Cost-effectiveness analysis of behavioral interventions to improve vaccination compliance in homeless adults


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
This study examined the cost-effectiveness of behavioural interventions to improve compliance with a vaccination against hepatitis A and B viruses among homeless people, focusing on hepatitis B virus infections. The authors concluded that nurse case management plus incentives and tracking improved vaccination compliance and the clinical outcomes, producing savings for society. The analysis was well conducted and the results were robust, despite limited reporting about some sources of data.

Type of economic evaluation
Cost-utility analysis

Study objective
This study examined the cost-effectiveness of behavioural interventions to improve compliance with a joint hepatitis A and B viruses vaccination programme for homeless people.

Interventions
A three-dose hepatitis vaccination, against A and B viruses, given at baseline, one month and six months, was delivered in conjunction with one of three behavioural interventions. These were nurse case management plus incentives and tracking, standard management plus incentives and tracking, and standard management plus incentives only. These three vaccination plus behavioural intervention strategies were compared with vaccination alone with no behavioural intervention.

Location/setting
USA/primary care.

Methods
Analytical approach:
A decision tree with embedded Markov models was developed and focused on hepatitis B virus infections. A lifetime horizon was considered and the authors stated that a societal perspective was adopted.

Effectiveness data:
The clinical data appear to have been derived from a selection of published relevant sources, including a systematic review on the natural history of chronic hepatitis B virus infection. The impact of incentives and tracking on vaccination compliance was based on an ongoing randomised controlled trial (RCT) involving 865 adults living in homeless shelters in Los Angeles. A key input to the model was the vaccination success rate, which was from RCTs. Some assumptions were also made and justified.

Monetary benefit and utility valuations:
The utility values were from published studies that used various instruments, such as the time trade-off technique, the Health Utilities Index, and transformations of the Quality of Well-being scale, to elicit the patient preferences.

Measure of benefit:
The summary benefit measure was the expected number of quality-adjusted life-years (QALYs), which were discounted at an annual rate of 3%.
Cost data:
The economic analysis included vaccination costs (travel to clinic, nursing time, patient tracking, incentives, serostatus test, and hepatitis vaccination) and the costs of treatment of hepatitis A and B viruses. The vaccination costs were estimated directly from the ongoing RCT, using a micro-costing approach. The treatment costs were from published reports, but their details were not provided. All costs were in US dollars ($) and the price year was 2005. Future costs were discounted at an annual rate of 3%.

Analysis of uncertainty:
A deterministic one-way sensitivity analysis was undertaken, using plausible ranges of values derived from the literature for clinical inputs and arbitrary ranges for economic inputs. A Monte Carlo analysis with 10,000 simulations was carried out across a range of willingness-to-pay thresholds.

Results
The lifetime costs were $2,153.3 with no intervention, $1,039.1 with incentives (standard management), $964.2 with incentives and tracking, and $849.2 with nurse management (plus incentives and tracking). The lifetime QALYs were 10.9 with no intervention, 19.5 with incentives, 20.7 with incentives and tracking, and 21.3 with nurse management. Nurse management was the dominant strategy, as it was more effective and less expensive than the others. Incentives and tracking dominated incentives, which dominated no intervention.

The analysis of compliance confirmed the superior economic profile of nurse management over the other interventions.

The Monte Carlo simulation showed that nurse management was the best strategy overall. Compared with no intervention, at a threshold of $50,000 per QALY, nurse management was cost-effective in 50% of simulations, incentives and tracking in 47%, and incentives in 41%.

The two key findings of the deterministic analysis were that vaccination was cost-saving at disease prevalence rates above 0.40 and that changes in compliance rates, costs, discount rates (including no discounting), and other inputs did not alter the findings.

Authors' conclusions
The authors concluded that nurse management with incentives and tracking improved vaccination compliance and clinical outcomes, producing savings for society.

CRD commentary
Interventions:
The authors justified their selection of the comparators. Vaccination alone with no behavioural intervention was used for comparison as a reference case. The behavioural strategies were appropriately selected.

Effectiveness/benefits:
No systematic review to identify the data sources was reported. The use of data from a RCT of the vaccination and behavioural interventions in the authors’ setting was valid as it reflected the actual implementation of these interventions. The remaining data were from valid sources, such as a systematic literature review and other RCTs. More information on these sources would have been useful to make a full assessment of the clinical inputs. The uncertainty underlying these estimates was investigated in the sensitivity analysis. Some key details on the derivation of the utility values were provided. QALYs were a valid and appropriate benefit measure.

Costs:
The analysis of costs was consistent with the perspective. The authors provided a justification for the exclusion of some costs, such as those associated with productivity lost, which were implicitly incorporated in the benefit measure, and vaccination side effects, which were minor and infrequent. Some costs were presented as category totals, while others were broken down into individual items. The data sources were reported, but some of them were not clearly described. Other features of the analysis, such as the price year and the use of discounting were reported.

Analysis and results:
The results were clearly presented. An incremental approach was correctly used to synthesise the costs and benefits and to identify the most cost-effective strategy. The issue of uncertainty was appropriately investigated using a deterministic and a probabilistic approach, the results of which were presented and discussed. Details of the analytic model were presented and discussed. The study was based on a number of assumptions, which were investigated in the sensitivity analysis. The authors stated that some limitations of their analysis were the lack of life tables for homeless people and the exclusion of disease transmission from the model.

Concluding remarks:
The analysis was well conducted and the results were robust, despite limited reporting about some sources of data.

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