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HPV vaccines indicators

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Burden & epidemiology

Number of new cases per year (last 3-5 years)

Cervical cancer is the fourth most common cancer in terms of incidence in women with an estimated 604,000 new cases in 2024.1

Cervical cancers account for over 90% of Human papillomavirus (HPV)-related cancers in women.[2]

While virtually all cases of cervical cancer are caused by HPV, the attributable fraction (AF) of other HPV related cancers ranges between 2% (oral cavity and larynx cancer) and 88% (anal cancer).[3]

For country-level data, please refer to the country reports available from the HPV Centre.[4]

Proportion of the population affected by the disease or infected with the antigen

Most sexually active people will be infected with HPV at some point in their lives.[5, 6]

Cervical cancer is the most common cancer type in 25 countries and the leading cause of cancer death in 37 countries, mainly in sub-Saharan Africa as well as South America and South-Eastern Asia.[7]

The highest prevalence of cervical HPV among women is in sub-Saharan Africa (24%), followed by Latin America and the Caribbean (16%), Eastern Europe (14%), and South-East Asia (14%). Prevalence among men is highly variable based on sexual trends.[6, 8]

Prevalence estimates vary by sampling frame, age and assay.

Serogroup or serotype distribution (for serogroup- or serotype-specific vaccines)

Currently, 12 HPV types are defined as high-risk (oncogenic) and cause cancer in humans (types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59); type 68 is classified as probably causing cancer. Oncogenic risk varies by type, with type HPV16 being the most oncogenic.[9]

The most common HPV genotypes found in invasive cervical cancer are HPV16 and HPV18, together accounting for about 77% of cases, globally. Other significant high-risk types include HPV31, 33, 35, 45, 52, and 58, which raise this share to nearly 95% of cases globally.[10]

To note that 2010 data is seen as a historical baseline. Given that the existing HPV vaccines cover HPV-16 and HPV-18 types, measuring the "natural" seroprevalence burden for these two

types (16 and 18) will no longer be possible, as they start to disappear due to vaccination.[11]

A more recent meta-analysis of HPV among men showed a global pooled prevalence of 31% (95% CI: 27–35) for any HPV. Pooled prevalence estimates were similar for the regions of Europe and Northern America, Sub-Saharan Africa, Latin America and Oceania, while estimates for Eastern and South-Eastern Asia were half that of the other regions.[12]

Number of deaths from the disease per year

Cervical cancer was the fifth leading cause of cancer deaths in women in 2024, with around 280,000 deaths worldwide.[13]

Case Fatality ratio (number of deaths / number of new cases, in %)

Cervical cancer mortality rates were six times higher in low Human Development Index (HDI) countries versus very high HDI countries.[14]

According to the most recent estimates (2024), the mortality per incident case rate is estimated at 46 deaths per 100. Rates differ by country income level and health system capacity. No single global estimate is available.[13]

Outbreak, epidemic or pandemic risk

Not applicable for HPV

Contribution of the vaccine to achievement of the national, regional or global disease goals

The HPV vaccine plays a critical role in the global strategy to eliminate cervical cancer. By targeting high-risk HPV types, high-coverage HPV vaccination programs are integral to reducing the incidence of the disease. The World Health Organization’s (WHO) global strategy against cervical cancer sets ambitious goals: vaccinating 90% of girls by age 15, screening 70% of women by ages 35 and 45, and treating 90% of women with pre-cancerous lesions.[15]

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Benefits of the intervention

Serogroup or serotype coverage by vaccines considered (for serogroup- or serotype-specific vaccines)

As of 2022, authorised HPV vaccines provide protection against HPV types 6, 11, 16, 18, 31, 33, 45, 52, and 58 (types 6 and 11 are responsible for most anogenital warts).[16]

The older bivalent (Cervarix) and quadrivalent (Gardasil) vaccines show partial protection against HPV types not included in the vaccine (cross-protection), when used in multidose schedules. The bivalent vaccine (targeting HPV-16/18) generally provides stronger and more consistent cross-protection, particularly against HPV31, 33 and 45. Some studies also report partial protection against HPV-35, 52 and 58, though the evidence is less robust and more variable.[17], [18], [19]

No data on cross protection is available for the newer vaccines. Less evidence is available on the extent of cross protection provided by HPV vaccine in single dose schedule.

Efficacy and effectiveness estimates (e.g. against infection, disease, hospitalization, death), including in different populations

Three doses of the bivalent (Cervarix) and quadrivalent (Gardasil) vaccines offered significant protection against cervical adenocarcinoma in situ associated with HPV16 and HPV18 among young women (15–26 years of age): 88% (95% CI: 30–98%).[20], [21]

Trials among vaccine recipients not already infected with HPV showed high efficacy against high-grade cervical, vulvar and vaginal lesions: 98% (95% CI: 93–100) for CIN2+ and 100% (95% CI 83–100) for vulvar and vaginal intraepithelial neoplasia grade 2+ caused by the HPV types in the quadrivalent vaccine.[21], [22]

Approval of the two-dose schedule in girls 9 to 14-years of age- was based on demonstration of non-inferiority of the immune response when compared with young adult women (16–26 years of age) in whom 3-dose efficacy has been proven (immunobridging).[21]

A one-dose schedule is supported by WHO in the general population based on evidence from post-hoc analyses of efficacy trials, post-licensure observational studies and an RCT (0 vs 1) among African females 15-20 years of age. These studies demonstrate that a single dose of HPV vaccine is sufficient to elicit a lasting, stable immune response, and provides protection against persistent HPV infection similar to that of multidose regimens.[20, 21]

Head-to-head RCTs comparing one and two-dose schedules of Cervarix and Gardasil-9 showed VE was non-inferior with a single-dose schedule within the specified margins.[23, 24]

Duration of protection and waning of immunity in general and risk groups

With a multidose schedule, antibody titres remain high for up to 16 years following the bivalent (Cervarix) vaccine for girls vaccinated at 16-17 years of age, up to 15 years following the quadrivalent (Gardasil) vaccine, and for at least six years following the more recently licensed nonavalent vaccine (Gardasil-9).[25, 26, 27]

Geometric Mean Titers (GMT) following a single dose remain stable for at least 12-16 years.[28, 29, 24]

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Safety of the intervention

Type, including severity, consequences and frequency of short- and long-term adverse events following vaccination

As of the end of 2024, more than 700 million doses of HPV vaccine have been distributed since licensure in 2006.[30, 31, 32]

Post-licensure surveillance has detected no serious safety issues to date, aside from rare reports of anaphylaxis. The risk of anaphylaxis has been characterized as approximately 1.7 cases per million doses.[33]

A systematic review of studies on the safety of HPV vaccines found little to no difference in serious adverse events among recipients of bivalent, quadrivalent and nonavalent HPV vaccines.[34]

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Values and preferences

Perception of the target population on the risk of disease

A variety of studies from countries, including Australia, China, Pakistan, and Italy, across different target populations (medical personnel, girls, MSM, students, general public), show low to moderate knowledge and awareness of HPV- related cancers, though this is not necessarily associated with low uptake of the vaccination.[35], [36], [37], [38], [39]

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Acceptability to stakeholders

Acceptability of the vaccine and of vaccination against the disease

Based on 86 studies worldwide, parents generally supported HPV vaccinations for their children, with HPV vaccine acceptance rates varying from 12% to 98%. Geographical variations were seen in pooled acceptance rates, highest in Africa (79.6%; 95% CI: 73.5–85.2%) and lowest in North America (56.7%; 95% CI: 49.3–64.0%). Knowledge levels of HPV vaccination varied widely (6.5% to 100%) across world regions.[40]

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Financing & funding

Estimated financial cost of materials per vaccine dose (syringes, needles, safety box) (in USD)

Price for one auto-disable (AD) syringe and needle

- As of October 2025, the UNICEF procurement price for 2026 ranges from US$ 0.0225 to US$ 0.0460, depending on supplier and product.[41]
- The 2025 PAHO Revolving Fund for Access to Vaccines price ranges from US$ 0.0280 to US$ 0.0438, depending on supplier and product.[42]

Price for one 5-litre safety box

- The UNICEF procurement price for 2026 ranges from US$ 0.3752 to US$ 0.860, depending on supplier and product.[43]
- The 2025 PAHO Revolving Fund for Access to Vaccines prices ranges from US$ 0.356 to US$ 0.467, depending on supplier and product.[42]

Each 5-liter safety box can hold around 100 syringes.

Estimated vaccine financial cost per dose (in USD)

As of June 2026, the UNICEF price per dose for countries eligible for Gavi pricing ranges from US$ 2.80 for a bivalent vaccine, single dose vial (Walvax) to US$ 5.18 for a bivalent vaccine, two dose vial (GSK), depending on the supplier, valency and presentation.[44]

For different groupings of Middle Income Countries (MICs), the UNICEF price per dose ranges from US$ 2.90 for a bivalent vaccine, single dose vial (Cecolin) to US$ 33.25 for a nonavalent vaccine, single dose vial (MSD), depending on supplier, valency and presentation.[44]

UNICEF prices are subject to change. The latest HPV vaccine price information is available from UNICEF Supply Division.[44]

Users are encouraged to confirm current prices by contacting UNICEF Supply Division.

The 2026 PAHO Revolving Fund for Access to Vaccines pricelist reports a price per dose ranging from US$ 2.90 for the bivalent vaccine to US$ 14.99 for the nonavalent vaccine.[45]

The June 2026 US CDC pricelist reports a price per dose of US$ 275.013-329.090 for the nonavalent HPV vaccine (Merck/MSD) in the United States.[46]

In 2024, among self-procuring MICs, county-reported prices per dose range from US$ 9.50 to US$ 10.30 for bivalent, US$ 5.20 to US$ 103.6 for the quadrivalent and US$ 32.7 and US$ 113.2 for the nonavalent vaccines.[47]

Estimated financial cost per person vaccinated (in USD)

The cost of vaccine delivery can vary greatly depending on the strategies, financing elements (e.g., vaccine procurement and delivery costs), and the country context.

A six-country study published in November 2023 (Ethiopia, Guyana, Rwanda, Senegal, Sri Lanka, and Uganda) reported the financial cost per dose from approximately US$ 1.50 to US$ 5.50, and economic costs ranging from US$ 2.50 to US$ 7.50 per dose. These differences were influenced by factors such as service delivery strategies, the number of doses administered per health facility, and the intensity of program activities. Health facility activities and associated expenditures accounted for the largest proportion of the economic cost per dose. Health worker and non-health worker time were also substantial cost components, regardless of the operational context.[48]

A 2020 study in Zambia estimated the financial cost of school-based delivery at US$ 12.40 per Fully Immunised Child (cost of vaccine is the co-financing portion only).[49]

A 2024 five country study (Ethiopia, Guyana, Rwanda, Sri Lanka, and Uganda) modelled the financial cost of vaccine procurement and delivery per adolescent receiving the full schedule as ranging from US$ 9.64 (Sri Lanka) to US$ 23.43 (Guyana) under a two-dose schedule. The cost decreased to US$ 4.84 and US$ 12.34, respectively, under a single-dose schedule, reflecting savings up to 50%. For economic costs, the range for a single-dose schedule was US$ 7.86 (Rwanda) to US$ 28.53 (Guyana).[50]

Cost-effectiveness ratio

Global cost-effectiveness analysis suggests that vaccinating pre-adolescent girls is usually cost-effective for cervical cancer prevention, particularly in resource-constrained settings where screening and other cervical cancer prevention and control measures often have limited coverage. At 2020 prices for the bivalent and quadrivalent vaccines, girls-only vaccination was cost-effective (compared with no vaccination), irrespective of the schedule or vaccine used.[51, 52]

HPV vaccination is generally cost-effective or even cost-saving in both high- and low-income countries, especially when targeting girls 9–14 years of age. The mean incremental cost-effectiveness ratio (ICER) for HPV vaccination globally is estimated at US$ 4 217 per disability-adjusted life year (DALY) averted, with much lower ICERs in regions with high cervical cancer burden, such as Sub-Saharan Africa and South Asia.[53] In Latin America, most studies found HPV vaccination to be cost-saving or cost-effective, with mean ICERs ranging from I$ 358 to I$ 3 804 depending on the vaccine type and study parameters.[54]

Cost-effectiveness varies considerably by several factors, including, the burden of disease, vaccination coverage, vaccine price, delivery costs, delivery approaches, and schedules. Caution is recommended when comparing estimates of cost-effectiveness for different interventions evaluated by different methods and in different contexts (e.g., with different concurrent health interventions and standards of care).

Is there a Gavi programme to support the introduction of this vaccine? If a Gavi programme is available, what support is available to countries?

Gavi opened a funding window for HPV vaccines in 2013.HPV vaccine introduction is supported by the guaranteed vaccine budget. The calculations of the budget amount are based on adoption of a single dose schedule and lower cost products.

All Gavi-eligible and Catalytic Phase countries that have not yet introduced HPV vaccine into their national vaccination schedule are eligible for support. For these countries, that have not yet introduced HPV vaccination into their national EPI schedule, Gavi supports routine HPV vaccine introduction calculated on a single-age cohort of girls aged between 9–14 years.

Introductions can be combined with a one-time multi-age cohort (MAC) catch-up campaign for girls up to age 14 to maximise impact in the first year. As of 2027, co-financing of MAC doses will be required.

For countries with existing HPV vaccination programmes, Gavi provides support for HPV optimisation, which may include switching vaccine product or schedule.

Either a one-dose or two-dose HPV vaccination schedule can be selected, however the guaranteed vaccine budget is calculated based on a single-dose schedule.

Countries in the Catalytic Phase are eligible for vaccine support to cover 50% of the routine immunisation target cohort; these countries are not eligible for MAC catch-up campaign funding.[55]

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Market (feasibility)

Available vaccines, licensing status, prequalification status, presentation, formulation, dosage and route of administration

As of September 2026, there are eight HPV vaccines with marketing authorisation that are manufactured directly by the authorisation holder: Bivalent: Cecolin ® (Innovax), Cervarix ® (GSK), Walrinvax ® (Walvax) ; Quadrivalent: Gardasil ® (MSD), Cervavac (SII), Tsegardex ® (Nanolek); Nonavalent: Gardasil-9 ® (MSD), Cecolin 9® (Innovax).[56]. Five of those vaccines are WHO-prequalified.[57], [58]

Other HPV vaccines are authorised or commercialised under local brand names through technology-transfer, bulk-transfer, licensing, distribution or localisation arrangements (e.g., Nusagard in Indonesia, Silgard in Argentina, Papilovax in Bangladesh). For these products, the available public evidence indicates local commercialisation and/or partial local manufacturing steps, but does not consistently demonstrate full end-to-end production– including drug-substance manufacture – by the local commercialising entity.[56]

Detailed information on the different products can be found in the vaccine comparison table.[59]

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Service delivery (feasibility)

Number of doses and timing of administrations

WHO recommends that either a single-dose schedule or a two-dose schedule (administered 6–12 months apart, with an interval of up to 3–5 years between doses), may be used for females and males between nine and 20 years of age. For individuals above 20 years of age, a 2-dose schedule is recommended.

Given current evidence of comparable efficacy and duration of protection to a two-dose schedule, a one-dose schedule may offer programmatic advantages, be more efficient and affordable, and contribute to improved coverage.60

As of September 2026, four vaccines have data on single dose schedule: Cervarix, Gardasil, Gardasil-9 and Cecolin.58

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Logistics (feasibility)

Cold chain volume required per vaccine dose (in cm3)

Depending on vaccine type and presentation: Bivalent - 4.8 cm3 to 57.7cm3 per dose (carton of 1 vial); Quadrivalent: 15 cm3 to 75 cm3 per dose; Nonavalent: 18.4 cm3 per dose.61

This information is limited to vaccines where publicly available information is accessible.

For specific product characteristics see the comparison table.59

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