Evaluation of the cost-effectiveness in the United States of a vaccine to prevent herpes zoster and postherpetic neuralgia in older adults

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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.

CRD summary
The objective was to gain an insight into the potential benefits and costs, for society and health care payers, of a vaccine to prevent herpes zoster and post-herpetic neuralgia in adults aged 60 years or over. The authors concluded that a herpes zoster virus vaccine was likely to be cost-effective for a cohort of immunocompetent vaccine recipients. Overall, the quality of the study methodology was good and the results adequately reported, so the authors’ conclusions appear appropriate.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
The objective was to gain an insight into the potential benefits and costs, for society and health care payers, of a vaccine to prevent herpes zoster and post-herpetic neuralgia in adults aged 60 years or over.

Interventions
Herpes zoster virus vaccination was compared with no-vaccination.

Location/setting
USA/Primary care.

Methods
Analytical approach:
An age-specific decision analytic model was used to estimate the lifetime costs and outcomes. The model was adapted and expanded from a developed decision analytic model (Edmunds et al 2001, see 'Other Publications of Related Interest' below for bibliographic details). The authors reported that the perspectives adopted in the analysis were those of the health care payer and society.

Effectiveness data:
The effectiveness data were derived from a number of different sources including randomised controlled trials, mainly the Shingles Prevention Study (Oxman et al 2005, see 'Other Publications of Related Interest' below for bibliographic details), the Medstat Marketscan database and medical record data from herpes zoster cases in Olmsted County, Minnesota. The authors did not report the methods used to identify the published literature. The main measures of effectiveness were the proportion of individuals protected following immunisation, and the rate at which protection declined. These estimates were derived from the Shingles Prevention Study.

Monetary benefit and utility valuations:
Quality of life estimates were derived from the Shingles Prevention Study, which used the Zoster Brief Pain Inventory to measure post-herpetic neuralgia pain, with scores that ranged from 0 to 10 for pain ratings.

Measure of benefit:
The measures of benefit were quality-adjusted life-years (QALYs) gained, herpes zoster cases avoided and post-herpetic neuralgia cases avoided.
Cost data:
The direct costs were those relating to inpatient admission, outpatient visits, emergency visits, diagnostic procedures and pharmacy prescriptions. Resource use and cost data were derived from the Medstat Marketscan and Olmsted County databases, which were also used to derive measures of effectiveness. Productivity losses due to herpes zoster were derived from a questionnaire based study involving 153 patients and valued using average wage rates. As costs could be incurred over the lifetime of the patient, future costs were discounted at an annual rate of 3%. All costs were reported in 2006 US dollars ($).

Analysis of uncertainty:
Probabilistic sensitivity analyses were performed in which input parameters were simultaneously varied according to their probability distribution. For each scenario, the model was run 10,000 times. Univariate sensitivity analyses were also performed.

Results
For the population of vaccine recipients aged 60 years or over: the number of herpes zoster cases avoided for a cohort of 1,000,000 was 88,928; the number of post-herpetic neuralgia cases avoided was 24,529; and the discounted quality-adjusted life-years (QALYs) gained were 4,094. The incremental discounted costs for the cohort were $103,868,800.

For the population of immunocompetent vaccine recipients aged 60 years or over: the number of herpes zoster cases avoided for a cohort of 1,000,000 was 75,548; the number of post-herpetic neuralgia cases avoided was 20,901; and the discounted QALYs gained were 3,478. The incremental discounted costs for the cohort were $82,760,070.

Costs and benefits were combined using an incremental cost-utility ratio (i.e. the additional cost per QALY gained). For the vaccine recipients, from a societal perspective, the additional cost per QALY gained was $16,229, and from a health care payer perspective the additional cost per QALY gained was $18,439. For immunocompetent patients, the additional cost per QALY gained was $25,379 if a societal perspective were adopted and $27,609 if a health care payer perspective were adopted.

The results of the probabilistic sensitivity analyses showed that the probability of the herpes zoster vaccination being cost-effective at a threshold below $50,000 per QALY gained was between 90% and 94%.

Authors' conclusions
The authors concluded that a herpes zoster virus vaccine was likely to be cost-effective for a cohort of immunocompetent vaccine recipients aged 60 years.

CRD commentary
Interventions:
The intervention (herpes zoster virus vaccination) was clearly described and was compared to no vaccination, which would appear to be current practice in the authors' settings.

Effectiveness/benefits:
The effectiveness and clinical data were derived from randomised controlled trials and two cohort studies. The authors did not report the methods used to identify studies, so it was unclear if all relevant evidence was included in the model. However, the main clinical effectiveness estimates were derived from a randomised controlled trial, a design which is considered to be the highest level of evidence and the gold-standard when comparing health care interventions. However, quality of life was derived from a measure used to rate pain, rather than quality of life. Although pain is an important component of quality of life, other important health attributes, such as anxiety and ability, would not have been not be captured with the instrument used.

Costs:
The perspectives adopted in the economic analysis, the health care payer and society, were well reported. Given these perspectives, it would appear that all relevant cost categories and costs were included. The sources from which resource use and cost data were derived were reported. The authors also adequately reported the time horizon, currency used, price year and discount rate used.
Analysis and results:
The authors adapted and expanded a published model to the US setting. The model structure was well reported and a diagram was provided. Uncertainty in the model was exhaustively assessed using a series of one-way and probabilistic sensitivity analyses. In the UK, the use of probabilistic sensitivity analysis is considered to be the gold standard, as it captures overall model uncertainty. The methods and results were well reported. In their discussion, the authors compared their results with those from other studies and highlighted the limitations of their analysis.

Concluding remarks:
Overall, the quality of the study methodology was good. The methods and results were adequately reported and, given the scope of the analysis, the authors’ conclusions appear to be appropriate.

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Other publications of related interest


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