

# Human Papillomavirus Vaccination in Tajikistan: A Review of Epidemiology, Policy Progress, and Remaining Challenges

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## ABSTRACT

Human Papillomavirus (HPV) remains a leading cause of cervical cancer globally, and Tajikistan faces a significant burden of HPV-associated disease. Despite high incidence and mortality rates, organized cervical cancer prevention strategies have historically been limited in the country. In 2025, Tajikistan introduced the HPV vaccine into its national immunization schedule, marking a significant milestone in strengthening women's health and cancer prevention. This review synthesizes current knowledge on HPV epidemiology in Tajikistan, examines the rationale for national vaccine introduction, evaluates global and regional evidence on HPV vaccine effectiveness, and identifies implementation challenges and research gaps relevant to Tajikistan's context. While the rollout represents important progress, long-term success depends on improving screening systems, ensuring equitable vaccine reach, enhancing public awareness, and generating local data to evaluate program outcomes.

**Keywords:** human papillomavirus, HPV vaccine, cervical cancer, Tajikistan, immunization, public health, LMICs

## INTRODUCTION

Human Papillomavirus (HPV), the most common viral infection of the reproductive tract, is responsible for nearly all cervical cancer cases globally (World Health Organization [WHO], 2024). At least 14 HPV genotypes are considered high-risk, with HPV-16 and HPV-18 accounting for approximately 70% of invasive cervical cancers worldwide (WHO, 2024). Strong evidence from both high-income and low- and middle-income countries (LMICs) demonstrates that HPV vaccination is one of the most effective tools for cervical cancer prevention, significantly reducing HPV infection, precancerous lesions, and genital warts (Drolet et al., 2022; Toh et al., 2017). Countries that introduced HPV vaccination early, such as Australia and the United Kingdom, have documented substantial declines in cervical intraepithelial neoplasia and HPV prevalence (Hartwig et al., 2021).

Tajikistan, a lower-middle-income country with a young and rapidly growing population, has faced persistent challenges in cervical cancer prevention. Prior to 2025, the country lacked an organized screening program, relying instead on opportunistic Pap smears and limited clinical examinations (Deryabina et al., 2019). Structural barriers, including limited laboratory capacity, shortages of trained gynecologists, fragmented health information systems, and geographic inaccessibility in mountainous regions, further contributed to delayed detection and treatment. Cultural norms, low awareness of women's health issues, and financial barriers have also limited participation in preventive services (Almatkyzy, 2025).

According to the ICO/IARC HPV Information Centre (2023), Tajikistan experiences approximately 322 new cervical cancer cases and 190 deaths annually, reflecting a high case-fatality ratio. Most cases—nearly 69%—are attributable to HPV-16 and HPV-18, the primary targets of current vaccines (ICO/IARC, 2023).

In October 2025, Tajikistan introduced the HPV vaccine into its national immunization schedule, targeting girls aged 10–14 (WHO Regional Office for Europe, 2025). This introduction aligns with the WHO Global Strategy for the Elimination of Cervical Cancer, which aims for 90% HPV vaccination coverage among girls by age 15, 70% cervical screening coverage, and 90% access to treatment for cervical precancer and cancer (WHO, 2020). The move represents a transformative public health milestone for Tajikistan and supports global efforts to reduce cervical cancer mortality, particularly in LMICs where 90% of deaths occur (Hamid, 2025).

By adopting this vaccine into the national schedule, Tajikistan joins a growing number of LMICs working to

meet global elimination benchmarks. The policy also reflects the country's growing political will to strengthen preventive services and align national health priorities with global public health agendas. The HPV vaccine introduction is anticipated to have long-term benefits not only for reducing cervical cancer but also for reinforcing trust in the national immunization program, promoting gender equity, and normalizing adolescent vaccination in Tajik society.

This review synthesizes available epidemiological evidence, global implementation research, and national health policy analysis to evaluate the introduction of HPV vaccination in Tajikistan. It examines significant challenges, including geographic and socioeconomic disparities, vaccine hesitancy, and health-system limitations, and outlines future research needs and strategies to strengthen cervical cancer prevention nationally.

### **Epidemiology of HPV and Cervical Cancer in Tajikistan**

Before the nationwide HPV vaccine introduction, cervical cancer was one of the leading cancers affecting women in Tajikistan. The ICO/IARC HPV Information Centre (2023) reports 322 new cervical cancer cases per year, with a disproportionately high mortality of 190 deaths annually. High-risk HPV types 16 and 18 are implicated in most cases, consistent with global patterns (IARC, 2023; WHO, 2024).

HPV prevalence among women with normal cytology in Tajikistan is estimated at 3–4% but rises sharply among women with high-grade lesions (ICO/IARC, 2023). Such epidemiological patterns underscore the importance of preventive vaccination and early detection strategies.

However, prior to 2025, Tajikistan lacked an organized cervical cancer screening system. Screening coverage remained low due to both structural and cultural barriers, including limited laboratory infrastructure, low awareness, financial hardship, and restricted access in mountainous rural regions (Deryabina et al., 2019; Davies, 2023). These factors contributed to late-stage diagnoses and high mortality.

Given these challenges, the national HPV vaccine introduction provides a critical opportunity to reduce future cervical cancer incidence.

### **National Introduction of the HPV Vaccine in Tajikistan (2025)**

In October 2025, Tajikistan officially launched its national HPV vaccination program, targeting girls aged 10–14 (WHO Europe, 2025). The rollout was supported by the Ministry of Health and Social Protection of the Population (MoHSPP), WHO, UNICEF, and Gavi, the Vaccine Alliance, which provided technical and financial support (UNICEF Tajikistan, 2025; Gavi, 2025).

### **Delivery Model**

Tajikistan adopted a school-based vaccination strategy, consistent with global evidence identifying schools as the most efficient platforms for reaching adolescents aged 9–14 (LaMontagne et al., 2020). Health workers traveled to primary and secondary schools to deliver vaccines and conducted outreach activities to improve parental acceptance.

To ensure equitable access, mobile vaccination teams were deployed to remote mountainous areas with lower school attendance (WHO Europe, 2025). Community health workers also engaged households directly to address vaccine hesitancy.

### **Coverage Goals**

The Ministry of Health aims to vaccinate over 500,000 girls in the initial rollout phase of one of the most extensive adolescent immunization campaigns in the country's history (WHO Europe, 2025). Modeling studies from similar LMICs suggest that high HPV vaccination coverage can reduce cervical cancer incidence by more than 60% among vaccinated cohorts (Dorji et al., 2021).

## Vaccine Type

Tajikistan introduced WHO-prequalified vaccines targeting high-risk HPV types, particularly HPV-16 and HPV-18 (WHO, 2024). Depending on procurement, Tajikistan may use bivalent, quadrivalent, or nonvalent vaccines, all of which have been shown to reduce HPV circulation and precancerous lesions significantly (Drolet et al., 2022; Toh et al., 2017).

## Public Awareness and Social Mobilization

UNICEF and WHO supported a nationwide communication campaign emphasizing cancer prevention, engaging religious leaders, teachers, and community elders as trusted messengers (UNICEF Tajikistan, 2025). This approach is supported by research showing that trusted community voices significantly reduce hesitancy related to misinformation (Watson-Jones et al., 2021).

## Health System Preparedness

Before launch, Tajikistan strengthened its cold-chain infrastructure and trained over 3,000 health workers in vaccine administration and adverse event monitoring (WHO Europe, 2025). Establishing the Adverse Events Following Immunization (AEFI) system increased public transparency and confidence.

## Alignment with Global Goals

Tajikistan's introduction aligns with the WHO Global Strategy to Eliminate Cervical Cancer and regional cervical cancer control frameworks, emphasizing prevention in Central Asia (Ilic, 2025; WHO, 2020).

## METHODOLOGY

This review used a narrative synthesis approach to analyze evidence on HPV epidemiology, vaccination policy, and implementation challenges in Tajikistan. Peer-reviewed articles, WHO publications, IARC data, UNICEF reports, and global HPV vaccination studies published between 2015 and 2025 were included. Databases searched included PubMed, Scopus, and Google Scholar.

### Studies were included if they examined:

1. HPV epidemiology or cervical cancer burden
2. HPV vaccine effectiveness or coverage
3. Implementation strategies in LMICs
4. Barriers to vaccination in resource-limited settings

Themes that emerged included sociocultural factors affecting vaccine uptake, supply-chain challenges, financing and sustainability issues, and the importance of integrating vaccination with screening and community outreach. This thematic approach also allowed comparison between Tajikistan and other LMICs facing similar constraints, highlighting common barriers and identifying adaptable best practices.

## DISCUSSION

The introduction of the HPV vaccine into Tajikistan's national immunization program represents a critical milestone in the country's efforts to reduce the burden of cervical cancer. The epidemiological evidence demonstrates that high-risk HPV types 16 and 18 are responsible for most cervical cancer cases in Tajikistan (ICO/IARC, 2023; WHO, 2024), underscoring the importance of vaccination as a primary prevention strategy. Global studies consistently affirm the vaccine's effectiveness, safety, and capacity to reduce HPV infections and precancerous lesions at the population level (Dorji et al., 2021; Toh et al., 2017). Thus, Tajikistan's decision aligns with strong scientific evidence and international recommendations for cervical cancer elimination.

However, the success of the HPV program in Tajikistan will depend on overcoming several implementation challenges. Although school-based vaccination is internationally recognized as the most effective approach to reaching adolescents (WHO/UNICEF, 2025), Tajikistan risks missing out-of-school girls, especially in rural or economically disadvantaged regions. This underscores the need for supplemental outreach strategies, such as community vaccination days, mobile health teams, and partnerships with local women's organizations. Experiences from other LMICs indicate that failure to reach out-of-school girls can result in persistent inequities in cervical cancer risk (Davies, 2023).

Public perception and vaccine hesitancy also require careful attention. In culturally conservative settings like Tajikistan, misinformation linking HPV vaccination to early sexual activity or infertility may discourage parents from consenting to immunization. The communication campaigns led by UNICEF and WHO provide a strong foundation, but long-term success will require continuous community engagement, transparent communication about vaccine safety, and involvement of trusted community leaders, including religious authorities and educators (Almatkyzy, 2025).

Another challenge lies in the integration of HPV vaccination with broader cervical cancer prevention efforts. Vaccination alone will not eliminate cervical cancer; screening remains essential for detecting existing precancerous lesions among adult women. However, Tajikistan lacks a well-organized cervical cancer screening program, and screening coverage remains low (Davies, 2023). Strengthening screening infrastructure—potentially through cost-effective methods such as HPV self-sampling—will be critical to achieving WHO global elimination targets (WHO, 2020).

Furthermore, Tajikistan must invest in health-system strengthening to support the long-term sustainability of the vaccination program. Cold-chain infrastructure, health-worker training, and monitoring systems for adverse events following immunization (AEFI) are essential components of program quality. The initial technical support provided by Gavi, WHO, and UNICEF has significantly improved preparedness. However, continued investment is necessary to maintain vaccine supply, ensure high coverage, and respond effectively to public concerns (Ussai, 2025).

Finally, there is a significant need for local research to inform policy and monitor impact. Tajikistan currently lacks peer-reviewed studies evaluating vaccine coverage, public perceptions, or real-world effectiveness. Longitudinal studies following vaccinated cohorts, implementation assessments, and qualitative research on community attitudes will be essential to guide improvements in program design and reduce disparities (Hamid, 2025; Wang et al., 2024).

Overall, the introduction of the HPV vaccine is a transformative step for women's health in Tajikistan. If implemented alongside strengthened screening, robust community engagement, and ongoing evaluation, the program has the potential to drastically reduce cervical cancer incidence and contribute meaningfully to national and global health goals.

## CONCLUSION

The national introduction of HPV vaccination in Tajikistan marks a transformative shift in the country's approach to women's health and cancer prevention. While the program responds to a pressing public health need, its long-term impact will depend on maintaining high vaccination coverage, addressing persistent inequities in access, and strengthening the health-system capacities that support vaccine delivery and follow-up. Equally important is the expansion of cervical cancer screening for adult women, without which the full benefits of vaccination cannot be realized. By integrating HPV immunization with broader public health strategies, Tajikistan is positioned to make substantial progress toward the WHO elimination targets. Continued investment, community trust-building, and the generation of local evidence will be essential to guide policy and ensure that the program delivers meaningful and lasting reductions in preventable cervical cancer deaths.

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