

# HPV VACCINATION: AWARENESS, EDUCATION, VACCINE CONFIDENCE AND EARLY PREVENTION STRATEGIES

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## Abstract

Human papillomavirus (HPV) vaccination represents one of the most effective preventive strategies against cervical cancer and other HPV-related diseases. Despite the proven safety and effectiveness of HPV vaccines, vaccination rates continue to be influenced by misinformation, fear, lack of awareness, and limited public confidence. This paper discusses the importance of awareness, education, vaccine confidence, and early prevention in HPV vaccination, with special emphasis on North Macedonia's immunization policies and preventive healthcare strategies. The paper also highlights the role of healthcare professionals, parents, schools, and public institutions in combating misinformation and improving long-term public health outcomes.

**Keywords:** HPV vaccination, cervical cancer prevention, Gardasil 9, vaccine confidence, misinformation, adolescents, public health, North Macedonia

## Introduction

Human papillomavirus (HPV) is one of the most common sexually transmitted infections worldwide. Persistent infection with high-risk HPV types, particularly HPV 16 and HPV 18, is strongly associated with cervical cancer development. HPV infection is also linked to anal, vulvar, vaginal, penile, and oropharyngeal cancers, as well as genital warts.

Cervical cancer remains one of the leading preventable causes of cancer-related morbidity and mortality among women globally. According to the World Health Organization (WHO), preventive vaccination and screening strategies are essential for the elimination of cervical cancer as a public health problem.

The development of HPV vaccines has transformed preventive medicine by providing effective protection before exposure to the virus. However, fear, misinformation, and insufficient public education continue to influence vaccination acceptance in many countries. Increasing awareness and strengthening trust in vaccines remain essential components of successful immunization programs.

### HPV Vaccination and Prevention

HPV vaccination is considered a primary prevention strategy because it prevents infection before disease development. HPV vaccines induce a strong immunological response by stimulating the production of neutralizing antibodies, thereby providing long-term protection against high-risk HPV infections.

Currently, the most widely used vaccine is Gardasil 9, a 9-valent vaccine that protects against nine HPV types, including the most oncogenic strains responsible for cervical cancer. Scientific evidence demonstrates that HPV vaccination significantly reduces HPV infections, precancerous cervical lesions, genital warts, and cervical cancer incidence.

Vaccination is most effective when administered before the initiation of sexual activity. Consequently, adolescents are considered the primary target group for immunization programs. Vaccination of both girls and boys also contributes to herd immunity and reduction of HPV transmission within the population.

Preventive vaccination represents not only a medical intervention but also an investment in long-term public health and quality of life. Choosing HPV vaccination means choosing protection, prevention, and a healthier future.

## **Educating Adolescents and Parents**

Education represents one of the most important determinants of HPV vaccine acceptance. Many adolescents and parents remain insufficiently informed about HPV transmission, cancer risk, vaccine safety, and the benefits of early prevention.

Healthcare professionals, teachers, schools, and public health institutions play a crucial role in providing evidence-based information and promoting preventive healthcare awareness. Educational campaigns should focus on:

- the importance of cancer prevention;
- vaccine safety and effectiveness;
- recommended vaccination age;
- the importance of completing all vaccine doses;
- the role of vaccination in reducing HPV-related cancers.

Parents often make vaccination decisions for adolescents, making parental education especially important. Studies consistently demonstrate that strong physician recommendations significantly increase vaccination rates and improve public trust in immunization programs.

## **Combating Fear and Vaccine Misinformation**

One of the greatest challenges facing modern preventive medicine is the rapid spread of misinformation regarding vaccines. False claims shared through social media and non-scientific sources often create fear, confusion, and distrust among parents and adolescents. Misleading information about infertility, severe complications, or long-term health damage associated with HPV vaccines has no scientific evidence and may negatively influence public health decisions.

Healthcare professionals and public institutions must actively combat misinformation through transparent communication, evidence-based education, and community engagement. Providing accurate scientific information is essential for helping individuals make informed healthcare decisions.

HPV vaccines have undergone extensive clinical testing and continuous international safety monitoring. Organizations such as the World Health Organization (WHO), Centers for Disease Control and Prevention (CDC), and the European Medicines Agency (EMA) consistently confirm the safety and effectiveness of HPV vaccination. Most reported side effects are mild and temporary, including pain at the injection site, redness, mild fever, fatigue, headache, dizziness, or nausea. Serious adverse reactions remain extremely rare. The health benefits of preventing cervical cancer and other HPV-related diseases greatly outweigh the minimal risks associated with vaccination.

Fear should never become a barrier to cancer prevention. Promoting scientific literacy, strengthening public trust, and encouraging open communication between healthcare professionals and families are essential steps toward improving vaccine confidence and protecting future generations.

Every missed vaccination represents a missed opportunity for cancer prevention.

## **HPV Vaccination in North Macedonia**

In North Macedonia, the HPV (Human Papillomavirus) vaccine was officially introduced into the National Immunization Program in October 2009. Initially, it was administered as a mandatory vaccine for 12-year-old girls.

Some key points in the timeline:

2009 – Mandatory vaccination for 12-year-old girls began in schools and healthcare centers. The quadrivalent vaccine (Gardasil) was used, protecting against HPV types 6, 11, 16, and 18. At the same time, the government also provided free vaccination for girls aged 9–26 who registered for immunization.

2019 – The immunization calendar was updated, and the quadrivalent vaccine continued to be provided with a 2-dose schedule (0 and 6 months).

2024/2025 – The country switched to the nine-valent vaccine (Gardasil 9), which protects against more HPV types, and the vaccine also began to be recommended for boys aged 12–18. In 2024, the Ministry of Health introduced the 9-valent HPV vaccine Gardasil 9 into the national immunization program. The vaccination strategy was expanded to include both girls and boys in order to improve population protection and reduce HPV transmission. The vaccine is recommended primarily for children and adolescents aged 9–14 years. Vaccination is organized through public health institutions, vaccination centers, and school healthcare services.

For adolescents aged 9–14 years, a two-dose schedule is generally recommended:

- first dose at month 0;
- second dose after 6–12 months.

For individuals aged 15 years and older, a three-dose schedule is recommended:

- first dose at month 0;
- second dose after 2 months;
- third dose after 6 months.

Although HPV vaccination in North Macedonia is strongly recommended and included within preventive immunization strategies, it is not currently considered strictly mandatory like several childhood vaccines. The Ministry of Health continues to support vaccination through awareness campaigns and preventive healthcare education initiatives.

## **Conclusion**

HPV vaccination represents one of the most effective preventive interventions in modern medicine. Awareness, education, vaccine confidence, and early prevention remain essential for improving vaccination coverage and reducing HPV-related diseases worldwide.

Educating adolescents and parents, combating misinformation, and strengthening public trust in vaccines are critical priorities for successful immunization programs. In North Macedonia, the inclusion of Gardasil 9 in the national immunization calendar represents an important advancement in preventive healthcare and cancer prevention strategies.

Preventing cancer through vaccination is one of the greatest achievements of modern medicine. Strengthening educational campaigns and promoting evidence-based information can contribute significantly toward reducing cervical cancer incidence and protecting future generations from preventable diseases.

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