The cost-effectiveness of an inner-city asthma intervention for children

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 families of asthmatic children, aged 5 to 11 years, participated in a programme aimed at reducing the incidence of asthma. The programme was educational and used social workers trained as asthma counsellors. Also, it was targeted at several different factors that are associated with high asthma incidence. Part of the intervention aimed to change the asthma sufferers’ physical environments, for example, reducing their exposure to tobacco smoke and pets. Another part aimed at improved use of the medical facilities, for example, getting access to counselling and help with giving up smoking. Another part aimed at helping families with their social problems. Asthmatic children participating in the programme were compared with those receiving normal care.

Type of intervention
Secondary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised English- or Spanish-speaking asthmatic children, aged between 5 and 11 years, with asthma diagnosed by a doctor. The criteria for inclusion were that the children had to satisfy at least one of several conditions. These conditions were self-reported use of at least two classes of asthma medications, one or more asthma hospitalisations during the preceding year, one or more emergency department or unscheduled clinic visits for asthma during the preceding year, and asthma symptoms for more than 2 days or more than 2 nights' sleep disruption during the preceding 2 weeks. Asthma symptoms consisted of cough, wheezing, shortness of breath, whistling or tightness in the chest.

Setting
The setting was the community and primary care. The economic study was carried out in the USA.

Dates to which data relate
The dates relating to the effectiveness evidence and resource use were not reported. 1995 prices were used.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was carried out prospectively on the same sample of patients as that used in the effectiveness study.
Study sample
A power of 90% to detect a difference of 25% between the two patient groups led to an estimated sample size of 500 per group. There were 1,033 children in the study in year 1 of the trial. Of these, 515 children received the intervention programme in year 1 and 518 received normal care.

Study design
This was a randomised controlled trial with the children randomised to receive normal care or to participate in the asthma education programme. The trial was multi-centred, taking place in eight centres. The follow-up was for one year after the intervention finished. Seventy-two children were not followed up during the second year.

Analysis of effectiveness
The basis of the analysis was intention to treat. The primary health outcome used was the mean number of self-reported asthma symptom days during a 2-week period. The two groups were shown to be comparable in terms of their demographics, economic status and health status in terms of asthma.

Effectiveness results
The mean number of symptom-free days (SFDs) over the two years was 538.51 in the normal care group and 565.1 in the group participating in the programme. This difference of 26.6 days was split fairly equally between the two years, 14.3 days in year 1 and 13.3 days in year 2.

Clinical conclusions
An educational programme for inner city asthmatic children and their families, run by social workers, improved the children's asthma.

Measure of benefits used in the economic analysis
The measure of benefit used in the economic analysis was the average number of SFDs gained.

Direct costs
The non-intervention costs for the two patient groups were broken down into costs and quantities. The quantities measured were scheduled medical visits, unscheduled medical visits, emergency department visits, length of stay in hospital, length of stay in the intensive care unit, and inpatient physician visits. The quantities were based on actual data in the study. The drug costs were not included. The prices were obtained from the Medicaid Statistical Information system database, which is maintained by the Health Care Financing Administration. The costs of running the educational programme were not broken down into prices and quantities. The costs of the second year were discounted by 3%. The medical costs were calculated using 1995 prices. It is unclear which price year was used to calculate the costs of running the programme.

Statistical analysis of costs
This included stochastic modelling of the individual costs. Confidence intervals were calculated for the cost estimates.

Indirect Costs
No indirect costs were calculated.

Currency
US dollars ($).
Sensitivity analysis
Sensitivity analyses were carried out to assess the effect of varying the costs of the intervention. Sensitivity analyses were also carried out to study the effect of assessing each year separately, as compared with both years combined, but no results were presented. Also, the results were calculated for different categories of patients, depending on the severity of their symptoms and their initial use of medical resources.

Estimated benefits used in the economic analysis
Over the 2-year period, the number of SFDs in the intervention group was 26.6 days higher than in the normal care group.

Cost results
The average total costs over the 2-year period were $2,589.30 in the intervention group and $2,344.65 in the normal care group.

The costs in the second year were discounted by 3%.

Synthesis of costs and benefits
The cost per SFD gained over the 2-year period was $9.20 (95% confidence interval: -$12.56 - $55.29). The most sensitive parameter was the mean cost per child of the intervention. If this were less than $92, then the programme would not increase the overall costs. The intervention was found to have a much greater benefit and lower costs with the more severe asthma sufferers. For the latter, the costs were reduced under the intervention programme in comparison with normal care, making it the dominant strategy. The results varied according to the measure of asthma severity used. If the asthma was measured as severe in the previous 2 weeks, the cost per SFD gained was -$2.92. If the patients had been in hospital for at least 1 day during the previous 2 months, the cost per SFD gained was -$21.20. If patients had made more than 1 unscheduled medical visit during the previous 2 months, the cost per SFD gained was -$10.85. The authors also generated a cost-effectiveness acceptability curve. This showed that there was a 50% probability that the cost of a SFD was $9.20.

Authors' conclusions
The intervention programme was very effective for children with severe asthma. Since it lowered the total costs for this group there should be no questioning its value. For children with mild asthma, the cost of a SFD could be as high as $30.71 or as low as $10.85, depending on the asthma severity measure used.

CRD COMMENTARY - Selection of comparators
The selection of the comparator, normal care, was valid in order to evaluate the educational programme run by social workers.

Validity of estimate of measure of effectiveness
The study design, a randomised controlled trial, was appropriate for the study question and should have high validity. The study sample was representative of the study population and the patient groups were shown to be comparable at analysis. However, the authors did not give details of the patients who had dropped out of the study in the second year, so it was unclear whether this had biased the results.

Validity of estimate of measure of benefit
The estimate of benefit was taken directly from the effectiveness measure, SFDs. The authors acknowledge that they did not take account of the benefit to the children's education of a SFD.
Validity of estimate of costs
Only the direct costs were taken into account. If the researchers had taken into account the burden on the family of caring for an asthmatic child, this would have increased the advantage of the intervention programme by showing the normal care strategy to have relatively higher costs. The authors acknowledged that they did not include pharmaceutical costs in their analysis, but they did not believe that this would necessarily bias their results in favour of one of the two strategies. The authors also acknowledged that the prices used to compare the treatment costs for the two patient groups were not necessarily the same as those faced by the treatment providers of the two patient groups, as they were not from the same precise geographical locations. The authors carried out a sensitivity analysis on the cost of administering the programme.

Other issues
The authors made appropriate comparisons of their results with those of other studies, but did not address the issue of generalisability to other settings. It is therefore unclear whether similar effectiveness results could be obtained outside the US inner-city environment. Also, as the costs of the intervention programme were not broken down into separate costs and quantities, it is not clear how much such an intervention would cost in another setting. The authors did not present their results selectively and their conclusions reflected the scope of the analysis. After publication of this paper the authors were engaged in a scientific exchange regarding the study. See other publications of related interest for correspondence references.

Implications of the study
As the intervention had several different components, it would be interesting, as the authors acknowledge, to be able to break down the effect of the different components. Also, any future study should include the drug costs.

Source of funding

Bibliographic details

PubMedID
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Other publications of related interest


