the validity of these estimates. As the methods of the literature review were not reported, it is not possible to ascertain whether the best evidence was used. The benefits were discounted appropriately.

**Costs:**
The authors did not state the perspective so it is not clear if the appropriate cost categories were included. The cost data were well reported and were based on a number of estimates from the published literature and mainly RCTs. The price year was reported and costs were appropriately standardised using the consumer price index for health care. The costs were discounted appropriately.

**Analysis and results:**
Overall the analytical approach was satisfactorily reported and the model structure was well reported, with a diagram. The results were fully described. Appropriate sensitivity analyses were performed including a probabilistic sensitivity analysis, which is a thorough method for addressing parameter uncertainty. The authors also acknowledged and discussed the potential limitations of their study.

**Concluding remarks:**
Overall, the methodology seems to have been appropriate and the reporting was clear and transparent. The results appear to be reliable and the authors’ conclusions appear to reflect the evidence presented.
Funding
Not stated.

Bibliographic details

PubMedID
18215605

DOI
10.1016/j.ahj.2007.10.001

Other publications of related interest


Indexing Status
Subject indexing assigned by NLM

MeSH
Cost-Benefit Analysis; Disease Management; Heart Failure /economics /therapy; Humans; Markov Chains

AccessionNumber
22008000312

Date bibliographic record published
03/06/2009

Date abstract record published
28/10/2009