A multisite randomized trial of the effects of physician education and organizational change in chronic asthma care: cost-effectiveness analysis of the Pediatric Asthma Care Patient Outcomes Research Team II (PAC-PORT II)


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
This study examined a peer leader-based physician behaviour change intervention (PLE) and a practice-based redesign called the planned asthma care intervention (PACI). The PLE improved care through the use of physician education on asthma treatment guidelines. The PACI involved scheduled asthma care visits with a nurse who provided standardised assessments, care planning, coordination with the primary care physician, and self management tools for the patients and their families.

Type of intervention
Others: Education and management.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised children aged 3 to 17 years old with mild to moderate asthma.

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

Dates to which data relate
The dates to which the effectiveness and resource use data related were not reported. The price year was 1999.

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

Link between effectiveness and cost data
The costing was undertaken prospectively on the same patient sample as that used in the effectiveness study.

Study sample
It appears that power calculations have not been performed. The patient sample was taken from 42 primary practices in the USA. The inclusion and exclusion criteria for the study sample were not reported in this study, although they appear to have been given in another published study (Weiss et al. 2003, see ‘Other Publications of Related Interest’ below for bibliographic details). A total of 638 patients were randomly allocated to the three groups, 199 to usual care, 226 to PLE and 213 to PACI.
Study design
This was a multi-centred, 3-arm, randomised trial. The length of follow-up was 2 years. Details of the study design were given elsewhere (Weiss et al. 2003).

Analysis of effectiveness
This clinical study was based on an intent-to-treat approach. The primary health outcome was symptom-free days (SFDs). The study groups were well balanced in terms of their baseline characteristics. Details of the effectiveness analysis were given elsewhere (Weiss et al. 2003).

Effectiveness results
The mean number of SFDs was 14.8 for patients in usual care group.

Compared with the group, the gain in SFDs was 13.3 (95% confidence interval, CI: 2.1 - 24.7) for patients in the PACI group and 6.5 (95% CI: -3.6 - 16.9) for patients in the PLE group.

Clinical conclusions
The effectiveness evidence revealed that moving organisations toward guideline recommendations on asthma control resulted in improved SFDs for children in the authors' settings.

Measure of benefits used in the economic analysis
The summary benefit measure used was the mean number of SFDs gained with the interventions in comparison with usual care.

Direct costs
The direct unit costs included emergency department visits, physician visits and asthma related drugs. These were all derived from the PharMetrics Integrated Outcomes Database. Non-intervention costs and quantities were reported separately. The authors reported 2-year average resources used, but it would appear that the source of the resource use data was a prior study (Gendo et al. 2003, see 'Other Publications of Related Interest' below for bibliographic details). The unit costs of asthma-related drugs were from US average wholesale prices (or unit costs), and these were reduced by 15% to approximate acquisition costs. The quantity of drugs used was based on the standard dose per day. Intervention costs and related quantities were not reported separately. The costs were broken down into development costs, implementation costs and maintenance costs. The results were presented in a number of formats including and excluding development costs. The economic analysis was conducted from both societal and health care payer perspectives. The price was adjusted to the 1999 dollar. Discounting was not performed.

Statistical analysis of costs
A stochastic analysis was applied. Bootstrapping was used to estimate the 95% CIs.

Indirect Costs
For the evaluation undertaken from the societal perspective, the costs for the day absent from school were calculated. Values of the absences were estimated using the daily wage rate of the caregiver.

Currency
US dollars ($).
Sensitivity analysis
One-way sensitivity analyses were carried out to assess the robustness of the authors' findings. The variables changed were the unit cost values and the cost of caregiver absences. Also, regression methods and stratified analyses were carried out to identify sub-groups in which cost-effectiveness estimates may differ.

Estimated benefits used in the economic analysis
In comparison with usual care over the 2-year period, the PACI produced a mean increase of 13.3 SFDs (95% CI: 2.1 - 24.7). For PLE compared with usual care, the mean increase was 6.5 SFDs (95% CI: -3.6 - 16.9).

Cost results
The total annual costs per patient were $385 in the usual care group, $504 in the PLE group and $1,292 in the PACI group.

Synthesis of costs and benefits
For the health payer analysis, compared with usual care, the direct cost per SFD gained was $18.31 (95% CI: 5.21 - dominated) for PLE and $68.20 (95% CI: 37.36 - 361.16) for PACI. For the societal analysis, the cost per SFD gained was $17.85 for PLE and $69.25 for PACI. The analysis of age stratification indicated that the incremental cost-effectiveness ratios were lower in older children (7 - 16 years) than in the younger ones (3 - 6 years). In addition, PACI was dominated by usual care in the 3- to 6-year-old age group.

The cost-effectiveness acceptability curve showed that, for instance, given a threshold of $75 per SFD gained, there was a probability of 84.5% that PLE was cost-effective and a probability of 57.4% that PACI was cost-effective.

Authors' conclusions
The interventions in the authors' setting increased symptom-free days (SFDs), but also increased the costs associated with asthma care. The authors stated that ultimately "society, health care purchasers, and even parents will judge the value of asthma disease management programs by their willingness-to-pay for improvement in asthma outcomes".

CRD COMMENTARY - Selection of comparators
The selection of the comparator (usual care) was valid for evaluating the effect of physician education and organisational change on chronic asthma care for children between 3 and 17 years old.

Validity of estimate of measure of effectiveness
This study used clinical effectiveness data from a 3-arm, randomised controlled trial, which was appropriate for the study question. The study sample was taken from multi-centres and all patients selected met the inclusion criteria. Therefore, the sample was likely to have been representative of the patient population. The study groups were comparable at baseline in terms of their baseline characteristics. Statistical analyses were conducted to ensure the credibility of the study. To fully ascertain the internal validity of the study the reader is referred to an earlier publication (Weiss et al. 2003).

Validity of estimate of measure of benefit
The estimate of benefit, SFDs, was taken directly from the effectiveness measure. The reader is referred to the comments in the 'Validity of estimate of measure of effectiveness' field (above).

Validity of estimate of costs
The analysis was presented for two perspectives, society and the health care payer. It appears that cost categories relevant to both perspectives have been included in the analysis. Details of the medical costs incurred in the treatment
groups and the intervention costs for PLE and PACI were provided. The indirect costs were included in the economic analysis, although the authors found that they did not significantly affect the incremental cost-effectiveness ratio. Some research-related costs (e.g. the costs of conducting follow-up interviews) were omitted, and the authors did not justify these exclusions. Non-intervention costs and quantities were reported separately, but intervention costs and related quantities were not. A statistical analysis was performed. The unit costs of the resources used were estimated and a sensitivity analysis of the prices was conducted. The price year was reported, which increase the potential to reflate the cost results.

**Other issues**

The authors made extensive comparisons of their results with those of other studies. The issue of generalisability to other settings was addressed by performing a sensitivity analysis and presenting cost-effectiveness acceptability curves. However, as the costs of the intervention programmes were not broken down into separate costs and quantities, it was unclear how much such interventions would cost in another setting. The authors did not present their results selectively and their conclusions reflected the scope of the analysis. The authors acknowledged limitations of the study and referred readers to another study for details (Lozano et al. 2004, see 'Other Publications of Related Interest' below for bibliographic details).

**Implications of the study**

The authors did not make any recommendations for further research. However, they clearly stated that guideline recommendations on asthma control reduce asthma morbidity for children aged between 3 and 17 years, but with an increased cost in chronic asthma care.

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**Other publications of related interest**


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