Controlling varicella in the healthcare setting: the cost effectiveness of using varicella vaccine in healthcare 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 of health care workers.

Type of intervention
Screening and primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
Hypothetical population of health care workers.

Setting
Tertiary-care hospital. The study was carried out at the University of Iowa Hospitals and Clinics, Iowa City, Iowa, USA.

Dates to which data relate
Effectiveness data were collected from studies previously published between 1984 and 1995, and from exposure records of the University of Iowa Hospital (July 1994 - December 1995). Cost data were collected from a study published in 1995 and University of Iowa Hospitals sources. The price year was 1996.

Source of effectiveness data
Effectiveness data were derived from a literature review.

Modelling
A Markov-based decision analysis was used to determine the cost implications of the varicella vaccination strategies.

Outcomes assessed in the review
The review assessed the following outcomes: mortality from varicella, annual probability of exposure to chicken pox, annual incidence of varicella infection in health care workers, probability of seropositivity if classified as potentially susceptible, vaccine efficacy, and hospitalisation rate.

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
Summary statistics from each study.

Number of primary studies included
Approximately 7 studies were included in the review.

Methods of combining primary studies
Not stated.

Investigation of differences between primary studies
Not stated.

Results of the review
The mortality from varicella was 0.000309. The annual probability of exposure to chicken pox was 0.005. The annual incidence of varicella infection in health care workers was 0.0016. The probability of seropositivity if classified as potentially susceptible was 0.1. The vaccine efficacy was 0.7. 1.6% of infected adults were hospitalised.

Measure of benefits used in the economic analysis
Excess costs (or savings), calculated by subtracting the cost of the no vaccination strategy from the cost of each vaccination strategy, were used as the measure of benefit.

Direct costs
Costs were discounted at an annual rate of 5%. Quantities and costs were reported separately. Direct costs included the cost of the vaccine and vaccine side effects, the cost of treating varicella, and the costs of serological testing. The quantity/cost boundary adopted was that of the health service. The estimation of quantities and costs was based on actual data. Hospitalisation costs were derived from a previously published study. The cost of time lost from work was based on University of Iowa Hospitals data. The price year was 1996.

Statistical analysis of costs
Not reported.

Indirect Costs
The cost of time lost from work due to employee exposure or disease was included.

Currency
US dollars ($).
Sensitivity analysis
A sensitivity analysis was conducted on the cost per vaccine dose and booster doses, furloughing vaccine recipients, and misclassification of immune workers.

Estimated benefits used in the economic analysis
Estimated benefits were not reported separately.

Cost results
Vaccinating all potentially susceptible workers would save approximately $41,000 over the lifetime of the potentially susceptible workers or approximately $59 per person. Serological testing before vaccination resulted in a net cost saving of $15,000 or $22 per recipient. If more than 3% of recipients were furloughed for 14 days as a result of vaccine-induced rash, vaccination would result in a net financial loss. If all vaccine recipients were furloughed after each dose, the costs would be prohibitive.

Synthesis of costs and benefits
Not undertaken.

Authors' conclusions
Vaccination of susceptible employees was found to result in net cost savings. Importantly, the result was dependent on infection control policy regarding work restrictions after vaccination.

CRD COMMENTARY - Selection of comparators
The rationale for the choice of the comparator was clear. You, as a user of this database, should verify whether these health technologies are relevant to your setting.

Validity of estimate of measure of benefit
The authors considered costs savings due to vaccination as the measure of benefit. Alternatively, the number of varicella incidents per year, or morbidity and mortality due to varicella exposure could have been used as outcome measures. More details of the conduct of the literature review could have been provided. The effectiveness results do not appear to have been presented selectively. The authors used a conservative estimate of vaccine efficacy, which is likely to be higher in practice. The authors did not consider the reduced incidence of zoster in vaccinated patients. Any assumptions made were tested in the sensitivity analysis.

Validity of estimate of costs
Direct costs and indirect costs (cost of time lost from work) were considered. Cost data were derived from only two sources and are unlikely to be generalisable to other settings. The authors did not include the costs of spreading disease from a health care worker to a patient, the cost of varicella-zoster immune serum that might be used for exposed, immunocompromised patients or health care workers, or the costs associated with inadvertent acquisition of the disease during pregnancy.

Other issues
Cost and effectiveness results could have been presented separately. The generalisability of these results to other settings or countries was not discussed. Comparisons with other relevant studies were made.

Implications of the study
The reader is referred to the authors' conclusions described above.
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None stated.

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