Presentation: BAYESIAN MODELLING ASSESSING THE EFFECTIVENESS OF A VACCINATION STRATEGY TO PREVENT HPV-RELATED DISEASES: THE BEST STUDY

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Session: Bayesian Method
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Abstract: (463 words)

Background: Human Papillomavirus (HPV) is the primum movens both in the etiopathogenesis of invasive cervical cancer and in other neoplastic, malignant and benign lesions. The cost-effectiveness of different HPV vaccination programmes was already confirmed and throughout a large body of modelling studies. However, it is not clear that new vaccines are generally more costly, the cost-effectiveness of vaccination strategies should be properly evaluated to avoid concerns about value for money of chosen immunization programmes. HPV vaccination has the potential goals: to prevent infection, to prevent disease, and to prevent transmission. Unfortunately, at present not all the sequential phases of this complex process are perfectly known. Consequently, an excess of uncertainty associated with the main parameters of commonly utilized models can be observed. The aim of this study was to assess the cost-effectiveness of quadrivalent-based mult-cohort HPV vaccination strategy using a statistic Bayesian approach.

Methods: A full Bayesian Markov model was used, where unknown quantities were associated with suitable probability distributions reflecting the state of science currently available. These distributions were updated by the observation of any Italian available data, and uncertainty propagated through the entire model with a Markov Chain Monte Carlo procedure. The model was calibrated using age-specific incidence of invasive cervical cancer data derived from Italian female population. As base case was considered a vaccination of 2 cohorts of girls aged 12 and 15 years. Results: Base case and other mult-cohort vaccination strategies under evaluation (3 and 4 cohort strategy, variability of HPV-related events occurred progressively early (range of reduction with 4 cohorts versus 72% of base case). The analysis of the expected value of information showed that the uncertainty was always kept low level among different multi-cohort strategies. The cost associate with the achievement of the expected value of information (which is able to limit uncertainty) ranged between 9 and 13 per patient.

Conclusions: This study highlights the features of a methodological research approach that could take to reduce the uncertainty associated with HP vaccination. The quadrivalent-based multi-cohort HPV vaccination programme can provide excellent value for money spent and the Bayesian expects value of information analysis provides the most appropriate and feasible representation of this program true value.

Key Terms: Bayesian modelling, cost-effectiveness, HPV vaccination, mult-cohort strategy, variability, parameters

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