Economic evaluation of a vaccine for the prevention of herpes zoster and post-herpetic neuralgia in older adults in Switzerland

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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 assess the cost-effectiveness of a vaccination programme for the prevention of herpes zoster (shingles) and post-herpetic neuralgia, in those aged 70 to 79 years, in Switzerland. The authors concluded that the herpes zoster vaccination programme could be cost-effective. Insufficient information was reported on the quality of and uncertainty in the data inputs, which makes it difficult to be confident in the authors' conclusions.

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

Study objective
The objective was to assess the cost-effectiveness of a vaccination programme for the prevention of herpes zoster (shingles) and post-herpetic neuralgia, in those aged 70 to 79 years, in Switzerland.

Interventions
Vaccination against herpes zoster and its main complication, post-herpetic neuralgia (PHN), was compared with no vaccination.

Location/setting
Switzerland/primary care.

Methods
Analytical approach:
The authors adapted a UK Markov model to assess the costs and outcomes of the two interventions. The time horizon was the lifetime of the patient. The authors reported that they took two perspectives: a third-party payer and a societal perspective.

Effectiveness data:
The clinical and effectiveness estimates were from a range of sources, including the Swiss Sentinel Surveillance Network, national statistics, randomised controlled trials, and published literature. The main effectiveness estimate was the lifetime protection against herpes zoster and PHN offered by vaccination. This estimate was from a large randomised, double-blind, placebo-controlled trial (Oxman, et al. 2005, see 'Other Publications of Related Interest' below for bibliographic details).

Monetary benefit and utility valuations:
The utility decrements for different pain levels were from published studies of the US population.

Measure of benefit:
The main measure of benefit was quality-adjusted life-years (QALYs). The cases of herpes zoster averted and cases of PHN averted at three months were also reported. Future QALYs were discounted at an annual rate of 1.5%.

Cost data:
From a third-party payer perspective, the costs included those of vaccination (including administration), out-patient visits, diagnostic tests, medications, non-pharmacological treatments, and hospitalisations. The societal perspective also
included health care co-payments made by the patient, and productivity lost. The resource use was from a study evaluating the burden of illness in Switzerland. Most of the health care resource use and the working days lost were from two expert clinicians. The health care resources were valued using Swiss tariffs. Working days lost were valued using the human capital approach and mean Swiss wages. All costs were reported in Swiss francs (CHF) and future costs were discounted at an annual rate of 3.5%.

Analysis of uncertainty:
One-way sensitivity analyses were performed by varying the following parameters within feasible ranges: the discount rates, the herpes zoster incidence, the PHN proportion, the vaccine coverage, waning immunity, the duration of vaccine efficacy, the vaccine price, the health care costs, and the utility decrements.

Results
Vaccinating 20% of the Swiss population aged 70 to 79 years would result in 3,412 fewer cases of herpes zoster, 1,460 fewer PHN cases at three months, and 885 additional QALYs, over their lifetime. The additional costs of vaccination would be CHF 22.6 million from a third-party payer perspective or CHF 25.3 million from a societal perspective.

Compared with no vaccination, the incremental cost-effectiveness ratio with vaccination was CHF 6,625 per herpes zoster case avoided or CHF 15,487 per PHN case avoided, from a third-party payer perspective, and CHF 7,405 per herpes zoster case avoided or CHF 17,310 per PHN case avoided from a societal perspective.

The incremental cost-utility ratio with vaccination was CHF 25,538 per QALY gained, from a third-party payer perspective or CHF 28,544 per QALY gained from a societal perspective.

These results were most sensitive to changes in the discount rate, the herpes zoster incidence, and the vaccine price.

Authors’ conclusions
The authors concluded that the herpes zoster vaccination programme could be cost-effective in Switzerland.

CRD commentary
Interventions:
The interventions were reported clearly and in detail.

Effectiveness/benefits:
The clinical and effectiveness data were mainly from published studies. The sources for the main clinical and effectiveness parameters and the baseline estimates were reported, but the authors did not report how these sources were identified. This makes it unclear if all the relevant evidence was included. Very little information was provided on the main trial that supplied the vaccination efficacy and the analysis of effectiveness. The utility decrements were from the US population rather than the Swiss population, but the authors pointed out that these estimates could reasonably be transferred between countries.

Costs:
The two perspectives were clearly reported. From a third-party payer and a societal perspective all the relevant cost categories and costs appear to have been analysed. The authors reported that 20% of herpes zoster patients missed 20 to 21 days of work, depending on pain severity, but it was unclear if this 20% was of all herpes zoster patients, or of those aged 70 to 79 years. The assumption that the working days lost would be the same for those aged 70 to 79 years as for the overall herpes zoster population, would be an overestimate due to the likelihood of patients being retired. The authors reported the sources for the costs and resource use. Most of the resource use was from two experts, which was not as accurate as a survey of actual resource use. It was not clear if any measure of uncertainty was obtained for the experts’ estimates. The time horizon and discount rate were reported, but the price year was not, which will hamper future inflationary exercises.

Analysis and results:
A Markov model was used to synthesise the cost and outcome information. The model structure and details were clearly reported, and a diagram was given. The uncertainty in the model was assessed in exhaustive one-way sensitivity analyses. This went some way towards evaluating the uncertainty, but a probabilistic sensitivity analysis could have
captured the overall model uncertainty. It was not clear how the authors determined their feasible ranges for the parameters. As the main limitation to their study, the authors reported that Swiss data were not always available, and data from other countries had to be used.

**Concluding remarks:**
Insufficient information was reported on the quality of and uncertainty in the data inputs, which makes it difficult to be confident in the authors' conclusions.

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