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 rotavirus vaccination in young children, compared with no vaccination, using recent data to update the results from previous studies. Rotavirus vaccination was cost-effective from both the societal perspective and that of the health care system, but the results depended on assumptions on vaccine efficacy and rotavirus epidemiology in local settings. The methods were valid, which enhances the reliability of the authors’ conclusions.

Type of economic evaluation
Cost-utility analysis

Study objective
The study examined the cost-effectiveness of rotavirus vaccination in young children compared with no vaccination, using recent data to update the results from previous studies.

Interventions
The vaccination strategy was Rotarix vaccine administered in two doses, alongside other infant vaccinations, such as the diphtheria-tetanus-pertussis vaccine. The comparator was no rotavirus vaccination.

Location/setting
Vietnam/primary care.

Methods
Analytical approach:
A Markov model was developed to examine the clinical and economic impact of rotavirus vaccination in a birth cohort and for its first five years of life. The authors stated that the perspectives of both society and the health care system were taken.

Effectiveness data:
The clinical data were from selected studies and no systematic review was reported. The efficacy of vaccine was a key input and was based on data from a pivotal, phase III randomised controlled trial (RCT). This trial was conducted in Latin America and some adjustments to the data were made to reflect the Vietnamese population. Wherever possible, country-specific sources of evidence were used, especially for epidemiological estimates and the authors chose the most appropriate estimates.

Monetary benefit and utility valuations:
The disability weights were from published studies that used the Global Burden of Disease approach.

Measure of benefit:
Disability-adjusted life-years (DALYs) were the summary benefit measure and they were discounted at an annual rate of 3%.

Cost data:
The economic analysis included the costs of vaccination (acquisition, wastage, and delivery), disease treatment (outpatient and in-patient), and non-medical items (transportation and caregiver’s time). Vaccination costs were assumed based on data from other countries because the cost per dose of Rotarix vaccine was not available for developing
countries. The remaining costs were from a published study that estimated the costs for different levels of health facilities in rural versus urban areas in Vietnam. All costs were in US dollars ($) and were discounted at an annual rate of 3%. The price year was 2004.

Analysis of uncertainty:
A series of one-way sensitivity analyses was carried out on the key model inputs, using plausible ranges of values. A threshold analysis was performed on the price of vaccine, at which vaccination would have an incremental cost-utility ratio below the per-capita gross domestic product (GDP) in Vietnam. A probabilistic analysis, based on a Monte Carlo simulation, was completed using predefined probability distributions for all the inputs. The results were presented as cost-effectiveness acceptability curves.

Results
In the 2004 birth cohort, vaccination prevented 31,600 DALYs at an incremental cost of $16,933,000 from the societal perspective and $17,462,000 from the health care system perspective, compared with no vaccination. The incremental cost per DALY avoided was $540 from the societal perspective and $550 from the health care system perspective.

The sensitivity analysis showed that these base-case results were sensitive to variations in the vaccine price and efficacy and the discount rate. The incremental cost per DALY avoided remained below the GDP threshold at a maximum vaccine price of $5.41 per dose ($5 in the base case) and below three times the GDP at a maximum of $32.4 per dose.

The cost-effectiveness acceptability curve indicated that the probability of vaccination being cost-effective at the threshold of $530 per DALY avoided was 50%, and at $710 it was 75%, and at $1,350 it was 100%.

Authors' conclusions
The authors concluded that rotavirus vaccination was cost-effective from both the perspective of society and the health care system, but this depended on assumptions on the vaccine efficacy and price and rotavirus epidemiology in local settings.

CRD commentary
Interventions:
The rationale for the selection of the comparators was clear, in that the proposed vaccination strategy was compared against the usual pattern of care (no vaccination) in the authors' setting.

Effectiveness/benefits:
The clinical data were from studies selected by the authors rather than a review of the literature, but these sources were generally justified and appear to have been chosen appropriately. For example, vaccine efficacy was from a RCT conducted in low income countries, and adjusted to the Vietnamese situation, while other data were selected to represent the context of the study. Some assumptions were needed and these were extensively varied in the sensitivity analysis. The benefit measure was appropriate as it captured both survival and quality of life and it is often used in studies of low income countries.

Costs:
The economic analysis considered two different perspectives, which makes the findings interesting to alternative payers. The costs were broken down into categories and their unit costs were generally presented. Most of the data were from a previous study, the methods of which were not fully described, but all the unit costs and quantities of resources referred to the Vietnamese setting. The impact of variations in unit costs was extensively considered in the sensitivity analysis. The authors justified the exclusion of those costs associated with adverse events, as they were very infrequent.

Analysis and results:
An incremental analysis was appropriately used to synthesise the costs and benefits of the two options. Both total and incremental data were presented for costs and benefits. The issue of uncertainty was satisfactorily investigated and the results of all analyses were clearly presented and discussed. The findings appeared to be country specific and caution will be required if extrapolating them to other settings. Extensive information on the decision model and the methods used to select the clinical sources was presented. The model was enhanced by the incorporation of reinfection and
natural immunity, but might have been limited by being static and not dynamic, as acknowledged by the authors.

Concluding remarks:
The methods were valid, which enhances the reliability of the authors’ conclusions.

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