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Epidemiology and costs of herpes zoster and its complications in Italy and cost-effectiveness analysis of herpes zoster vaccination programmes: results from a multicentre study

Cristiano Alicino*[1], Sara Boccalini[2], Domenico Martinelli[3], Angela Bechini[2], Cecilia Trucchi[4], Francesca Fortunato[3], Barbara Pellizzari[5], Andrea Orsi[1], Rosa Prato[3], Paolo Bonanni[2], Stefania Iannazzo[6], Giancarlo Icardi[1]

[1]*University of Genoa; Department of Health Sciences*

[2]*University of Florence*

[3]*University of Foggia; Department of Medical and Surgical Sciences*

[4]*University of Genoa*

[5]*Veneto Region; Regional Center for Disease Prevention and Control*

[6]*Ministero Della Salute*

Background: Herpes Zoster (HZ) and post-herpetic neuralgia (PHN) represent important public health issues because of their relevant burden within older adult population. In the last years a live attenuated vaccine against HZ became available in Italy. Updated data on epidemiologic and economic burden of the disease together with the assessment of the cost-effectiveness of HZ vaccination program represent fundamental information to support the decision whether vaccination should be implemented.

Material/methods: Incidence of HZ and PHN was estimated by seeking for cases of HZ and PHN, occurred in the period 2013-2015, in the clinical charts of 56 General Practitioners (GPs). Hospitalization rates for HZ and PHN was estimated through a retrospective analysis of the hospital discharge records between 2001 and 2012, using the ICD-9-CM 053 code. Costs were estimated using clinical and therapeutic data from GPs electronic clinical chart. A cohort model with lifetime

horizon was developed in order to value the cost-effectiveness of HZ vaccination program for the elderly in Italy. Particularly, different immunization scenarios were modeled (single, double or triple cohort strategy). The study was funded by the Italian Ministry of Health, Center for Disease Prevention and Control (CCM) in 2013.

Results: Overall, 598 cases of HZ were identified over 93,146 person-years of observation, corresponding to an overall incidence of 6.42 (IC95%: 5.93 – 6.95) HZ cases per 1,000 person-years. In total, 22.7%, 12.7%, and 2.4% of HZ cases suffered PHN at 1 and 3 months and 1 year from the onset of acute episode. Incidence of HZ and proportion of PHN significantly increased with age.
In the period 2001-2012, 88561 hospital admissions were registered. Hospitalization rates for HZ and PHN decreased from 9.6 to 3.9 hospitalization per 100,000 inhabitants and 0.7 to 0.4 hospitalization per 100,000 inhabitants, respectively.
The mean direct medical cost per HZ episode in Italy was calculated as €170,4, which comprised outpatient costs of €125,4 per episode and hospitalization costs of €45 per HZ episode.
Cost-effectiveness analysis (Table 1) demonstrated that the cost-effectiveness ratio of the vaccination ranged from €3.396 (single cohort strategy) to €4.747 (triple cohort strategy) per quality-adjusted life-year (QALY) under the National Health System Perspective.

Table 1. Clinical and economic evaluation of Herpes Zoster vaccination program in the Italian elderly with a lifetime horizon under the National Health System Perspective

HZ vaccination	**1 cohort**	**2 cohorts**	**3 cohorts**
Vaccinated cohort (years)	**60 years**	**60 and 65 years**	**60, 65 e 70 years**
Number of subjects in the vaccinated cohorts	**758,249**	**1,493,197**	**2,078,309**
N° of vaccinated cohorts	**1**	**2**	**3**
Avoided Cases			
HZ	9,608	18,764	22,643
PHN	1,021	2,445	3,996
Ophthalmic HZ	117	672	915
Hospitalization due to HZ	136	136	213
Hospitalization due to PHN	11	29	51
Hospitalization due to HZ with ophthalmic complications	22	53	66
Deaths	0	1	2
Clinical savings due to avoided cases	1,268,285	2,823,865	3,893,439
Vaccination costs	37,854,065	74,544,874	103,755,420
Total net costs	**36,585,780**	**71,721,009**	**99,861,982**
QALY	10,774	18,297	21,038
Costs / QALY	**3,396**	**3,920**	**4,747**

HZ: Herpes Zoster
PHN: Post-Herpetic Neuralgia
QALY: Quality-Adjusted Life-Year

Conclusions: Even though hospitalization rates decreased both for HZ and PHN, their epidemiologic and economic burden remains high. The vaccination against HZ in subjects >59 years of age in Italy may have a high clinical impact, in terms of avoided cases and reductions in hospitalizations related to the disease