

# Protocol for a Living Evidence Repository and Gap Map on Human Papillomavirus Vaccines Delivery

- Version 2.0

## Protocol information

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# Background and Objectives

Despite the proven efficacy of the human papillomavirus (HPV) vaccines in preventing cervical and other cancers, global coverage remains suboptimal. Challenges in HPV vaccine delivery, accessibility, effectiveness, feasibility, equity and vaccine hesitancy persist across various regions, especially in low- and middle-income countries (1,2). This protocol for the repository of evidence on HPV vaccine delivery is developed collaboratively to reflect the priorities of the HPV Living Evidence Partnership community ([HPV Living Evidence Partnership](#)) and will be updated as needed.

- **Goal:** To provide a comprehensive evidence repository and maps that identify available evidence and implementation gaps on HPV vaccine delivery, with the goal of informing policy change and guiding strategic decision-making.
- **Objectives:**
  1. Identify and describe evidence on HPV vaccine delivery and (not screening or disease burden), and evidence that informs planning, implementation, and coordination.
  2. Highlight gaps in research and practice to guide future studies and interventions.
  3. Support policymakers, public health practitioners, and researchers with an organized repository of evidence.

## Scope

**Thematic Focus:** This protocol focuses exclusively on evidence related to the delivery of HPV vaccination in low- and middle-income countries. Thematic areas include:

- Delivery strategies (e.g., school-based, outreach, facility-based)
- Health systems readiness, training and infrastructure
- Demand generation and communication
- Monitoring and data systems for HPV vaccine delivery
- Coordination and implementation structures
- Equity and gender within delivery contexts, including barriers to delivery to for example adolescent girls or marginalized groups
- Vaccine choice

**Geographical Focus:** Low and middle income countries

# Inclusion and Exclusion Criteria

## Study types

### Inclusion

All empirical study designs are eligible. This includes but is not limited to:

- Surveys/cross sectional studies
- Case studies
- Systematic reviews
- Narrative reviews
- Review of reviews
- Evidence maps
- Cohort studies
- Qualitative studies
- Modeling studies
- Impact evaluations
- Costing studies
- Randomised trials
- Pre-post studies
- Implementation research

### Exclusion

- Opinion pieces without empirical data for example editorials

## Publication status

### Inclusion

- Peer-reviewed journal articles
- Preprints
- Government reports
- NGO or donor reports
- Technical briefs
- Theses/dissertations
- Unpublished data/evaluations

### Exclusion

- Press releases
- Abstracts
- On-going studies

## Topics

### Inclusion

- Delivery strategies (e.g., school-based, outreach, facility-based)
- Health systems readiness, training and infrastructure
- Demand generation and communication
- Monitoring and data systems for HPV vaccine delivery
- Coordination and implementation structures
- Equity and gender within delivery contexts, including barriers to delivery to for example adolescent girls or marginalized groups
- Vaccine choice, including efficacy, safety

### Exclusion

- Studies focusing only on disease burden or HPV prevalence/incidence data
- Studies solely focused on screening or treatment of cervical cancer

## Participants

### Inclusion

- Girls - all ages
- Boys - all ages
- Parents
- Healthcare workers
- Interest holders

### Exclusion

- None

## Geographical scope

### Inclusion

- Low and middle income countries based on the World Bank's fiscal year 2025 (data for calendar year 2023) [World Bank Country and Lending Groups – World Bank Data Help Desk](#). We also include Venezuela even though it is currently unclassified by the World Bank
- Mix of low, middle and high income countries

## Exclusion

- High income country only

## Language

### Inclusion

- English
- French

### Exclusion

- Languages other than English or French

## Methodology

### Search Strategy

We will search the following databases: Google Scholar, [iris.who.int](http://iris.who.int), [globalindexmedicus.net](http://globalindexmedicus.net), OpenAlex, PubMed, nitag-resource.org/compendium/hpv and Technet-21

For objective 1: (("HPV vaccine" OR "human papillomavirus vaccine" OR "HPV vaccination") AND ("delivery strateg\*" OR "implementation strateg\*" OR "vaccination program\*" OR "service delivery" OR "health system\*" OR "school-based vaccination" OR "community-based vaccination" OR "outreach program\*")) AND ("LMIC" OR "low- and middle-income countr\*" OR "developing countr\*" OR "Sub-Saharan Africa" OR "South Asia"))

#### French

((("vaccin contre le HPV" OR "vaccin contre le papillomavirus humain" OR "vaccination contre le HPV") AND ("stratégies de mise en œuvre" OR "stratégies d'implémentation" OR "programmes de vaccination" OR "prestation des services" OR "systèmes de santé" OR "vaccination en milieu scolaire" OR "vaccination communautaire" OR "programmes de proximité")) AND ("pays à revenu faible et intermédiaire" OR "PRFI" OR "pays en développement" OR "Afrique subsaharienne" OR "Asie du Sud"))

For objective 2: (("HPV vaccine" OR "human papillomavirus vaccine" OR "HPV vaccination") AND ("research gap\*" OR "evidence gap\*" OR "implementation gap\*" OR "knowledge gap\*" OR "barriers" OR "challenges" OR "lessons learned" OR "unmet need\*")) AND ("LMIC" OR "low- and middle-income countr\*" OR "developing countr\*" OR "Sub-Saharan Africa" OR "South Asia"))

French

((("vaccin contre le HPV" OR "vaccin contre le papillomavirus humain" OR "vaccination contre le HPV") AND ("lacunes de recherche" OR "lacunes en matière de données probantes" OR "lacunes de mise en œuvre" OR "lacunes de connaissances" OR "obstacles" OR "défis" OR "leçons apprises" OR "besoins non satisfaits") AND ("pays à revenu faible et intermédiaire" OR "PRFI" OR "pays en développement" OR "Afrique subsaharienne" OR "Asie du Sud")))

For objective 3: ((("HPV vaccine" OR "human papillomavirus vaccine" OR "HPV vaccination") AND ("policy" OR "guideline\*" OR "recommendation\*" OR "best practice\*" OR "program evaluation" OR "implementation outcome\*" OR "equity" OR "gender" OR "demand generation" OR "communication strateg\*" OR "monitoring system\*" OR "program sustainability" OR "vaccine uptake") AND ("LMIC" OR "low- and middle-income countr\*" OR "developing countr\*" OR "Sub-Saharan Africa" OR "South Asia")))

French

((("vaccin contre le HPV" OR "vaccin contre le papillomavirus humain" OR "vaccination contre le HPV") AND ("politique" OR "lignes directrices" OR "recommandations" OR "meilleures pratiques" OR "évaluation de programme" OR "résultats de mise en œuvre" OR "équité" OR "genre" OR "génération de la demande" OR "stratégies de communication" OR "systèmes de suivi" OR "pérennité des programmes" OR "adhésion vaccinale") AND ("pays à revenu faible et intermédiaire" OR "PRFI" OR "pays en développement" OR "Afrique subsaharienne" OR "Asie du Sud")))

The second set of searches will cover from August, 2025 to December, 2025.

## Screening

We will do an Initial screening by title/abstract, eligible references will then be screening based on the full text.

Differences in screening will be reconciled and decisions made by a third reviewer where required. Percentage agreement and/or interrater reliability will be reported for the screened records.

### Initial screening by title/abstract.

References identified through the search will be imported into EPPI-Reviewer, a web based software program for managing and analysing data in all types of systematic reviews (3). Duplicate records will be automatically identified through the built in deduplication algorithm to

ensure only unique references proceed to the screening stage. References with missing abstracts will be identified and abstracts will be found and added manually where available.

A subset of references (~10%) will be double screened by two human reviewers to ensure consistency in the screening criteria and guidance and also to serve as a “ground truth” dataset to train the Large Language Models (LLMs) .

The references which have been marked as an include by the human reviewers will be screened on title and abstract using the LLM prompt from v1 of the map to further determine how accurate the recall and precision of the prompt is. Using the human decisions and feedback from the LLM model the prompt will be iteratively refined to optimize recall, so that the chance of missing relevant studies is minimized, and then the precision to reduce the workload for the human reviewers. The prompt will take the format of “(GPT-4.1): is\_this\_record\_about\_HPВ\_vaccines: boolean // [does this record report a study about HPV vaccines?]”.

A random (10%) subset of references screened using the LLM will then be checked by the team lead to ensure the accuracy of the LLM results. All included references by the human reviewers and the LLM will then be screened at the full text level.

## Full-text screening

We will retrieve full texts for references included at title/abstract level from the zotero plugin to the EPPI-Reviewer software, any full texts not found will be searched for and added manually.

Full text will be screened by one reviewer with a percentage check in (~10%) by a second reviewer. Any disagreement will be solved by discussion or if needed by involving a third reviewer. Automation will not be used for full text screening and references included at the full text screening will progress to data extraction.

## Data extraction

We will extract data using LLMs from the included full text documents according to a data extraction coding tool. Using the description and/or definition of the terms, a prompt is constructed to ensure accurate information is retrieved from the fulltext document in order to classify or extract specific text relevant to this term. These prompts are developed individually and are specific to the following parameters:

Country or regional focus

Continent

World Bank Region

WHO regions

UNICEF regions

World Bank Income Group

## Thematic Foci

- Acceptability of HPV vaccine by patients
- Acceptability of HPV vaccination by parents
- Vaccine Efficacy and Effectiveness
- Vaccine Introduction and Implementation in LMICs
- Cost and Cost-Effectiveness of Vaccination Programs
- Impact & equity of vaccination
- Single-dose HPV vaccination
- Vaccine types & development
- Monitoring & evaluation of vaccination programs

## Study Design

- Modeling study
- Clinical trials
- Costing study
- Prevalence study
- Systematic reviews and meta-analyses
- Qualitative study
- Analysis of surveillance data
- Proficiency testing program
- Use of administrative and registry data

## Vaccine Schedule

- Dose Schedule
- Catch-up Strategies

## Delivery dose

- Single dose
- Multi dose

## Special Populations

- Out of school girls
- Hard to reach populations
- HIV positive adolescents
- Medical Physicians
- Medical students
- Parents
- Researchers/Academics
- NGO workers
- Policy makers

## Age

## Sex

- Male
- Female

#### Delivery strategy

- Routine delivery
- Campaign delivery
- Mixed strategy

#### Delivery location

- School-based
- Health facility-based
- Outreach/mobile
- Community-based
- Schools + Outreach
- Schools + child health days
- School + health facility
- School, health facility + outreach
- Integration into the health care service

#### Delivery cadre

- Health workers
- Community Health Workers
- Teachers/Volunteers

#### Communication and Social Mobilisation

- Community Engagement
- Demand Generation
- Misinformation Management

#### Vaccine Logistics

- Cold Chain & Supply
- Wastage Management
- Microplanning

#### Monitoring Evaluation

- Coverage Monitoring
- Adverse Event Monitoring
- Data Quality Audits

#### Equity and Access

- Gender Considerations
- Socioeconomic Barriers
- Geographic Barriers

## Governance and Financing

- Government Leadership
- Partner Coordination
- Financing Mechanisms

## Vaccine Types

- Vaccine choice
  - Cervarix
  - Gardasol-4
  - Gardasol-9

# Analysis

## Data Synthesis:

- Using EPPI mapper we will create matrices linking for example interventions to outcomes. [the exact matrices will depend on the scope]
- The evidence maps will be interactive. We will add filters [they will be defined with the community] and embed hyperlinks within the maps connecting users directly with research papers and other sources of evidence.
- We will regularly incorporate new records into the maps

# Engagement and reporting

The primary users of this map will be national stakeholders involved in HPV vaccine planning and delivery, including EPI managers, ministries of health, and implementing partners. Engagement activities will support identifying their priority delivery questions and feeding these into living synthesis processes.

We will facilitate and convene living evidence communities that engage with, support the dissemination of, and directly use evidence that emerges through dynamic living evidence processes. This evidence community and engagement process will focus on collectively refining a rigorous body of evidence to ensure policy and practice questions are met with timely and context-specific answers.

We will establish a free and open data repository to store and manage all data and analyses compiled and generated by the project. We will discuss with relevant stakeholders how we designed this resource to complement and align with existing resources such as WHO TechNet-21. The repository will be regularly updated. Based on current funding we anticipate that the last update will be in early 2027.

## Change log

Version	Change
2.0	French language added as inclusion criteria
2.0	Search strategy updated
2.0	WHO and UNICEF regions added under data extraction

## References

1. Aggarwal S, Agarwal P, Gupta N. A comprehensive narrative review of challenges and facilitators in the implementation of various HPV vaccination program worldwide. *Cancer Med.* 2024 Feb;13(3):e6862. doi: 10.1002/cam4.6862. Epub 2024 Jan 11. PMID: 38213086; PMCID: PMC10911072.
2. Rosser EN, Wysong MD, Rosen JG, Limaye RJ, Park S. HPV Vaccine Delivery Strategies to Reach Out-of-School Girls in Low- and Middle-Income Countries: A Narrative Review. *Vaccines.* 2025; 13(5):433. <https://doi.org/10.3390/vaccines13050433>
3. Thomas, J., Graziosi, S., Brunton, J., Ghouze, Z., O'Driscoll, P., & Bond, M. & Koryakina, A. (2023) EPPI-Reviewer: advanced software for systematic reviews, maps and evidence synthesis. EPPI Centre, UCL Social Research Institute, University College London