Health Technology Assessment India (HTAIn)

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Economic Evaluation of HPV Vaccination in India

Postgraduate Institute of Medical Education & Research, Chandigarh

RECOMMENDATIONS

- Single dose of quadrivalent HPV vaccine to 14 years old girls is recommended for implementation in India.
- As the population-level benefits of HPV vaccination will accrue gradually (after decade), cervical cancer screening should continue to remain a cornerstone of cervical cancer prevention in India.

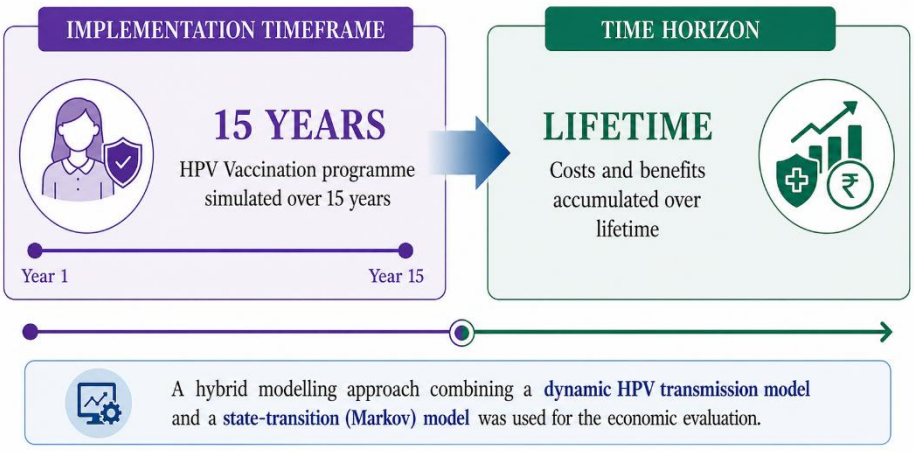
KEY FINDINGS

- Single-dose HPV vaccination is projected to avert approximately 2136 thousand cervical cancer cases and 1326 thousand cervical cancer deaths over the lifetime of the population, representing a reduction of nearly 36% in the burden of cervical cancer.
- The vaccination strategy is projected to generate an additional 4 crore quality-adjusted life years (QALYs) at the population level over lifetime, which is equivalent to 0.002 QALY gained per person.
- Although implementation of the vaccination programme would require an estimated investment of ₹11,894 crore, it is projected to reduce lifetime health system costs and out-of-pocket expenditure, resulting in discounted net savings of approximately ₹46,835 crore.
- Population-level reductions in cervical cancer will be modest during the first two decades after implementation, with the full projected benefit (approximately 36% reduction) expected to be realized after about 50 years through cumulative protection and cohort replacement.

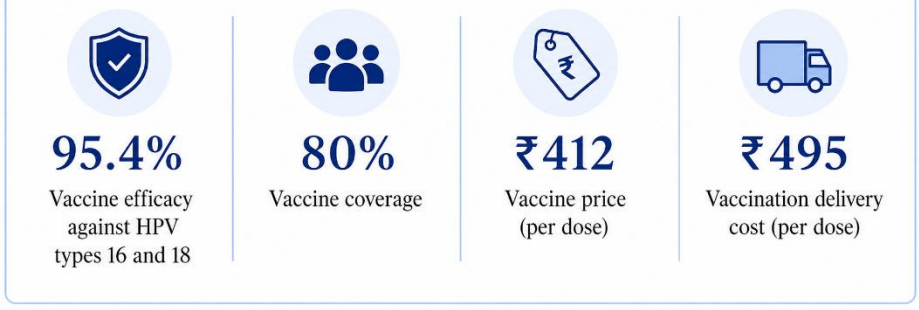
BACKGROUND

- Cervical cancer remains a major public health challenge in India. It is the second most common cancer among women, with an age-standardized incidence of 18.0 and mortality of 10.4 per 100,000 women. Nearly 85–90% of cases are diagnosed at an advanced stage, resulting in poor treatment outcomes.
- Persistent infection with oncogenic human papillomavirus (HPV), particularly HPV 16 and 18, is responsible for the majority of cervical cancer cases. HPV vaccination is the most effective strategy for primary prevention of cervical cancer.
- Although cervical cancer screening remains important, its implementation in India is constrained by limited infrastructure, access, and adherence. Preventive strategies such as HPV vaccination therefore assume greater importance in reducing the burden of disease.
- While HPV vaccines are available in India and have demonstrated high efficacy in preventing cervical precancerous lesions, evidence on their cost-effectiveness in the Indian setting is essential to inform decisions regarding introduction into the national immunization programme.

MODELLING APPROACH



HPV VACCINE–RELATED INPUTS



PICO FRAMEWORK

POPULATION

Adolescent girls aged 14 years

INTERVENTION

One dose of Quadrivalent HPV Vaccine

COMPARATOR

No Vaccination

OUTCOME

- Cervical cancer cases prevented
- Cervical cancer deaths averted
- ICER / QALY gained
- Disaggregated benefits across wealth quintiles

ESTIMATED HEALTH BENEFITS AND COST

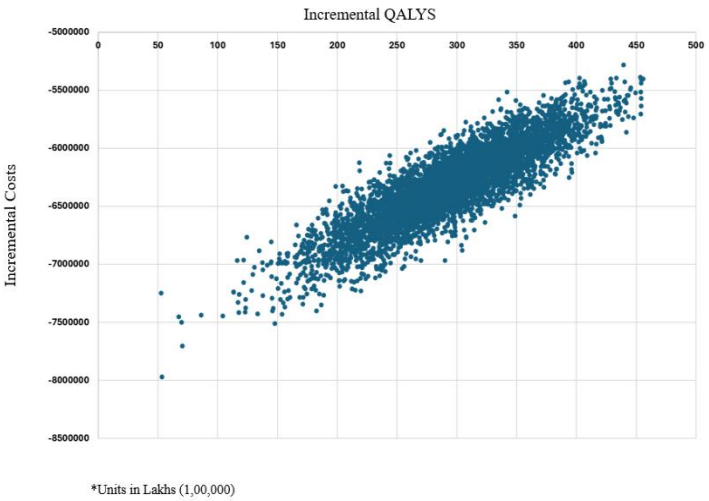
Lifetime Health Benefits (Discounted)

Outcome	Non-Vaccinated	Vaccinated
Incidental Cervical cancer cases (In thousands)	5889	3753
Deaths due to Cervical cancer (In thousands)	3687	2361
Life years (in crores)	781	784
QALY (in crores)	779	782

Lifetime Costs (Discounted)

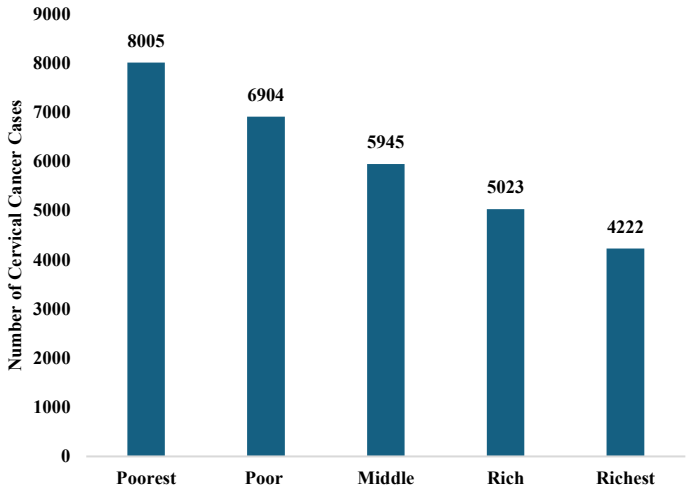
Outcome	Non-Vaccinated	Vaccinated
Health system cost on Treatment (In crores)	₹ 29,616	₹ 19,615
Total Out of pocket expenditure on Treatment (In crores)	₹ 143,912	₹ 95,184
Total costs (In crores)	₹ 173,528	₹ 114,799
Cost of vaccination (In crores)	0	₹ 11,894

Cost-effectiveness Plane



*Units in Lakhs (1,00,000)

Disaggregated benefits across wealth quintiles (annualized)



CONCLUSION

Introduction of single-dose quadrivalent HPV vaccination for 14-year-old girls into the Immunization Programme represents a cost-saving strategy for reducing cervical cancer morbidity and mortality and should be prioritized for implementation.