The burden of Haemophilus influenzae type b disease in Australia and an economic appraisal of the vaccine PRP-OMP

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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 using PRP-OMP (Hib capsular polysaccharide linked to the outer membrane protein complex of Neisseria meningitidis) at two, four and 12 months.

Type of intervention
Primary prevention

Economic study type
Cost-effectiveness analysis and cost-utility analysis.

Study population
Hypothetical cohort of all Australian children at risk of Hib disease for the first five years of life.

Setting
The practice setting was primary care. The economic study was conducted in Australia.

Dates to which data relate
Effectiveness data for PRP-OMP were derived from 1992 studies and for PRP-D from 1988 studies. Price date was not given. Resource data were not dated.

Source of effectiveness data
Review of previous studies.

Modelling
A decision tree was used to estimate costs and benefits.

Outcomes assessed in the review
Vaccination effectiveness and vaccine compliance.

Study designs and other criteria for inclusion in the review
Not stated.

Sources searched to identify primary studies
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
Not stated.

Methods of combining primary studies
Not stated.

Investigation of differences between primary studies
Not stated.

Results of the review
In the base case, the vaccine PRP-OMP was assumed to be 95% effective after the second month if all three inoculations were given. It will be only 80% effective if only 2 inoculations were given and 60% if only one. The overall take-up rate was 91% in the base case. Using the single dose vaccine PRP-D, effectiveness ranged from 74% to 96%.

Measure of benefits used in the economic analysis
Life-years gained and QALYs, estimated using a decision tree. QALY estimates were based on a review of health status measures. Other details were not given.

Direct costs
Costs and quantities were not reported separately. Health service, patient and relatives costs were considered. Medical and non-medical costs were included in the analysis. The former included hospital costs, costs of follow-up and pharmaceuticals, costs of vaccine and the latter, transport cost, living expenses, expenses for child care for siblings, respite care, education etc. Estimates of costs were based on actual data, survey and personal communication.

Final costs were calculated using a decision tree. Differences between marginal and average costs were considered. Price date was not given. The discount rate applied was 5%.

Indirect Costs
Costs and quantities were not reported separately. Time cost of parents was considered. Final costs were derived using a decision tree. Costs were discounted at 5% No price date was given.

Currency
Australian dollars

Sensitivity analysis
Sensitivity of the model to some underlying assumptions regarding the range of disease incidence, the probability of sequelae, the effectiveness of the vaccine, the cost of the vaccine and the discount rate were tested.

**Estimated benefits used in the economic analysis**
A vaccination programme for a cohort of 251,136 children using PRP-OMP was expected to produce a saving of 341 discounted life years and a further 205 discounted QALYs. Duration was life-time. Side effects were considered.

**Cost results**
The net cost of the vaccination program for a cohort of 251,136 children using PRP-OMP discounted at 5% was $7,093,943 with only the medical costs and $1,073,090 with medical and non-medical costs. Duration was life-time.

**Synthesis of costs and benefits**
The incremental cost per life-year gained, using the vaccine PRP-OMP compared to no programme was, $20,811 with medical costs only and $3,148 with non-medical costs included. Considering the improvements of quality of life, the net cost per QALY extended was $12,993 with medical costs only and $1,965 with non-medical costs as well.

Comparing PRP-OMP with a single vaccination at 18 months (PRP-D), the incremental cost per additional QALY gained was $5,047, and the incremental cost per life year gained was $8,271. The results were sensitive to discount rate, probability of severe sequelae, cost of vaccine and the effectiveness of vaccine.

**Authors' conclusions**
The study showed that a vaccination program at two, four and 12 months was cost-effective and compared favourably with other medical interventions.

**CRD Commentary**
The cost analysis could be clearer. Moreover, no satisfactory explanation was provided for the calculation of QALYs.

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