

## Research Letter

# Cost utility analysis of human papilloma virus vaccination for females in three different age groups: A medical economics analysis

Viroj Wiwanitkit\*

Wiwanitkit House, Bangkhuae, Bangkok, Thailand

Accepted 21 December 2009

Human papilloma virus (HPV) infection is accepted as an important viral infection in female. HPV infection is confirmed for correlation with the oncogenesis [1]. The infection has become the focus of interest in obstetricians around the world. A long history of effect encountered with this viral infection can be seen. Recently, the medical scientists attained success in general HPV vaccine. HPV vaccine becomes the hope for getting rid of cervical cancer, the most important complication of chronic HPV infection [2–5]. Focusing on the HPV vaccination, because the HPV can be generated by many serotypes, including HPV 6, 11, 16, and 18, therefore, the vaccine for coverage on all serotypes is the standard vaccine at present [6–8]. The HPV vaccination is proved useful in female. Although natural immunity can be generated from natural infection, the level of immunity is very low, not lifelong, and cannot protect from reinfection. Therefore, the vaccination seems to be the best primary prevention. In the present situation of economical crisis, the usage of HPV vaccine should be focused on its utility. In this work, the author hereby performs a cost utility analysis of HPV

vaccination for females in three different age groups based on standard medical economics analysis.

This work is a medical economics study. The cost utility analysis is performed. The cost of HPV vaccination is set as the cost of the vaccine in its full course. The utility is set based on previous standard reports on HPV vaccination trials. The utility in this work is assigned to two main properties, which are general studies in any HPV trials [9], namely, vaccine efficacy and immunogenicity of the vaccine. The cost utility in this work is set as the ratio between cost and utility for each studied age group.

In this work, the cost utility of the HPV vaccination for females in three age groups (1) younger than 24 years old; (2) 24–34 years old; and (3) 34–45 years old is performed. The details on cost and utility for each age group is presented in Table 1. It seems that the cost utility of the age group “younger than 24 years old” is the lowest and that of the age group “34–45 years old” is the highest.

Infection with HPV is confirmed as a precancerous stage. The female genital tract cancer has strong relationship to chronic HPV infection [1]. According to the concept of

Table 1  
Cost utility analysis of the HPV vaccination for females in three age groups

Age groups (yr)	Cost (US\$) <sup>a</sup>	Utility <sup>b</sup>		Cost utility (US\$) <sup>c</sup>
		Efficacy (%)	Immunogenicity (%)	
<24	230	96	100	239.6
24–34	230	92	86.75	288.2
34–45	230	89	76	340.0

<sup>a</sup> The cost of HPV vaccination is set as the cost of the vaccine in its full course. The reference price from hospital in Bangkok Thailand is used.

<sup>b</sup> The utility is the finalized result from multiplication of efficacy and immunogenicity in each age group. The data is derived from standard reports on HPV vaccination trials. Focusing on immunogenicity, the finalized average value from reported immunogenicity for each serotype 6, 11, 16, and 18 is used in calculation and the reported value within age group “<24 years old” is set as referenced value and set at 100%.

<sup>c</sup> The cost utility can be calculated by “cost utility = cost/utility.”  
HPV = human papilloma virus.

\* Corresponding author. Wiwanitkit House, Bangkhuae, Bangkok 10160, Thailand.

E-mail address: [wviroj@yahoo.com](mailto:wviroj@yahoo.com).

preventive medicine, primary prevention by giving HPV vaccine is raised [2–5]. The quadrivalent HPV is accepted as the vaccine that has best coverage on the problematic serotypes of HPV [6–8]. Based on the pharmacoeconomics principle, the evaluation on the medical economics aspect of the new vaccine is required [10,11]. The cost effectiveness of the vaccination is confirmed over the nonvaccination [10,11]. However, because the vaccine is expensive for developing countries, application for all might be problematic and it needs for priority ranking. The usage of HPV vaccination in three different age groups is hereby studied. It is detected that the cost per utility of vaccination increases by age. This means that the prevention by vaccination is more economically preferable in young female. This is also concordant with the fact that the infection starts at younger age in females and chronic infection occur and finalize its way on to cancer. Indeed, a recent article by Jenson [12] also noted for a paradigm shift to the early vaccination in childhood.

## References

- [1] Centers for Disease Control and Prevention. Human papillomavirus: HPV information for clinicians. *Ala Nurse* 2008;35:17–9.
- [2] Massad LS, Einstein M, Myers E, Wheeler CM, Wentzensen N, Solomon D. The impact of human papillomavirus vaccination on cervical cancer prevention efforts. *Gynecol Oncol* 2005;26:129–42 [Epub ahead of print].
- [3] Juárez-Albarrán AC, Juárez-Gómez CA. Vaccine against human papilloma virus. *Rev Med Inst Mex Seguro Soc* 2008;46:631–7 [in Spanish].
- [4] Bornstein J. The HPV vaccines—which to prefer? *Obstet Gynecol Surv* 2009;64:345–50.
- [5] Cutts FT, Franceschi S, Goldie S, Castellsague X, de Sanjose S, Garnett G, et al. Human papillomavirus and HPV vaccines: a review. *Bull World Health Organ* 2007;85:719–26.
- [6] Dasbach EJ, Insinga RP, Elbasha EH. The epidemiological and economic impact of a quadrivalent human papillomavirus vaccine (6/11/16/18) in the UK. *BJOG* 2008;115:947–56.
- [7] Joura EA, Leodolter S, Hernandez-Avila M, Wheeler CM, Perez G, Koutsky LA, et al. Efficacy of a quadrivalent prophylactic human papillomavirus (types 6, 11, 16, and 18) L1 virus-like-particle vaccine against high-grade vulval and vaginal lesions: a combined analysis of three randomised clinical trials. *Lancet* 2007;369:1693–702.
- [8] Govan VA. A novel vaccine for cervical cancer: quadrivalent human papillomavirus (types 6, 11, 16 and 18) recombinant vaccine (Gardasil). *Ther Clin Risk Manag* 2008;4:65–70.
- [9] Garland SM, Hernandez-Avila M, Wheeler CM, Perez G, Harper DM, Leodolter S, et al. Females United to Unilaterally Reduce Endo/Ecto-cervical Disease (FUTURE) I Investigators. Quadrivalent vaccine against human papillomavirus to prevent anogenital diseases. *N Engl J Med* 2007;356:1928–43.
- [10] Marra F, Cloutier K, Oteng B, Marra C, Ogilvie G. Effectiveness and cost effectiveness of human papillomavirus vaccine: a systematic review. *Pharmacoeconomics* 2009;27:127–47.
- [11] Ronco G, Giorgi Rossi P. New paradigms in cervical cancer prevention: opportunities and risks. *BMC Womens Health* 2008;8:23.
- [12] Jenson HB. Human papillomavirus vaccine: a paradigm shift for pediatricians. *Curr Opin Pediatr* 2009;21:112–21.