Evaluation of a regional disease management programme for patients with asthma or chronic obstructive pulmonary disease
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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 study compared a disease management programme for patients with asthma or chronic obstructive pulmonary disease (COPD) with usual care. In addition to usual care, the disease management programme assigned patients to a general practitioner (GP), respiratory specialist nurse, or pulmonologist. The programme was centrally coordinated with central data collection and annual feedback.

Type of intervention
Screening and treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised patients who had been diagnosed with asthma or COPD. However, the target population also included people who would be diagnosed with asthma or COPD in the future. The exclusion criteria included patients with a serious co-morbidity, such as lung cancer or congestive heart failure.

Setting
The management programme was provided in both primary care and outpatient care settings. The economic study was carried out in the Netherlands.

Dates to which data relate
The effectiveness and resource use data were collected from May 2002 to March 2004. The price year was not explicitly stated, but it appears to have been 2004.

Link between effectiveness and cost data
The costing was undertaken prospectively on the same patient sample that provided the effectiveness data.

Study sample
While the authors reported that the number of patients included was sufficiently high to be able to detect small changes in certain outcome measures, their sample size estimation was not described. The sample selection method employed was that of a convenience sample and, of the 1,062 patients found to be eligible, 975 (92%) were included in the study. The reasons for non inclusion were not reported. Of the patients included, 10% were assigned to the pulmonologist, 65% to the respiratory nurse specialist, and 25% to the general practitioner, as the primary provider of care.
Study design
The study was a case series in which patients were assessed at baseline, on entry into the programme, and were followed for a 12-month period. The authors stated that this study design was chosen because the disease management programme was implemented on a regional basis and it was not possible to find a comparable region. The study was conducted in 16 general practices and one outpatient department in Maastricht, the Netherlands. Seventy per cent (n=685) of the patients were followed for the entire 12-month study period, and most drop-outs resulted from an unwillingness to complete the questionnaires.

Analysis of effectiveness
The outcomes of interest included:

- lung function (measured using a spirometer);
- quality of care (assessed using the Dutch Quality of Care Through Patients Eyes, QUOTE, Questionnaire);
- self-care behaviour and disease-specific knowledge, respiratory health and patient satisfaction (all measured using validated instruments); and
- utility (measured using the Dutch EuroQol).

Missing data were inferred using the last observation carried forward approach.

Effectiveness results
The effectiveness results were too numerous to report in this abstract, but the important ones are as follows.

- The compliance with medication increased (3.2 versus 4.3, p<0.001; scale 1 to 5).
- Disease-specific knowledge increased (4.6 versus 5.6, p<0.001; scale 0 to 10).
- Patient satisfaction increased for both asthma patients (6.99 versus 7.90, p<0.001) and COPD patients (7.01 versus 7.94, p<0.001).
- Health-related quality of life (EuroQol) improved for COPD patients (67 versus 69, p<=0.001), but not for asthma patients (72 versus 73, p=0.43).

Clinical conclusions
Quality aspects of care, self-care behaviour, smoking status, disease-specific knowledge and patient satisfaction improved after implement of the disease management programme.

Measure of benefits used in the economic analysis
The authors did not derive a summary measure of benefit. In effect, a cost-consequences analysis was performed.

Direct costs
The study reported the direct costs to the health service. These included the costs of planned consultations with programme providers, consultations with other care providers, medication, non-routine consultations and any hospital admissions. Implementation and overhead costs were calculated using a bottom-up approach. The resource use data were collected using a 15-item questionnaire and verified using care providers’ administrative data. Resource use was valued using current prices or tariffs. Discounting was not necessary. The costs were reported as an average cost per patient. The price year was not reported, but it appears to have been 2004.
**Statistical analysis of costs**
Resource use was described, for the intervention as a whole, using means and standard deviations. The costs were described for both asthma and COPD patients separately, using means and standard deviations. Resource use and (log transformed) cost-differences between baseline and 12 months were compared using a paired sample t-test.

**Indirect Costs**
Productivity losses were measured in terms of sick leave days and were estimated using the age-dependent friction cost method. Further details of the estimation method and valuation were not given.

**Currency**
Euros (EUR).

**Sensitivity analysis**
The issue of uncertainty was not investigated.

**Estimated benefits used in the economic analysis**
See the 'Effectiveness Results' section.

**Cost results**
The annual cost per asthma patient was EUR 766 at baseline and EUR 698 at 12 months. The difference of EUR 68 was statistically significant, (p=0.002).

The annual cost per COPD patient was EUR 1,423 at baseline and EUR 1,381 at 12 months. The difference of EUR 42 was not statistically significant, (p=0.09).

**Synthesis of costs and benefits**
The costs and benefits were not combined.

**Authors' conclusions**
The introduction of the disease management programme was associated with significant improvements in several processes and outcomes of care delivery within exiting budgets. Further, amongst patients with asthma, significant cost-savings were possible.

**CRD COMMENTARY - Selection of comparators**
A limited justification was provided for the comparator used, which was usual care in the authors' setting. You should decide if this comparator represents current practice in your own setting.

**Validity of estimate of measure of effectiveness**
The analysis was based on a case series design, described by the authors as a one-group pre-post test design. While the study sample was representative of the study population, the case series design represents a limitation to the internal validity of the study since it is possible that confounding factors affected the results. Appropriate statistical analyses were undertaken to take possible bias and missing data into account. No power calculations were reported, thus it is not possible to ascertain whether the results obtained were due to the intervention or to chance.

**Validity of estimate of measure of benefit**
The authors did not derive a summary measure of benefit. In effect, a cost-consequences analysis was performed.
Validity of estimate of costs
The analysis of the costs was performed from a societal perspective. It included all the relevant health care costs as well as lost productivity. The cost methods were adequately reported. Since the costing was conducted alongside the clinical study, the issues to consider regarding the accuracy of the cost estimates are whether the 3-month follow-up for the comparator was sufficiently long, and whether there could have been any confounding factors affecting the health outcomes. There was no attempt to address uncertainty. There was limited reporting of both resource use and cost, some resource use estimates were presented, but only the total annual cost per patient was presented.

Other issues
The authors compared their findings with those from other studies, generally showing the results to be in agreement. The authors acknowledged that the generalisability of the study results would be limited by the fact that the intervention was designed to fit into their local health care structures. The authors do not appear to have presented their results selectively. The authors reflected on the scope of their analysis, discussing the fact that some of their findings could be caused by other changes in health care or disease progression. A shortcoming of the study was that the authors estimated health-related quality of life using the EQ-5D, but did not seek to undertake a cost-effectiveness analysis by combing the costs and benefits.

Implications of the study
The authors suggested that further research should be undertaken to investigate the relationship between structure, process and outcomes to guide the choice of indicators when evaluating disease management programmes.

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