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
Varicella vaccine in conjunction with the measles-mumps-rubella vaccine.

Type of intervention
Primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
Hypothetical cohort of 100,000 children aged 15 months.

Setting
Primary care. The economic study was carried out in the United States.

Dates to which data relate
Effectiveness data were mainly extracted from a 1991 study. Costs were derived from 1987 and 1991 data. All costs were adjusted to 1991 price levels.

Source of effectiveness data
Synthesis of previous published studies.

Modelling
A decision-analytic model was used to evaluate the costs and benefits.

Outcomes assessed in the review
Incidence of chickenpox in the long term and adverse reactions to the vaccine.

Study designs and other criteria for inclusion in the review
Review of previously completed studies and a single randomised controlled trial (RCT).

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
Not stated.

Methods of combining primary studies
Not stated.

Investigation of differences between primary studies
Not stated.

Results of the review
The clinical trial showed that in the first year follow-up, there were no reported cases of chickenpox in the vaccinated group, compared with 39 in the placebo group, i.e. 100% efficacy. In the second year protective efficacy was 96% overall and 92% among those exposed. In the clinical trial, 27% of vaccine recipients had adverse reactions within 48 hours and 4% had varicella-like rashes within 8 weeks of vaccination. Long term follow up studies have reported persistence of antibody in all vaccines tested after 6 years, and in 97% of those tested between 7 years and 10 years. In conclusion, it was assumed that vaccination would reduce the expected incidence of chickenpox at each future age, up to age 25 years, by 95%.

Measure of benefits used in the economic analysis
Incidence of chickenpox in the long term and adverse reaction to the vaccine.

Direct costs
Costs and quantities were reported separately. The costs of chickenpox estimated included expenses for out-patient visits, prescription drugs and hospitalizations. The cost of vaccination included the cost of the vaccine, plus the handling and administration charges of the physician, and also the cost of treating side effects.

All costs were adjusted to 1991 price levels by means of the Medical Care Component of the Consumers Price Index (Bureau of Labour Statistics).

The discount rate used was 5%. Costs were estimated from a societal perspective. Vaccine cost estimation was based on personal communication.

Resource data and medical care costs were derived from the medical expenditure survey for 1987, other annual surveys and publications. The data was incorporated into a decision analytic model estimating final costs.

Indirect Costs
Costs and quantities were reported separately. Costs were discounted at 5%. Indirect costs of work loss for the care of sick children and of employed persons who acquire the disease were included in the cost analysis. Costs were estimated from a societal perspective, using 1991 survey data, and were expressed in price levels of the same year. The data was incorporated into a decision analytic model estimating final costs.
Sensitivity analysis
One-way sensitivity analyses were conducted to test variability in data, such as efficacy of the vaccine, costs, discount rate etc.

Estimated benefits used in the economic analysis
From the clinical study results, vaccination would reduce the expected incidence of chickenpox at each future age, up to age 25 years, by 95%.

Cost results
The duration was approximately 24 years. Side effects of treatment were considered. Total vaccination costs were $5,415,000 against $12,062,000 with no vaccination programme. Therefore, a vaccination programme for 100,000 children saved $6,647,000 in total costs, which included the treatment costs of chickenpox and also work loss costs. The discount rate applied was 5%.

Synthesis of costs and benefits
Synthesis was not relevant since the incremental benefit of the vaccination programme were positive and the incremental costs were negative.

Authors' conclusions
The authors concluded that childhood vaccination against varicella would yield substantial economic benefits, and it should be part of the routine immunization schedule for US children.

CRD Commentary
1) The economic benefit of the vaccination programme is due to the inclusion of work loss cost in the analysis. It is therefore crucial that this calculation is accurate.

2) The vaccine price, which was not based on actual data, was not tested by sensitivity analysis.

3) The study suffered from not giving more details about the clinical evidence and the sources investigated.

4) Finally, the study understated the non-monetary consequences of having the infection in adulthood, due to waning immunity (it may be more tolerable to have the disease during the childhood).

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