Cost-effectiveness analysis of a vaccine to prevent herpes zoster and post-herpetic neuralgia in Italy. 

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Background. Herpes zoster (HZ), or shingles, is a painful disease that results from reactivation of the varicella zoster virus (VZV) which has remained latent in sensory ganglia following primary infection i.e. varicella (VZV), a virus commonly acquired in childhood (chickenpox) [1]. The most common complication is post-herpetic neuralgia (PHN), a severe pain that can persist for months [2]. HZ and PHN have a significant impact on patients’ quality of life and well-being. Beside the negative impact on patient’s quality of life, HZ and PHN also generate a notable economic burden to the National Healthcare Service. A way to prevent the disease onset is Zostavax®, that significantly reduces the incidence of HZ by 51% and the incidence of PHN by 67% in adults 60 years of age or older [3].

Objective. Aim of the study is to perform a cost-effectiveness analysis of Zostavax® vaccine for the prevention of HZ.

Methods. The natural history of HZ and PHN was mapped through a Markov model (Figure 1) with a lifetime horizon and one-month cycles. The model compared two arms: vaccination versus no vaccination strategy. The model, already presented in previous published studies referring to France [4], the UK [5], Belgium [6] and Switzerland [7] has been adapted to the Italian setting. The Third Payor Perspective (TPP), referring to the Italian National Health Service (INHS) and the societal perspective were adopted. Costs and effectiveness data were derived from literature and discounted by 3.5%. Model results were expressed in terms of incremental cost-effectiveness ratio (ICER). Both deterministic and probabilistic sensitivity analyses were performed to appraise the effect of parameters’ variation on the incremental cost-effectiveness ratio.

Table. 1 Base-case results

<table>
<thead>
<tr>
<th>Vaccination Strategy</th>
<th>Base Case</th>
<th>Incremental costs</th>
<th>ICER Societal perspective</th>
<th>ICER PPP perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zostavax®</td>
<td>€13,094,533</td>
<td>€2,283,231</td>
<td>€11,811,302</td>
<td>€11,943 per QALY</td>
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</tbody>
</table>

The ICER of the vaccination was €11,943 per QALY under the NHS perspective and €11,248 per QALY under the societal perspective (Table 1). The deterministic sensitivity analysis showed that some critical parameters potentially affect the model results such as epidemiologic data, vaccine-induced protection duration, vaccine efficacy and vaccine price.

Conclusion. The analysis concluded that Zostavax® vaccine can be considered as a promising and cost-effective strategy for the prevention of herpes zoster and post-herpetic neuralgia in individuals aged between 60 and 79, as an alternative to the current management of the disease, which does not involve any prevention initiative but only the treatment of symptomatic patients.

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Key references

Fig.1 Markov model structure.

Results. The sample was made up of 12,418,626 patients with HZ aged between 60 and 79.

Fig.2 Cost-effectiveness acceptability curve.