A review and economic evaluation of bronchodilator delivery methods in hospitalized patients

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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
Metered dose inhaler.

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
Patients with a mean age of 61.6 years (SD 16.4) with prescribed bronchodilator therapy (either salbutamol alone or with ipratropium bromide).

Setting
Hospital. The study was carried out in Vancouver, British Columbia, Canada.

Dates to which data relate
The estimates for the effectiveness analysis were obtained from two studies published in 1987 and 1989. The data for the resource use were not reported as belonging to any specific date. The dates for the prices used were not reported.

Source of effectiveness data
A review of previously published studies was used as the source of data.

Modelling
'Time and motion' studies were carried out in order to estimate labour time allocation.

Outcomes assessed in the review
The review assessed airflow obstruction and duration of hospitalization.

Study designs and other criteria for inclusion in the review
Randomised controlled trials were included in the review.

Sources searched to identify primary studies
Criteria used to ensure the validity of primary studies
Not reported.

Methods used to judge relevance and validity, and for extracting data
Not reported.

Number of primary studies included
Two primary studies were included.

Methods of combining primary studies
Not combined.

Investigation of differences between primary studies
Not reported.

Results of the review
The authors report that the clinical outcomes from the studies “have been demonstrated to be equivalent” for both bronchodilator delivery methods.

Measure of benefits used in the economic analysis
Since the effectiveness analysis showed no difference in clinical benefit between the intervention and the comparator, the economic analysis was based on the difference in costs only.

Direct costs
The quantities were reported separately from the prices. The costs measured were operating costs (medication and labour). The boundary adopted was that of the hospital. The estimation of labour time was carried out by means of a time and motion study carried out with nurses unaware of the study being under way. The rest of the resources used were estimated mostly from actual data. The source of resource quantities used was the Departments of Pharmacy, Human Resources, and Respiratory Therapy of the institution. The dates for the collection of data and prices used were not reported except for those data related to the estimation of the unit cost of spacer devices, which were from the fiscal year 1991-92. The duration of the study was 6 weeks. The rest of the operating costs and the overhead costs were assumed to be similar for both therapies.

Statistical analysis of costs
Not undertaken.

Currency
Canadian dollars (Can$).

Sensitivity analysis
The parameter values varied in the analysis were the costs of medications, labour (time spent in teaching inhaler technique by a nurse), and equipment. One-way and two-way simple sensitivity analyses were performed.
Estimated benefits used in the economic analysis
Not applicable.

Cost results
The cost per treatment by MDI, with 10 minutes of education time in the inhaler technique, ranged from Can$1.27 (200mcg salbutamol via self-administration) to Can$3.56 (400mcg salbutamol and 80mcg ipratroprium with 100% supervision). The cost per treatment by WN ranged from Can$2.62 (2.5mg salbutamol) to Can$4.70 (5mg salbutamol and 0.5mg ipratroprium). The sensitivity analysis showed that allocation of labour time was the most influential parameter in the results, with the cost differential persisting in favour of the MDI until the salbutamol administration (4 puffs) was fully supervised by a nurse or respiratory therapist and each patient was given 20 minutes (nursing time) of education in inhaler technique. Use of a non-recyclable spacer device increased the cost of MDI treatment so that MDI became more costly than WN when more than two puffs were administered.

Synthesis of costs and benefits
Not applicable.

Authors' conclusions
The authors concluded that "This economic evaluation supports the use of MDI therapy and the results are generalisable to hospitalized non-ICU patients. Substantial savings are possible for well-motivated, capable patients who can effectively self-administer bronchodilator therapy. The role of educational interventions and patient and physician preferences need to be investigated".

CRD COMMENTARY - Selection of comparators
A justification was given for the comparator used. The authors’ reason for the choice of comparator was clear. The comparator chosen was salbutamol 2.5 mg dose by nebulized bronchodilators.

Validity of estimate of measure of benefit
The likelihood of the internal validity in the estimate of measure of benefit used in the economic analysis would have to be analysed based on those previous studies referred in the present study.

Validity of estimate of costs
The resource quantities were reported separately from the prices. The cost estimates were not adequately reported, since the reference year for prices was not given and nor was a specific time period reported during which the resource quantities were collected. Some operating and overhead costs were excluded from the analysis because they were assumed to be common to both strategies.

Other issues
The authors’ conclusions were justified on the grounds of the sensitivity analysis, despite important weaknesses in the estimation of costs arising mainly from possible confounder effects from the clinical units where the patients were treated (the respiratory ward accounted for the majority of patients). Also, the low numbers in the MDI-alone therapy group (6 patients) casts doubt on the results. The issue of generalisability was partly addressed in terms of the recyclable nature of the spacer device and the cost per salbutamol puff for reusable MDIs. Appropriate comparisons with other studies were made. The results were not presented selectively. The amount of time spent ‘supervising’ and teaching patients to use MDI may vary greatly from site to site, which may make these results less generalisable.

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