

Perspective

Human papillomavirus vaccination with other health interventions in schools

A significant attribute of human papillomavirus (HPV) vaccine introduction in a country is the departure from conventional age groups for childhood vaccination. HPV vaccination primarily uses school-based delivery as the most efficient strategy, considering that the children in this age group are expected to be in primary schools, therefore constituting a captive population.

The school health programme exists in India as a concept but is far from being a well-developed strategy to benefit an estimated 264 million children across all schools¹. As of 2022, 125 countries have introduced HPV vaccination globally, of which 47 countries include vaccination for the boys also². India implemented a demonstration pilot project for HPV vaccination in two districts in the year 2009³.

The year 2024 marks two significant developments—the government budget announcement for introducing HPV vaccination in India⁴, and the development of an indigenous quadrivalent HPV vaccine, Cervavac by Serum Institute of India³. Internationally, many countries have already introduced HPV vaccination with the availability of two vaccines for over a decade², yet in India, producing a vaccine by a domestic manufacturer weighs heavily on the government's decision. This decision to accelerate nationwide introduction is an opportunity to combine relevant health introductions while delivering the HPV vaccine to schoolgirls to expand the objective of reducing the substantial burden of cervical for school children in future.

The National Technical Advisory Group for Immunization (NTAGI) in India has already recommended including HPV vaccination in the universal immunization programme (UIP)⁵. The Indian Academy of Pediatrics (IAP) has recommended routine use of the HPV vaccine with a two-dose schedule in all girls above nine yr of age since 2021⁶. With these developments, it is expected that universal use of HPV vaccination will soon become a reality.

This pathway of delivery through the schools is further simplified with the recent World Health Organization (WHO) recommendation that one dose of HPV is sufficient for high seroconversion comparable to either two or three doses². A single school grade, either sixth or seventh standard that corresponds to the 'entry' level for middle or upper primary level is the core target group for HPV vaccination⁷. This age group in the schools corresponds with the one for other vaccines like tetanus-diphtheria (Td), typhoid, and campaign vaccines, vision screening, hearing screening, dental screening, deworming, iron-folic acid (IFA) supplementation, menstrual hygiene and physical activity. Hence, there is an opportunity to seize the programmatic advantage.

The school system offers a large captive population, which can be reached in an organized manner. The target age group of 9-14 yr is characterized by significant growth, development and cognitive skills development in the life course of an individual. The Government of India (GOI) already has a detailed blueprint for school health programmes under the aegis of *Ayushman Bharat*, where the HPV vaccination is aimed for nationwide implementation, and the joint delivery of other health interventions can be initiated as pilots⁸. The Global Immunization Agenda 2030⁹ recommends a life course and integration of health interventions as strategic priorities.

The age group of 9-13 yr is the target group for several other health interventions including vaccines, screening for vision, hearing, and dental health; mass drug administration of anti-helminthic treatments, iron-folic acid tablets; and life skills education. These interventions are already being implemented in parallel but with different levels of coverage and achievements. The schools are like railway tracks that run different programmes, represented as trains in a coordinated manner. Keeping this in mind, strategic question emerges on whether there can be synergies in integrating multiple health interventions with HPV

vaccination using primary schools as the service delivery platform?

Routine vaccines like HPV (for girls) and Td require parental consent, listing of eligible girls, and recording of coverage by the class teachers. The UIP team delivers the vaccine and monitor reporting of adverse events. Screening for vision, hearing and dental health requires that the school nurse or teachers be trained to conduct the initial test and refer to pre-arranged ophthalmic assistant, audiologist or dental hygienist, respectively. Simple primary testing tools are already available. The teachers can take responsibility for distribution of anti-helminthic treatments and iron-folic acid tablets (for girls only) for deworming and preventing anaemia respectively. Promotion of physical well-being and sports may be integrated in the school timetable for the week; and educational lesson on menstrual hygiene and distribution of sanitary pads for girls can be integrated as part of the curriculum.

Another global development last year regarding effectiveness was the recommendation for one dose of HPV vaccine instead of two doses due to comparable high seroconversion rates². This provides an operational ease for the programme implementation in the schools because of the need for one contact only with each girl.

Importance of school for multiple health interventions: The health and well-being of school-going children have received little attention compared to under-five age group children. For many reasons, the schools present a potentially effective platform for delivering health and nutrition interventions in developing countries. As per the latest United Nations Educational, Scientific and Cultural Organization (UNESCO) data¹, the gross school enrolment in India is 112.3 per cent for year 2023, meaning that most children are expected to be found in primary schools as a captive group. The absolute number is 264 million school children in India. The data shows a consistent increase for last 50 years¹.

The school and health systems are well developed in their respective domains but with limited contacts and coordinated activities. Globally, only a handful of the countries have mature school health programmes. The National Health Mission (NHM) of the GOI formally issued the operational guidelines, training curriculum, and training-IEC materials for the school health programme in 2018 under the aegis of *Ayushman Bharat*⁸. However, this is ambitious in its scope and

focuses mainly on the learning aspects for the school children rather than other interventions.

Growth and development during the life course are most prominent in the school-age group, alongside the development of cognitive and intellectual skills. This is a critical life transition period where individual problems can be picked up through screening and assisted with health interventions and nutrition supplementation for course correction. For example, uncorrected refractive errors will limit learning capabilities later in life and are best picked up early in schools.

Age group and school grade for HPV vaccination: HPV vaccination is targeted for girls aged nine yr and above corresponding to the sexual debut or prior. Operational ease is better when targeting a single school grade for HPV vaccination than a single age group spread across multiple grades. This age group also corresponds to the higher level of primary education, also known as middle school entry.

The recent recommendation from the WHO that one dose of HPV vaccine is as effective as two or more doses has significant operational implications². This recommendation followed a review that at 24 months post-vaccination, over 97.5 per cent of participants in all dose groups for both vaccines were seropositive and that a single dose of HPV16/18 produced antibody responses that were non-inferior. It is safe to assume that in India, the Indian government would revise its recommendation for the use of one dose only. This leads to the question of what other health interventions may be combined while delivering the HPV vaccine in the schools, bearing in mind that the HPV vaccine is delivered to girls only as per current policy.

Health interventions that can jointly be delivered with the HPV vaccine in the schools: WHO has reviewed the potential interventions that can be delivered with the HPV vaccine⁹. The selection criteria included public health relevance; duration of the intervention for a single contact with the school children for delivery of HPV vaccination schedule; appropriateness for the 9–13 yr age group for both girls or boys; quality of the evidence-base on the effectiveness of the interventions in low and middle-income countries; and the programmatic feasibility of simultaneous delivery.

WHO further recommends four health interventions for co-delivery with the HPV vaccine in schools⁹. These are other vaccines in use and relevant for the

school-age group, health commodities and treatment, screening for critical sensory functions and promotion of life skills. The selection of the interventions considers current policies for these interventions, the screening tools and availability of the personnel for screening and treatment, the availability of the selected health commodities for distribution, and training materials for life skills. For the screening services, a pre-arranged referral system is to be agreed upon for time-bound examination and provision of aids when required. An example is the vision screening programme, where the trained teachers conduct the initial screening in the school, and children with suspected errors are referred to an ophthalmic assistant or optometrist on scheduled dates for examination and provision of corrective eyeglasses.

School teachers are vital to implementing the HPV vaccination or other interventions, either for service delivery or as facilitators to the health professionals deputed to conduct these services. A single-grade student (6th or 7th) would serve best as the primary target group unless an intervention requires other class grades, for example, a multi-age HPV campaign in the first year of introduction.

Evidence base for integration of health interventions for joint delivery with HPV vaccine in schools: A global review of school health services in 2015¹⁰ reported existence of school health services in 102 countries with variable coverage and types of interventions. The services were provided mostly from the schools, in 97 out of 102 countries. The top four interventions included vaccination, life skills education, vision screening and nutrition.

Actual field examples⁹ of successful simultaneous delivery of interventions and programmatic synergies with HPV vaccination have been observed in several low- and middle-income countries: Bhutan and Uganda combined HPV vaccination with deworming treatment; Uganda linked HPV vaccination with Child Health Days; Rwanda delivered HPV vaccine together with another vaccine (Measles & Rubella); and Malaysia and Panama integrated HPV vaccination into the routine school health programme for adolescents.

A new programme needs policies, finances, and human resources for implementation. It can be argued that these are available in India. For the year 2024-2025, the GOI has allocated a budget of INR 31,967 cr for NHM, including dedicated earmarking of

INR 24,750 cr for the flexible pool for reproductive and child health and health system strengthening, national health programmes and national urban health mission⁴. The interventions mentioned above can take advantage of these budget allocations for wide-scale implementation of the programme, which is contingent upon the explicit priority for school health as part of the education system accorded by the individual states.

Implementing the school health platform: The HPV vaccination initially was advocated and implemented as a pilot programme in two districts each across many countries including India³. The lessons underscored³ that implementation on scale through school health system is a good choice³.

Previously, the screening for the refractive errors was piloted in five pilot districts in India¹¹. It is, therefore, a good approach to pilot the wider delivery of the health interventions with HPV vaccine delivery in three types of situations to correspond to the administrative and governance set up in India – (i) 50 schools of different types across India; (ii) five districts in different geographic regions; and (iii) one full State of medium size with 10 to 50 million population.

To conclude, the introduction of an annual routine HPV vaccination for a new cohort of girls can create a platform for India to systematically integrate other health interventions on scale. One concerted push in the next two years will lead to the incremental establishment of a robust school health programme by 2030. Furthermore, this approach will align with the Strategic Priority 4 (SP4) of the global immunization agenda 2030 (IA2030)—on life course and integration¹².

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References

1. Ministry of Education, Department of School Education & Literacy. Government of India. *UDISE+ school data capture*. Available from: <https://udiseplus.gov.in/#/en/page/udise>, accessed on August 29, 2024.
2. World Health Organization. *Weekly epidemiological record. Human papillomavirus vaccines, WHO Position paper (2022 update)*. Available from: <https://iris.who.int/bitstream/handle/10665/365350/WER9750-eng-fre.pdf?sequence=1>, accessed on August 29, 2024.
3. Gupta S, Kumar, P, Das BC. Challenges and opportunities to making Indian women cervical cancer free. *Indian J Med Res* 2023; 158: 470-75.
4. Government of India. *Interim Budget 2024-2025. Speech of Nirmala Sitharaman, Minister of Finance*. Available from: [https://www.indiabudget.gov.in/doc/bspeech/bs2024_25\(I\).pdf](https://www.indiabudget.gov.in/doc/bspeech/bs2024_25(I).pdf), accessed on July 30, 2024.
5. Press Information Bureau. Ministry of Education, Government of India. *Centre urges states to create awareness and take steps for prevention of cervical cancer among girl students*. Available from: <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1885597>, accessed on August 29, 2024.
6. Indian Academy of Pediatrics. *Human papillomavirus vaccines (HPV vaccine)*. Available from: <https://acvip.org/files/HPV-vaccine.pdf>, accessed on August 29, 2024.
7. World Health Organization. *Global strategy to accelerate the elimination of cervical cancer as a public health problem*. Available from: <https://www.who.int/publications/item/9789240014107>, accessed on July 30, 2024.
8. National Health Mission. Ministry of Health & Family Welfare. Ministry of Human Resource & Development. Government of India. *Operational guidelines on School health programme under Ayushman Bharat*. Available from: https://nhm.gov.in/New_Updates_2018/NHM_Components/RMNCHA/AH/guidelines/Operational_guidelines_on_School_Health_Programme_under_Ayushman_Bharat.pdf, accessed on August 29, 2024.
9. World Health Organization. *Options for linking health interventions for adolescents with HPV vaccination*. Available from: https://cdn.who.int/media/docs/default-source/immunization/hpv/linking_interventions_hpv_en.pdf?sfvrsn=c0cef192_11.
10. Baltag V, Pachyna A, Hall J. Global overview of school health services: Data from 102 countries. *Health Behav Policy Rev* 2015;2: 268-83.
11. Jose R, Sachdeva S. School eye screening and the National program for control of blindness. *Indian Pediatr* 2009; 46 : 205-8.
12. World Health Organization. *Immunization agenda 2030, a global strategy to leave no one behind*. Available from: <https://www.who.int/docs/default-source/immunization/strategy/ia2030/ia2030-document-en.pdf>, accessed on July 30, 2024.