A cost-effectiveness analysis of human papillomavirus vaccine for people aged 30 to 45 years in the United States.

Kommoju Geethanjali*

Department of Pharmacology, Andhra University, West Godavari, Andhra Pradesh, India.

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Short communication

In the United States, a nonavalent Human Papilloma Virus (HPV) vaccination has been approved for use in women and men up to the age of 45. In order to inform national guidelines, the cost-effectiveness of HPV vaccination for women and men aged 30 to 45 years in the context of cervical cancer screening was assessed.

Findings and methods

We used two independent HPV microsimulation models to assess the cost-effectiveness of expanding the upper age limit for HPV vaccination in women (starting at age 26) and men (starting at age 21) to 30, 35, 40, or 45 years. The models were empirically calibrated to reflect the burden of HPV and related diseases in the US population, and they employed standardized inputs such as vaccination uptake in the past and future, vaccine efficacy, cervical cancer screening, and costs. Cervical, anal, oropharyngeal, vulvar, vaginal, and penile malignancies, as well as genital warts, were among the disease outcomes. As the maximum age limit for HPV vaccination grew, both models predicted higher expenditures and better health benefits.

Female and male vaccination strategies up to the ages of 30, 35, and 40 were shown to be less cost-effective than vaccination strategies up to the age of 45, which had an ICER larger than a frequently recognised upper threshold of $200,000 per Quality-Adjusted Life Year (QALY) gained. When all HPV-related outcomes were taken into account, the ICER for vaccination people up to 45 years old ranged from $315,700 to $440,600 per QALY gained. The cost-effectiveness of vaccination regimens was heavily influenced by assumptions about cervical screening compliance, vaccine costs, and the natural history of noncervical HPV-related malignancies.

Using two well-validated and thorough modelling platforms, this comparative analysis assessed the cost-effectiveness of raising the upper age limit for HPV vaccination. In the United States (U.S), we discovered that immunisation at older ages (30, 34, 40, 45 years) was ineffective or related with bad ICERs. According to the sensitivity analysis, assumptions about cervical screening compliance, vaccine costs, and the natural history of non-cervical HPV-related malignancies could have a significant impact on the vaccine strategies' estimated cost-effectiveness. Even with the most extreme assumptions, both models almost universally found that HPV vaccination was more cost-effective than $200,000 per QALY for adults aged 30 to 45 years. The only exception was in the case of imperfect screening compliance, where one model suggested that vaccination people up to the age of 40 and potentially 45 may be cost-effective if an upper-bound willingness-to-pay threshold of $200,000 per QALY was used.

Those who are not already infected but are exposed to new diseases as they age, despite the fact that the likelihood of new infections diminishes with age. Furthermore, because of the long median dwell time between infection and cancer development, the advantages of vaccination are compounded over several decades and consequently reduced in cost-effectiveness analyses.

The fact that we used two independent, well-validated models that have been used in a variety of evaluations in diverse situations is strength of this study. The ambiguity in the illness mechanism or data is reflected in where we differ in inputs, assumptions, or structure. This comparison was also carried out in response to the CDC's call for multiple independent modelling groups to participate in the ACIP debates. Despite differences across all models, we discovered that the conclusions of non-industry-funded models were qualitatively consistent.

***Correspondence to:**
Kommoju Geethanjali
Department of Pharmacology
Andhra University
West Godavari
Andhra Pradesh
India
Tel: + (970) 159-1905
E-mail: kgeethanju@gmail.com