An economic analysis of varicella vaccination for health care workers

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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
Varicella vaccination for health care workers.

Type of intervention
Screening and primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
Hospital with 1,540 health care workers and 255,000 patient bed daysar.

Setting
Hospital. The study was carried out in the UK.

Dates to which data relate
Effectiveness and resource use data were gathered via a questionnaire carried out in the 1994 calendar year. Other effectiveness data were retrieved from studies previously published between 1990 and 1993. The price year was 1995.

Source of effectiveness data
Effectiveness data were derived from a review of previously published studies and results of questionnaire.

Modelling
A decision tree model with a 10 year time duration was used to determine the cost-effectiveness of the screening and vaccination strategies.

Outcomes assessed in the review
The review assessed the following outcomes: the population at risk, the number and probability of incidents, the effectiveness of screening by history of varicella, vaccine seroconversion rate and duration.

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

Sources searched to identify primary studies
Criteria used to ensure the validity of primary studies
Not reported.

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

Number of primary studies included
Approximately two studies were included.

Methods of combining primary studies
Not reported.

Investigation of differences between primary studies
Not reported.

Results of the review
0.08% of the population was at risk. The number of staff and patient incidents per annum was 1.9 and 2, respectively. The proportion of health care workers who had an incident in the past was 66%. The probability of a positive antibody test after a negative screening result was 0.78. The probability of a negative test after a positive screening result was 0.007. The seroconversion rate was 0.9. The seroconversion programme lasted for 10 years.

Methods used to derive estimates of effectiveness
Questionnaires were sent to 160 general, teaching and specialist hospitals. Data provided by 39 hospitals were used in the model.

Estimates of effectiveness and key assumptions
46% of hospitals recorded no incidents of varicella in 1994, and 54% reported at least one incident. Across all respondents, the mean number of incidents was 3.9. The index case was a patient or visitor to the hospital in a mean of 2 incidents/year, and a member of staff or family of a member of staff in 1.9 incidents/year. Only 3% of hospitals performed antibody tests to screen new staff for antibodies to VZV. 61% of hospitals did no antibody testing, and 36% did antibody testing on some groups of staff.

Measure of benefits used in the economic analysis
The benefit measure was the mean number of incidents per hospital year.

Direct costs
Costs were discounted at an annual discount rate of 6%. Quantities and costs were reported separately. Direct costs included the costs of screening, testing and vaccination. The quantity/cost boundary adopted was that of the hospital. The estimation of quantities and costs was based on information from the questionnaire. The price year was 1995.

Statistical analysis of costs
Not reported.
Indirect Costs
Not included.

Currency
UK pounds sterling ( ).

Sensitivity analysis
Sensitivity analysis was carried out on the following parameters: the number of staff employed, the probability of staff index case incidents, the probability of patient index case incidents, the staff turnover rate, the discount rate, and the vaccine price.

Estimated benefits used in the economic analysis
The mean number of incidents per hospital year was 3.91 (option 1), 2.2 (option 2), 2.3 (option 3), 2.29 (option 4), and 2.2 (option 5).

Cost results
Net total costs per hospital were 37,300 for option 1, 120,973 for option 2, 51,805 for option 3, 36,587 for option 4, and 60,935 for option 5.

Synthesis of costs and benefits
The net cost per incident averted compared with the baseline was 48,932 for option 2, 9,007 for option 3, -440 for option 4, and 13,822 for option 5. Sensitivity analyses did not greatly alter the ranking of the options.

Authors' conclusions
Introducing a policy of vaccinating health care workers after an antibody test on staff who answer "no" or "not sure" to a question about previous varicella would result in a reduction in net costs to the NHS compared with the present policies for dealing with incidents of exposure in hospitals.

CRD COMMENTARY - Selection of comparators
The rationale for the choice of the strategies was clear.

Validity of estimate of measure of benefit
An intermediate outcome measure was used in the analysis, namely the number of incidents per hospital year. The implications of incidents for health in terms of morbidity and mortality were not examined.

Validity of estimate of costs
Only the direct costs falling to the hospital were considered. No indirect costs were included. With the exception of vaccine price, the robustness of the cost results was not tested by the sensitivity analysis.

Other issues
Incidents of varicella exposure of patients and visitors were not examined. The authors point to the fact that the study underestimates the annual incidence and cost of varicella exposures because zoster incidents were excluded. Effectiveness and resource use data were retrieved from published literature and a sample of hospitals. Therefore, the reader should verify whether the input data also apply to an individual hospital's position.

Implications of the study
Better information than currently exists is required on the health consequences of incidents of varicella exposure.
Source of funding
Research grant to the Health Economics Group from SmithKline Beecham Pharmaceuticals.

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Other publications of related interest


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