

Acting on the call: A framework for action for rapid acceleration of access to the HPV vaccination in low- and lower-middle-income countries

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Abstract

Cervical cancer, caused by HPV infection, is responsible for more than 311 000 preventable deaths every year. A global call to accelerate efforts to eliminate this disease has generated a new global strategy proposing ambitious, but achievable, targets for HPV vaccination of girls, and screening and treatment of women. The present paper addresses the suboptimal access to HPV vaccination in low-income and lower-middle-income countries (LICs/LMICs), where the burden of disease weighs most heavily, in part through co-infection with HIV. A proposed framework for action was formulated by first reviewing the reasons underlying gaps in HPV vaccine coverage. Good practices from recent introductions of HPV vaccine at scale in LICs/LMICs were then assessed based on targeted literature reviews and the experience and views of the authors. Difficulties in uptake and coverage of the HPV vaccine relate to the costs of the vaccine and service delivery, lack of prioritization, the challenges of vaccinating adolescents, and shortage of vaccines as the supply failed to keep pace with the rapid expansion in global demand, including from LICs/LMICs. The framework for action calls for new strategic thinking to consolidate global learning and invigorate operationalization at a country level.

KEYWORDS

Cervical cancer, Elimination, Human papilloma virus, Immunization, Vaccines

1 | BACKGROUND

A woman dies every 2 minutes due to cervical cancer. Cervical cancer is responsible for more than 311 000 preventable deaths every year,¹ 85% of them in low- and middle-income countries.² Caused by human papilloma virus (HPV), the cancer is largely preventable through vaccination against HPV and secondary prevention strategies. However, access to vaccines and other

prevention is grossly suboptimal in low-income countries (LICs) and lower-middle-income countries (LMICs) (as defined by the World Bank income classification, 2019³). Women living with HIV are more likely to die from cervical cancer,¹ a major issue in Sub-Saharan Africa, which faces the dual burden of high numbers of HIV and HPV infection.⁴

In May 2018, WHO¹ made a global call for the elimination of cervical cancer as a public health problem, defined as an incidence rate of

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less than four cases per 100 000 women. In response, a global strategy for elimination using primary prevention (vaccination) and secondary prevention (screening and treatment of cervical pre-cancers) has been developed⁵ and approved by WHO Member States⁶ through the modified World Health Assembly process in 2020. According to the WHO Cervical Cancer Elimination Modelling Consortium (CCEMC), if 90% coverage of HPV vaccination of girls (by 15 years of age) could be achieved, together with 70% coverage of screening (twice in a lifetime with a highly sensitive test), followed by 90% uptake of treatment, by 2030; then cervical cancer could be eliminated globally by 2100.⁷ In doing so, more than 74 million cases would be averted over the next century, 61 million of these by vaccination alone.⁷

Given the critical role of the HPV vaccination for the elimination of cervical cancer, the aim of the present paper was to understand the reasons behind the suboptimal access to the HPV vaccination in LICs and LMICs thus far⁴ and to suggest a multidimensional framework for reaching the 2030 goal of vaccinating 90% of eligible girls. Such a framework can demonstrate the need for multiple and synchronized strategies to move from the current 15% global coverage of the HPV vaccination^{4,8,9} to the targeted 90% by the year 2030. Convergence, synergy, and harmonization across all stakeholder efforts are needed to reach these targets.

2 | METHODS

The proposed framework for action was formulated using a three-step process. First, the reasons behind the gaps in coverage of the HPV vaccination in LMICs were analyzed, covering finances, products, health systems, and community engagement. This was followed by a review of the demonstrated best practices and promising innovations based on targeted literature reviews,¹⁰ and the experience and views of the authors. Lastly, based on the present analysis and review, a pragmatic multidimensional framework for action was proposed to provide actionable guidance to the global and in-country stakeholders. This aims to help plan and coordinate strategies for actualizing the global call to action for the elimination of cervical cancer.

3 | RESULTS

3.1 | Challenges in access

Although the HPV vaccine was licensed in 2006, as of 2020 just 22 of the 78 LICs and LMICs have introduced the vaccine.¹¹ This is well behind the 50 of 57 high-income countries (HICs) and 35 of 59 upper-middle income countries (UMICs) that have introduced the HPV vaccination. This has resulted in less than 25% of girls living in LICs and LMICs having access to the HPV vaccination.¹¹ This inequity of access is driven by the cost of vaccines, cost of delivery, prioritization below other new vaccines, and, lately, shortage of vaccine supply.

3.2 | Costs of the vaccine and service delivery

The HPV vaccine is among the more expensive vaccines in the national immunization schedule. However, in 2011, an opportunity was made available by Gavi and UNICEF to secure vaccines for as little as US\$4.50 per dose for LICs to vaccinate millions of girls. The same vaccines can cost up to US\$168 in HICs with the previous lowest public sector price being US\$9.58 per dose, as negotiated by the Pan American Health Organization (PAHO).¹² The cost of HPV vaccines for middle-income countries (MICs) is still about three times the cost of the price of HPV vaccines for Gavi-eligible countries and this has contributed to financial barriers for these countries to introduce the vaccine.¹²

The recurrent cost of delivery of the HPV vaccine is an additional financial barrier to the access of the vaccines in LICs and LMICs.¹³ As per a costing study of the early introduction efforts, the financial cost of delivery of HPV vaccines through a school-based vaccination, proven to be the most effective route of delivery to date, is US\$1.80 per dose, much higher than the facility or outreach-based strategies used for other pediatric vaccines.¹³ This does not take account of the introduction costs related to generating demand and social mobilization needed for high coverage, which are greater for HPV than other vaccines.

3.3 | Lack of prioritization

Introduction and maintenance at scale in LICs and LMICs requires policy and leadership commitment to the elimination of cervical cancer. Competing priorities such as the introduction of other vaccines against pneumococcal and rotavirus disease, with support from pediatric interest groups, may have taken precedence over the introduction of the HPV vaccine in some countries.¹⁴ While HPV vaccine costs are similar or lower than other new vaccines, delivery costs appear higher than the childhood vaccines.^{13,15} Countries with larger populations such as India (which bears nearly one-fifth of the global burden of cervical cancer) have been slower to introduce the HPV vaccine, and localized efforts there demonstrate the critical importance of both political commitment and evidence of cost-effectiveness.¹⁶ Other constraints on prioritization can include the fact this is specifically a women's disease, often under-recognized where cancer registries are weak, and that returns on investment take 30 years or longer to become apparent.

3.4 | Challenges of vaccinating adolescent girls

Although HPV vaccines require a new immunization platform, LICs and LMICs can perform as well as HICs: a majority of countries have coverage over 50% and many exceed 80%.^{9,15,17} This is enabled for most through a school-based delivery strategy¹⁸; however, policy makers and program managers raise increasing

concerns with its costs^{18,19} and the inequity of missing girls who are not in school.^{15,18,20} While out-of-school girls could be vaccinated in health facilities,¹⁷ in reality the uptake is inconsistent, and reaching this marginalized group is not yet adequately planned, resourced, measured, and monitored.^{18,20} Other constraints on school-based vaccination may relate to rumors and reluctance from the community or staff.^{21,22} School managers may also add barriers by requiring procedures of written consent and, in some cases, not allowing the vaccination on the school premises, more often in private institutions, and especially important in urban areas.²⁰ Reaching a consistent high coverage of a second dose has also been a challenge for some contexts^{20,23} due to weak mechanisms for tracking girls for follow-up after their first dose. Identifying the number and location of out-of-school girls,^{18,20} as well as timely, accurate enumeration of all girls is a challenge in most countries as the sources of data, in particular for denominators, are either outdated or inaccurate.¹⁵ Vaccinating HIV-positive girls with the recommended three doses of the HPV vaccine has been another important challenge, contributed partly by the sub-optimal linkages of the HPV vaccination interventions with the HIV-prevention programs.²⁰

3.5 | Shortage of vaccine supply

While Gavi's new pricing and advocacy has led to increased demand from LICs/LMICs, access to the vaccines has recently been affected by the limited vaccine supply. After 2017, introductions were affected by a global vaccine shortage available to LICs/LMICs, largely due to the fact that increasing global demand, including from Gavi-eligible countries, outpaced the production capacity and ongoing scale-up efforts of one manufacturer. This disruption to supply is expected to affect new national introductions in LICs/LMICs until 2024,¹² by when availability of supply is expected to improve from both existing and new manufacturers which will thus delay access to HPV vaccines. Vaccination of adult women (with three doses) in the private sector, as well as the strong increase of vaccination for boys, added in nearly one-third of all countries by 2020, has exacerbated the supply demand gap. Despite the gap, it is important for countries to continue to plan for increased access so that programs can rapidly scale up to meet the 90% coverage target as vaccines become available.

4 | DISCUSSION: A FIVE "I" FRAMEWORK FOR ACTION

Understanding these challenges is an important first step to plan towards achieving the 2030 targets of 90% coverage with the HPV vaccination. It is only fair to note that introduction of the HPV vaccine in LICs/LMICs only began at scale over the last few years. However,

there is sufficient experience now to highlight key opportunities for acceleration and identify where innovation can best contribute to move from the current global coverage levels of 15%¹¹ towards the targets of 90% coverage by the year 2030. From analysis of the challenges presented above, a framework for action was proposed for global and in-country stakeholders to organize and harmonize efforts to reach the levels of access needed to achieve the 2030 targets. This multidimensional framework addresses most of the determinants of consistent, high, and equitable coverage and identifies potential new levers and drivers for rapidly expanding access in LICs/LMICs.

5 | INNOVATION

Innovation is needed in multiple areas to improve vaccine products as well as delivery, especially in resource-constrained settings. Thankfully, some promising developments are currently in progress that can alleviate some of the challenges discussed above.

5.1 | Innovation in the vaccine market

The price and supply of the HPV vaccine had been a major barrier for countries with the highest disease burden, despite Gavi's successful market shaping to US\$4.50 per dose. New vaccines can improve supply and create a healthier market. The current mainstays, GSK's Cervarix (HPV2) and Merck's Gardasil (HPV4) and Gardasil 9 (HPV9),¹² are expected to be joined by the Inovax (China) vaccine (which is undergoing WHO prequalification review) and other new entrants, such as those from Serum Institute of India (India) and Walvax (China) in the next few years.²⁴

5.2 | Innovation in vaccine products

Another innovation applicable to HPV vaccines is the controlled temperature chain (CTC). CTC is a program innovation that promotes "on-label" deployment of suitable, accredited vaccines at temperatures outside of the traditional cold chain of +2°C to +8°C.²⁵ Although Gardasil (HPV 4) has already been licensed and prequalified for CTC, and other vaccines may be candidates, this advantage has rarely been exploited. Countries could leverage the capacity of CTC to save costs and enable easier outreach in schools and small facilities, and in going the last mile through community outreach to reach out-of-school girls.²⁶

Microarray patches (MAPs, also known as microneedle patches), or other needle-free solutions, are a promising innovation as a potential alternative method of vaccine delivery; however, their potential for HPV vaccines is not yet known. MAPs offer clear advantages in easier delivery through self-administration or by lesser-trained staff as well as easier waste disposal. Some may also offer better

vaccine thermostability, easing burdens on the cold chain.²⁷ All these are especially beneficial to low-resource settings, including for school-based vaccinations where teachers or community health workers for out-of-school girls could act as potential administrators of the vaccine.

5.3 | Innovation in dosing and schedule

For the priority target population of girls aged 9–14 years, the HPV vaccine is currently delivered under a two-dose regimen, at intervals of at least 6 months.²⁸ LICs/LMICs are challenged to finance two doses of a relatively expensive vaccine, and institute tracking and follow-up to ensure good coverage of the second dose.²⁸ A single dose schedule, if effective, thus offers many gains in both cost and simplicity of delivery. Some existing studies show that a single dose of the HPV vaccine may potentially be protective against HPV infection for healthy young girls²⁹ but the quality of existing evidence is not robust enough for a global recommendation.³⁰ Randomized controlled trials, observational studies, and modeling analyses are underway to evaluate the efficacy, immunogenicity, effectiveness, and cost-effectiveness of a single-dose HPV vaccination.³¹ These randomized controlled trials and observational studies, along with ecological studies from Australia, Denmark, Scotland, USA, and Mongolia, will be reporting in the near future and the evidence is expected to be evolving rapidly.

The WHO Strategic Advisory Group of Experts on Immunization (SAGE) will continue to review evidence on the single dose as it becomes available,³⁰ such that global policy may change in some years. A single dose could be a game changer, by reducing the financial cost of the vaccine, increasing the ease of delivery, and balancing the supply-versus-demand scenario.

5.4 | Innovations in programs providing vaccination

In November 2019, WHO SAGE reinforced the continuing benefits of programmatic innovation, including maximizing service delivery efficiencies in the light of global supply constraints. These included that “Countries introducing HPV vaccine should consider initially targeting an older cohort of girls (e.g. 13 or 14 years old), as this strategy will retain the maximum disease impact...” while noting the inherent challenges of reaching an older age group and achieving a high coverage of the second dose.³² Gavi and alliance partners adopted a similar strategy to maximize the number of HPV vaccine launches, in asking countries to introduce with a single age cohort only until sufficient supply is available.³³

The same deliberations proposed consideration of an extended interval between doses: “Countries could adopt a ‘1 + 1’ schedule with an extended interval of 3–5 years between doses for younger girls (e.g. first dose provided at 9 or 10 years old or lower school grade) and taking measures to ensure that the girls receive two doses each. This strategy constitutes an off-label use of the vaccine”.^{30,32}

One caution is that countries adopting this approach will also need to overcome the programmatic challenges of tracing, registering, and reminding girls for catch-up, and carefully consider the risks related to the age of onset of sexual activity in their setting.^{30,32}

A priority for programmatic innovation is to more explicitly define and promote the hybrid approach to service delivery that complements school-based vaccination with stronger facility-based vaccination,¹⁷ especially when integrated with wider adolescent health services (see “Integration,” below). This recognizes the inherent limits of school-based strategies, as well as their relatively higher delivery costs. Most countries are already implementing some form of hybrid programs; however, there are gains to be made in increasing the attention on facility-based approaches in settings where many girls are not regularly attending school, when coupled with strong demand generation efforts to attract more girls to the facilities. Several countries such as Tanzania and Senegal are using this mix, sometimes in select regions, lessons from which can help standardize such strategies in other countries in the future.²⁰

6 | INVESTMENT

6.1 | Global investments

Achieving the goals for the elimination of cervical cancer will need a significant increase over current levels of global health investments, with a revision to spending priorities. Accounting for one-quarter of health spending in LICs, 32.1% of development assistance for health was aimed at reproductive, maternal, newborn, and child health services, and only 2% of Development Assistance for Health was allocated to cancers and other non-communicable diseases that account for over 60% of the global disease burden.³⁴ Both maternal health and cervical cancer are women's health issues, but cervical cancer receives significantly less funding than maternal health.³⁵ Additionally, while there is strong recognition of the relationship between HIV and HPV infections, there is a need to leverage the investments in HIV prevention efforts for increasing access to the HPV vaccination.³⁶ The diversion of funding to and projected reductions in government budgets due to the COVID-19 emergency will also have a major effect, as discussed below.

Of the total US\$10.5 billion financing needs for the elimination of cervical cancer, 59% are for vaccination programs, with 41% for cancer prevention programs.⁵ During 2021–2025, Gavi expects the demand for the HPV vaccine, in the LICs and LMICs it supports, to comprise 84 million girls vaccinated (meaning 1.4 million deaths averted) if availability of supply improves through increased production by existing manufacturers and new vaccine entrants. The expenditure expected during this period is about US\$516 million.³⁷ While Gavi countries have access to low prices, non-Gavi countries may find the price of the vaccine to be a key barrier, as they pay up to three times the Gavi price (twice for PAHO countries).¹² These financial barriers limited MICs in introducing this vaccine.^{24,38} There

is a need for global investments in further market-shaping efforts that can reduce the financial barriers to vaccines in non-Gavi eligible LMICs and UMICs. PAHO's revolving fund pooled procurement, provided collective bargaining power, and enabled a reduced price for the LMICs in the region, most of which now have introduced. This successful experience in market shaping could inspire other non-Gavi-eligible LMICs and MICs to work collectively to reduce financial barriers.³⁸

Global spending should also be linked to the increasingly recognized benefits of investing in adolescent health and well-being through adolescent health and school health platforms. A number of economic models demonstrate that, even for health interventions alone, a relatively modest investment of US\$4.50 per capita (including HPV vaccination) has a benefit-cost ratio of greater than 10,³⁹ and similar benefits are seen for investments in adolescent well-being beyond the health sector.⁴⁰ These demonstrate the advantages that governments and development partners can expect by synergizing the introduction of the HPV vaccine with broader school health, HIV prevention, and youth development programs noted in the Integration section below.

6.2 | Country-level investment

Countries can leverage external support to introduce the HPV vaccine in the short term, but for longer-term sustainability, their own long-term funding solutions must be developed.⁴¹ An analysis of 12 Gavi HPV demonstration programs¹³ found that the greatest share of financial costs at the country level were social mobilization at approximately 30% (range 6%–67%) and service delivery at about 25% (range 3%–46%), while vaccine costs were the main economic cost driver. Although achieving the highest coverage for the second dose, a school-based strategy did have the highest service delivery cost per dose in comparison with outreach or facility-based vaccination.¹³ From a sustainability perspective, without an existing infrastructure for school-based delivery, countries will incur higher costs for school delivery. Countries are encouraged to take a long-term view to invest in school health programs to advance a range of health interventions for adolescents, including the HPV vaccination.¹³ Sri Lanka integrated the HPV vaccine in their existing school medical health inspection program and achieved 82% coverage for the second dose, as of 2019.^{9,42} Advocacy efforts for sensitizing country policy makers on appropriate and adequate investments for achieving and sustaining high coverage should be prioritized.

7 | INTEGRATION

Integration of the HPV vaccination with other adolescent health services advances progress to 90% coverage targets in several ways. First, it can help share costs of delivering other life-saving interventions, noting evidence that that cost per vaccine dose was lower

when delivery was integrated into existing health services.⁴³ Beyond efficiency, integrated services can be more attractive to girls and their families, boosting demand.⁴⁴ Most importantly, this can expand equitable access to HPV vaccines and other important adolescent health services with high intrinsic benefits,⁴⁰ with vaccination as one gateway of entry to the health system for young people.

There is already a significant body of evidence on the successful integration of adolescent health priorities in school programs.⁴⁵ WHO endorses a menu of evidence-based and short-duration adolescent health interventions to integrate with the HPV vaccination.^{41,46} The challenge for countries is to choose a limited set of highest priorities feasible in their programs. Some of these are being applied in settings such as Malaysia and South Africa and were recently tested by Gavi and Jhpiego in Tanzania.²⁰ There is room to strengthen facility-based adolescent-friendly platforms further in LMICs, including ensuring sufficient human resource capacity, interdepartmental coordination, more integrated planning across HIV and FP programs, and supporting the Expanded Program on Immunization (EPI) team to collaborate with new partners.²⁰ Tailoring integration packages to the preferences of families and girls is of proven effectiveness,⁴⁴ but needs more consistent application, possibly through more widespread use of formal tools to incorporate families' perspectives such as human-centered-design approaches. Inter-generational promotion of cervical cancer screening has been demonstrated in South Africa,⁴⁷ Thailand, the Philippines,⁴⁸ and Cameroon.⁴⁹

Greater synergy and convergence across global strategies and investments can help ensure these country integration experiences work to accelerate the HPV vaccination. An inter-agency coordination mechanism including funders, technical partners, and implementers could facilitate the exchange of information and ideas on integrated programming and collaborate on joint operational frameworks to harmonize across funders. There may be scope for a pooled funding mechanism for investments to promote co-design and delivery of integrated services. Vaccination goals would also be advanced by consensus on integrated program metrics, both in schools and beyond, linking these to broader movements in measuring global progress in adolescent well-being.⁵⁰

8 | INFORMATION (DATA FOR DECISION-MAKING)

The availability of quality data related to different dimensions of HPV vaccination programming has been a limitation in designing effective and sustainable strategies for vaccine delivery in resource-limited settings,⁵¹ as discussed above. Stronger data systems at scale are needed to better identify eligible populations and define better quality denominators, including better use of census or school enrolment data in micro-planning and progress assessments.^{17,18,20,51} Improved paper-based or scalable electronic registers, tally sheets, vaccination cards, and reminder systems are critical gaps to be addressed in many countries.^{20,23,41} Investing in the training of teachers and healthcare providers to involve them

more actively in information systems can enable better application of eligibility criteria. For some settings, an age-based strategy can be successful, in which case it is critical to define age by calendar year of births, while in other settings, grade-based eligibility criteria will be optimal.

Mechanisms to enumerate, estimate, and monitor coverage of out-of-school girls is a critical issue about equity, given that girls who are not in school are more vulnerable to health disparities. Community health workers may play an important role in enabling this.

Major gains can be achieved through improvement in tracking girls for their second dose, including more systematic registration of eligible girls, especially those not in school. Zambia²⁰ uses an online electronic registration tool to enumerate and track vaccinated girls, disaggregated by mode of delivery and age cohort, to better understand coverage, dropout rate, and effective local service delivery arrangements.²⁰ Better data on dropout rates can reveal systemic problems such as lack of community confidence in the vaccine or in disruption to supply.^{41,47} Future innovation in digital technologies to identify individual girls and their setting, linked to policy goals and service targets, can both enhance coverage of the first dose and reduce dropouts.

Policy makers also need new approaches to generate reliable estimates on investment and recurring costs for different components of the HPV vaccination at scale in LIC/LMICs.¹⁸ Periodic costing studies could generate data to assess the relative cost and sustainability of different strategies for communication and delivery, enabling programs to revise and adjust, for example, the mix of school- or facility-based delivery. Where possible, new data systems for the HPV vaccination should be integrated into the existing data platforms for other vaccines of the national EPI programs to enable linkages to both policy and program planning.

9 | INFLUENCE (ADVOCACY, COMMUNICATION, AND PARTNERSHIPS)

Rapid expansion of access from the current levels of coverage of the HPV vaccine to the 2030 goals of 90% coverage will need force multipliers at all levels of action. Advocacy, communication, and partnerships are all essential to address the challenges related to demand, investments, and acceptance of the HPV vaccine. Links to global advocacy for the elimination of cervical cancer, increasingly supported by global health agencies and foundations, are important to situate the vaccination appropriately in broader investment and multisectoral coordination discussions on the US\$3 billion needed over 10 years for LICs and LMICs.^{37,42}

The past few years have provided multiple examples of successful efforts to effectively engage the leadership at the highest level from countries that have introduced HPV vaccines. The 2020 Gavi replenishment meetings also drew commitments from key manufacturers to prioritize a sustainable supply for LICs.⁴² Nineteen Gavi countries with successful introductions of the HPV vaccine have demonstrated that strong political will and championing at the highest levels of leadership are important determinants for the prioritization of the national introduction of HPV vaccines among the many competing priorities. Global and national stakeholder commitment will be strengthened by country-specific, costed, measurable, multiyear plans, especially if aligned with secondary prevention efforts.

Meaningful engagement of Civil Society Organizations (CSOs) has been instrumental in creating demand and generating political will for the national introduction of the HPV vaccination in countries across Africa and the Caribbean.^{52,53} Local partnerships and coalitions across professional, cultural, and religious associations, women's and youth groups, and cancer societies, among others, play a critical role in advocacy with the key decision makers such as parliamentarians, policy makers, and communities.⁵⁴ Strong

TABLE 1 A five "I" framework for action on the primary prevention of cervical cancer

Domain	Strategies
Innovation (product and process)	<ul style="list-style-type: none"> • Healthy HPV vaccine market for more equitable and accessible vaccine prices • New vaccine product technologies that can increase ease of vaccination and leverage thermostability (including CTC strategies) • Innovation in dose and schedule • Multidose vaccine vials, especially to support school-based vaccination • Programmatic innovation in delivery of vaccination
Investment (global and local)	<ul style="list-style-type: none"> • Increased and coordinated global Investments • In-country investments for introduction and sustainability • Investments for market shaping for improved access in MICs
Integration (of services and of communications)	<ul style="list-style-type: none"> • Integration at service delivery and demand generation levels • Coordination across global funders to ensure inclusion in adolescent health investments as part of universal health coverage
Information (data for action and accountability)	<ul style="list-style-type: none"> • Strengthening systems to get better, real-time data for understanding gaps in coverage • Data on equity of coverage • Costing data to design most efficient delivery strategies
Influence (advocacy, communications, and partnerships)	<ul style="list-style-type: none"> • Civil society engagement, connections with gender equality initiatives, and advocacy to generate political will • Convergence of action of various stakeholders: products, health systems, public sector, private sector, global investment, in-country investments, community action

Abbreviations: CTC, controlled temperature chain; MIC, middle-income country.

communications are essential to any reproductive health intervention for adolescent girls, and accelerating coverage of the HPV vaccine relies on sustained investments in communication efforts for creating awareness and dispelling myths around the HPV vaccine.⁵⁴

Both funders and efforts to generate demand should also focus on the core need to ensure an uninterrupted supply of the vaccine in LICs/LMICs by renewing commitments to Gavi and increasing catalytic investments to provide technical support countries in their efforts for the introduction and sustained equitable coverage for the HPV vaccination.

10 | STRATEGIES TO COUNTER THE IMPACT OF COVID-19 PANDEMIC

The disruptions to the delivery and utilization of immunization services in wake of the COVID-19 pandemic imperil the gains made over many years to expand the access to essential vaccinations for children and adolescents. Many countries are seeing declines in all immunizations,⁵⁵ including the HPV vaccination, as travel restrictions, school closures, or community concerns limit uptake. The impact of this on girls who are vulnerable (including those not normally in school) is important to include in learning agendas for 2020. Additionally, the probable shift of the focus of the policy makers and international donors towards the introduction of a potential COVID-19 vaccine, coupled with projected decreases in government budgets due to the economic effects of the pandemic, carry the risk of deceleration of the efforts to increase access to the HPV vaccine in LICs/LMICs. While the prioritization of global and national resources and efforts to counter the COVID-19 pandemic is warranted, strategies must be in place to ensure that investments and efforts for the prevention of cervical cancer, including the HPV vaccination, are sustained through and beyond the pandemic. This will call for increased global and national investments for strengthening the resilience of the health systems in the short and intermediate term as well as advocacy and technical assistance to support the LICs/LMICs to manage the multiple priorities with limited financial and system resources.

11 | CONCLUSION

The introduction, provision, and uptake of the HPV vaccination in LICs and LMICs currently falls far short of what is needed to reach the recently adopted global targets for the elimination of cervical cancer of 90% coverage by 2030. The acceleration of introductions in LMICs in the next decade requires new strategic thinking to consolidate learning and invigorate operationalization at the country level. The following are proposed: attention to *innovation* in vaccine products and programs; expansion of *investment*, both globally and locally; *integration* of services and messaging; *information* for action and accountability; and *influence* through advocacy, communications, and partnerships.

CONFLICTS OF INTEREST

Where authors are identified as personnel of the International Agency for Research on Cancer / World Health Organization, the authors alone

are responsible for the views expressed in this article and they do not necessarily represent the decisions, policy or views of the International Agency for Research on Cancer / World Health Organization.

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