

# System Dynamic Models in the Economic Evaluation of Human Papillomavirus Vaccine: A Review of Recent Progress

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**Abstracts Background** The human papilloma virus (HPV) vaccine is an expensive and effective vaccine potentially used in the prevention of cervical cancer and genital warts. System dynamic models (SDM) are used to simulate the natural history of HPV infection and cervical carcinogenesis, and it played an important role and was of great value in disease forecast and decision making for vaccination strategy of HPV vaccine. The purpose of this paper is to provide an overview of recent progress of system dynamic models method in the economic evaluation of Human Papillomavirus Vaccine. **Methods** A literature search was done on the international database PubMed, EMBASE, Cochrane Collaboration of Systematic Reviews, Health Technology Assessment and Centre for Review and Dissemination for articles and reviews pertaining to SDM of HPV related diseases. **Results** Hamer (1906) constructed a discrete time models to analyze the epidemic of measles, which is the origin of SDM. And Ross (1911) won his Nobel Prize for using the SDM to explain the relationship between quantity of mosquito and malaria. In 1926, the famous SIR model was proposed. Otherwise, until 2002 the epidemiologic impact of vaccinating vaccine against human papillomavirus infection and disease was studied by Hughes. **Conclusion** SDMs of infectious diseases which is one of the most used method in economic evaluation of HPV vaccine. The SDM of HPV related diseases was a useful tool in decision making of diseases control. It was used to describe the spread characters of cervical cancer and genital warts, predict the progress of disease, evaluate the efficacy of control strategies and calculate the cost-effectiveness of different strategies. This article was aimed to give a review of SDM in the economic evaluation of HPV vaccine. Firstly, SIR was introduced briefly, which were the basic dynamics models. Secondly, the application of SDM in the economic evaluation of HPV vaccination strategy was reviewed. Finally, the future direction of SDM was discussed.

Key Words: System Dynamic Model, Human Papillomavirus, Vaccination Strategy, Economic Evaluation