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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.

CRD summary
The study objective was to assess cost-effectiveness and affordability of a universal newborn vaccination programme against hepatitis B virus in Vietnam. The authors concluded that universal newborn vaccination was highly cost-effective from a payer's perspective and a cost-saving intervention from both a societal and a healthcare perspective. The study methodology was good but some of the methods could have been better reported. The authors' conclusions appear to be valid.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The study objective was to assess cost-effectiveness and cost-effective affordability of a newborn universal vaccination programme against hepatitis B virus in Vietnam.

Interventions
The study compared a newborn universal vaccination programme for the hepatitis B virus with no vaccination.

Location/setting
Vietnam/primary care.

Methods
Analytical approach:
A decision analytic Markov model linked to a decision tree was used to assess to combine data on costs and outcomes and simulate disease progression. The model focused on chronic hepatitis B infections only. The time horizon of the study was that of the lifetime of the patient (75 years in Vietnam). The authors reported that economic analysis was from three different perspectives: societal, healthcare system and third party payer.

Effectiveness data:
Effectiveness data were derived from published studies found by searching the PubMed database. Where several data sources were used for a single transition probability they were combined into a single outcome using a random-effects model. The main clinical effectiveness estimate was vaccine effectiveness against hepatitis B virus.

Monetary benefit and utility valuations:
Obtained from international published studies due to a lack of data on specific quality of life estimates for Vietnam.

Measure of benefit:
Life years and quality-adjusted life-years (QALYs) gained. These were discounted using an annual rate of 3%.

Cost data:
From the payer's perspective (such as Vietnamese government or international organisation) only the costs of vaccination were included in the analysis. From a healthcare system perspective, direct costs of vaccination and costs of treating chronic hepatitis B infection and its related progressions. From a societal perspective, direct medical costs and direct non-medical costs (such as travel, meals and lodging) and productivity losses.
Treatment costs for chronic hepatitis B and related progressions were derived from a Vietnamese cost-of-illness study. Costs of vaccination were obtained from Vietnamese sources. Costs were presented in US dollars ($) and discounted at an annual rate of 3%.

Analysis of uncertainty:
A series of one-way sensitivity analyses were performed by varying model parameters over a range of plausible values. A probabilistic sensitivity analysis included distributions alongside each model parameter. There was a series of 5,000 Monte Carlo simulations. Affordability of a universal vaccination was evaluated on the basis of joint distribution of simulated incremental costs and health gains. Results of these analyses (payer's perspective only) were presented using cost-effectiveness acceptability curves and cost-effectiveness planes.

Results
Costs and benefits were combined using an incremental cost-effectiveness ratio (additional cost per life-year gained) and incremental cost-utility ratio (additional cost per QALY gained). Vaccination was found to be dominant (more effective and less costly) over no vaccination for both societal and healthcare system perspectives. From a payer’s perspective, when compared with no vaccination, vaccination was associated with an incremental cost per life-year gained of $4.53 and an incremental cost per QALY gained of $3.77.

Results of the probabilistic sensitivity analysis showed that vaccination was always more effective and less costly than no vaccination when viewed from healthcare system and societal perspectives. From a third-party payer perspective the probability that vaccination was cost-effective was 51% at a willingness to pay threshold of $3.77. Results showed that from a payer perspective, vaccination would not be affordable where the budget was less than $2 million but implementation was always possible where the budget exceeded $13 million.

Authors’ conclusions
The authors concluded that universal newborn vaccination was highly cost-effective from a payer's perspective and a cost-saving intervention from societal and healthcare perspectives.

CRD commentary
Interventions:
The interventions under study were reported adequately.

Effectiveness/benefits:
Little information was given on the search strategy used except that the PubMed database was used to search particularly for studies in high-endemic Asian countries where the epidemiology of hepatitis B infections was similar to that in Vietnam. It was unclear whether a systematic review was undertaken and whether all the best available evidence was included in the study.

Little information was provided on how utilities were estimated. This made it difficult to fully assess whether the international sources used were suitable for the study setting and were estimated appropriately.

Costs:
The authors explicitly reported the different study perspectives taken. It appeared that all the major cost categories were included for each of the perspectives used. Sources of healthcare costs data were reported adequately. No information was given for how non-medical productivity costs were estimated and so the reliability of these estimates was unclear.

The price year was not reported explicitly and this would hamper any future inflationary exercises. Time horizon, discount rate and currency conversions were all reported adequately.

Analysis and results:
Outcome and cost information were synthesised using a decision analytic Markov model. Adequate details of the model structure were provided and included a graphical depiction of the model. The results were presented clearly. Uncertainty in the results was tested exhaustively using a series of one-way and probabilistic sensitivity analyses. The authors reported as main limitation to their study that their model was static instead of being a dynamic model of the
disease.

Concluding remarks:
The study methodology was good but some of the methods could have been better reported. The authors’ conclusions appear to be valid.

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