

## RESEARCH ARTICLE

Editorial Process: Submission:08/04/2023 Acceptance:12/06/2023

# Update on HPV Vaccination Policies and Practices in 17 Eastern European and Central Asian Countries and Territories

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## Abstract

**Background:** In 2021, a survey was conducted as part of the regional program of the United Nations Population Fund (UNFPA) Regional Office for Eastern Europe and Central Asia (EECA) to assess the policies and practices relating to HPV vaccination and cervical cancer screening in the 17 countries and territories included in this region. Since then, very substantial progress has been made with HPV vaccination across the region so another survey was conducted establish the current situation. **Methods:** A 10 question survey covering the policies, plans and practices for HPV vaccination was prepared. As cervical cancer prevention is a priority for the UNFPA, its offices in the 17 countries and territories included in this study are well placed to identify the people who can provide authoritative data for this survey. Working with the UNFPA offices, the questionnaires were sent to these national experts in May 2023, with data collected until 30 June 2023. All countries and territories returned completed questionnaires. **Results:** In the period from 30 June 2021 to 30 June 2023, the number of countries and territories that have implemented or are implementing HPV vaccination programs has doubled. As of 30 June 2021, only 6 of 17 countries and territories had implemented national HPV vaccination programmes, and by 30 June 2023, another 6 could be added to this list. Of the 4 countries with sub-optimal vaccination coverage rates in 2021, none showed substantial improvement over the 2-year period. **Conclusions:** The implementation of HPV vaccination programs across the region is progressing very rapidly with  $\approx 70\%$  of the countries and territories implementing or having implemented national programs. However, greater attention needs to be given to ensuring that both the old and the new programs will achieve high coverage rates.

**Keywords:** HPV vaccination- Eastern Europe- Central Asia

*Asian Pac J Cancer Prev*, 24 (12), 4227-4235

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## Introduction

Globally there are more than 570,000 new cases and 311,000 deaths from cervical cancer every year and these numbers are predicted to increase to more 700,000 new cases and 400,000 deaths per year by 2030 (International Agency for Research on Cancer, 2018). Most of this disease and death occurs in low and middle income countries (LMICs) that lack the effective HPV vaccination, cervical screening and cancer treatments that are common in high-income countries (Bray et al., 2018; PATH, 2019; Riley, 2019; Gakidou et al., 2008).

In recognition of this, the World Health Assembly adopted the global strategy to accelerate the elimination of cervical cancer as a public health problem, which specifies that all countries should achieve an incidence rate below 4 per 100,000 women-years (World Health Assembly, 2020). Subsequently, the World Health Organization (WHO) published its Global Strategy to Accelerate the Elimination of Cervical Cancer as a Public Health Problem (WHO, 2020) that focuses on prevention through HPV vaccination and cervical screening with treatment of pre-cancerous cervical lesions, and management of invasive disease through effective treatment and palliative care. The WHO Global Strategy also set targets (the 90-70-90 targets) that all countries should achieve by 2030:

- 90% of girls fully vaccinated with HPV vaccine by age 15.

- 70% of women screened with a high-performance test (with performance similar to or better than a nucleic-acid amplification test for HPV test) by age 35 and again by age 45.

- 90% of women with cervical disease treated (90% of women with pre-cancer treated; 90% of women with invasive cancer managed).

In 2021, in order to assess readiness to meet the 90-70-90 targets and guide capacity building, a comprehensive survey was conducted as part of the regional program of the United Nations Population Fund (UNFPA) Regional Office for Eastern Europe and Central Asia (EECA) to assess the policies and practices relating to HPV vaccination and cervical cancer screening in the 17 countries and territories included in this region (Davies et al., 2023). Regarding HPV vaccination, only 6 of the countries and territories in this region (Armenia, Georgia, Moldova, North Macedonia, Turkmenistan and Uzbekistan) had implemented national HPV vaccination programmes, with only the last 2 of these reaching the WHO target of 90% of girls fully vaccinated by age 15, and rates in the other 4 being far lower (range: 10%-50%). Since that survey was conducted, a number of countries and territories have moved forward with implementing HPV vaccination programs so another survey was conducted to establish the current situation across the region and to assess progress.

## Materials and Methods

A 10 question survey tool covering policies, plans and practices relating to HPV vaccination was prepared. (A copy of the survey tool is available from the corresponding

author). As cervical cancer prevention is a priority for the UNFPA, its offices in the 17 countries and territories included in this study have regular contact with national experts who are directly involved in all aspects of cervical cancer prevention, including HPV vaccination, and are therefore well placed to involve the people who can provide authoritative data for this survey. Working through these UNFPA offices, the questionnaires were sent to relevant national experts in May 2023, with data collected until 30 June 2023. In Bosnia and Herzegovina (BiH), most responsibilities for healthcare have been devolved to the 2 entities, the Federation of Bosnia and Herzegovina (FBiH) and the Republika Srpska (RS), and to Brcko District (BD), so each is reported separately. All countries and territories returned completed questionnaires.

The data used for this study came from sources that did not contain any personal identifiers, clinical data, cases reports or cases series and did not involve human or animal subjects. Therefore, neither ethical approval nor informed consent were obtained.

## Results

### Albania

*June 2021:*

HPV vaccination had not been included in an official strategy or plan, or in a national vaccination program and was only available privately.

*June 2023:*

HPV vaccination was included in the National Immunization Calendar for girls age 13, starting in November 2022. Vaccinations are provided through primary health care clinics using 1 dose of the 4-valent (Gardasil) vaccine.

### Armenia

*June 2021:*

HPV vaccination was included in the National Immunization Calendar for females aged 13 starting in December 2017 and was then expanded to include females aged 13-45 and males aged 14-45 starting in February 2019. Vaccinations are provided through primary health care clinics using the 4-valent (Gardasil) vaccine with a 2 dose schedule (0 and 6 months). Coverage rates in 2018, 2019 and 2020 were 8.0%, 5.5% and 10.3% respectively (females, last dose).

*June 2023:*

HPV vaccination coverage rates in 2021 and 2022 were 10.8% and 13.3% respectively, and increased to 23.7% for the period from January to April 2023 (girls aged  $\leq 15$ , last dose).

### Azerbaijan

*June 2021:*

HPV vaccination had not been included in an official strategy or plan, or in a national vaccination program and was only available privately.

*June 2023:*

HPV vaccination still had not been included in an official strategy or plan, or in a national vaccination program and is only available privately.

**Belarus***June 2021:*

HPV vaccination has been included in the Belarusian State Program, “Health of the people and demographic security” for 2021-2025 (Government of the Republic of Belarus, 2021) that includes the action: Development, preparation and implementation of a national vaccination program against infection caused by the human papillomavirus. However, HPV vaccination had not been included in the National Immunization Calendar and was only available privately.

*June 2023:*

Currently, a comprehensive cost assessment of different options for a national HPV vaccination program is being prepared and will be presented to the National Expert Council on Immunization later this year. However, at this time HPV vaccination has not been included in the National Immunization Calendar and is only available privately.

**Bosnia and Herzegovina**

In Bosnia and Herzegovina, most responsibilities for healthcare have been devolved to the 2 entities, the Federation of Bosnia and Herzegovina (FBiH) and the Republika Srpska (RS), and to Brcko District (BD), so each is reported separately.

*FBiH**June 2021:*

HPV vaccination had not been included in any official strategies or plans and an HPV vaccination program had not been implemented in any of the cantons.

*June 2023:*

In Canton Sarajevo, free, voluntary HPV vaccination for girls aged 11-12 started in November 2022 with provision through primary health care centres using the 4-valent (Gardasil) vaccine with a 2 dose schedule (0 and 6 months). From the end of December 2022, HPV vaccination in Canton Sarajevo was extended to females aged 11-26.

Elsewhere in FBiH, HPV vaccination pilots were launched in January 2023 in 3 cantons for girls aged 13-14 with delivery through primary health care centres using the 4-valent (Gardasil) vaccine with a 2 dose schedule (0 and 6 months). In September 2023, HPV vaccination will be extended to the remaining 6 cantons.

*RS**June 2021:*

HPV vaccination had been included in the ‘Republika Srpska Policy for Improvement of Health of the Population in the Republic of Srpska by 2020’ (Ministry of Health and Social Welfare of the Republic of Srpska, 2012) and the ‘Action Plan for prevention and control

of non communicable diseases in Republic of Srpska 2019-2026.’ (Ministry of Health and Social Welfare of the Republic of Srpska, 2018) However, a HPV vaccination program had not been implemented.

*June 2023:*

HPV vaccination was included in the Immunization Calendar starting in March 2023 as a free, voluntary vaccination for girls and boys aged 11-14 with provision through primary health care clinics using the 9-valent (Gardasil) vaccine with a 2 dose schedule (0 and 6 months). HPV vaccination is also available for people aged  $\geq 15$  through regional units of the Institute of Public Health, but is not free.

*BiH-BD**June 2021:*

HPV vaccination had not been included in any official strategies or plans and an HPV vaccination program had not been implemented.

*June 2023:*

HPV vaccination still has not been included in any official strategies or plans and an HPV vaccination program has not been implemented.

**Georgia***June 2021:*

In 2017, HPV vaccination for girls age 9 was piloted in 3 territories of Georgia (Tbilisi, Kutaisi, Adjara). HPV vaccination was then included in the National Immunization Calendar for girls aged 10-12 starting in September 2019. Vaccinations are delivered through primary health care clinics using the 4-valent (Gardasil) vaccine with a 2 dose schedule (0 and  $\geq 6$  months). The vaccination coverage rate in 2020 was 23.5% (females, last dose).

*June 2023:*

In 2022, a catch-up vaccination program was started for females age 13-18 and this was extended to females age 13-26 in January 2023. Most recently, boys aged 10-12 were included in the vaccination program starting in July 2023, and the catch-up vaccination program was extended to include females aged 13-45 and males aged 13-26 starting in September 2023. Vaccination is delivered through primary health care clinics using the 4-valent (Gardasil) vaccine with the following schedules:

- Ages 13-14: 2 doses (0 and  $\geq 6$  months)
- Ages 15-45: 3 doses (0, 2 and 6 months).

Coverage rates in 2021 and 2022 were 23.8 and 25.8% respectively (females, last dose)

**Kazakhstan***June 2021:*

Kazakhstan started a HPV vaccination pilot in 2013 for girls age 11-12 in Atyrau and Pavlodar oblasts and the municipalities of Almaty and Nur Sultan. However, the pilot was stopped in 2016 because of a high refusal rate that was attributed to parents’ lack of understanding about HPV vaccination and health care providers’ inability to

adequately address the concerns of girls and their parents (Kaidarova et al., 2017). Subsequently, Kazakhstan included HPV vaccination in the Comprehensive Plan to Combat Cancer in the Republic of Kazakhstan for 2018-2022 (Government of the Republic of Kazakhstan, 2018) and the State Program for the Development of Healthcare in Kazakhstan for 2020-2025 (Government of the Republic of Kazakhstan, 2019), but had not been included in the National Immunization Calendar.

*June 2023:*

The implementation of an HPV vaccination program was approved in the Order of the Ministry of Health of the Republic of Kazakhstan No. 321 dated 7 June 2023 "On approval of the Action Plan for the introduction of human papillomavirus vaccination among 11-year-old girls in the Republic of Kazakhstan for 2023-2025" (Ministry of Health of the Republic of Kazakhstan, 2023). In addition, HPV vaccination is included in the new Comprehensive Plan to Combat Cancer in the Republic of Kazakhstan for 2023-2025 (Government of the Republic of Kazakhstan, 2023), which specifies that HPV vaccination will be included in the National Immunization Calendar for girls aged 11 starting in September 2024.

**Kosovo**

*June 2021:*

HPV vaccination had not been included in an official strategy, plan or national vaccination program, and no HPV vaccines had been licensed in Kosovo.

*June 2023:*

HPV vaccination has been included in the National Immunization Action Plan 2022-2025, (Government of the Republic of Kosovo, 2022) and has been approved for inclusion in the National Immunization Calendar for girls age 12-13 starting in October 2023. Vaccination will be delivered through schools and primary health care clinics, using the 4-valent (Gardasil) vaccine with a 2 dose schedule (0 and  $\geq 6$ -months).

**Kyrgyz Republic**

*June 2021:*

HPV vaccination had been included in the Universal Health Care Strategy and Plan 2019-2023 as well as the National Strategy for the Control and Prevention of Oncological Diseases 2021-2025. HPV vaccination had not been included in the National Immunization Calendar but an application had been submitted to GAVI to support the introduction of HPV vaccination for girls age 11, starting in 2022.

*June 2023:*

HPV vaccination was included in the National Immunization Calendar for girls aged 11 starting in November 2022. For the first year, girls aged 12-14 are included in a catch-up program. Vaccination is delivered primarily through schools but is also available through primary health care clinics for girls who miss the school vaccination dates. The 4-valent (Gardasil) vaccine is used with a 2 dose schedule (0 and 6 months). As of June 2023

(8 months since the start of the program), the coverage rate among girls aged 11-14 was 70% (first dose) and 42% (second dose).

**Moldova**

*June 2021:*

HPV vaccination was recommended in the National Cancer Control Strategy for 2016-2025 and since December 2017 has been available free of charge for girls aged 10 on a voluntary basis through PHC providers. The 4-valent (Gardasil) vaccine is used with a 2 dose schedule (0 and  $>6$  months). Vaccination coverage rates in 2018, 2019 and 2020 were 44.2%, 35.8% and 31.1% respectively (females, last dose).

*June 2023:*

HPV vaccination was included in the National Immunization Calendar for girls and boys aged 9-14 starting in September 2021, using the 4-valent (Gardasil) vaccine with a 2 dose schedule (0 and  $>6$  months) (Government of the Republic of Moldova, 2023). Vaccination coverage rates in 2021 and 2022 were 39.9% and 35.8% respectively (females, last dose).

**North Macedonia**

*June 2021:*

HPV vaccination was included in the National Immunization Calendar for girls aged 12 starting in October 2009. Vaccination is delivered through health care clinics using the 4-valent (Gardasil) vaccine with a 2 dose schedule (0 and 6 months). Vaccination coverage rates have varied between 31% and 49% from 2010 to 2020 (females, last dose).

*June 2023:*

In 2022, the National Commission on Immunization recommended the introduction of gender-neutral vaccination, the provision of catch-up HPV vaccination to high school students who were not vaccinated at age of 12, and transition to the 9-valent (Gardasil) vaccine starting in 2024. Vaccination coverage rates in 2021 and 2022 were 35.5% and 52.5% respectively (females, last dose).

**Serbia**

*June 2021:*

HPV vaccination was included in the Program of Mandatory and Recommended Immunizations in 2017 for females and males aged  $>9$ , but as a 'recommended' vaccination and it was not paid for by the Health Insurance Fund (Government of Republic of Serbia, 2017; Institute of Public Health of Serbia "Dr Milan Jovanovic Batut" 2018).

*June 2023:*

Since June 2022 HPV vaccination is recommended for females and males aged 9-19 and is now paid for by the Health Insurance Fund. Vaccination is delivered through primary health care clinics using the 9-valent (Gardasil) vaccine and 2 dosing schedules:

- Ages 9-14: 2 doses (0 and 6 months).
- Ages 15-19: 3 doses (0, 2 and 6 months).

Informed consent signed by parents for children younger than 15 or by the children themselves for those 15 or older is a prerequisite for vaccination.

### **Tajikistan**

*June 2021:*

HPV vaccination was included in the National Program for Prevention, Diagnosis and Treatment of Oncological Diseases 2010-2015 and in the National Cancer Control Strategy 2021-2030, but HPV vaccination had not been included in the National Immunization Calendar and no HPV vaccines had been licensed in the country.

*June 2023:*

The Ministry of Health and Social Protection, WHO and UNFPA have prepared a proposal for GAVI to support the implementation of a HPV vaccination pilot with an anticipated start in 2024.

### **Turkiye**

*June 2021:*

HPV vaccination had not been included in an official strategy or plan, or in a national vaccination program and was only available privately.

*June 2023:*

In November 2022 the Turkish Ministry of Health announced that HPV vaccination would be provided free of charge through the national immunization program. However, as of June 2023, it still had not been included in an official strategy or plan, or in a national vaccination program and is only available privately.

### **Turkmenistan**

*June 2021:*

HPV vaccination was included in the National Immunization Calendar in October 2016 as a mandatory vaccination for girls and boys aged 9. Vaccination is delivered through schools and primary health care clinics using the 4-valent (Gardasil) vaccine with a 2 dose schedule (0 and 6 months). Vaccination coverage rates in 2018, 2019, 2020 and 2021 were 99.2%, 99.5%, 99.1% and 99.2% respectively for both females and males, final dose. (Turkmen State Publishing Service, 2023).

*June 2023:*

Vaccination coverage rates in 2021 and 2022 were 99.2 and 98.7% respectively (for both females and males, final dose).

### **Ukraine**

*June 2021:*

HPV vaccination had been included in the draft National Cancer Control Plan 2021-2030 that had not yet been approved and HPV vaccination was only available privately.

*June 2023:*

HPV vaccination still has not been included in the National Immunization Calendar and is only available privately.

### **Uzbekistan**

*June 2021:*

HPV vaccination was included in the State Program for Strengthening Reproductive Health in Uzbekistan 2014-2018, the State Program on Improving the Quality and Coverage of Medical Care for Women and Children 2019-2023, the Comprehensive Measures for Improvement of Healthcare in Uzbekistan 2019-2025 and the Presidential Decree № 6155 of 03/02/2021, about the state program for the implementation of the action strategy for the five priority areas of development of the republic of Uzbekistan in 2017-2021. HPV vaccination was then included in the National Immunization Calendar for girls aged 9 starting in October 2019. Vaccination was delivered through schools and primary health care clinics using the 4-valent (Gardasil) vaccine with a 2 dose schedule (0 and 6 months). The vaccination coverage rate in 2020 was 98.6% (females, final dose).

*June 2023:*

Vaccination coverage rates in 2021 and 2022 were 98.6 and 99.5% respectively (females, final dose) (Table 1).

### **Discussion**

Comparing the results of this survey to the corresponding results for the survey conducted in 2021 show that substantial progress is being made with implementing HPV vaccination programs in the 17 countries and territories of the UNFPA EECA region. Over the past 2 years, the number of countries that have implemented or are implementing these programs has doubled from 6 to 12 with an additional country having submitted an application to GAVI to support the implementation of a program in 2024.

However, while substantial progress is being made with program implementation, the data on coverage rates is not as encouraging. The 2021 survey found that of the 6 countries that had implemented national HPV vaccination programs, only 2 had reached the WHO coverage target of 90% and rates in the other 4 (Armenia, Georgia, Republic of Moldova, North Macedonia) ranged from 10% to 50%, far below the WHO target of 90% of girls fully vaccinated by age 15 that is required to optimise the benefits of HPV vaccination. Now, this survey found that rates in these 4 countries have not shown substantial improvement over the 2 year period. Further, it should be noted that in Armenia where the program was launched in December 2017, the rates over the period from 2018 to 2022 have remained in the range of 8%-13%, while in North Macedonia where the program was launched in 2009, the rates over the period from 2010 to 2022 have remained in the range of 31%-52%. Therefore, while substantial progress is being made in implementing HPV vaccination programs, greater attention needs to be paid to improving coverage rates in the older programs and ensuring that high coverage rates are achieved in the new programs.

### **Author Contribution Statement**



Table 1. Characteristics of HPV Vaccination across the EECA Region in June 2023

Country/Territory	Included in official strategy or plan	Included in vaccine calendar	Sexes	Ages	Catch-up	Delivery	Vaccine	Schedule	Coverage
Albania	Yes	Nov 2022	F	13	No	PHC	Gardasil-4	1 dose	-
Armenia	NC	NC	NC	NC	NC	NC	NC	NC	2021-10.8% 2022-13.3% (F ≤15, last dose)
Azerbaijan	NC	NC	NC	NC	NC	NC	NC	NC	NC
Belarus	NC	NC	NC	NC	NC	NC	NC	NC	NC
Bosnia and Herzegovina	Yes	Dec 2022	F	11-26	NA	PHC	Gardasil-4	2 doses: 0, 6 mos	NA
	Yes	Sep 2023	F	13-14	No	PHC	Gardasil-4	2 doses: 0, 6 mos	NA
	Yes	Mar 2023	F+M	11-14	No	PHC	Gardasil-9	2 doses: 0, 6 mos	NA
	No	No	NA	NA	NA	NA	NA	NA	NA
Georgia	NC	Sep 2019 Jul 2023	F M	10-12 10-12	Jan 2023 F 13-26	NC	Gardasil-4	10-14: 2 doses: 0, ≥6 mos 15-26: 3 doses: 0, 2, ≥6 mos	2021-23.8% 2022-25.8% (F, last dose)
Kazakhstan	Yes	Sep 2024	F	11	No	NA	NA	NA	NA
Kosovo	Yes	Oct 2023	F	12-13	No	Schools & PHC	Gardasil-4	2 doses: 0, ≥6 mos	NA
Kyrgyz Republic	Yes	Nov 2022	F	11	For 1st yr: F 11-14	Schools & PHC	Gardasil-4	2 doses: 0, 6 mos	NA
Republic of Moldova	Yes	Sep 2021	F+M	9-14	No	PHC	Gardasil-4	2 doses: 0, ≥6 mos	2021-39.9% 2022-46.8% (F, last dose)
North Macedonia	Yes	Jan 2024 (new terms)	F+M	12	Yes, 13-15	PHC	Gardasil-9	2 doses: 0, 6 mos	2021-35.5% 2022-52.5% (F, last dose)
Serbia	Yes	Jun 2022 (mandatory and paid for by the state)	F+M	9-19	NA	PHC	Gardasil-9	9-14: 2 doses: 0, 6 mos 15-19: 3 doses: 0, 2, 6 mos	NA
Tajikistan	NC	NC	NC	NC	NC	NC	NC	NC	NC
Türkiye	NC	NC	NC	NC	NC	NC	NC	NC	NC
Turkmenistan	NC	NC	NC	NC	NC	NC	NC	NC	2021-99.2% 2022-98.7% (F+M, last dose)
Ukraine	NC	NC	NC	NC	NC	NC	NC	NC	NC
Uzbekistan	NC	NC	NC	NC	NC	NC	NC	NC	2021-98.6% 2022-99.5% (F, last dose)

F, females; M, males; PHC, primary health care; NA, not applicable; NC, no change

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## Acknowledgements

The authors would like to acknowledge the assistance

that has been provided by the UNFPA staff at the regional and country levels who are listed below.

- Abuova, Gaukhar. SRH Project Officer, UNFPA Kazakhstan (retired).
- Berzan, Eugenia. SRH Program Analyst, UNFPA Moldova.
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