Cost-utility of universal hepatitis A vaccination in Canada
Bauch C T, Anonychuk A M, Pham B Z, Gilca V, Daual B, Krahn M D

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 assess the cost and outcomes associated with universal hepatitis A vaccination. The authors concluded that, depending on how the programme was introduced, vaccination was cost-effective in low incidence countries. The methodology, on the whole, was satisfactory and the conclusions reached by the authors appear to be appropriate.

Type of economic evaluation
Cost-utility analysis

Study objective
The objective was to assess the cost and outcomes associated with universal hepatitis A (HA) vaccination in children and adults.

Interventions
Several vaccination strategies, which differed in the age at which the vaccination was received, were assessed. Most of them scheduled the HA vaccination with other currently administered vaccines.

Location/setting
Canada/primary care and school.

Methods
Analytical approach:
A dynamic model, accounting for herd immunity, was used to facilitate the synthesis of the cost and clinical data. The time horizon was 80 years and the authors stated that the two study perspectives were the third party payer and societal.

Effectiveness data:
The effectiveness data were derived from published studies, with data specific to Canada being used where possible. Birth rates, death rates and population per age group were obtained from vital statistics data for Canada. The main clinical parameters were the rates of infection and transmission, vaccine efficacy, and mortality.

Monetary benefit and utility valuations:
Quality of life estimates were derived from published studies, but the instruments used to derive these utilities were not reported.

Measure of benefit:
The primary measure of benefit was the number of quality-adjusted life-years (QALYs) gained, which were discounted at an annual rate of 5%.

Cost data:
The costs from the third party payer perspective (direct costs) included physician visits, hospitalisation, death, liver transplantation, and public health costs. From the societal perspective, they included these direct costs, plus time costs (e.g. the cost of work loss) and costs borne by the patients and the private sector. The resource use and cost data were identified from a systematic review of the literature, supplemented by expert opinion where required. The price year was 2005 and all costs were reported in Canadian dollars (CAD) and were discounted at an annual rate of 5%.
Analysis of uncertainty:
Both univariate and probabilistic sensitivity analyses were performed, with some of the results of the probabilistic sensitivity analysis being displayed in the form of a cost-effectiveness acceptability curve.

Results
The results were provided for three vaccination strategies: the current strategy; a four plus nine strategy (vaccination at four and nine years); and a nine plus nine strategy (two doses of vaccination at nine years).

Compared with the current strategy, from the payer's perspective, the four plus nine strategy was associated with 9.7 QALYs gained at a cost of CAD 1.69 million, giving a cost per QALY gained of CAD 175,000 and, from the societal perspective, it was cost saving. The nine plus nine strategy was cost saving from both the payer's perspective and the societal perspective.

The probabilistic sensitivity analysis showed that the nine plus nine strategy was cost-effective, from the societal perspective, at all thresholds of willingness to pay per QALY gained. From the payer's perspective, at a willingness to pay per QALY gained of CAD 20,000, 65% of simulations were associated with positive net benefits.

Authors' conclusions
The authors concluded that, depending on how the programme was introduced, universal hepatitis A vaccination was cost-effective in low incidence countries.

CRD commentary
Interventions:
The vaccination strategies were clearly reported and represented the relevant strategies in the authors' setting.

Effectiveness/benefits:
The effectiveness data were derived from published studies and the methods of the literature review were reported in full. The effectiveness estimates were reported in full, including details of their sources. The main outcome measure was the QALY which was appropriate as it captures the impact of HA on both length and quality of life. The quality of life estimates were obtained from a published study, but details of the methods of that study were not provided.

Costs:
The analysis was conducted from the payer's perspective and the societal perspective, and all costs relevant to those perspectives appear to have been included. Full details of the methods used to identify the vaccine and infection costs were provided, along with the estimates used in the model. However, details of the methods used to value the indirect costs were poorly reported. Adjustments, including the price year and discounting, were included.

Analysis and results:
The model structure was presented graphically along with all the relevant details and modelling assumptions. The authors conducted an incremental analysis and the results were adequately presented. Sensitivity analyses were conducted on the modelling assumptions and parameters, enhancing the generalisability of the findings. The authors provided a thorough discussion on the limitations and weaknesses of their study.

Concluding remarks:
The methodology, on the whole, appeared to be satisfactory and the conclusions reached by the authors appeared to be appropriate.

Funding
Funded by a grant from the Canadian Institutes of Health Research, with GlaxoSmithKline Canada.

Bibliographic details