



**Title** Cost-utility of Vaccination Against Chickenpox in Children and Against Herpes Zoster in Elderly in Belgium

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## Aim

*Vaccination against chickenpox (Varicella):* To assess the effectiveness and cost effectiveness of different childhood vaccination strategies against chickenpox versus no vaccination. The strategies include vaccination against chickenpox with and without herpes zoster booster vaccination.

*Vaccination against herpes zoster (shingles):* To assess the cost effectiveness of universal vaccination against herpes zoster versus no vaccination in different age cohorts (60 to 85 years of age).

## Conclusions and results

*Vaccination against chickenpox:* If the exogenous boosting hypothesis is confirmed, vaccinating children in Belgium against chickenpox would not be cost effective for many decades after vaccination, due to the expected increase in the annual cases of herpes zoster (HZ) following the introduction of such a vaccination program. If the exogenous boosting hypothesis is proven wrong, large-scale 2-dose vaccination in Belgium against chickenpox is probably cost effective at current vaccine price levels.

*Vaccination against herpes zoster:* Substantial uncertainty exists about which data source and/or model to use to estimate several key variables. This uncertainty increases with increasing age of the cohort considered for vaccination, and has a major impact on whether HZ vaccination can be considered cost effective in Belgium, and at which ages.

## Recommendations

*Vaccination against chickenpox:* A universal chickenpox vaccination program cannot be recommended due to a reasonable risk that such an intervention may cause more harm than benefit.

*Vaccination against herpes zoster:* Vaccination of adults and elderly against shingles cannot be recommended based on the cost-effectiveness analyses at current vaccine prices.

## Methods

*Vaccination against chickenpox:* An extensively studied and improved dynamic model was used, allowing detailed exploration of age-specific VZV disease transmission dynamics. Most of the input parameters are based on Belgian data. We used age-specific social contact data to derive transmission patterns that provided the best fit to Belgian seroprevalence data.

*Vaccination against herpes zoster:* A deterministic compartmental static model was developed, which tracks individuals to develop HZ according to their age. Most of the input parameters are based on Belgian data. This is the first study that estimated HZ-related costs and QALY loss as a function of a severity of illness score (SOIS). To obtain age- and SOIS-specific estimates, flexible statistical models are fitted to the data. (See full report for further details.)

## Further research/reviews required

Industry and medical agencies should be made aware of the importance of making public all study results that are crucial for improving the accuracy of cost-effectiveness analyses. Research agenda: a large prospective study measuring age-specific herpes zoster-related severity of illness and QALY loss in the general community is urgently needed.