Effectiveness of Integrating Health Services into HPV vaccination services in low and middle-income countries: Protocol for a living systematic review

Protocol Information

Version 1.0, 12/06/2026

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Funding

This work was supported by the Gates Foundation (INV-075762). The funders had no role in study design, data collection, analysis and interpretation of data, decision to publish, or preparation of the manuscript.

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Note to tactical Group Members – common sections during reviewing the three LSRs

LSRs 6, 7, and 8 form part of a coordinated series of living systematic reviews evaluating different approaches to HPV vaccine delivery. To minimize duplication of effort during protocol review, please note that several sections are intentionally harmonized across the protocols and are identical or substantially similar.
The following sections are common across all three LSRs and generally only need to be reviewed once:
• Background and rationale relating to HPV vaccination and cervical cancer prevention (at least the first three paragraphs)
• Overall methodological approach
• Eligibility criteria relating to populations
    o Study types, Publication status, Participants, Geographical context, Language, Year
• Study designs eligible for inclusion
• Search methods and Screening
    o Study selection procedures
• Risk of bias/critical appraisal methods
• Data extraction procedures
• Analysis
• Certainty of evidence assessment
• Living review procedures and update processes

Note: we encourage focus on detailed review on the sections that differ across protocols, namely:

LSR 6 - Integrated Health Services and HPV Vaccination
    • Key terms and concepts; Eligibility criteria - concepts; Outcomes
LSR 7-– HPV Vaccination in Adolescent Health Service
    • Key terms and concepts; Description of the interventions; Eligibility criteria - concepts; Outcomes
LSR 8 - HPV Vaccination Through Routine EPI
  • Key terms and concepts; Eligibility criteria - concepts; Outcomes

Introduction

This living systematic review (LSR) is being produced for the HPV Living Evidence and Knowledge Partnership:

The partnership includes:

- The Alive team at the Future Evidence Foundation. The goal of Alive is to build innovative evidence systems that empower decision-makers to solve society's most pressing challenges.
- Center for Evidence-synthesis, Support & Development in Africa (CESDA), an Ethiopia-based organisation with expertise in systematic reviews, evidence synthesis, and knowledge translation. CESDA brings strong experience in systematic, rapid, qualitative, and mixed-methods reviews, supporting evidence-informed decision-making across health and development sectors in African contexts
- UCL EPPI Centre. The EPPI Centre aims for better evidence for better decision-making: robust and responsive reviews informing policy and practice
- The HPV vaccine delivery community, represented through three structures: a Steering Group; a Tactical Group; and a Group of Advisors.

Background

Cervical cancer remains a major global public health problem despite being highly preventable. Globally, it was the fourth most common cancer among women worldwide in 2022, with an estimated 662,301 new cases and 350,000 deaths. However, this figure masks a profound geographic disparity where the disease disproportionately (94% of cervical cancer deaths) concentrates in low- and middle-income countries (LMICs), being the leading cause of cancer-related mortality among women across sub-Saharan Africa and parts of Southeast Asia (1,2).

These regional differences reflect disparities in access to vaccination, screening, and treatment services, further influenced by broader social and economic determinants, including gender inequality and poverty (3,4).

More than 95% of cases are attributable to persistent infection with oncogenic HPV genotypes, particularly types 16 and 18. A causal relationship that renders cervical cancer, in principle, both preventable through vaccination and detectable through screening (2,3). Because prophylactic HPV vaccination can prevent the majority of HPV-attributable cervical cancers, it is a cornerstone of primary prevention and a critical component of global efforts to reduce the burden of disease (2,4).

Recognizing both the preventability of cervical cancer and the disproportionate burden carried by poorer countries, the World Health Organization (WHO) launched the Global Strategy to Accelerate the Elimination of Cervical Cancer as a Public Health Problem. This strategy established the 90-70-90 targets to be achieved by 2030: 90% of girls fully vaccinated with the HPV vaccine by age 15 years, 70% of women screened with a high-performance test by ages 35 and 45 years, and 90% of women identified with cervical disease receiving appropriate treatment and care. Achieving these targets would place countries on the path toward eliminating cervical cancer as a public health problem(1).

Although HPV vaccination is central to this elimination agenda, implementation has lagged behind policy ambition. Global HPV vaccine coverage has improved, but it remains well below the 90% target, and progress has been uneven across settings. WHO reported that first-dose HPV vaccine coverage among girls increased from 27% in 2023 to 31% in 2024, while coverage in lower-income countries supported by Gavi reached 25% in 2024 (5,6). Although these gains are important, they remain far below the threshold required for elimination and point to persistent weaknesses in programme reach and continuity.

Unlike routine immunization programmes, HPV vaccination primarily targets early adolescents aged 9 - 14 years, a population group that often has limited routine interaction with health services. This creates operational challenges for vaccine delivery, but also presents an opportunity to use HPV vaccination platforms as an entry point for broader adolescent health interventions (5). Integrating other health services into existing HPV vaccination programmes in LMICs has increasingly been recognised as a promising strategy to improve coverage, efficiency, cost-effectiveness, equity, and sustainability of adolescent health services while simultaneously strengthening health systems (6,7). Globally, integration approaches have gained increasing attention as countries seek to maximize limited health system resources and maintain HPV vaccination programmes amid declining external donor support (8).

The WHO has emphasized that HPV vaccine delivery can provide a platform for delivering additional health interventions, particularly in settings where adolescent-focused services remain fragmented or under-developed 4). Consequently HPV vaccination visits may be leveraged to deliver integrated services such as health promotion, disease prevention, deworming, nutrition interventions, sexual and reproductive health education, menstrual hygiene promotion, HIV and STI prevention messaging, mental health counselling, and WASH interventions(6,9). Such integrated approaches may create a ‘one-stop’ package of adolescent health services that addresses multiple risks during a critical developmental stage while improving efficiency in service delivery.

Emerging evidence from LMICs suggests that integrating health services into HPV vaccination may contribute to improved vaccine uptake, series completion, acceptability, and programme sustainability(10). Integrated delivery models implemented through schools, outreach campaigns, and primary healthcare platforms may also strengthen multisectoral collaboration between immunization, adolescent health, school health, and reproductive health programmes(11). In addition, integrated service delivery may improve equitable access to preventive services among underserved populations, particularly adolescent girls in rural, low-income, or marginalized communities(12). However, integration may also introduce operational complexities, including increased workload for health workers, logistical challenges, competing programme priorities, and potential unintended effects on service quality and equity (13).

Even though the policymakers and clinicians need timely, sustainable evidence for effective HPV vaccination, uptake, completeness, and acceptability, there is dispersed and dynamic evidence on the integration of other health services alongside the HPV vaccination programme. Therefore, this LSR aims to evaluate the effectiveness of integrating health services delivered alongside HPV vaccination compared with HPV vaccination alone in LMICs. By maintaining an up-to-date synthesis of the evidence, the review seeks to support evidence-informed policy and implementation decisions aimed at strengthening HPV vaccination programmes and improving adolescent health outcomes in LMICs.

Why is it important to do this living systematic review?

Given the rapidly evolving and context-dependent nature of integrating health services alongside HPV vaccination, a traditional static review would quickly become outdated. Besides, the existing studies on integrated HPV vaccination approaches vary substantially in intervention types, implementation strategies, outcomes measured, and methodological quality, making it difficult for policymakers and programme managers to draw consistent conclusions from the available evidence(14,15). An LSR provides an approach that can continuously incorporate new evidence, track emerging patterns, and support timely decision-making for countries introducing or scaling up HPV vaccination (16). This is particularly important in LMIC settings, where programs must often adapt to dynamic information environments, resource constraints, and varying program contexts(17).

Integrating services such as sexual and reproductive health, HIV and STI prevention, nutrition, and mental health into HPV vaccination programmes offers an opportunity to improve coverage, efficiency, sustainability, and equity of adolescent health services while strengthening health systems more broadly (14). However, despite growing global interest in integrated adolescent health service delivery, no comprehensive living systematic review currently synthesizes evidence on the effectiveness, feasibility, acceptability, equity, and unintended effects of integrating other health services into HPV vaccination programmes in LMICs. Continually updated evidence is therefore critical to inform policymakers, implementation partners, and health systems as demand for integrated HPV vaccination strategies continues to increase. We currently have funding to keep the review living until early 2027, but are exploring options for sustainability beyond that.

In this review protocol, we considered PRISMA guidance established for living systematic reviews (18).

Research questions

Do integrated health services delivered alongside HPV vaccination increase uptake, completion, demand, and equity compared with HPV-only delivery in LMICs?

Primary Research Question

1. Does integrating other health services into the HPV vaccination programme increase HPV vaccine uptake in comparison with the HPV delivery service programme alone?
2. Does integrating other health services into the HPV vaccination programme increase HPV completion rates in comparison with the HPV delivery service programme alone?

Secondary Research Questions

1. How does integrating other health services into HPV vaccination affect equity in vaccination outcomes (uptake, completion, cost) across population subgroups defined by PROGRESS-Plus characteristics?
2. What are the facilitators and barriers for the implementation feasibility of integrating other health services into the HPV vaccination programme in comparison with the HPV delivery service programme alone?
3. Does integrating other health services into the HPV vaccination programme impact the acceptability of the HPV vaccine in comparison with the HPV delivery service program alone?
4. What unintended effects are associated with integrating other health services into HPV vaccination, including impacts on health systems, service utilization, and equity?

Key terms and Concepts

Health services integration alongside HPV: The co-delivery of at least one distinct clinical, screening, commodity, or educational intervention during the same recipient encounter or service delivery session of HPV vaccine administration, regardless of whether the same or different providers deliver the components(14,19).

HPV vaccine uptake: The proportion of the target population (e.g., eligible adolescents) that has received at least one dose of the HPV vaccine within a specified period. Measured by the initiation of HPV vaccination(20).

HPV vaccine completion: The proportion of individuals who finish the full recommended HPV vaccination schedule (e.g., all required doses) among those who initiated the vaccine(21).

HPV vaccine acceptance: The willingness of individuals, parents, or communities to agree to receive or allow administration of the HPV vaccine, regardless of whether vaccination actually occurs(22).

Equity: measured by analysing the distribution of HPV vaccination outcomes (e.g., uptake, completion, timeliness) across population groups based on factors that create social disadvantage or vulnerability. The reported differences across population subgroups, and/or the differential effects of integrating health services into HPV vaccine delivery services across the groups, will be analysed.

Feasibility: The practicality of implementing the integration of health services into HPV vaccination programmes within a specific setting, considering factors such as infrastructure, workforce, logistics, funding, and community support (23).
Unintended effects: Any unintended outcome resulting from integrating health services into the HPV vaccine alone vaccination programme.

PROGRESS Plus framework: P-Place of residence (urban/rural, region); R - Race/ethnicity/culture/language; O- Occupation; G - Gender/sex; R – Religion; E-Education; S-Socioeconomic status; S-Social capital, Personal characteristics (age and disability), and feature of relationship (schooling status)(24,25).

Low- and middle-income countries (LMICs): Countries classified as Low- and middle-income economies according to the World Bank country income classification at the time of the study.

Description of the interventions

This living systematic review considers the evidence on the integration of other health services alongside HPV vaccination services as an intervention. Integrated health services refer to services that are managed and delivered to provide a continuum of health promotion, disease prevention, diagnosis, treatment, disease management, rehabilitation, and palliative care, coordinated across different levels and sites of care within and beyond the health sector(26). This review will consider studies evaluating such integrated service delivery models implemented in conjunction with HPV vaccination programmes spanning various categories of health service delivery.

Health promotion interventions include physical activity promotion, micronutrient supplementation (iron, folic acid, and vitamin A), handwashing promotion, sexual and reproductive health education, menstrual hygiene education, adolescent growth and development information, tobacco cessation messaging, and early pregnancy prevention (19,27).

Disease prevention interventions encompass distribution of insecticide-treated bed nets, mosquito-borne disease education, condom demonstration and promotion, sexually transmitted infection prevention, pre-exposure prophylaxis for HIV, a range of co-administered vaccines (tetanus, tetanus-diphtheria booster, hepatitis B, meningococcal, typhoid, and rubella), dental care, family planning education, and HIV prevention education (19,27–30).

Disease diagnosis interventions include vision screening, schistosomiasis screening, and nutrition screening (14,19), while Disease treatment and management interventions cover treatment of schistosomiasis and soil-transmitted helminths (19). Besides, rehabilitation and palliative care interventions include cancer end-of-life support integrated within HPV vaccination frameworks (31).

Engagement and reporting

The primary users of this LSR will be decision-makers and primarily their advisors in low- and middle-income countries (LMICs), involved in HPV vaccine delivery, including but not limited to: representatives from National and Regional Immunization Technical Advisory Groups (NITAGs), EPI teams, Ministries of Health, Ministries of Education, Ministries of Finance, technical partners, academia, researchers, implementing partners, and civil society. However, this LSR also has application to policy, programme design, and implementation decisions for normative and financing institutions, technical and learning partners, and evidence intermediaries at global and regional levels.

This review is not intended to replace national decision-making processes. Rather, it aims to strengthen evidence-informed deliberation by providing decision-makers at all levels with a continuously updated and contextually relevant synthesis of *integrating other health services along with HPV vaccination programmes*.

Alive as the partnership secretariat will facilitate and convene a community of users to engage with, support the dissemination of, and directly use evidence that emerges from this LSR. This 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.

The community will be engaged through three structures.

- Steering Group (SG), which provides stewardship to the development of the living HPV vaccine delivery, evidence-based. It provides strategic direction and ensures that the living evidence serves the needs of the broader research and delivery community and meets the needs of end users. See here for the involved individuals.

- Tactical Group (TG), which provides expert guidance and technical oversight to *CESDA*, UCL, and Alive, the teams responsible for developing the LSR 6. Members of TG will provide technical oversight to ensure the LSR is both methodologically sound and meets the needs of decision-makers. TG will provide technical oversight to ensure the development of robust, high-quality living protocols, providing input on PICO frameworks, search strategies, and inclusion criteria.

- Advisory Group (AG): Provides technical input and systems insight to inform the SG's strategic decisions. The AG includes membership from global normative and financing institutions and regional technical and learning partners and evidence intermediaries

Methods

This study is an LSR and will be updated continually. An LSR is a high-quality, up-to-date online synthesis of research that is updated as data from new relevant research that meets study inclusion criteria becomes available(16). This means that, following an initial search with no date to the final date of report submission of February 2027, repeat searches will be re-run monthly, any new studies incorporated into the review, and updates will be regularly published. Based on current funding, we anticipate that the last update will be in February 2027, but options for sustainability beyond that are being explored. The protocol will be registered on PROSPERO. In this protocol, we have considered PRISMA guidance established for LSRs(18).

All the data and analyses compiled and generated by the project will be stored at data.evidence-repository.org.

Eligibility criteria

Study types

Inclusion

- This review will consider studies employing experimental, quasi-experimental, comparative observational, qualitative, and mixed-methods designs that evaluate the integration of additional health services into existing HPV vaccination programmes.
- Qualitative and mixed methods studies will be included to capture implementation determinants (barriers and facilitators), feasibility and acceptability, and unintended consequences along with contextual, stakeholder perspectives related to integrating HPV vaccine delivery into the routine immunization services.

Exclusion

- Editorials, commentaries, conference abstracts, non-evaluative programme reports, and animal studies will be excluded.
- *Additionally, reviews, text and opinion papers will be excluded*

Publication status

Inclusion

- Both published and unpublished records including working documents of organizations will be included

Exclusion

- No records will be excluded related to their publications status.

Concepts

Inclusion

- Studies looking at the integration of additional health services into an existing HPV vaccination programme or HPV vaccine delivery platform will be included. Note that the HPV vaccination programme must serve as a platform through which the additional health service(s) are delivered.

Exclusion

- Studies looking at the integration of HPV vaccination into pre-existing health programmes or service delivery platforms will be excluded. In such studies, the HPV vaccine is added to another health service rather than serving as the platform for integration. For example: The integration of HPV vaccination into EPI programmes will not be considered, as it will be addressed in LSR 8 and the integration of HPV vaccination into adolescent health service will not be included as it will be addressed in LSR 7.

Participants

Inclusion

This review will consider

- Studies involving early adolescent and adolescent girls as the primary target population, defined as all girls aged 9-14 years, consistent with WHO priority recommendations for HPV vaccination.
- Studies involving secondary target populations will also be considered, including
    - Females aged 15 years and older (including women in catch-up cohorts), boys and men
- Relevant stakeholders
    - Parents/caregivers
    - Healthcare providers
    - Teachers/school administrators
    - Policymakers/program managers

Exclusion

- Adults above 45 years of age (the age limit applies only to the vaccine-recipient population, not to stakeholder respondents)
- Pregnant women
- Populations with existing HPV-related cancers

Geographical context

Inclusion

- Studies done in Low- and middle-income countries will be included
- Multi-country studies will be eligible if data from LMIC settings can be extracted separately.

Exclusion

- Studies conducted exclusively in high-income countries (HICs) will be excluded.

Language

Inclusion

- Publications in any language will be eligible. Non-English records identified during the search will be screened for potential eligibility using automated translation tools (e.g., Google Translate) at the title and abstract stage. Where studies are deemed potentially relevant, full-text translation support will be sought where feasible to enable full-text review and inclusion.

Exclusion

- None: no language restrictions are applied. Studies for which full-text translation is not possible or feasible will not be included in the review. These studies will be documented and their potential relevance will be noted, but they may be excluded from full-text review, data extraction and synthesis.

Year

Inclusion

- All studies/records with no date restriction

Exclusion

- None

Outcomes

This review will consider extracting one or more of the following outcomes from the studies:

1. Primary outcome: *HPV vaccine uptake/initiation, HPV vaccine completion,*
2. *Secondary outcome: Equity, feasibility, implementation barriers and facilitators, acceptability and unintended effect of integrating health service alongside HPV vaccine delivery service.*

Search and screening

Search strategy

A comprehensive search strategy will be developed by the team, which includes an information specialist with a background in evidence synthesis reviews. The search strategy will aim to locate both published and unpublished records, including institutional reports, with no restriction by date. Searches will be performed in the following electronic databases: CINAHL (Ebsco), Cochrane Library, Embase (Elsevier), MEDLINE (Ebsco), PsycInfo (Ebsco), and Web of Science (Clarivate). Grey literature will be searched through Google Scholar, OpenAlex, WHO IRIS, UNICEF, WHO's ICTRP, and Gavi repositories, and directly on the websites of relevant organizations if identified.

The search will combine controlled vocabulary as appropriate with title/abstract keywords to account for evolving terminology in integrating other health services with HPV vaccination research. The strategy will incorporate truncation, wildcards, and proximity operators where supported, and will be adapted for each database as appropriate. An example search strategy for MEDLINE is presented in Appendix 1.

Title and abstract screening

Following the search, all identified citations will be collated and uploaded into EPPI Reviewer, a web application that enables researchers to manage the entire lifecycle of a review in a single location(32), and duplicates removed. A pilot test will be done on titles and abstracts which will be screened by two independent reviewers for assessment against the inclusion and exclusion criteria for the review. Any disagreements will be resolved by a third reviewer or through team discussions. After achieving high agreement (80% and above), a further subset of references will be single screened with a 10% check in by the team lead.

The double screened references will be divided into 10% subsets. These subsets will be used to iteratively develop and test the use of Large Language Models (LLMs) for screening. Prompts will be developed using the inclusion and exclusion criteria for the review and run in EPPI Reviewer using the integrated OpenAI GPT-4.1 model on the first 10%. The performance of the LLM will be evaluated by comparing it to the gold standard human reviewer judgments to determine the accuracy of the model in correctly including and excluding citations. Once the prompt has been refined and evaluated to accurately achieve above 95% recall, it will be deployed on all remaining unscreened citations. A 10% random selection of records will then be screened by the team lead to calculate agreement with the LLM.

Full text screening

Reviewers will independently assess the full text of studies retained after title and abstract screening. Discrepancies will be resolved by a third reviewer, or through team discussions. Reasons for exclusion will be documented. The results of the search and the selection process will be illustrated on a PRISMA flow diagram.

Data extraction

Data will be extracted using a standardized form (see Appendix 2 for the data extraction form). For each study retained after full-text screening, one reviewer will extract the data, and a second reviewer will verify the data for accuracy and completeness.

Using a subset of studies with data extraction verified by two reviewers, LLM prompts will be iteratively developed and tested for all items on the data extraction form using the integrated OpenAI GPT-4.1 model within EPPI Reviewer. The prompts will be applied to all studies included in the full text, with a 10% random subset double-screened by a human reviewer. If agreement is above 95%, the LLM will extract

the remaining studies and then verify by a human reviewer for accuracy and completeness.

The extraction form will include details on the following areas: country or region of primary study, study design, setting, population, sample size, comparator, HPV Delivery Strategy, Integrated Health Service(s), Description of Integration, Primary Outcomes (uptake and completion of HPV vaccine) secondary outcome (acceptability, equity, feasibility Unintended Effects, Cost/Resource Use, Barriers, Facilitators, level of integration(design, budgeting, training, service delivery, monitoring and evaluation) and Reviewer Notes. Additionally, the reviewers will extract data related to HPV and Other health services delivery strategy/setting/method, which includes variables such as school-based delivery, health facility–based delivery, community/outreach delivery, mixed delivery strategy, campaign-based delivery, routine immunization delivery, mobile delivery, door-to-door/home-based delivery, integrated adolescent health platform, digital/reminder-supported delivery, and other variables as needed.

Risk of bias (RoB)

Two reviewers will independently conduct the appraisal using the JBI critical appraisal tool dedicated to study types with any disagreements resolved through discussion or consultation with a third reviewer. All studies, regardless of the results of their methodological quality, will undergo data extraction and synthesis. For this LSR, RoB assessments will be updated as new studies are incorporated. The results will be presented in summary tables and will inform the interpretation of findings and the overall confidence placed in the body of evidence.

Analysis

Quantitative evidence will, where possible, be pooled in statistical meta-analysis using EPPI-reviewer. Effect sizes for binary outcomes (uptake, completion, acceptability) will be expressed as either odds ratios or risk ratios with 95% confidence intervals. Effect sizes for continuous outcomes (timeliness) will be expressed as weighted mean differences (WMD) or standardized mean differences (SMD) and their 95% confidence intervals. Statistical heterogeneity will be assessed using the standard chi-squared and I-squared tests. Heterogeneity will be considered significant if $p < 0.05$ or $I2 > 50\%$. A random-effects model will be used as the primary analysis in order to account for expected variations in healthcare delivery platforms across different national contexts. If sufficient data are available, subgroup analysis will be done based on country of primary study, study design, context of intervention, context of implementation, age group of the target population, type of health services integrated with HPV, and year of primary study publication

Sensitivity analyses will be conducted to test decisions made regarding the influence of one study over the other for the quantitative study. A funnel plot will be generated to assess publication bias if there are 10 or more studies included in a meta-analysis. Statistical tests for funnel plot asymmetry (Egger test, Begg test, Harbord test) will be performed where appropriate. Where meta-analysis is not possible, the findings will be presented in narrative form, including tables and figures to aid in data presentation.

Equity analysis will be done using the PROGRESS-Plus framework (25,33). Data will be extracted and synthesized on differences in uptake, completion, and timeliness across population subgroups defined by place of residence, gender, socioeconomic status, and other relevant factors. Where quantitative data are available, differences between subgroups will be summarized descriptively. Where studies report differential effects of the intervention across subgroups, the direction of impact on equity will be categorized as reduced inequity, increased inequity, no difference, or unclear. Qualitative evidence on equity (like exclusion of out-of-school adolescents) will be synthesized thematically. Qualitative findings will be synthesized using thematic synthesis. Data will be analysed inductively and deductively using relevant domains from the Consolidated Framework for Implementation Research (CFIR). The CFIR will be used as an analytical lens to identify and interpret barriers and facilitators to implementation and to explain variations in intervention delivery and outcomes across contexts. Themes will be mapped to CFIR domains and constructs and synthesized narratively.

Certainty assessment

The certainty of the evidence will be assessed using the GRADE (Grading of Recommendations Assessment, Development and Evaluation) approach, which provides a structured framework for evaluating evidence and supporting healthcare decision-making (34). GRADEpro GDT 2020 (McMaster University, ON, Canada) will be used to generate a Summary of Findings (SoF) table presenting pooled effect estimates, relative and absolute risks, and overall evidence quality. The quality of evidence will be evaluated based on directness, precision, heterogeneity, risk of bias, and publication bias (16). For qualitative findings, confidence in the evidence will be assessed using the GRADE-CERQual approach (18).

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Appendices

Appendix 1. Example Search Strategy

MH – MeSH heading; XB – title/abstract; N2 – within two words (either order); * - stem plus 0 or more letters

((MH "Papillomavirus Vaccines+" AND MH "Immunization+") OR XB(((HPV* OR “Human Papilloma*”) N2 (immuni* OR vaccin*)) OR cecolin OR cervarix OR gardasil OR walrinvax))

AND

(MH "Adolescent Health Services" OR MH "Delivery of Health Care" OR MH "Delivery of Health Care, Integrated+" OR MH "Health Services Accessibility" OR MH "Immunization Programs" OR MH "Preventive Health Services” OR MH "Primary Health Care" OR MH "School Health Services" OR XB(anthelminthic OR "bed net*" OR bundle* OR combin* OR contracept* OR "condom us*" OR codeliver* OR coordinat* OR "co-implement*" OR “co-ordinat*” OR deliver* OR embed* OR EPI OR “expanded program*” OR “general practic*” OR “health check” OR "health education" OR "health system*" OR hybrid OR integrat* OR “life course” OR lifestyle* OR opportunistic OR packag* OR platform* OR "primary care" OR parallel* OR promot* OR routine OR "sanitary pad*" OR schedul* OR schistosomiasis OR school* OR "service delivery" OR "skills building" OR soap* OR "social behavio*" OR SBC* OR "vaccine delivery" OR "vitamin A"))

AND

(MH "Developing Countries" OR XB(((low* OR middle) N2 (income)) OR "LMIC" OR "LMICs" OR "third world" OR "central asia*" OR "north* asia*" OR "southeast* asia*" OR "south east* asia*" OR "western asia*" OR "east* europe*" OR africa* OR caribbean OR "south america*" OR "latin america*" OR "central america*" OR "global south" OR "middle east*" OR "south pacific" OR afghan* OR albania* OR algeria* OR angola* OR argentin* OR armenia* OR azerbaij* OR bangladesh* OR belarus* OR byelarus* OR belorus* OR byelorus* OR beliz* OR benin* OR dahomey* OR bhutan* OR bolivia* OR bosnia* OR herzegovina* OR botswana* OR bechuanaland* OR brazil* OR brasil* OR bulgaria* OR "burkina fas*" OR "upper volta*" OR burundi* OR urundi* OR "cabo verde*" OR "cape verde*" OR cambodia* OR kampuchea* OR khmer* OR cameroon* OR cameron* OR cameroun* OR "ubangi shari" OR chad* OR chile* OR china OR chinese OR colombia* OR comoro* OR mayotte* OR congo* OR zair* OR "costa rica*" OR "cote d’ivoire*" OR "ivory coast" OR cuba* OR djibouti* OR dominica* OR ecuador* OR egypt* OR "united arab republic" OR "el salvador*" OR eritrea* OR eswatini* OR ethiopia* OR fiji* OR gabon* OR gambia* OR georgia* OR ghana* OR "gold coast" OR grenada* OR guatemala* OR guinea* OR guyana* OR guiana* OR haiti* OR hispaniola* OR hondura* OR india* OR indonesia* OR iran* OR iraq* OR jamaica* OR jordan OR kazakh* OR kenya* OR "north korea*" OR "democratic people’s republic of korea" OR kosov* OR kyrgyz* OR kirgiz* OR kirghiz* OR lao* OR latvia* OR lebanon* OR lesoth* OR basutoland* OR liberia* OR libya* OR

lithuania* OR macedonia* OR madagascar* OR malagas* OR malawi* OR nyasaland* OR malaysia* OR maldiv* OR mali* OR micronesia* OR kiribati OR "marshall island*" OR nauru* OR palau OR tuvalu OR maurit* OR mexic* OR moldova* OR mongolia* OR montenegr* OR morocc* OR ifni OR mozambiqu* OR myanmar OR burm* OR namibia* OR nepal* OR "netherlands antill*" OR nicaragua* OR niger* OR pakistan* OR panam* OR paragu* OR peru* OR philippin* OR philipin* OR phillipin* OR phillippin* OR filipin* OR romania* OR russia* OR rwanda* OR ruanda* OR samoa* OR "pacific island*" OR polynesia* OR "sao tome*" OR senegal* OR serbia* OR seychell* OR "sierra leon*" OR melanesia* OR "solomon island*" OR "norfolk island*" OR somali* OR "sri lanka*" OR ceylon* OR "saint kitts" OR "st kitts" OR "saint lucia*" OR "st lucia*" OR "saint vincent*" OR "st vincent*" OR grenadine* OR sudan* OR surinam* OR syria* OR swaziland OR tajikistan OR tadjikistan OR tadzhik* OR tanzania* OR tanganyika* OR thai* OR siam* OR timor* OR togo* OR tonga* OR tunisia* OR turk* OR uganda* OR ukrain* OR uruguay* OR uzbek* OR vanuatu* OR "new hebride*" OR venezuela* OR vietnam* OR "viet nam*" OR "west bank" OR gaza* OR palestin* OR yemen* OR zambia* OR zimbabwe* OR rhodesia* OR magreb* OR maghrib* OR sahara*))

Appendix 2. Data Extraction Form

Draft Extraction tool: LSR 6,7,8