Varicella zoster antibodies in healthcare workers from two neonatal units in Sao Paulo, Brazil: assessment of a staff varicella policy

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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
Several policies for assessing the immunity of hospital staff to varicella zoster (VZ) were examined. The policies were:

- only history of varicella infection obtained (policy 1);
- history of varicella infection obtained and serology assessed if history negative or uncertain (policy 2);
- history of varicella infection obtained and vaccination undertaken if history negative or uncertain (policy 3);
- all staff tested for varicella serology, with vaccination of seronegative staff (policy 4); and
- history of varicella infection obtained and serology assessed if history negative or uncertain, with vaccination of seronegative staff (policy 5).

Type of intervention
Primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised hospital staff in neonatal units.

Setting
The setting was hospital neonatal units. The economic study was conducted in Brazil.

Dates to which data relate
The effectiveness data were gathered between September and November 2002. No dates pertaining to resource use or the costs were provided.

Source of effectiveness data
The effectiveness evidence was derived from a single study.

Link between effectiveness and cost data
The costing was conducted hypothetically on the same sample of individuals as that used in the effectiveness study.
Study sample
A sample of 215 health care workers identified at the study centres was included in the study. This represented 97% of all potentially eligible health care workers. The median age of the sample was 33 years (range: 20 - 64) and the majority of the participants were women (196 out of 215). The evidence came from a single group of participants and no control group was required.

Study design
This was a diagnostic study that was conducted at two hospitals in Sao Paulo. The outcomes were estimated from the sample of health care workers who were managed using policy 5, which was the only one actually implemented at the study centres. The outcomes associated with the remaining vaccination strategies were hypothetically assessed in the same group of individuals. No follow-up was conducted. A blood test based on an enzyme-linked immunosorbent assay (ELISA) was used.

Analysis of effectiveness
The outcome measure used was the accuracy of the screening policies. This was assessed using the adequate detection of susceptible individuals and vaccine administration in the sample of 215 health care workers considered in the analysis. The participants answered a questionnaire about past varicella illness, herpes zoster, varicella vaccination, and any present immunosuppressive condition. This information was used to assess the accuracy rate associated with each vaccination strategy.

Effectiveness results
Of the 215 staff surveyed, 150 (70%) had a history of varicella infection and all of them had VZ antibodies detected by an ELISA. Thus, the sensitivity of a varicella history was 100% (95% confidence interval, CI: 97.5 - 100).

The remaining 65 participants did not remember having had varicella, and in 60 (92%) of them there was serological evidence of varicella infection.

Five participants were considered not to be immune to varicella and were all vaccinated.

In the sample of 215 health care workers, the number of adequate detected susceptible individuals receiving vaccine was 150 with strategy 1, 210 with strategy 2, and 215 with strategies 3, 4 and 5.

Clinical conclusions
The effectiveness analysis showed that all susceptible individuals were adequately detected and vaccinated only by the testing and vaccination of individuals with negative or uncertain history of varicella infection. Therefore, the strategy of obtaining varicella history, testing those with a negative or uncertain history, and then vaccinating seronegative staff, was highly effective.

Measure of benefits used in the economic analysis
No summary benefit measure was used in the economic analysis. In effect, a cost-consequences analysis was conducted.

Direct costs
Discounting was not relevant since the costs were incurred during a short timeframe. The unit costs and the quantities of resources used were presented separately. The health services included in the economic evaluation were the serology test and vaccine. The cost of the questionnaire used to assess varicella history was assumed to have been zero. The cost/resource boundary of the hospital appears to have been adopted. The resource use data was estimated on the basis of the procedures assumed in each vaccination strategy, and was calculated for the sample of 215 health care workers considered in the effectiveness analysis. The source of the costs was not reported. The price year was not reported.
Statistical analysis of costs
The costs were treated deterministically.

Indirect Costs
The indirect costs were not considered.

Currency
US dollars ($).

Sensitivity analysis
No sensitivity analyses were conducted.

Estimated benefits used in the economic analysis
See the 'Effectiveness Results' section.

Cost results
The total costs in the whole sample of 215 health care workers were $0 with strategy 1, $21.45 with strategy 2, $2,167.10 with strategy 3, $237.65 with strategy 4, and $188.15 with strategy 5. Therefore, the choice of strategy 5 was optimal, as it was the cheapest of the three strategies with a 100% detection rate.

Synthesis of costs and benefits
A synthesis of the costs and benefits was not relevant since a cost-consequences analysis was carried out.

Authors' conclusions
A simple, staff varicella policy implemented in neonatal units in Brazil and based on varicella history, with the testing and subsequent treatment of individuals with a negative or uncertain history, was found to be a cost-effective strategy. This was because it had a 100% accuracy and led to cost-savings in comparison with other vaccination options with 100% accuracy.

CRD COMMENTARY - Selection of comparators
The selection of the comparators appears to have been appropriate since the analysis covered all possible vaccination strategies for health care workers. A detailed description of each strategy was provided. You should decide whether they are valid comparators in your own setting.

Validity of estimate of measure of effectiveness
The effectiveness evidence came from a single group of individuals who actually received only one vaccination strategy. The outcome measures for the remaining strategies were attributed after the primary results had been obtained. The use of a comparative study where groups of participants are compared directly with each other would have been more appropriate. The individuals were enrolled in the study at two centres. The study sample appears to have been representative of the study population.

Validity of estimate of measure of benefit
No summary benefit measure was used in the analysis because a cost-consequences analysis was conducted.
Validity of estimate of costs
The perspective of the study was not explicitly stated, but it appears to have been that of the hospital where the intervention was delivered. The cost calculation was fairly transparent since information on resource use and the quantities of resources used with each strategy were reported separately. This enables replication of the study. Resource use depended on each vaccination option. The participants were evaluated in 2002 but the price year was not explicitly reported, which makes reflation exercises in other settings difficult. The administration of the questionnaire was assumed to cost nothing. The inclusion of costs associated with varicella would have been relevant to the hospital perspective. The authors noted that the costs of varicella treatment were substantial in one of the two centres involved in the study.

Other issues
The authors made some comparisons of their findings with those from other studies, which supported the implementation of a vaccination programme in paediatric health care facilities. However, the issue of the generalisability of the study results to other settings was not addressed and sensitivity analyses were not conducted. In fact, the overall analysis focused on Brazil-specific data. This affected the external validity of the analysis. The study referred to health care workers in paediatric facilities and this was reflected in the authors' conclusions.

Implications of the study
The authors stated that a simple and cost-effective staff varicella policy could be implemented in neonatal units in Brazil, as shown in studies carried out in more developed countries.

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Other publications of related interest


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