Rotavirus vaccination for Hong Kong children: an economic evaluation from the Hong Kong Government perspective
Ho AM, Nelson EA, Walker DG

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 aim was to evaluate the cost-effectiveness of a universal rotavirus vaccination programme. The authors concluded that universal vaccination was cost-saving if the vaccination cost was less than 40 to 92 US dollars per child. The methodology appears to have been appropriate and, on the whole, was clearly and transparently reported. The conclusions reached by the authors appear to be appropriate.

Type of economic evaluation
Cost-utility analysis

Study objective
The aim was to evaluate the cost-effectiveness of a universal rotavirus vaccination programme.

Interventions
The universal rotavirus vaccination programme was compared against no vaccination for children.

Location/setting
Hong Kong/primary care.

Methods
Analytical approach:
A Markov model was developed to simulate the impact of vaccination on the natural history of disease in a hypothetical cohort of children under six months old. Two Monte Carlo simulations were carried out. In simulation A, 50,000 newborns entered the cycle each year, with a total of 250,000 children in the model over a five-year time horizon. In simulation B, 50,000 children entered the model and no newborns were added. The cycle length was one year and the authors stated that a governmental perspective was adopted.

Effectiveness data:
The clinical data were from a selection of published studies. The data on age-related mortality were from life tables in the authors' setting. Expert opinion and authors' assumptions were used to adapt these data to the local context.

Monetary benefit and utility valuations:
The utility valuations were derived using person trade-off methods.

Measure of benefit:
Disability-adjusted life-years (DALYs, life-years lost due to disability or death) avoided were the summary benefit measure, and were estimated using the decision model. These benefits were discounted at an annual rate of 3%.

Cost data:
The costs incurred by the government health care system were included and the cost categories appear to have been direct costs, such as vaccination, hospitalisation, and physician visits; and indirect costs, such as transport, food supplements, and hours off work for family members. The cost data reflected local resource use in the authors' setting. All costs were in US dollars ($) and a 3% annual discount rate was applied. The price year was 2003.

Analysis of uncertainty:
To address the issue of uncertainty, a deterministic sensitivity analysis was undertaken, by varying most of the model inputs, such as the vaccination costs, vaccine efficacy, DALY estimates, age weighting, and the costs of hospitalisation and clinic visits.

**Results**

The net costs and incremental costs per DALY averted for a range of vaccination costs were presented in tables. The vaccination programme reduced disability and resulted in cost savings when the vaccination costs were less than $55 per child for simulation A, and $70 for simulation B, with 5% annual decline in vaccine efficacy.

For simulation A at a vaccination cost of $60, the programme resulted in expected costs of $1,500,000 in the whole cohort of 250,000 children, and generated an incremental cost-effectiveness ratio (ICER) of $15,000 per DALY averted. For simulation B at a vaccination cost of $80, the programme resulted in expected costs of $590,000 in the whole cohort of 50,000 children, and generated an ICER of $25,830 per DALY averted.

The sensitivity analysis indicated that the most influential model inputs were the utility estimates, age weighting, health care costs, and vaccination costs.

**Authors' conclusions**

The authors concluded that universal vaccination was cost-saving if the vaccination costs were less than $40 to $92 per child.

**CRD commentary**

**Interventions:**

The selection of no vaccination as the comparator was appropriate as it was the current strategy in the authors' setting.

**Effectiveness/benefits:**

The clinical evidence was derived from selected studies. It was unclear whether the best available data were used as the authors did not state the methods of study selection and they did not describe the selected studies. The derivation of the benefit measures was clear.

**Costs:**

The unit costs and resource quantities were not provided, which makes the cost analysis less transparent. The authors justified the exclusion of some cost items on the grounds that this was necessary to ensure that the cost analysis reflected the perspective. A sensitivity analysis was conducted by varying the cost estimates, which enhances the external validity of the analysis. The price year and the use of discounting were reported.

**Analysis and results:**

The model structure was presented in a diagram, 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, which enhances the generalisability of the findings. The authors provided a thorough discussion of the limitations and weaknesses of their study.

**Concluding remarks:**

The methodology appears to have been appropriate and, on the whole, was clearly and transparently reported. The conclusions reached by the authors appear to be appropriate.

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**Bibliographic details**

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