Cost effectiveness of an inpatient influenza immunization assessment and delivery program for children with asthma

Teufel R J, Basco W T, Simpson K N

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.

CRD summary
The objective was to determine the outcomes and costs of an influenza vaccination programme for hospitalised children with asthma. The authors concluded that improving the delivery of vaccination improved the clinical outcomes and generated cost savings. Although the methodology was appropriate, there were few details on the identification of the clinical data and the measure of benefit did not convey the intervention's impact on health or quality of life. So, the authors' conclusions should be treated with caution.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective was to determine the potential clinical benefit and cost savings of an influenza vaccination programme for hospitalised children with asthma.

Interventions
The intervention was the universal assessment of influenza vaccination status of all hospitalised children with asthma, with those who had not been immunised receiving the vaccination. This intervention was compared with a strategy of no assessment.

Location/setting
USA/secondary care.

Methods
Analytical approach:
A decision tree model was used to assess the costs and effects of delivering influenza vaccination to children with asthma in acute-care hospitals. The time horizon was not explicitly reported and neither was the perspective.

Effectiveness data:
The effectiveness and clinical data were derived from a survey of the literature. The main effectiveness estimate was the vaccine efficacy against influenza. This estimate was derived from a published study (White, et al. 1999, see 'Other Publications of Related Interest' below for bibliographical details), but no further details were reported.

Monetary benefit and utility valuations:
Not relevant.

Measure of benefit:
The benefit measure was the percentage of hospitalised children who became up to date in their influenza vaccination status.

Cost data:
The direct costs were those relating to antibiotic prescriptions, clinic visits, and hospitalisation. The authors reported that these costs were collected from multiple studies. The indirect costs were those of care giving due to adults taking time off work to care for the children who missed school due to sickness. The number of days a child was off school...
and the probability that an adult would take time off work were derived from published studies. The median hourly wage of a child care provider was derived from the US Bureau of Labour and Statistics. The costs of secondary infection were also included. All costs were reported in US dollars, and updated to 2006 prices using the the consumer price index for medical care and medical care services.

Analysis of uncertainty:
A one-way sensitivity analysis was performed by varying the vaccine efficacy between worst-case and best-case in order to determine the effects on the clinical outcomes and cost savings. The influenza prevalence, morbidity and all other model parameters were also varied in a series of one-way sensitivity analyses.

Results
Assuming 100% assessment of all hospitalised children with asthma, the post-intervention percentage who were up to date was 59%, compared with 29% with no routine assessment. The average total cost (including the direct and indirect costs of influenza, and the cost of in-patient vaccination) of the 100% assessment programme was $90.45 per child compared with $95.99 with no assessment.

These costs and benefits were not combined as the 100% assessment programme, followed by vaccination of all non-vaccinated children, was more effective and less costly than no assessment. The sensitivity analysis showed that, even when the worst-case vaccine efficacy was used, the assessment programme still generated cost savings.

Authors’ conclusions
The authors concluded that an intervention aimed at improving the assessment and delivery of influenza vaccination to hospitalised children with asthma would improve the clinical outcomes and result in cost savings.

CRD commentary
Interventions:
The interventions were reported clearly and in detail. An explicit justification was given for using no assessment and no vaccination as the comparator, which was because only a small proportion of asthmatic children were vaccinated.

Effectiveness/benefits:
The authors did not report a systematic review of the literature and they provided few details of their methodology for identifying and reviewing the relevant studies. As a result, it is not clear if all the relevant information was included. The benefit measure (up to date status with influenza vaccination) was very narrow. It does not cover the impact of influenza on health or quality of life and does not allow comparisons across different diseases and interventions.

Costs:
The authors did not explicitly report the perspective. They included the costs of treatment, hospitalisation, visits to the doctor, treatment of secondary influenza transmission, and indirect costs (productivity costs associated with informal care giving). It, therefore, appears that a societal perspective was taken. The authors appropriately reported the sources from which the resource use and cost data were derived. The time horizon of the study was not reported, which makes it impossible to determine if discounting, which was not performed, was applicable. The price year and currency used were appropriately reported.

Analysis and results:
Appropriate details of the model were reported, with a diagram. The authors performed a series of one-way sensitivity analyses to assess the impact of uncertainty in each parameter. However, the use of a probabilistic sensitivity analysis would have been better as it would evaluate the overall model uncertainty. The authors reported a series of limitations, such as: that many of the clinical and effectiveness parameters could change every influenza season, and the scarcity of data on the link between influenza vaccination and missed school days, hospitalisations, or secondary infections.

Concluding remarks:
Although the methodology appears to have been appropriate, the measure of benefit was too narrow and did not convey the impact of the intervention on either health outcome or quality of life. The methods used to determine the costs were appropriately reported, but there were few details on those used to identify the clinical and effectiveness data. Given
these limitations, the authors' conclusions should be treated with caution.

**Funding**
Not stated.

**Bibliographic details**

**PubMedID**
18438789

**DOI**
10.1002/jhm.286

**Original Paper URL**
http://onlinelibrary.wiley.com/journal/118860264/abstract?CRETRY=1& amp;SRETRY=0

**Other publications of related interest**


**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Adolescent; Asthma /economics /epidemiology /prevention & control; Child; Child, Preschool; Comorbidity; Cost of Illness; Cost-Benefit Analysis; Hospital Costs; Humans; Immunization Programs /economics; Infant; Infant, Newborn; Influenza Vaccines /economics; Influenza, Human /economics /epidemiology /prevention & control; Inpatients; Outcome Assessment (Health Care) /economics; Program Evaluation

**AccessionNumber**
22008100752

**Date bibliographic record published**
13/05/2009

**Date abstract record published**
23/09/2009