Epidemiological features and economic evaluation of a potential chickenpox vaccination strategy in Slovak Republic

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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.

Health technology
Vaccination for chickenpox was under evaluation.

Type of intervention
Vaccination.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised all children born in the SR in 1995.

Setting
The setting was primary care. The economic study was performed in the SR.

Dates to which data relate
The effectiveness data were gathered between 1995 and 1996. The resource data were collected from annual statistical records published in 1997. The costs were expressed in 1996 values.

Source of effectiveness data
Some of the effectiveness data were derived from EPIS data (Epidemiological Information System in the SR) and a published report in the SR. The authors also made assumptions in the derivation of effectiveness data.

Modelling
A simple model was used to estimate the clinical effects and health care costs of chickenpox vaccination over chickenpox treatment. The timeframe of the model was one year. Details of the model were not reported.

Outcomes assessed in the review
The outcome estimated was the chickenpox incidence in 1996.

Study designs and other criteria for inclusion in the review
Not stated.
Sources searched to identify primary studies
Not stated.

Criteria used to ensure the validity of primary studies
Not stated.

Methods used to judge relevance and validity, and for extracting data
Not stated.

Number of primary studies included
Two sources of data were used to assess chickenpox incidence. These were the EPIS data and official analyses of the epidemiological situation in the SR.

Methods of combining primary studies
Not stated.

Investigation of differences between primary studies
Not stated.

Results of the review
There were 22,690 cases of chickenpox in the SR in 1996.

Methods used to derive estimates of effectiveness
It is likely that the authors made one assumption to determine the efficacy of chickenpox vaccination.

Estimates of effectiveness and key assumptions
The efficacy of chickenpox vaccination was assumed to be 90%.

Measure of benefits used in the economic analysis
The summary benefit measure used was the number of chickenpox cases prevented by vaccination. This was estimated from the effectiveness data. Discounting was not relevant since the health benefits occurred during a 1-year period.

Direct costs
The unit costs were not presented separately from the quantities of resources used. The cost categories considered in the economic evaluation were grouped into vaccine and chickenpox treatment. The vaccine category included purchase, procedure, medical consumables and the treatment of adverse reactions. The chickenpox treatment category included general practitioner visit, medical check-ups, medications and hospitalisation. The cost/resource boundary of the study was not reported. It appears that the resource use data have been estimated from annual statistical records published in 1997. The source of the unit costs was not reported. The average purchasing price of the vaccine was calculated in French francs and converted to Slovak crowns using the 0.6 coefficient of Pasteur Merieux Connaught Co. for Central and East European countries. All the costs were presented in 1996 values. Discounting was not relevant, as all the costs were incurred during one year, and hence was not performed.

Statistical analysis of costs
No statistical analysis of the costs was performed.

**Indirect Costs**
The unit costs were not presented separately from the quantities of resources used. The cost categories considered in the economic evaluation were family member attendance allowance, sickness benefits, costs of lost productivity due to illness, time lost from work due to vaccination (2 hours on average for an attending mother) and losses of gross domestic product. The cost/resource boundary of the study was not reported. The sources of the resource use data and unit costs were not reported. All the costs were presented in 1996 values. Discounting was not relevant, as all the costs were incurred during one year, and hence was not performed.

**Currency**
Slovak crowns (Sk). The conversion rate between Slovak crowns and US dollars ($) was 1$ = 35-40 Sk.

**Sensitivity analysis**
No sensitivity analysis was performed.

**Estimated benefits used in the economic analysis**
The number of chickenpox cases prevented was 20,421.

**Cost results**
The annual direct costs were Sk53.34 million for the vaccination strategy and Sk10.45 million for the treatment strategy.

The annual indirect costs were Sk13.75 million for the vaccination strategy and Sk82.74 million for the treatment strategy.

The total annual costs for each strategy were not reported.

The total annual costs saved by the vaccination strategy were Sk26.10 million.

**Synthesis of costs and benefits**
The authors combined the costs and effectiveness and also the costs and benefits. Assuming that the effectiveness measure used in the cost-effectiveness analysis was as reported, the results reported by the authors appear to be wrong.

The cost-effectiveness ratio of vaccination over treatment was reported to be Sk4,107.50.

The authors also calculated the benefit-cost ratios, but the data reported did not explain what they were exactly or how they were calculated.

**Authors' conclusions**
According to their estimates, the authors concluded that the potential chickenpox vaccination programme was highly cost-effective.

**CRD COMMENTARY - Selection of comparators**
The reason for the choice of the comparator (no chickenpox vaccination) was clear. You should decide whether it represents a valid comparator in your own setting.
Validity of estimate of measure of effectiveness
The effectiveness data were derived from two sources of data and authors’ assumption. Since the authors provided no evidence to support their assumption of vaccine efficiency, the analysis appears quite hypothetical. The chickenpox vaccination programme was adapted to the SR context to reflect actual disease patterns. A systematic review of the literature was not performed to identify primary studies helpful to derive health outcomes. In addition, the validity of the sources selected was not reported. Estimates and assumptions were not varied in a sensitivity analysis. Thus, uncertainty remains as to the validity of the effectiveness measure.

Validity of estimate of measure of benefit
The estimation of health benefit was modelled, but the model was not explicitly presented. The benefit measure was derived from the effectiveness analysis. It represents an intermediate measure (i.e. number of cases prevented), which may be difficult to compare with the benefits of other health care interventions.

Validity of estimate of costs
The perspective of the study was not stated. Thus, it is not possible to assess whether all the relevant categories of costs were included in the analysis. Details of the unit costs, quantities of resources used, and price year were not reported, which limits the transferability of the economic analysis to other settings. The source of the cost data was not reported. A potentially good feature of the cost analysis was that the authors evaluated both the direct and indirect costs. However, the study lacked a comprehensive cost analysis relating to both cost-effectiveness and cost-benefit ratios. Those results appear to have been miscalculated. These facts limit the internal validity of the cost analysis. The costs were treated deterministically and a statistical analysis was not carried out. Sensitivity analyses were not performed. Hence, the robustness of the results was not examined.

Other issues
The authors did not compare their findings with those from similar studies. The authors stated that their findings reflected SR epidemiological patterns, thus caution is required when extrapolating the study results to other settings. The authors did not report any limitations of their study.

Implications of the study
The authors did not make any recommendations for policy or practice as a result of their study. You should be aware that the results of this study are subject to many weaknesses.

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None stated.

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MeSH
Chickenpox /epidemiology /prevention & control; Child; Cost-Benefit Analysis; Health Care Costs; Humans; Immunization Programs /economics; Incidence; Slovakia /epidemiology