DELPHI CONSENSUS
ON
CERVICAL CANCER

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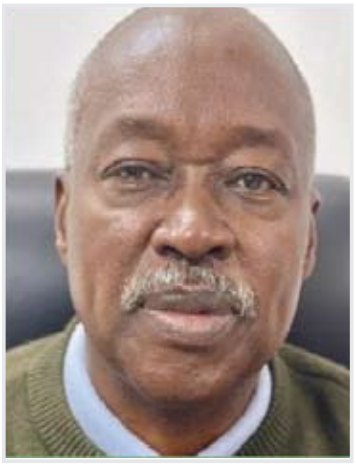
THE SOUTH SOUTH SOUTH CONSENSUS ON CERVICAL CANCER

Science Integra®

Message from Dr. Hrishikesh Pai

Dr. Hrishikesh Pai
Trustee for Asia Oceania FIGO



Dr. Blami Dao
Trustee for Africa FIGO

Dr. Nestor Garello
Trustee for Latin America FIGO

Dear Colleagues,

It is with great pride and a deep sense of global responsibility that I present the DELPHI Consensus on Cancer Screening—a landmark international initiative aimed at shaping the future of cancer prevention through early detection.

This important publication is the culmination of multiple structured rounds of expert consultation, built on the foundation of the DELPHI methodology. What sets this consensus apart is the breadth and diversity of its contributors: leading voices from the Asian, African, European, and South American continents, all representing FIGO, other key global societies and institutions, came together with a shared mission—to define best practices in cancer screening that are both evidence-based and globally relevant.

These deliberations brought to the table not only scientific expertise but also real-world experience from varied healthcare systems, cultural contexts, and resource settings. The result is a consensus that is not only academically rigorous but also practical and adaptable to local and regional needs.

This is more than a guideline—it is a global call to action. It is a demonstration of what international collaboration in medicine can achieve when driven by purpose, inclusivity, and a common goal: to save lives through early detection and equitable access to care.

I encourage clinicians, public health leaders, policymakers, and institutions worldwide to adopt and implement the insights from this consensus. Let us work together to bridge the gaps in cancer screening, reduce disparities, and move toward a future where preventable cancers are caught early and treated effectively—everywhere, for everyone.

With shared vision and unwavering commitment.

Dr. Hrishikesh Pai

Dr Blami Dao

Dr. Nestor Garello

Dr. Sunita Tandulwadkar

Dr. Rishma Pai

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Insights from Two Rounds -
Delphi Consensus on Cervical Cancer

Round 1 at FOGSI South South Conclave 2025

FOGSI South South Conclave 2025, held in New Delhi on 10th April 2025, was led by Hrishikesh Pai and Blami Dao, FIGO Trustees for Asia-Oceania and Africa region respectively along with Sunita Tandulwadkar, Rishma Pai, Nandita Palshetkar, Suvarna Khadilkar and Hema Divakar. The Conclave witnessed the participation from 14 FIGO Member Societies (7 from Africa and 7 from Asia) for strengthening Afro-Asian Collaboration and the representatives were Abdulfetah Abdulkadir & Hailemariam S Abawollo (Ethiopia), Blami Dao (Burkina Faso), Ditas Cristina Duque Decena (Philippines), Farhana Dewan (Bangladesh), Hrishikesh Pai (India), Justus Barageine (Uganda), Litia Narube (Fiji), Sanath Akmeemana (Sri Lanka), Sarikapan Wilailak (Thailand), Saroja Karki Pande (Nepal), Sunday Dominico (Tanzania), SY Telly (Guinea), Victor Muela Difunda & Dieudonne Sengeyi (Congo) and Youssouf Traore (Mali). All the 14 representatives of FIGO Member Societies had an interactive session where each of the country's Vision, Challenges, Solutions and Initiatives in OBGYN were discussed.

The Conclave featured dynamic scientific program comprising of insightful speaker sessions, engaging panel discussions, and interactive round table meetings where Round 1 of Delphi Consensus on Cervical Cancer took place. The participants were:

Editors	:	**Dr. Hrishikesh Pai, Dr. Blami Dao**
Co-Editors	:	**Dr. Sunita Tandulwadkar, Dr. Nandita Palshetkar,**
		Dr. Rishma Pai, Dr. Suvarna Khadilkar
		Dr. Hema Diwakar
Convener	:	**Dr. Priya Ganeshkumar and Dr. Shobha N Gudi**
Participants	:	**Dr. Rishma Pai, Dr. Blami Dao, Dr. Barageine Justus,**
		Dr. Hailemariam S Abawollo, Dr. Samson Chisele, Dr. Sarikapan Wilailak,
		Dr. Victor Muela Difunda, Dr. Youssouf Traore, Dr. Apurba Dutta,
		Dr. Bhagyalaxmi Nayak, Dr. Bharti Maheshwari, Dr. Bindya Gupta,
		Dr. Mala Srivastava, Dr. Maninder Ahuja, Dr. Neerja Bhatla, Dr. Vidya Thobbi,
		Prof. Seema Hakim, Dr. Parveen Roshan
Content Partners	:	**Science Integra - S. Subramanian and Pragya Kahar**

Round 2 - at FOGSI Femmtek V Conference 2025

FOGSI Femmtek V Conference - New Advances in Reproductive Medicine, Gynaecology & Obstetrics, held in Mumbai from 2nd-3rd August 2025, was led by Hrishikesh Pai FIGO Trustee for Asia-Oceania region Néstor Garello - Trustee for Latin America along with Sunita Tandulwadkar, Nandita Palshetkar, Rishma Pai, Suvarna Khadilkar and Hema Divakar.

The 13 participants who attended from across the globe were Agnaldo Lopes da Silva Filho (Brazil), Giuseppe Trojano (Italy), Hani Fawzi (UK), Ismail Mete Itil (Turkey), Kenneth B Ruzindana (Rwanda), Muna Tahlak (UAE), Nestor Garello (Argentina), Okechukwu Ikpeze (Nigeria), Pere Bresco & Maria Degollada (Spain), Sambit Mukhopadhyay (UK), Stephen Rulisa (Rwanda) and Unnop Jaisamrarn (Thailand). The meeting brought together these 13 representatives from FIGO Member Societies in an engaging exchange, where they shared their respective country perspectives, including their vision,
key challenges, proposed solutions, and ongoing initiatives in the field of OBGYN.

The Conference offered a rich scientific agenda with thought-provoking lectures, stimulating panel dialogues, and collaborative roundtable discussions, during which the second round of the Delphi Consensus on Cervical Cancer was conducted. The participants included:

Editors	:	**Dr. Hrishikesh Pai, Dr. Nestor Garello**
Co-Editors	:	**Dr. Sunita Tandulwadkar, Dr. Nandita Palshetkar, Dr. Rishma Pai, Dr. Suvarna Khadilkar, Dr. Hema Diwakar**
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Content Partners	:	**Science Integra - S. Subramanian and Pragya Kahar**

Delphi Consensus Study on Cervical Cancer Prevention Strategies focusing on optimizing HPV Vaccination and Screening Protocols

Abstract

Background: Cervical cancer is the second most common cancer among women of reproductive age worldwide, with persistent infection by oncogenic human papillomavirus (HPV) as the principal cause. HPV types 16 and 18 account for nearly 71% of cases globally.[1] Optimal integration of HPV vaccination and screening strategies is critical to achieving the WHO's 90-70-90 cervical cancer elimination targets. Despite the availability of effective vaccines and screening methods, significant gaps in implementation and practice standardization remain, underscoring the need for expert consensus.

Objective: To develop expert consensus recommendations on HPV vaccination schedules, target populations, and cervical screening protocols.

Method: A modified Delphi process was conducted with a multidisciplinary expert panel.

Results: Consensus was achieved on 28 key recommendations on barriers to cervical cancer reduction prevention strategies, HPV transmission, HPV vaccination policy, and screening protocols.

Conclusions: The strong consensus on evidence-based interventions—such as HPV vaccination, DNA-based screening, and standardized diagnostic pathways—provides a robust foundation for advancing cervical cancer elimination efforts in India and globally. Areas of limited agreement, particularly on screening intervals and lesion management, warrant further study, local piloting, and continuous feedback loops to ensure care delivery.

Supplementary data are provided in supplementary Table 1.

Key words: Cervical cancer, human papillomavirus, screening, HPV vaccination.

Background

Cervical cancer remains a major global public health concern, ranking as the second most common malignancy in terms of both incidence and mortality among women of reproductive age.[1] The burden is disproportionately higher in countries with the lowest Human Development Index (HDI), reflecting inequities in prevention, screening, and access to care.[2] In India, cervical cancer ranks as the second most common cancer among women, accounting for 18.3% of new cases and 18.7% of cancer-related deaths in 2020, with a 5-year prevalence of 18.8%.[3] Persistent infection with oncogenic human papillomavirus (HPV) is the established primary cause, with HPV types 16 and 18 alone accounting for approximately 71% of cervical cancer cases worldwide.[4] These epidemiological realities highlight the critical importance of effective prevention strategies, including widespread HPV vaccination and evidence-based cervical screening protocols.

Cervical cancer is a largely preventable and treatable disease, with substantial reductions in incidence and mortality observed in countries that have successfully implemented widespread screening programs and HPV

vaccination. Despite these advances, cervical cancer continues to pose a major global public health challenge, particularly in low- and middle-income countries (LMICs), where gaps in vaccine coverage, screening access, and healthcare infrastructure persist.[5,6]

Progress in reducing premature cancer mortality has been modest—only 11.5% between 2015 and 2030—falling short of the Sustainable Development Goal target of a one-third reduction.[7] The age-standardized incidence rate of cervical cancer in India was estimated at 12.1 cases per 100,000 women (2016), with a corresponding burden of 223.8 disability-adjusted life years (DALYs) per 100,000 women.[3]

Despite the establishment of the National Program for Prevention and Control of Non-Communicable Diseases (NP-NCD) in 2010, cervical cancer screening uptake in India remains alarmingly low, with less than 3% of eligible women ever screened. This striking gap, particularly between urban and rural populations, underscores the urgent need to scale up prevention strategies if a country is to meet the WHO elimination threshold of 4 cases per 100,000 women-years by 2030.[3]

Methods

Study design

A modified Delphi methodology was employed, beginning with a structured set of evidence-based statements derived from a systematic literature review and existing WHO, FIGO, and national cervical cancer prevention guidelines.

Expert panel

- **Composition:** 13 experts (gynecologic oncologists) from India and ..... countries across high-, middle-, and low-income categories.
- **Inclusion criteria:** Clinical/research experience in cervical cancer prevention.

Rounds

Round 1

A total of 34 draft statements circulated for rating on a 9-point Likert Scale (1 = strongly disagree, 9 = strongly agree). Consensus definition: ≥80% of panelists scoring 7–9.

Round 2

Statements failing to reach consensus were revised based on Round 1 feedback and re-circulated. New statements proposed by the panelists in Round 1 were added.

Data analysis

Quantitative: Agreement proportions and mean scores calculated; Qualitative: Thematic analysis of comments to inform statement revisions.

Grading of statements

After two Delphi rounds, the level of agreement for each statement was evaluated and categorized using a predefined grading scale (Table 1).

Table 1. Grading system

Grade	Level of agreement	Description
Grade U	100%	Unanimous consensus
Grade A	90–99%	Near-unanimous consensus
Grade B	78–89%	Strong agreement with minimal variance
Grade C	67–77%	Moderate agreement
Grade D	<67%	Below consensus threshold

A supermajority rule was applied to determine consensus, defined as agreement by more than 67% of the expert panel on a given statement.

The initial round consisted of 34 questionnaire items, answered by 13 expert panel. Over the course of the Delphi rounds and the subsequent in-person consensus meeting, six statements were removed by the expert panel due to redundancy or conceptual overlap.

Our iterative changes throughout the process yielded 28 final statements (Table 2), all with >67% consensus summarized in Table 2.

Results

Panel Participation

- Round 1: 100% responses
- Round 2: 100% responses.

Consensus outcomes

Table 2. Iterative changes throughout the process yielded 28 final statements

Item	Topic	Grade
1	Barriers to Cervical Cancer Reduction	
1.1	Cervical cancer mortality in India is driven by multifactorial barriers, including lack of awareness, limited screening coverage, poor healthcare infrastructure, and socioeconomic disparities	U
2	Prevention Strategies	
2.1	HPV vaccination, screening, and early treatment—as the most effective prevention strategy	A
	A dedicated national mission should be established for cervical cancer elimination. Public-private partnerships should also have a role in expanding access and resources. There is a need for increased budget allocation to support sustainable program implementation.	C
3	HPV Transmission	
3.1	HPV is transmitted via skin-to-skin, skin-to-mucosa, and sexual contact and blood transfusion was unanimously rejected as a transmission mode	U
3.2	HPV be passed from a mother to her child during	U
3.3	HPV vaccine does not cause fertility issues in the future	U
4	Vaccination Policy	
4.1	The major challenges in achieving 90% HPV vaccination coverage are affordability, inequitable access, and lack of government prioritization. Additional concerns included limited provider awareness, parental hesitation, and vaccine safety perceptions.	U
4.2	HPV vaccination should be included in India's Universal Immunization Program (UIP).	U
5	Screening Protocols	
5.1	hrHPV testing as the gold standard where feasible	U
5.2	HPV DNA testing (self-sampling) is the most feasible option, including LMIC	U
5.3	Screening needed even if HPV vaccine is given before sexual debut	U
5.4	It is recommended that girls aged 9–14 years are to be routinely given HPV vaccination	U
5.5	Screening for cervical cancer should begin at 25 years to 30 years	C
5.6	The exit criteria from the cervical cancer screening are age 60 years with 3 negative cytology tests or 2 negative HPV tests within 10 to 5 years respectively.	C
5.7	In LMIC, "twice in a lifetime" (ages 35 & 45) strategy is recommended for hrHPV testing	U
5.8	If hrHPV testing is unavailable, VIA /cytology every 3–5 years is most viable for LMIC	U
5.9	LMIC should adopt both screen-triage-and-treat and screen-and-treat approaches, depending on regional healthcare capacity	D
5.10	For immunocompromised patients, HPV testing should be done every 3 years, if it is unavailable annual PAP is acceptable option.	U
6	HPV vaccination	
6.1 6.2	Optimal dose of HPV vaccine schedule be piloted in LMIC for girls/boys aged 9–20 years Compromised dose HPV vaccine schedule should be discouraged in LMIC for girls/boys aged 9–20 years	U
6.3	Recommend adopting WHO's reduced-dosage HPV vaccine schedule (single dose for ages 9–20)	A
6.4	*HPV vaccination is recommended for regularly screened women, particularly high-risk subgroups*	C
6.5	HPV vaccination drastically reduces cervical cancer risk but screening is essential to address non-vaccine HPV types and protect unvaccinated populations.	C
6.6	Extended genotype PCR-based hrHPV DNA tests be recommended as the primary screening method	B
6.7	The non-valent HPV vaccine offers significantly broader protection than the Quadrivalent vaccine.	A
6.8	For Pap ASCUS, reflex HPV testing where liquid-based cytology is preferred, with colposcopy for HPV+ cases.	D
6.9	For LSIL with unknown HPV status, immediate colposcopy is recommended	D
6.10	For CIN1, 12-month colposcopy follow-up, with immediate treatment (27.3%) reserved for high-loss settings.	D
6.11	Ablative therapy for CIN2+ is appropriately qualifying patient. Microinvasion on biopsy and prior treatment failure with LEEP are acceptable alternatives	U

Results

This Delphi study achieved strong consensus on core strategies for HPV vaccination and screening integration. This Delphi study achieved a high level of consensus across key domains related to cervical cancer prevention and control in India. Among the 34 evaluated statements, a significant majority (over 80%) received Grade A or U, indicating strong to unanimous agreement among the expert panel.

Barriers and prevention

There was unanimous consensus (Grade U) recognizing the multifactorial nature of cervical cancer mortality in India, including systemic gaps in awareness, screening, and healthcare access. Experts strongly supported HPV vaccination, screening, and early treatment as the cornerstone prevention strategy (Grade A), although policy suggestions such as establishing a national mission or increasing budget allocation received only moderate agreement (Grade C), reflecting varied perspectives on implementation feasibility.

HPV transmission and vaccination policy

Experts unanimously rejected blood transfusion as a mode of HPV transmission and confirmed other well-known routes (Grade U). There was full consensus that HPV vaccination should be included in India's Universal Immunization Program (Grade U), addressing barriers like affordability and awareness (Grade U).

Screening recommendations

There was strong to unanimous agreement that hrHPV DNA testing, including self-sampling, should serve as the gold standard where feasible (Grade U). Importantly, the need for screening despite prior vaccination (Grade U) reflects the panel's emphasis on comprehensive risk mitigation. However, screening age parameters and exit criteria only reached moderate consensus (Grade C), suggesting variability in practice preferences and local capacity.

Approaches like screen-and-treat received divergent views (Grade D), highlighting the need for contextual adaptation based on regional infrastructure.

Vaccination schedules and diagnostic strategies

The panel endorsed the WHO's single-dose HPV vaccination schedule for ages 9–20 (6.3, Grade A), while also warning against compromised dosing (Grade U).

In the domain of vaccination policy, the panel endorsed the inclusion of HPV vaccination within India's UIP and highlighted key challenges such as affordability, accessibility, and misinformation. A universal recommendation was made to administer the HPV vaccine to girls aged 9–14 years, and further, to pilot optimal dose schedules for boys and girls aged 9–20 years while discouraging compromised dosing strategies. These positions reflect a unified stance on integrating scientifically validated, population-wide vaccination efforts—especially in low- and middle-income countries (LMICs).

Broader protection offered by nonavalent vaccines was also validated (Grade A). However, screening and vaccination strategies in high-risk or vaccinated groups drew only moderate consensus (Grade C), reflecting gaps in longitudinal data and implementation logistics.

Diagnosis and management of lesions

Strong agreement (Grades A–U) was reached for diagnostic steps like reflex HPV testing for ASCUS, and ablative therapy for CIN2+. However, management of LSIL and CIN1 showed low consensus (Grade D), indicating ongoing debate over risk thresholds and overtreatment concerns.

Discussion

This Delphi consensus study provides a comprehensive assessment of cervical cancer prevention strategies in the India and in global context, with a specific focus on HPV vaccination and screening protocols. The findings reaffirm that cervical cancer remains a multifactorial public health challenge in India as well as other countries, driven by limited awareness, insufficient screening coverage, and persistent health inequities. Similarly, in a nationwide online survey among healthcare professional aimed to understand the challenges faced by doctors in India in this fight against cervical cancer. It was reported that awareness, screening, health inequities are factors that are important challenges in cervical cancer prevention.[8]

This is also observed in the data published by WHO—Cervical Cancer Country Profiles, which estimated that fewer than 1 in 10 women have been screened in India in past 5 years, averaging the screening rates to be > 2%.[9]

The unanimous consensus on these barriers underscores the need for system-level interventions, extending beyond medical strategies to include community awareness and infrastructural strengthening.

A major area of agreement was the role of HPV vaccination, screening, and early treatment as the most effective prevention strategy. While HPV vaccination alone has demonstrated high efficacy in reducing cervical cancer risk, the panel emphasized that vaccination must be complemented with organized screening programs to address non-vaccine HPV types and protect unvaccinated populations. The recommendation to adopt the WHO-endorsed single-dose HPV vaccine schedule for individuals aged 9–20 years (grade A) has important implications for India and other low- and middle-income countries (LMICs), where cost and logistics remain barriers to full coverage. This aligns with global evidence showing that reduced-dose schedules can maintain protective efficacy while improving affordability and accessibility.[9] In a study by montroy et al, single-dose HPV vaccination schedules show a one-dose schedule is highly effective, continued follow-up of single-dose cohorts will be critical to understanding the relative duration of protection for reduced dose schedules and informing future NACI guidance on HPV vaccines.[10]

However, concerns regarding affordability, inequitable access, and limited government prioritization highlight that successful implementation requires policy-level commitment, public-private partnerships, and sustained financial investment.

The panel endorsed high-risk HPV (hrHPV) testing as the gold standard, with HPV DNA self-sampling emerging as a feasible approach for LMICs. Importantly, experts supported the continuation of screening even among women vaccinated before sexual debut, acknowledging residual risks from non-vaccine HPV types. Consensus also emerged around screening initiation at 25–30 years and defined exit criteria at age 60, contingent on negative prior results. However, recommendations such as "twice in a lifetime" testing (at ages 35 and 45) and the viability of VIA/cytology-based approaches in resource-limited settings demonstrate recognition of India's heterogeneous healthcare capacities. These factors has been addressed by FOGSI's Screening recommendations according to resource settings are summarized in Table 3 and Algorithm 1.[11]

Algorithm 1. Screening recommendations according to resource settings

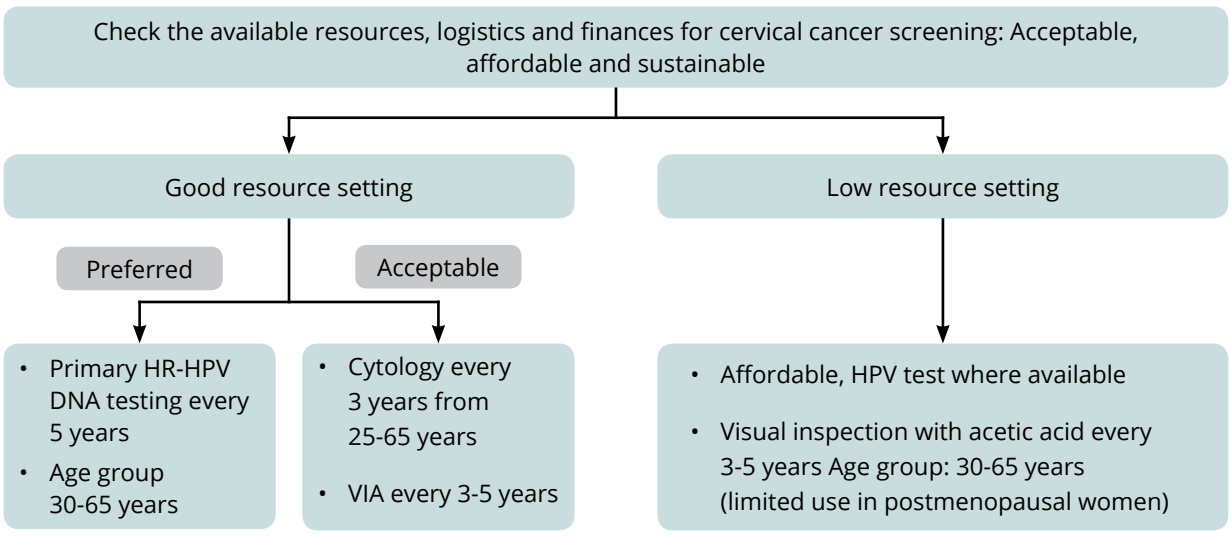

Table 3. FOGSI screening recommendations

	Recommendation	Level of evidence, Grade of recommendation
Age to start screening	25 years in good resource setting, universal recommendation: 30 years	Level 1, Strong recommendation
Age to end screening	65 years with 3 consecutive negative cytology results, or 2 consecutive negative HPV test within 10 years. The most recent test should have been performed within 5 years	Level 1, Strong recommendation
Tests with screening interval	Primary hrHPV testing every 5-10 years; In limited resource settings at least twice in a life time, i.e. 35 years and 45 years Cytology every 3 years VIA every 3-5 years	Level 1, Strong recommendation
Screening after hysterectomy with removal of cervix	Not recommended. If hysterectomy was done for cancer or precancer, screening to be continued	Level 1, Strong recommendation
Screening for immunocompromised women	Start at 25 years and to be screened more frequently, duration between two screenings should not extend beyond 3 years, preferable to screen with HPV tests	Level 1, Strong recommendation

Interestingly, divergence was noted in the adoption of screen-and-treat versus screen-triage-and-treat strategies (graded D), reflecting ongoing debate about balancing feasibility with overtreatment risks in low-resource settings.

After 10 years of follow-up in the IARC trial, HPV vaccination—whether given as one, two, or three doses—was associated with markedly reduced risk of cervical precancer. No cases of CIN2+ or HPV-related cancers occurred in any vaccinated group, while such cases were observed only among unvaccinated women.[12]

The panel also addressed clinical management of abnormal cytology and early lesions. Reflex HPV testing for ASC-US and immediate colposcopy in LSIL cases were discussed, with varying levels of agreement, reflecting practice differences across regions. Similarly, while ablative therapy for CIN2+ was supported, there was caution against overtreatment of CIN1, where follow-up rather than immediate intervention was favored. These discussions highlight the importance of contextualizing management guidelines to local healthcare realities and patient follow-up capacities.

Finally, there was strong recognition that elimination of cervical cancer in India requires a coordinated national mission. The endorsement of public–private partnerships and increased budget allocation reflects an understanding that sustainable success depends not only on scientific evidence but also on political will, programmatic prioritization, and multisectoral collaboration.

In a recently published study, researcher also recommended public-private partnerships with incentives can also play a crucial role in mobilizing resources. Investing in culturally appropriate public awareness campaigns is essential to educate the population about HPV, cervical cancer, and prevention strategies.[13]

In summary, this Delphi study highlights broad consensus on the integration of HPV vaccination and screening as the cornerstone of cervical cancer prevention, while also revealing areas of divergence where further evidence or regional customization is warranted. The recommendations align with global elimination targets yet emphasize the need for context-sensitive policies in LMICs such as India. Moving forward, operational research on cost-effectiveness, implementation feasibility, and community engagement will be crucial to bridge the gap between consensus and practice.

Strengths and limitations

This Delphi consensus featured several strengths. The resulting statements for which consensus was achieved reflect the views of experts with relevant expertise and experience in preventing and managing women at risk of cervical cancer globally. Although generated through a consensus process, these statements were derived from

the medical literature and existing guidelines, and are therefore evidence-based. In addition, the high consensus threshold ensured that the recommendations were unequivocal.

A few limitations should be noted. The size of the expert panel may not be representative of all countries, and therefore not generalizable to women outside of the represented countries with differing cultures and values, healthcare access, and quality of care received. Furthermore, modified Delphi excluded an open-ended first round. Secondly, the absence of online or in-person meetings after each Delphi round may have deprived panelists from exchanging pertinent information and clarifying reasons for disagreement. Additionally, it is acknowledged that the some of the statements were not supported by strong clinical evidence.

Conclusion

This Delphi consensus study offers a comprehensive and evidence-informed framework for advancing cervical cancer prevention through optimized HPV vaccination and screening strategies. The high level of consensus across 28 statements—particularly those related to vaccination coverage, screening modalities, and implementation in low-resource settings—demonstrates a strong convergence of expert opinion on critical components of an effective national strategy.

Unanimous agreement on barriers such as limited awareness, healthcare inequities, and infrastructural gaps underscores the urgency of system-wide interventions that go beyond clinical practice and into community outreach and policy reform. Importantly, the panel emphasized the dual necessity of HPV vaccination and continued cervical screening—especially with self-sampling HPV DNA testing—as essential to achieving WHO's 90-70-90 elimination targets.

While strong consensus emerged on most items, areas of divergence—such as screening initiation/exit criteria, triage strategies, and CIN1/LSIL management—highlight the need for further operational research, regional customization, and longitudinal follow-up studies. These disagreements reflect the dynamic and context-sensitive nature of cervical cancer care in India and other LMICs, where health system capacities and population need vary considerably.

Ultimately, successful implementation of these expert-endorsed recommendations will require multisectoral collaboration, including public–private partnerships, government investment, community engagement, and integration into existing national programs. Sustained advocacy, data-driven policymaking, and continued consensus-building efforts will be crucial to translate these recommendations into scalable, culturally appropriate, and equitable interventions.

References

1. Arbyn M, Weiderpass E, Bruni L, et al. Estimates of incidence and mortality of cervical cancer in 2018: a worldwide analysis. Lancet Glob Health. 2020;8(2):e191–e203.
2. Sung H, Ferlay J, Siegel RL, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin . 2021;71(3):209–249.
3. Ramamoorthy T, Kulothungan V, Sathishkumar K, Tomy N, Mohan R, et al. Burden of cervical cancer in India: estimates of years of life lost, years lived with disability and disability adjusted life years at national and subnational levels using the National Cancer Registry Programme data. Reprod Health. 2024 Jul 29;21(1):111.
4. Das M. WHO launches strategy to accelerate elimination of cervical cancer. Lancet Oncol. 2021;22(1):20–21.
5. Arbyn M, Xu L. Efficacy and safety of prophylactic HPV vaccines. A Cochrane review of randomized trials. Expert Rev Vaccines. 2018;17(12):1085–91.
6. Bouvard V, Wentzensen N, Mackie A, et al. The IARC perspective on cervical Cancer screening. N Engl J Med. 2021;385(20):1908–18.
7. Kulothungan V, Ramamoorthy T, Mohan R, Mathur P. Assessing progress of India in reduction of premature mortality due to four noncommunicable diseases towards achieving the WHO 25_25 goal and the sustainable development goals. Sustainable Development. 2023;1–11.
8. Kaur S, Sharma LM, Mishra V, Goyal MGB, Swasti S, Talele A, Parikh PM. Challenges in Cervical Cancer Prevention: Real-World Scenario in India. South Asian J Cancer. 2023 Feb 25;12(1):9-16.
9. World Health Organization - Cervical Cancer Country Profiles . 2021. Accessed February 15, 2023 at:https://www.who.int/teams/noncommunicable-diseases/surveillance/data/cervical-cancer-profiles
10. Montroy J, Salvadori MI, Forbes N, Dubey V, Almasri S, Jirovec A, Yan C, Gusic K, Stevens A, Young K, Tunis M. Efficacy, effectiveness and immunogenicity of reduced HPV vaccination schedules: A review of available evidence. Can Commun Dis Rep. 2024 Jun 28;50(6):166-178.
11. Federation of Obstetric and Gynaecological Societies of India (FOGSI), Indian College of Obstetricians and Gynaecologists (ICOG). Good Clinical Practice Recommendations for Prevention and Management of Cervical Cancer. Mumbai, India: FOGSI; June 18, 2024. Available at: https://www.fogsi.org/wp-content/uploads/2024/06/GCPR-Cervical-Cancer-18th-June-2024.pdf. Accessed August 21, 2025.
12. Basu P, Malvi SG, Joshi S, Bhatla N, Muwonge R, et al. Vaccine efficacy against persistent human papillomavirus (HPV) 16/18 infection at 10 years after one, two, and three doses of quadrivalent HPV vaccine in girls in India: a multicentre, prospective, cohort study. Lancet Oncol 2021;22(11):1518–29.
13. Poddar A, Rao SR. Overcoming barriers of cervical cancer elimination in India: A practice to policy level advocacy. J Cancer Policy. 2025;43:100521.

Delphi Study
Table of consensus graded HPV vaccination cervical cancer

Table. Delphi results for statements relating to the screening and prevention strategies of cervical cancer and HPV vaccination protocols

Sl No.	Statements on identification	Clarified statement	Round 1 rating	Round 2 rating	Grading
1	The key barriers to reducing cervical cancer mortality in LMIC includes, lack of awareness Limited screening programs, vaccine hesitancy, and poor healthcare infrastructure	Retained	81.8%	100%	U
2	Cervical cancer can be prevented by adopting screening, vaccination, early detection and treatment	Omitted in round 2	90.9%	—	A
3	HPV transmission occurs through skin-to-skin contact, skin-to-mucosa contact, and sexual contact, and blood transfusion is not the mode of transmission for HPV	Omitted in round 2	100%	—	U
4	HPV be passed from a mother to her child during childbirth	Transmission during childbirth	45.5%	100%	U
5.	HPV vaccine does not cause fertility issues in the future	Retained	90.9%	100%	U
6	The major challenges in achieving 90% HPV vaccination coverage, include Cost and affordability (disparities in access to healthcare), cultural/religious beliefs (vaccine hesitancy), lack of government prioritization, misinformation about side effects	All of the given options	100%	100%	U
7	HPV vaccination should be included in India's universal immunization program	Omitted in round 2	100%	—	U
8	The most feasible screening method HPV DNA testing (self-sampling)	Retained with self-sampling		100%	U
9	The most feasible screening method HPV DNA testing (self-sampling)	Retained with modification	81.9%	69.23%	B/C
10	Signal-amplification tests (.g., HC2) be used where PCR tests are unavailable		81.8%	—	B
11	Screening should be carried out even if HPV vaccine is given before sexual debut	Retained	100%	100%	U
12	Screening for cervical cancer begin25 to 30 years	Consensus not reached	63.6%	69.23%	C
13	Apart from age, the exit criteria from cervical cancer screening 65 years with 3 consecutive negative cytology results, consecutive negative HPV test within 10 years.	Consensus not reached on single response	90.9%	76.9%	C
14	In LMIC, "twice in a lifetime" (ages 35 & 45) strategy acceptable for hrHPV testing should be the minimum benchmark	Retained	81.8%	100%	U
15	The primary target age group in which HP vaccination recommended is between 9-14 years	Omitted in round 2	90.9%	—	B
16	If hrHPV testing is unavailable, VIA /cytology every 3–5 years is the most viable interim strategy for LMIC.		45.5%	100%	U
17	LMIC should adopt both screen-triage-and-treat and screen-and-treat approaches, depending on regional healthcare capacity	Consensus not reached	81.8%	38.46%	B/D

Sl No.	Statements on identification	Clarified statement	Round 1 rating	Round 2 rating	Grading
18	Validated HPV test be used for screen-and-treat single visit approach	No response	—	—	—
19	The screening interval for immunocompromised patients should be 3 yearly HPV test		81.8%	—	B
20	The optimal dose HPV vaccine schedule should be piloted in LMIC for girls/boys aged 9–20 years	Added in round 2	—	100%	U
21	Compromised dose HPV vaccine schedule is not recommended in LMIC for girls/boys aged 9–20 years	Added in round	—	100%	U
22	The women aged 30-45 years should continue to receive 3 doses, even with regular screening.	Omitted in round 2	82.8%	—	B
23.	HPV vaccine is safe, with mild local reactions are common; serious adverse events are extremely rare		100%	100%	U
24	HPV vaccination does not eliminate the need for cervical cancer screening		90.9%	—	A
25	The panel strong agreed or agreed that extended genotype PCR-based hr HPV DNA test as the primary screening methods.		63.6%	—	D
26	The panel agreed that HPV test can be used for screening and treat single visit approach		90.9%	—	A
27	For HPV-positive women, the optimal triage method (limited resource) recommends combining HPV genotyping and colposcopy for triaging HPV+ women where resources allow		72.7%	—	B
28	The nonavalent HPV vaccine offers significantly broader protection than the Quadrivalent vaccine.		90.0%	—	A
29	For Pap ASCUS, the expert panel recommends HPv DNA testing as next step.		63.6%	—	D
31	**For patients with an LSIL Pap result (HPV status unknown) immediate colonoscopy referral is the appropriate management option**	Consensus not achieved	54.5%	—	D
31	**For CIN1, the panel** recommended 1**2-month colposcopy follow-up**	Consensus not achieved	54.5%	—	D
32	**Ablative** therapy is recommended **for CIN2+ is appropriately qualifying patient.**		100%	—	U

Grading

Table 1. Grading system

Grade	Level of Agreement	Description
Grade U	100%	Unanimous consensus
Grade A	90–99%	Near-unanimous consensus
Grade B	78–89%	Strong agreement with minimal variance
Grade C	67–77%	Moderate agreement
Grade D	<67%	Below consensus threshold