Is a target culture in health care always compatible with efficient use of resources: a cost-effectiveness analysis of an intervention to achieve thrombolysis targets

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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.

Health technology
The hospital increased the nursing staff in the accident and emergency department to assess patients presenting with chest pain and introduced the use of a single, bolus thrombolytic agent for patients needing thrombolysis. The comparator technology was to act so as to reduce morbidity and mortality for all patients in the hospital. Patients in need of thrombolysis were given it intravenously.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis and cost-utility analysis.

Study population
The study population comprised patients needing thrombolysis for acute myocardial infarction (MI) who were attending one hospital.

Setting
The setting was secondary care. The economic study was carried out in the UK.

Dates to which data relate
The dates to which the effectiveness evidence referred were not clearly stated. The effectiveness data were collected for two 10-month periods, the first of which was after 2000 and before 2002. The second was before April 2003. The price year was not explicitly stated but it might have been 2005, the year of the exchange rate used.

Source of effectiveness data
Intermediate effectiveness data were derived from a single study, and were then converted to final outcomes using a model based on published data.

Link between effectiveness and cost data
The same patients provided both the cost and the effectiveness data.

Study sample
No power calculations were reported. Patients who met the inclusion criteria were selected for the study sample. There were 92 patients needing thrombolysis whose treatment was eligible to be counted in the government target. Of these, 50 patients were admitted before the introduction of the targets and 42 afterwards.
Study design
This was a comparative study with historical controls. The hospital implemented the new protocol for a year.

Analysis of effectiveness
The analysis was conducted on an intention to treat basis. The primary health outcomes were the number of lives saved per year and the total number of life-years. The patient groups were not shown to be comparable.

Effectiveness results
Expected lives saved increased from 25.2 to 26.3 per 1,000. This was derived from the reduction in mean pain-to-needle (PTN) time, using the equation published by Boersma et al. 1996, (see 'Other Publications of Related Interest' below for bibliographic details).

The mean PTN time decreased from 219.8 (+/- 23.6) to 197.6 (+/- 22.4) minutes, (p non significant).

The door-to-needle (DTN) time decreased from 37.6 (+/- 5.9) to 27.6 (+/- 3.6) minutes after the intervention, (p=0.06)

A total of 0.06 lives (95% confidence interval, CI: -0.09 to 0.33) were saved per year, which is the equivalent of 0.94 life-years gained (95% CI: -1.45 to 5.10). The calculation of the life-years gained used an anticipated mean life expectancy of 15.41 years following thrombolysis for acute MI (Mark et al. 1995, see 'Other Publications of Related Interest' below for bibliographic details).

Clinical conclusions
The authors concluded that there was a slight improvement in health outcomes as there was a small increase in the number of lives saved per year as a result of introducing the government targets.

Measure of benefits used in the economic analysis
The measures of benefit used were the lives saved, the life-years gained and the quality-adjusted life-years (QALYs). The QALYs were derived from life-years gained using a mean utility value of 0.9, taken from a published paper.

Direct costs
No discounting was carried out as the costs were incurred during less than 2 years. The authors estimated the marginal cost of introducing the intervention and measured the marginal nursing cost and the marginal cost of the more expensive thrombolytic agent. The estimation of the costs was based on actual data obtained from the hospital. The year of the exchange rate used was reported; this might have corresponded to the price year.

Statistical analysis of costs
No statistical analysis of the costs was carried out.

Indirect Costs
No indirect costs were estimated.

Currency
UK pounds sterling (£).

Sensitivity analysis
No sensitivity analysis was carried out.

**Estimated benefits used in the economic analysis**
The number of lives saved per year was 0.06 (95% CI: -0.09 to 0.33).

The number of life-years saved was 0.94 (95% CI: -1.45 to 5.10).

The number of QALYs gained per year was 0.84 (95% CI: -1.30 to 4.59).

The benefits were estimated over the patients' lifetime.

The side effects of treatment were not considered in the economic analysis.

**Cost results**
The cost of the intervention was 173,247 for 10 months (annual equivalent 207,896).

The costs of any adverse effects were not dealt with.

**Synthesis of costs and benefits**
The cost per life saved was 3,423,850 (95% CI: 627,705 to infinity).

The cost per life-year gained was 222,184 (95% CI: 40,734 to infinity).

The cost per QALY gained was 246,871 (95% CI: 45,260 to infinity).

**Authors' conclusions**
The benefits produced by changes resulting from the government targets were very costly. This means that the government targets are far too expensive in comparison with the generally accepted standards for judging an intervention to be recommended.

**CRD COMMENTARY - Selection of comparators**
The choice of the comparator (i.e. pre-existing staffing level and intravenous infusion of thrombolysis) was justified by it having been current practice in the hospital in the past.

**Validity of estimate of measure of effectiveness**
The source of the effectiveness data was a comparative study with historical controls. The study design was not ideal for the hypothesis. The study sample, patients needing thrombolysis, was representative of the study population in that all patients meeting the inclusion criteria were included in the study. The patients were not shown to be comparable. The analysis of effectiveness was not handled credibly as non-comparability of the patient groups might cause a difference in outcomes between the two patient groups.

**Validity of estimate of measure of benefit**
The estimation of the benefits was taken from the effectiveness estimates using life expectancy and a utility score from a published paper (Mark et al. 1995).

**Validity of estimate of costs**
From the cost perspective adopted (i.e. that of the hospital), all the relevant costs appear to have been included in the analysis. There was no clear reporting of the costs separately from the quantities. The resource use quantities were
taken from a single study, while the unit costs were taken from the authors’ setting. No statistical, sensitivity, or any other kind of analysis of the quantities or prices was carried out. No other sources of the resource quantities were used. The year of the exchange rate used was reported; this might have corresponded to the price year.

**Other issues**
The authors did not compare their results with the findings from other studies. The issue of generalisability to other settings was not addressed. The authors did not present all their results clearly. For example, they did not give the actual mortality data for the study sample. The authors were aware that their study suffered from having a small patient sample.

**Implications of the study**
The authors argued that, despite any limitations of their study, the introduction of the changes in nursing staff and in thrombolysis could not possibly have resulted in an acceptable cost per QALY.

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**Other publications of related interest**


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