# CERVICAL CANCER PREVENTION USING HPV VACCINE IN INDONESIA

**Mir Atudz Dzikro[1*], Liana Verawaty[1]**

[1] Faculty of Medicine, Universitas Pembangunan Nasional "Veteran" Jawa Timur

**Corresponding author:**

Mir Atudz Dzikro

Faculty of Medicine Universitas Pembangunan Nasional "Veteran" Jawa Timur

Rungkut Madya Number 191, Rungkut Kidul, Rungkut, Surabaya, Jawa Timur 60293

Tel/Fax: +6282131262479

E-mail: 23091010032@student.upnjatim.ac.id

## ABSTRACT

Cervical cancer is one of the most common cancers affecting women in Indonesia, primarily caused by infection with Human Papillomavirus (HPV), and vaccination has been proven effective in preventing HPV infections that may develop into cervical cancer; to increase coverage and reduce risk among adolescent girls, the Indonesian government has incorporated the HPV vaccine into the national immunization program. Method: The writing of this scientific article was conducted through several steps, including literature search and data collection strategies. Discussion: HPV vaccination is available in three commercial types bivalent, quadrivalent, and nonavalent which contribute to reducing the incidence of cervical cancer, with high effectiveness and generally mild side effects, and its administration must comply with regulations set by the Indonesian government and global health organizations. Conclusion: This study emphasizes that HPV vaccines are effective and have a safe side effect profile for widespread public use, and Indonesia's policy to implement mandatory HPV vaccination through the school immunization month program represents an appropriate strategy in preventing cervical cancer.

**Keyword :** Cervical cancer; cervical cancer prevention; HPV vaccine; immunization

## Introduction

Cervical cancer is one of the most common types of cancer in the female genital organs, with human papilloma virus (HPV) playing an important role in the majority of cases. Although the exact cause of cervical cancer is not yet known, HPV infection is considered to be the main external factor influencing the development of this cancer, especially as more than 95% of cervical cancer cases are associated with sexually transmitted

HPV infection. Low-risk HPV types (types 6 and 11) do not cause cancer of the cervix, but can lead to genital warts. Meanwhile, high-risk HPV types (types 16 and 18) require further medical diagnosis [1]. Globally, cervical cancer ranks third in the number of new cases per year among women. In developing countries, it accounts for about 70% of the total cancer burden. Cervical cancer causes90-100% of all cancer deaths in women worldwide, mainly in those under 35 years of age, with higher mortality rates in developing countries. In Indonesia, cervical cancer is the second most common cancer in women, accounting for 5.4% of total cervical cancer cases in the world [2].

WHO Southeast Asia Region recently formulated a cervical cancer control strategy for countries in the region. The strategy proposes a comprehensive approach to cervical cancer control, including HPV vaccine-related policies. The human papillomavirus (HPV) vaccine is recommended as a primary prevention intervention for girls aged 9-13 years. Cervical cancer screening programs with efficient and cost-effective methods can be implemented to detect pre- cancerous conditions and cancers early. Health systems also need to be strengthened to provide prevention, treatment and palliative care services for cancer patients[2]. HPV vaccine is one of the globally recommended interventions for cervical cancer prevention. HPV vaccination programs have become part of national immunization programs in more than 60 countries. While affordability of the vaccine remains a major challenge, the cost of the vaccine has decreased in recent years. Support from donors and the Global Alliance for Vaccines and Immunization (GAVI) has helped low- and middle-income countries to obtain vaccines at more affordable prices [3].

Many people do not understand the benefits of HPV vaccination, even though it can prevent 70% of HPV infections. Primary prevention is through vaccination, while secondary prevention is through early detection of cervical cancer, such as pap smear or visual examination with acetic acid (VIA)[4]. The purpose of writing this scientific article is to understand and identify the role of the HPV vaccine in preventing cervical cancer. Further discussion on the HPV vaccine will include how effective it is in overcoming cervical cancer, side effects that may arise from vaccination, and the development of HPV vaccine programs implemented nationally in Indonesia and around the world.

## Material and Methods

The method applied in writing this scientific article includes several steps, as follows: 1).Literature Search Strategy: By listing the databases used for the literature search, such as PubMed, Google Scholar, and Scopus. In addition, it also mentions the keywords and search

phrases used to find relevant articles on cervical cancer prevention through HPV vaccines in Indonesia. 2). Data Collection: Through the selection process, relevant articles were selected based on inclusion and exclusion criteria. Subsequently, the selected articles were organized by theme for scientific articles written by

## Discussion

Cervical cancer is a type of cancer that arises in the area of the uterine cervix, which is the part of the female reproductive organs that connects the uterus to the sexual canal (vagina) [5]. It commonly occurs in older women, but statistics show that cervical cancer can also affect women between the ages of 20 and 30 [6]. Cervical cancer is the second most common cancer in women, with high incidence rates in low- and middle-income countries [7].This situation has a direct impact on the country's expenditure in the health sector, given that most cases of cervical cancer are detected at an advanced stage (56%), resulting in reduced quality of life and significant treatment costs. The five-year survival rate for advanced stages is only about 17%. This can be prevented through preventive measures, such as screening and vaccination. Human Papilloma Virus (HPV) vaccination can help reduce the incidence of cervical cancer [8].

### Types of HPV Vaccines

HPV vaccines are available in three commercial types: bivalent, quadrivalent and nonvalent. The quadrivalent vaccine provides protection against four HPV types (6, 11, 16, and 18), while the bivalent vaccine protects against two HPV types, namely 16 and 18 [3].The recently introduced nonvalent (nine-valent) vaccine offers protection against five additional types, namely HPV 31, 33, 45, 52 and 58, in addition to the types contained in the quadrivalent vaccine. All three vaccines are given by intramuscular injection. Data from several clinical trials involving young women (15-26 years of age) showed excellent immunogenicity profiles for all vaccines tested. Although efficacy studies have not been conducted in the targeted adolescent population, studies focusing on immunogenicity have noted strong immune responses and good safety profiles [9].

### Effectiveness of HPV Vaccine against Cervical Cancer

The HPV type 16/18 vaccine can prevent about 66.2% of cervical cancer cases. High-risk HPV vaccines have the potential to reduce the incidence of cervical cancer by 90%. However, these vaccines only prevent HPV infections that occur after vaccine administration, so they are not effective in preventing pre-existing cervical cancer due to infection [10]. In terms of effectiveness, the HPV vaccine can significantly reduce the risk of

cervical cancer, making it a viable solution for cervical cancer prevention in women. However, concerns have been raised regarding what side effects may occur after patients receive the HPV vaccine [11].

**Side Effects of HPV Vaccine Use**

The Global Advisory Committee on Vaccine Safety (GACVS) has issued statements on vaccine safety in 2013 and 2014 based on available evidence. Based on the observations of this committee, the HPV vaccine does not cause serious side effects such as syncope, anaphylaxis, venous thromboembolism, adverse pregnancy outcomes, or stroke. In December 2015, the GACVS reaffirmed the safety of this vaccine by referring to data on more than 200 million doses of HPV vaccine that have been distributed since 2006 [12]. During vaccination, it is important that responsible healthcare staff are educated about common side effects of the vaccine. In clinical trials of bivalent and quadrivalent vaccines, mild side effects such as pain at the injection site were experienced by approximately 83 -93% of patients who received both vaccines. Other mild side effects reported include headache and fatigue, which occurred in 50-60% of the vaccinated group [13].

Possible side effects in HPV vaccine recipients are generally mild, and serious side effects are denied based on observations that have been made in many patients who received the vaccine previously. This may make HPV vaccine recipients feel more secure in their efforts to prevent cervical cancer. In addition, it is important to discuss government programs and government programs and policies related to the HPV vaccine so that it can be widely accepted by the community [14].

**Rules for HPV Vaccine Use in Indonesia and the World**

The Advisory Committee on Immunization Practices (ACIP) at the Centers for Disease Control and Prevention (CDC) has formulated recommendations regarding all vaccinations in the United States, including HPV vaccination. The current ACIP recommendations for HPV vaccination are as follows: A). Children and adults aged 9 to 26 years. HPV vaccination is routinely recommended at 11 or 12 years of age, but vaccination can begin as early as 9 years of age. All persons up to 26 years of age who have not been properly vaccinated previously are advised to get the HPV vaccine [15]. B). Adults aged 27 to 45 years. Although the Food and Drug Administration (FDA) has approved the HPV vaccine to be given up to 45 years of age, it is not recommended for all adults in the 27 to 45 age range. ACIP encourages physicians to discuss with patients in this age group who have not been adequately vaccinated whether HPV vaccination is suitable for them, as the benefits of vaccination in this age range are smaller due to the number of individuals who have been

exposed to the virus [15]. C). Pregnant women. HPV vaccination should be delayed until after pregnancy, but a pregnancy test is not required before vaccination. There is no evidence to suggest that vaccination will affect pregnancy or harm the fetus [15].

The HPV vaccine is given as a series of injections. ACIP prescribes a dosing schedule that varies depending on the age at which vaccination is started. Children who start the vaccine series before they turn 15 years old only need two doses to gain full protection. Meanwhile, individuals who start vaccination at 15 years of age or older, as well as those with certain conditions that weaken the immune system, require three doses to achieve optimal protection [16].

HPV vaccine guidelines for women state that the HPV vaccine that can be given is bivalent or quadrivalent, which is widely available in Indonesia. Vaccine effectiveness is maximum in women aged 9-26 years or who are not yet sexually active. (17)The maximum age for vaccine recipients is up to 55 years of age. Despite vaccination, early detection through Pap Smear or VIA is still required at least every three years. In addition, pregnant women in Indonesia are not recommended to receive the HPV vaccine, but are advised to wait until the labor process or pregnancy is over [18].

The HPV vaccine will be one of the mandatory vaccines and will be funded by the government [19]. HPV vaccine recipients will be focused on school children as part of the Month of Immunization for School Children (BIAS) program for 5th or 6th grade students [20]. The Indonesian Ministry of Health expects the program to be implemented in all provinces and districts by 2023 [21]. Both the Indonesian government and global health organizations have developed comprehensive recommendations and policies related to HPV vaccine administration [22]. It is hoped that the HPV vaccine can be an effective solution in reducing cervical cancer cases in Indonesia and around the world. In Indonesia in particular, with the mandatory HPV vaccine policy for women, it is hoped that it can reduce the incidence of cervical cancer and reduce the mortality rate of women in the future, especially those caused by cancer [23].

## Conclusion

HPV vaccine is proven to be effective in reducing the incidence of cervical cancer and has safe side effects. The establishment of the HPV vaccine as a mandatory program by the government of the Republic of Indonesia to be given to women before they are sexually active is a very appropriate step in efforts to prevent cervical cancer in Indonesia, which is one of the types of cancer with the highest mortality and incidence. In addition, good

cooperation from the community is needed to support this program in order to prevent cervical cancer together.

**References**


1. Wolf J, Kist LF, Pereira SB, Quessada MA, Petek H, Pille A, et al. Human papillomavirus infection: epidemiology, biology, host interactions, cancer development, prevention, and therapeutics. Rev Med Virol. 2024;34(3):1–16.
2. Kombe AJ, Li B, Zahid A, Mengist HM, Bounda GA, Zhou Y, et al. Epidemiology and burden of human papillomavirus and related diseases, molecular pathogenesis, and vaccine evaluation. Front Public Health. 2021;8:1–19.
3. Goldfarb JA, Comber JD. Human papillomavirus (HPV) infection and vaccination: a cross-sectional study of college students' knowledge, awareness, and attitudes in Villanova, PA. Vaccine X. 2022;10:100141.
4. Oyouni AAA. Human papillomavirus in cancer: infection, disease transmission, and progress in vaccines. J Infect Public Health. 2023;16(4):626–31.
5. Reuschenbach M, Doorbar J, del Pino M, Joura EA, Walker C, Drury R, et al. Prophylactic HPV vaccines in patients with HPV-associated diseases and cancer. Vaccine. 2023;41(42):6194–205.
6. Husodo SD, Kumala AR, Rahayu IN. Hang Tuah medical journal. Hang Tuah Med J. 2020;18(1):100–13.
7. Aliza AD. Kata kunci. 2022;8(2).
8. Roy V, Jung W, Linde C, Coates E, Ledgerwood J, Costner P, et al. Differences in HPV-specific antibody Fc-effector functions following Gardasil® and Cervarix® vaccination. NPJ Vaccines. 2023;8(1):1–11.
9. Basu P, Malvi SG, Joshi S, Bhatla N, Muwonge R, Lucas E, et al. Vaccine efficacy against persistent human papillomavirus (HPV) 16/18 infection at 10 years after one, two, and three doses of quadrivalent HPV vaccine in girls in India: a multicentre prospective cohort study. Lancet Oncol. 2021;22(11):1518–29.
10. Nicoli F, Mantelli B, Gallerani E, Telatin V, Squarzon L, Masiero S, et al. Effects of the age of vaccination on the humoral responses to a human papillomavirus vaccine. NPJ Vaccines. 2022;7(1):1–11.
11. Han L, Zhang B. Can prophylactic HPV vaccination reduce the recurrence of cervical lesions after surgery? Review and prospect. Infect Agent Cancer. 2023;18(1):1–10.
12. Yamaguchi M, Sekine M, Hanley SJB, Kudo R, Hara M, Adachi S, et al. Risk factors

for HPV infection and high-grade cervical disease in sexually active Japanese women. Sci Rep. 2021;11(1):1–9.

13. Cheng L, Wang Y, Du J. Human papillomavirus vaccines: an updated review. Vaccines. 2020;8(3):1–15.
14. Wierzbicka M, San Giorgi MRM, Dikkers FG. Transmission and clearance of human papillomavirus infection in the oral cavity and its role in oropharyngeal carcinoma: a review. Rev Med Virol. 2023;33(1):1–9.
15. Suryoadji KA, Ridwan AS, Kusuma F. HPV vaccine as a cervical cancer prevention strategy in Indonesia. JIMKI J Ilm Mhs Kedokt Indones. 2022;10(1):114–20.
16. Montolalu YC, Arifuddin S, Adehline Y. Genotype of low-risk type human papillomavirus in female commercial sex workers in Makassar. 2019;94–101.
17. Astuti D, Mendrofa HK, Boli EB, Watunglawar CE. Pengetahuan dan sikap mahasiswi keperawatan tentang HPV. 2024;6(1).
18. Gheit T. Mucosal and cutaneous human papillomavirus infections and cancer biology. Front Oncol. 2019;9:1–10.
19. Yousefi Z, Aria H, Ghaedrahmati F, Bakhtiari T, Azizi M, Bastan R, et al. An update on human papilloma virus vaccines: history, types, protection, and efficacy. Front Immunol. 2022;12:1–11.
20. Petca A, Borislavschi A, Zvanca M, Petca RC, Sandru F, Dumitrascu M. Non-sexual HPV transmission and role of vaccination for a better future (review). Exp Ther Med. 2020;20(6):1–1.
21. Charde SH, Warbhe RA. Human papillomavirus prevention by vaccination: a review article. Cureus. 2022;14(10).
22. Bergman H, Buckley BS, Villanueva G, Petkovic J, Garritty C, Lutje V, et al. Comparison of different human papillomavirus (HPV) vaccine types and dose schedules for prevention of HPV-related disease in females and males. Cochrane Database Syst Rev. 2019;2019(11).
23. Gultom DA. Patogenitas human papillomavirus (HPV) dalam onkogenesis kanker serviks dan pengembangan vaksin pencegahannya. J Pro-Life. 2021;8(2):134–7.