

VACCINE DELIVERY RESEARCH DIGEST

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REPORT TO THE GATES FOUNDATION

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1. [Individual-level HPV vaccination verification in Botswana: lessons learned from implementation of the HOPE II trial.](#)

Jammalamadugu S, Tirelo L, Youssouf N, Umutesi G, Krows M, Kuate L, et al.

Front Public Health. 2026 Jul 16;14:1821335.

PubMed ID: 42459477

ABSTRACT

The World Health Organization (WHO) estimated 660,000 new cervical cancer cases and 350,000 deaths globally in 2022, with over 90% occurring in low- and middle-income countries (LMICs). Global elimination targets call for vaccination of >90% of girls against human papillomavirus (HPV) by age 15 by 2030. While Botswana's national policy aligns with these targets, progress monitoring is constrained by fragmented, predominantly paper-based health information systems. We describe our experience verifying individual-level HPV vaccination status among adolescent girls and young women living with HIV (AGYW) in Botswana. This activity was conducted to determine eligibility for the HOPE II trial, a randomized controlled study evaluating the efficacy of a single-dose nonavalent HPV vaccine. Verification followed the national rollout of school-based HPV vaccination in 2015, targeting girls aged 9-13 years. Participants provided pre-screening consent for review of vaccination records held in school health systems, Ministry of Health (MoH) registers, and participant-held vaccination cards where available. We sought HPV vaccination records for 80 potential participants across 80 schools and 68 clinics. Only 15 participants (18.8%) had verifiable records: 2 (2.5%) retained vaccination cards, 4 (5.0%) had documentation in school records, and 9 (11.3%) had entries in MoH registers. Most school records were incomplete or missing, and several sites reported loss or disposal of records due to relocation, fire damage, or storage constraints. These findings highlight critical gaps in HPV vaccination documentation. Strengthening electronic immunization registries, standardizing record transfer, and improving data integration could enhance monitoring and support equitable progress toward cervical cancer elimination.

WEB: [10.3389/fpubh.2026.1821335](https://doi.org/10.3389/fpubh.2026.1821335)

IMPACT FACTOR: 4.1

CITED HALF-LIFE: 3.2

START COMMENTARY

This brief report highlights how fragmented vaccination record systems can undermine both individual-level verification and broader immunization program monitoring. In Botswana, HPV

vaccination records are distributed across individual vaccination cards, school health records, and Ministry of Health (MoH) registers with limited integration or data exchange between systems and a heavy reliance on paper-based records. In the context of this system, the authors describe efforts to verify prior HPV vaccination among adolescent girls and young women living with HIV as part of screening for a single-dose HPV vaccine efficacy trial. Verifiable documentation for HPV vaccination records was scarce and inconsistent. Incomplete or missing documentation was common across schools and MoH sources.

Notably, records for other non-HPV booster vaccines were more frequently available, suggesting that the observed gaps may reflect HPV-specific documentation challenges rather than an absence or non-use of record keeping systems. Even when schools reported keeping HPV records, those records were often incomplete or could not be linked to individual participants. Schools also did not consistently give vaccination cards to students at major transition points, such as completing primary school or transferring to junior or secondary school, limiting continuity of vaccination records as students moved between schools. Paper records were also frequently lost or discarded during school renovations, relocations, and through routine disposal due to limited record space. Additionally, there was little overlap between school records and MoH registers.

A strength of this report is its systematic search across multiple record sources to provide a real-world picture of data availability. It also highlights specific record-keeping weaknesses which provides targeted areas for program improvement. Limitations identified by the report include manual searching, which may have missed some records, and retrospective record retrieval, which precludes assessment of causality regarding data gaps or vaccination determinants. To address these challenges, the authors recommend developing centralized vaccination registries that integrate MoH and school-based data. They also recommend standardizing procedures for record retention and transfer, particularly during vulnerable periods like school transitions and relocations. Increased use of digital records could reduce reliance on paper systems and improve timely access to vaccination information.

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2. [Klebsiella vaccine research and development in Africa: a rapid scoping review of current evidence and future priorities.](#)

Iwu-Jaja C, Mazingisa A, Jaja A, Iwu C, Wiysonge C.

BMJ Public Health. 2026 Jul 15;4(Suppl 1):e004451.

PubMed ID: 42453653

ABSTRACT

INTRODUCTION: *Klebsiella pneumoniae* is a major cause of neonatal sepsis in Africa and a WHO priority pathogen for vaccine development. With growing antimicrobial resistance and limited treatment options, maternal vaccination offers a potential preventive strategy. This scoping review synthesises evidence on *K. pneumoniae* vaccine research in Africa and highlights gaps to guide future research and development priorities.

METHODS: A systematic PubMed search was conducted on 1 September 2025 to identify studies on *K. pneumoniae* vaccine research in Africa. Additional searches were conducted in ClinicalTrials.gov, the Pan-African Clinical Trials Registry and the WHO International Clinical Trials Registry Platform. Eligible studies were screened, and data were extracted and synthesised using a framework focused on disease burden, vaccine development and implementation considerations.

RESULTS: A total of 14 studies published between 2008 and 2024 met the inclusion criteria, with most (11/14) published in the last 5 years. Studies reported a high burden of *K. pneumoniae* infections across multiple African countries, particularly in neonatal sepsis and meningitis. While genomic and immunological studies provided insights into vaccine target selection, no *K. pneumoniae* vaccine trials were identified in Africa. Modelling studies suggest that maternal immunisation with a 70% effective vaccine could prevent approximately 400 000 neonatal sepsis cases and 80 000 deaths annually worldwide, including Africa. Key research gaps include limited epidemiological surveillance and absence of immune correlates of protection.

CONCLUSIONS: Despite the high burden of *K. pneumoniae* neonatal infections in Africa, vaccine research remains in its early stages, with no ongoing clinical trials on the continent. Strengthening surveillance systems, advancing vaccine candidates and integrating *K. pneumoniae* vaccination into existing maternal immunisation programmes are critical next steps. Multisectoral collaboration among researchers, policymakers and continental and global health organisations will be essential to accelerate vaccine development and ensure equitable access in Africa.

WEB: [10.1136/bmjph-2025-004451](https://doi.org/10.1136/bmjph-2025-004451)

IMPACT FACTOR: 1.7

CITED HALF-LIFE: 1.4

START COMMENTARY

This rapid scoping review highlights the potential for *Klebsiella pneumoniae* (*K. pneumoniae*) vaccination to reduce neonatal disease burden, particularly neonatal sepsis, in Africa and presents the evidence gaps that remain before implementation is feasible. The proposed use case for *K. pneumoniae* vaccination is maternal immunization, with vaccination during pregnancy intended to provide passive protection to neonates. There is emerging immunologic evidence supporting the plausibility of this approach. For example, a study from Botswana found that lower maternal *K. pneumoniae* IgG levels were associated with neonatal sepsis, suggesting that maternally derived antibodies may play a protective role. However, no established immune correlate of protection or antibody threshold for neonatal protection has been identified yet.

Global *K. pneumoniae* vaccine development remains mostly at a preclinical to early stage. The most advanced candidate identified in the review, Kleb4V, is a tetravalent biconjugate vaccine targeting four common O-antigen serotypes and has completed Phase I/II evaluation in healthy adults in Europe. Other approaches, including outer membrane vesicle and multi-antigen vaccines, remain in preclinical stages. Notably, the review did not identify any ongoing or completed *K. pneumoniae* vaccine trials in Africa despite the substantial disease burden in the region. This geographic gap has implications for both vaccine design and future evaluation. Surveillance remains limited and uneven across African settings which also makes it challenging to comprehensively characterize disease burden and circulating strains. This is particularly important given the extensive antigenic diversity of *K. pneumoniae* and the challenges that come with developing broadly protective vaccines. Trials conducted in African populations will also be needed to understand vaccine performance in key populations, including pregnant women with HIV.

If a vaccine becomes available, integration into existing maternal immunization and antenatal care platforms could help facilitate delivery, but implementation will require health system preparedness, provider training, attention to vaccine acceptance, and evaluation of co-administration with other maternal vaccines. Advancing *K. pneumoniae* vaccination will require stronger regional surveillance, regionally representative clinical research, and coordination between researchers, policymakers, funders, and communities.

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3. ['Prevention is better than cure': a mixed methods study of communities' and healthcare workers' perspectives on new adult and adolescent TB vaccines and their implementation in Zambia.](#)

Kerkhoff A, Pry J, Haambokoma M, Le Tourneau N, Simbeza S, Shamoya B, et al.

BMJ Public Health. 2026 Jul 15;4(3):e003716.

PubMed ID: 42453283

ABSTRACT

BACKGROUND: New tuberculosis (TB) vaccines for adults and adolescents are crucial for achieving global control targets, and several candidates may be ready for introduction within 5 years. We conducted a convergent mixed-methods study in Lusaka, Zambia, among community members and healthcare workers (HCWs) to understand preliminary TB vaccine acceptance and potential factors influencing uptake to inform readiness activities critical for successful implementation.

METHODS: Adult community members were enrolled from randomly selected households within four communities with historically low COVID-19 vaccine coverage, and HCWs from 10 public healthcare facilities representing different care levels. Structured surveys evaluated participants' perspectives on new vaccines and mixed-effects Poisson regression was used to estimate the marginal probability of participants' intention to get a new TB vaccine. Qualitative in-depth interviews (IDIs; n=24) and focus group discussions (FGDs; n=9) were conducted and analysed using a hybrid approach to explore acceptable vaccine attributes, preferences and determinants of TB vaccine uptake and recommendations for rollout.

RESULTS: Overall, 499 participants completed surveys (395 community members and 104 HCWs) with 62 additional participants across IDIs and FGDs. 77% of community members and 83% of HCWs expressed intention to get a TB vaccine. Perceived TB risk and severity concerns were the only significant drivers of vaccine intention. Participants pragmatically accepted the WHO's preferred vaccine specifications (50% efficacy, two-dose schedule, transient, mild side effects, at least 2 years' duration) though HCWs preferred higher efficacy thresholds due to occupational risk. Implementation preferences emphasised early community engagement (at least 3-6 months pre-rollout), diverse delivery approaches, including facility-based and community venues for adults, schools for adolescents and door-to-door campaigns, while addressing COVID-19-related scepticism through transparent, clear communication using trusted sources.

CONCLUSIONS: This study reveals strong potential for a successful TB vaccine rollout in Zambia through proactive implementation strategies, including early community engagement, transparent communication and person-centred delivery approaches.

WEB: [10.1136/bmjph-2025-003716](https://doi.org/10.1136/bmjph-2025-003716)

IMPACT FACTOR: 1.7

CITED HALF-LIFE: 1.4

START COMMENTARY

This mixed-methods study explored community members' and healthcare workers' (HCWs) perspectives on future adult and adolescent TB vaccines in Lusaka, Zambia. Topics covered focused on vaccine intentions, delivery preferences, and anticipated barriers to uptake. With new TB vaccine candidates approaching introduction, participants emphasized the importance of beginning preparation and communication several months before a vaccine becomes available. HCW participants reported that early, sustained community engagement was critical for building vaccine confidence, addressing misconceptions before they become established, and ensuring that communities understand why the vaccine is being introduced. HCW participants also highlighted the need for sensitization efforts to address potential cultural and social barriers, including religious opposition to vaccination and stigma arising from the association between TB and HIV. Participants also recommended tailoring communication and delivery strategies to different populations. HCWs suggested reaching men through workplaces and community leaders and thought women may be better reached through health facilities and community health workers. They stated communication for older adults should use simple messaging, visual aids, and local languages. For adolescents, they viewed schools as an important communication and delivery platform which could be complemented by social media and peer education. A strength of this study is its inclusion of community members as well as professional and lay HCWs and its use of both quantitative and qualitative data. However, the study's focus on urban and peri-urban Lusaka may limit generalizability to rural settings. The authors emphasize that early and comprehensive preparations, strong HCW support, and consistent communication will be essential for TB vaccine rollout in high-burden settings like Zambia.

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4. [Feasibility and acceptability of an electronic immunization registry in urban Bangladesh.](#)

Haque M, Kamruzzaman A, Bohara R, Das C, Sanij M, Khan A, et al.

PLoS One. 2026 Jul 02;21(7):e0352972.

PubMed ID: 42391166

ABSTRACT

INTRODUCTION: Electronic Immunization Registries (EIRs) are increasingly being implemented in low- and middle-income countries (LMICs) to support immunization tracking and data management. In Bangladesh, an EIR was introduced in Rajshahi City Corporation (RCC) to strengthen routine immunization services. However, evidence on user perceptions and operational implementation in this context remains limited. We assessed perceptions related to the feasibility and acceptability of the EIR among caregivers and healthcare providers (HCPs) in an urban pilot setting.

METHODS: We conducted a cross-sectional study between July and September 2024 in RCC, Bangladesh. Data were collected from caregivers of children receiving vaccinations and HCPs involved in immunization service delivery using a pretested semi-structured questionnaire. Perceptions of EIR-supported services were assessed using a 5-point Likert scale. Responses to open-ended questions were reviewed and summarized descriptively. This study was designed as a descriptive assessment and was not intended to evaluate the effectiveness or causal impact of the EIR system.

RESULTS: A total of 321 participants were included, comprising 305 caregivers and 16 HCPs. Electronic registration was conducted primarily at the Expanded Program on Immunization centers (87%), with additional outreach through house-to-house visits. Reported vaccination uptake among children registered in the EIR system was high within the study sample. Caregivers and HCPs reported generally positive perceptions of EIR-supported services. Most respondents selected 'satisfied' or 'highly satisfied' responses across assessed items. HCPs also reported positive experiences, particularly in relation to record management and data accessibility, while noting operational challenges such as intermittent internet connectivity and device-related limitations.

CONCLUSIONS: The EIR was perceived as acceptable by caregivers and HCPs in this urban pilot setting. Further studies are needed to assess effectiveness, implementation challenges, and scalability across diverse settings.

WEB: [10.1371/journal.pone.0352972](https://doi.org/10.1371/journal.pone.0352972)

IMPACT FACTOR: 2.8

CITED HALF-LIFE: 8.9

START COMMENTARY

Timely delivery of routine vaccinations remains a challenge in Bangladesh due to inadequate record keeping and vaccination tracking systems leading to missed and delayed doses. Electronic immunization registries (EIRs) have been introduced in several low- and middle-income settings to strengthen immunization tracking, data availability, and timely follow-up. This study assessed caregiver and health care provider (HCP) perceptions of the feasibility and acceptability of a newly implemented EIR in Bangladesh using a cross-sectional survey. The new EIR assigned unique identifiers to children, enabled real-time data entry, and sent SMS reminders to caregivers.

Participants generally reported positive perceptions of EIR-supported services, but also have potential concerns for broader scale-up. HCPs reported intermittent internet connectivity and device-related limitations, even within this urban pilot setting. Additionally, the majority of EIR use was reported at facility-based EPI centers, with relatively few occurring through house-to-house visits. These challenges may be greater in rural and hard-to-reach settings, where internet connectivity and access to health facilities are more limited which could potentially reduce the ability of hard-to-reach children to benefit from registry-based tracking and reminders.

Future expansion of EIR programs in Bangladesh will require investment in internet infrastructure, offline-capable systems, staff training, and integration with broader health information systems. Experiences from other LMIC settings supports employing a phased approach when implementing national EIR programs. Important strengths of this study include perspectives from both caregivers and providers and the use of structured and open-ended survey data. However, participants were already engaged with EIR-supported services which could potentially inflate favorable perceptions. Additionally, a small number of HCPs were surveyed, which limits conclusions about provider experiences.

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5. [Reaching out-of-school girls with HPV vaccination: A qualitative evaluation in six low- and middle-income countries using the RE-AIM framework.](#)

Zhang L, Rosser E, Wysong M, Surkan P, Rosen J, Limaye R, et al.

medRxiv. 2026 Jun 29.

PubMed ID: 42369471

ABSTRACT

BACKGROUND: Infection with human papillomavirus (HPV), the primary cause of cervical cancer, disproportionately affects women in low- and middle-income countries (LMICs). While school-based vaccination of adolescent girls against HPV is highly effective, this strategy systematically excludes out-of-school (OOS) girls. Using the RE-AIM framework, we explored strategies to reach OOS girls with HPV vaccination across six African and Asian LMICs.

METHODS: We conducted semi-structured key informant interviews with 32 vaccination program stakeholders from Cambodia, Cameroon, Kenya, Malawi, Mozambique, and Uganda between May and September 2024. Interviews explored countries' implementation successes, challenges, and strategies to reach OOS girls with HPV vaccination and sustainability considerations. Data were analyzed using a hybrid team-based thematic analysis approach guided by the RE-AIM framework.

RESULTS: Community outreach-based strategies, typically integrated into routine immunization outreach, were identified as the most effective approach to reach OOS girls with HPV vaccination. Targeted strategies, such as locating outreach clinics in community venues frequented by OOS girls (e.g., churches, markets) enhanced implementation. Perceived effectiveness of these strategies varied across participants, and formal assessment of effectiveness was constrained by the absence of disaggregated vaccination coverage data by school enrollment status. Some subpopulations of OOS girls (i.e., girls in nomadic or migrant communities, urban OOS girls) were not readily reached through standard outreach approaches, prompting implementation of adapted and tailored strategies for these subpopulations. Costs associated with conducting outreach in harder-to-reach areas were major barriers to reaching OOS girls, presenting challenges to the sustainability and cost-effectiveness of these approaches.

CONCLUSIONS: Routine community outreach platforms were widely perceived as most effective for reaching OOS girls. Strengthening disaggregated monitoring systems, adapting outreach for harder-to-reach subpopulations of OOS girls, and financing delivery models for tailored outreach strategies will be critical to improving equitable HPV vaccine coverage among OOS girls.

WEB: [10.64898/2026.06.11.26355432](https://doi.org/10.64898/2026.06.11.26355432)

START COMMENTARY

This multi-country qualitative study examined strategies used by national immunization programs to reach out-of-school (OOS) girls with HPV vaccination, including implementation facilitators and barriers. The authors conducted semi-structured interviews with HPV vaccination stakeholders across five African LMICs and one Asian LMICs. Community-based outreach strategies were identified as the primary method for reaching this population, as OOS girls have limited contact with the health care system.

Participants stated that venue selection and adaptation of outreach activities were important for reaching different groups of OOS girls. Markets and churches were commonly used as vaccination sites, while other approaches were tailored to specific populations, including evening and weekend outreach for working girls and home visits for girls with disabilities. In pastoralist communities in Uganda, HPV vaccination was co-delivered with livestock vaccination to leverage events that nomadic families were already likely to attend. Reaching OOS girls in remote or sparsely populated areas required additional staff, time, and resources and could be physically demanding for health workers. Integrating HPV vaccination with other routine outreach services helped sustain health worker motivation by allowing outreach teams to reach other children in addition to OOS girls, while also making more efficient use of outreach resources. Identification of eligible girls also relied heavily on community health workers and local leaders, although community-generated estimates of OOS populations were not always reliable.

Participants generally perceived outreach strategies as effective, but most countries lacked vaccination coverage data disaggregated by school enrollment status which limited their ability to determine whether coverage was improving specifically among OOS girls. The authors highlighted the importance of tailored, community-based approaches while identifying persistent challenges related to resources, workforce burden, and programmatic monitoring and evaluation.

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6. [Bridging the service gap: health facility challenges in HPV vaccine uptake in rural Uganda.](#)

Evarist M, Kibonire R.

BMC Womens Health. 2026 Jun 28.

PubMed ID: 42366344

ABSTRACT

BACKGROUND: Cervical cancer remains a major cause of morbidity and mortality among women in Uganda. Although the Human Papillomavirus (HPV) vaccine is highly effective in preventing cervical cancer, completion of the recommended two-dose schedule remains low, particularly in rural settings. Rukiga District was selected for this study due to persistently low HPV second-dose (HPV2) completion rates compared with national targets. This study assessed health facility-level barriers influencing HPV vaccine completion among adolescent girls aged 9-14 years in rural Uganda.

METHODS: A mixed-methods cross-sectional study was conducted between June and September 2022 in selected Health Centre II (HC II), Health Centre III (HC III), and Health Centre IV (HC IV) facilities in Rukiga District. A household survey involving 292 caregivers of eligible adolescent girls was conducted using systematic random sampling. The primary outcome was completion of the two-dose HPV vaccination schedule (HPV2). Quantitative data were analysed using logistic regression to identify factors associated with vaccine completion. In addition, 21 key informant interviews involving 11 healthcare workers and 10 Village Health Team (VHT) members were conducted and analysed thematically to explore contextual barriers affecting HPV vaccine uptake and completion.

RESULTS: The HPV vaccine completion rate was 23.49%, indicating low coverage. In multivariable analysis, vaccine stock-outs and cold-chain challenges (adjusted odds ratio [AOR] = 1.75, 95% confidence interval [CI]: 1.04-2.93; $p = 0.004$) and understaffing of healthcare workers (AOR = 1.97, 95% CI: 1.05-3.68; $p = 0.006$) were the only statistically significant predictors of HPV vaccine completion. Although limited healthcare worker knowledge (AOR = 0.94, 95% CI: 0.70-1.24) and absence of government programmes targeting out-of-school girls (AOR = 0.97, 95% CI: 0.73-1.29) were not statistically significant in the adjusted model, qualitative findings highlighted them as important contextual barriers. Additional challenges identified included weak outreach systems, transportation constraints, misconceptions about HPV vaccination, and limited community awareness.

CONCLUSION: HPV vaccine completion in rural Uganda remains low and is strongly influenced by health system constraints, particularly vaccine supply-chain disruptions and human resource shortages. Strengthening vaccine logistics, improving staffing levels, enhancing healthcare worker

capacity, and expanding outreach strategies targeting underserved populations are essential for improving vaccine completion and achieving national immunisation targets.

WEB: [10.1186/s12905-026-04637-2](https://doi.org/10.1186/s12905-026-04637-2)

IMPACT FACTOR: 3.3

CITED HALF-LIFE: 3.8

START COMMENTARY

This mixed-methods study examined health system barriers to HPV vaccine uptake and completion among adolescent girls aged 9–14 years in rural Uganda. Quantitative survey data were collected from caregivers, while qualitative interviews with healthcare workers and Village Health Team members provided additional context on challenges affecting vaccine delivery. HPV vaccine completion was low, and both components of the study identified substantial supply- and service-delivery barriers.

Cold-chain and logistical constraints along with healthcare workforce shortages emerged as the most prominent barriers. Specifically, reported challenges included vaccine shortages due to national supply constraints, inadequate refrigeration equipment and ice packs, transportation difficulties that delayed or cancelled outreach sessions, limited staff motivation, and insufficient personnel to conduct vaccination activities. Qualitative interviews also highlighted limited provider knowledge of HPV vaccination guidelines as a barrier to vaccine delivery. Together, these barriers can reduce the availability and reliability of vaccination services and limit opportunities for girls to receive recommended doses, particularly when vaccination depends on school- or community-based outreach. The study also highlights the importance of reaching girls absent or no longer attending school, who may be missed by predominantly school-based delivery strategies. Additionally, community-based barriers such as rumors about infertility and misconceptions that HPV vaccination encourages early sexual activity contributed to vaccine hesitancy.

A strength of this study is its mixed-methods design, which combines caregiver reports with perspectives from those delivering vaccination services. However, the cross-sectional design limits understanding directionality of results, and findings from a single rural district may not be generalizable to other settings. The authors recommend strengthening vaccine supply chains and staffing, improving provider capacity and outreach, expanding vaccination strategies for out-of-school girls, addressing community misconceptions, and strengthening monitoring and evaluation of HPV vaccination programs.

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7. [Insights from 25 Years of Measles and Measles-Rubella Vaccination Campaigns in the WHO African Region \(2001-2025\).](#)

Masresha B, Weldegebriel G, Lebo E, Wanyoike S, Bwaka A, Vuo-Masembe Y.

Vaccines (Basel). 2026 Jun 25;14(6).

PubMed ID: 42347670

ABSTRACT

INTRODUCTION: The WHO African Region is working to eliminate measles and rubella in 80% of countries by 2030. In countries with sub-optimal routine immunization coverage, periodic supplemental Immunization Activities (SIAs) are implemented to boost childhood immunity against measles and rubella.

METHODS: We reviewed the SIA technical reports and reports from post-campaign surveys shared by countries with the WHO Regional Office for Africa, and we analyzed the coverage data from preventive measles campaigns implemented during the years 2001-2025.

RESULTS: A total of 326 preventive measles/measles-rubella SIAs were implemented across 44 countries in the years 2001-2025, providing more than 1.5 billion doses of vaccine to eligible children according to the type and scale of the campaigns. Four fifths (82%) of the SIAs were nationwide exercises, and all of the SIAs were implemented as non-selective vaccination campaigns targeting all eligible children irrespective of past vaccination history, with the exception of four SIAs. The 95% administrative SIA coverage target at national level was met in 209 SIAs (64.7%). At district level, 11 of 164 SIAs had 100% of districts attaining 95% administrative coverage. Only 94 SIAs (29%) were followed by post-campaign coverage survey, and only 18 (19%) of these attained coverage of 95% or more by survey. Nearly two thirds (62%) of the 272 SIAs implemented during 2006-2025 had at least one additional intervention included with the measles/MR vaccination.

DISCUSSION: Measles and MR vaccination campaigns have served as excellent opportunities for providing integrated child survival interventions in the African Region. While two thirds of the SIAs met the national administrative coverage target, district-level coverage targets were not met in the majority of the SIAs, and only one fifth of the SIAs met the national-level survey coverage targets. Moreover, discrepancies were noted between administrative and survey coverage results, possibly due to inaccuracies in the reporting of the number of doses administered and/or reliance on inaccurate denominators. For optimal impact, SIAs need to adequately reach unreached populations.

CONCLUSIONS: In view of the documented sub-optimal coverage, countries should provide strong leadership and ownership of the measles elimination strategies for the attainment of the SIA

coverage targets as well as the overall measles and rubella elimination goal. There is an urgent need for improved tools to identify unvaccinated children, high-risk populations, and innovative strategies to reach them. All countries implementing SIAs should also include systematic monitoring of zero-dose children, and conduct post-campaign coverage surveys in a timely manner.

WEB: [10.3390/vaccines14060549](https://doi.org/10.3390/vaccines14060549)

IMPACT FACTOR: 3.5

CITED HALF-LIFE: 3.3

START COMMENTARY

This study summarizes measles–rubella supplemental immunization activities (MR SIAs) across the WHO African Region, using coverage data from preventive campaigns conducted between 2001 and 2025. In addition to addressing vaccine coverage gaps, MR SIAs have served as important platforms for delivering other child health interventions. Among MR SIAs conducted from 2006–2025, 62% incorporated at least one additional intervention. Vitamin A supplementation and deworming were the most common integrated interventions, while polio vaccination and insecticide-treated bed net distribution were also included in several campaigns. More than half of MR SIAs with integrated interventions combined both vitamin A supplementation and deworming. Some countries used MR SIAs to deliver additional vaccines including against yellow fever, meningitis A, polio, and HPV, or to support broader catch-up vaccination activities. Mauritania was the only country in the region reported to have never included additional interventions during their national measles-rubella SIAs during this period. In contrast, some countries have integrated interventions not commonly paired with immunization campaigns. For example, Tanzania integrated treatment for lymphatic filariasis and soil-transmitted helminths. Nigeria used MR SIAs to deliver interventions for neglected tropical diseases and malaria. Its 2025 campaign included nOPV for children under five, treatment for onchocerciasis and lymphatic filariasis, and seasonal malaria prophylaxis. In Ethiopia, MR SIAs were also used for health screening and referral, including nutritional assessments and screening for clubfoot and obstetric fistula. These findings demonstrate the potential for SIAs to reach children with multiple health interventions through a single delivery platform. However, the study also identified substantial gaps in campaign performance. Only a small proportion of SIAs achieved uniformly high coverage across districts, and administrative coverage estimates frequently differed from post-campaign survey estimates. The authors emphasize that SIAs must more effectively identify and reach zero-dose children and strengthen campaign planning, logistics, monitoring, and post-campaign coverage surveys.

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8. [Routine immunization uptake and timeliness in young children exposed to multidrug-resistant tuberculosis: A secondary analysis of the Tuberculosis Child Multidrug-Resistant Preventive Therapy multi-site randomised controlled trial.](#)

Patel F, Purchase S, Dhar M, Horne E, Grab J, Soma-Kasiram H, et al.

BMC Glob Public Health. 2026 Jun 17;4(1).

PubMed ID: 42304464

ABSTRACT

BACKGROUND: The Expanded Programme on Immunization (EPI) reduces vaccine preventable disease-related childhood morbidity and mortality. Vaccine coverage and timeliness are crucial to maximise protection in children < 5 years old. This is especially important for children living in households affected by human immunodeficiency virus (HIV) and tuberculosis.

METHODS: Tuberculosis Child Multidrug-Resistant Preventive Therapy (TB-CHAMP), a randomised controlled trial of multidrug-resistant tuberculosis (MDR-TB) prevention, enrolled participants at five sites across South Africa between 26 Sep 2017 and 21 Jan 2023. In this secondary exploratory analysis, we analysed the coverage and timeliness of EPI vaccinations due by 12 months of age and associations between delayed/non-vaccinations and pre-defined factors relating to child participant, adult MDR-TB index patient, and household. Early, on-time, and delayed vaccinations were defined as > 5 days before, within 28 days of, and > 28 days after the projected dates, respectively. Modified Poisson regression was used to assess factors associated with delayed/non-vaccination and vaccination completeness. The COVID-19 period was defined as the 6 months after the start of South African lockdown.

RESULTS: Of 922 enrolled children, 814 children < 5 years with complete immunisation records were included. There was equal sex distribution, median age was 2.5 years (IQR 1.2-3.8), 35% were HIV-exposed, and 1% living with HIV. EPI coverage was over 80% across all vaccine types, excluding measles, with a trend towards an increase in delayed doses and non-vaccination as children aged. Two-dose measles vaccination coverage was 70.6% with 11.3% not having any measles vaccination. We found associations between delayed/non-vaccination with the primary caregiver being the MDR-TB index patient, lower household socioeconomic status and the site where children enrolled. We did not observe increased delays and non-vaccination during the COVID-19 period.

CONCLUSIONS: EPI coverage in this vulnerable population was reasonable, except for measles, which was low. There was a trend towards increasing delays and non-vaccination with age. Targeting vaccination interventions at households affected by TB and poorer households emphasising caregiver education on routine vaccination especially as children age is important.

TRIAL REGISTRATION: South African National Clinical Trials Register (SANCTR) (RefDOH270117530) and UK's Clinical Study Registry (Ref ISRCTN92634082, <https://doi.org/10.1186/ISRCTN92634082>).

WEB: [10.1186/s44263-026-00290-x](https://doi.org/10.1186/s44263-026-00290-x)

IMPACT FACTOR: 5.1

CITED HALF-LIFE: 1.4

START COMMENTARY

This exploratory secondary analysis of the TB-CHAMP MDR-TB prevention trial evaluated routine immunization coverage and timeliness among children under five living in MDR-TB-affected households across South Africa. The study examined child, caregiver, household socioeconomic, and geographic factors associated with delayed or missed vaccination. Although overall vaccine coverage was relatively high, delays were common and became more prevalent as children aged. Around 6–8.5% of children experienced delayed vaccination by six weeks of age, which increased to 18.3% by 9 months. Among delayed doses, the median delay was approximately 7–9 weeks, potentially leaving children susceptible to infection and contributing to delays in subsequent vaccinations.

Delayed or missed vaccination was associated with low socioeconomic status, study site, and having an MDR-TB index patient as the child's primary caregiver. Having a caregiver affected by MDR-TB may create additional barriers to routine vaccination through illness-related caregiving constraints and broader socioeconomic vulnerability. The authors also emphasize that crude vaccination coverage alone may not fully capture immunization program performance. Traditional measures often use the proportion of children receiving three doses of Diphtheria, Tetanus, and Pertussis as a proxy for program performance, but this can obscure substantial delays.

A key strength of this study was the large, geographically diverse cohort from urban, peri-urban, and rural settings, including children with varying HIV exposure and infection status. However, healthcare disruptions during the COVID-19 pandemic may have affected access to routine vaccination during the study period. The authors highlight limited evidence on vaccine timeliness among children in TB-affected households and suggest targeting delays specifically in rural households, poor communities, and in children born to adolescent mothers.

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9. [Vaccine management systems with a focus on cold chain management and delivery of immunization services in low- and middle-income countries: A scoping review.](#)

Qadeer A, Ay N, Paulson W, Rachel J, Nanda L, Dutta A, et al.

PLoS One. 2026 Jun 22;21(6):e0350231.

PubMed ID: 42302058

ABSTRACT

OBJECTIVE: The main objective of this scoping review is to examine the characteristics of vaccine management and delivery systems with a specific focus on cold chain management used for routine immunization in the LMICs, along with factors influencing these systems, challenges faced and the extent of digitization implemented.

METHODS: A comprehensive literature search was conducted using PubMed, Scopus, Cochrane Library, and Google Scholar for studies published between 2010 and February 2025. Our study selection, data charting, and synthesis followed methodological frameworks outlined by the Joanna Briggs Institute and PRISMA guidelines for Scoping Review.

RESULT: Out of 2451 identified studies, 16 eligible studies were included. The findings revealed diverse vaccine management system designs, including centralized and decentralized architecture, interoperable integrated models, and provisions for online and offline accessibility. Core features of these systems included longitudinal health records, automated inventory monitoring, and beneficiary engagement features including digital health cards. Implementation was influenced by global initiatives, project management teams and their capability, and challenges related to digitization. Factors impacting vaccine delivery included immunization sessions, stock management systems, distribution weaknesses, suboptimal practices, training gaps, and documentation. Digital transformations varied across countries, with Vietnam, Tanzania, and Zambia adopting electronic immunization registries, while India implemented the Electronic Vaccine Intelligence Network. The implementation of these digital logistics management information systems significantly improved vaccine management by reducing wastage, enhancing record-keeping, and optimizing supply chain efficiency.

CONCLUSION: To our knowledge, this scoping review is the first to provide empirical evidence on vaccine management and delivery systems and digitization in immunization in the LMICs. This review concludes that LMICs have been adapting various systems including electronic system, digitization, decentralisation of vaccine delivery, stock monitoring, individual tracking to improve immunization. Across countries, some have made notable progress, while others are at their initial stage of implementation. However, this review suggests further studies on integrated vaccine management systems and their impact for inter-country comparison.

WEB: [10.1371/journal.pone.0350231](https://doi.org/10.1371/journal.pone.0350231)

IMPACT FACTOR: 2.8

CITED HALF-LIFE: 8.9

START COMMENTARY

This scoping review examines vaccine management systems in low- and middle-income countries, focusing on cold-chain management and the role of digitization in improving routine immunization delivery. Vaccine stockouts can result from gaps in staff knowledge, unclear stock-management protocols, supply-chain weaknesses, inadequate infrastructure, workforce shortages, and poor data management. Several countries have introduced digital systems to address these challenges by providing real-time tracking, demand forecasting, and inventory monitoring.

For example, Vietnam has transitioned from paper-based records toward a national digital immunization system since 2010. Initially, the ImmReg system managed individual vaccination histories, while the VaxTrak system supported vaccine stock management. The two platforms were integrated into the National Immunization Information System (NIIS) in 2017 and contributed to substantial improvements in vaccination coverage and timeliness. By October 2022, Vietnam's NIIS contained 32.2 million patient records and had been adopted by nearly all healthcare facilities nationwide.

India's Electronic Vaccine Intelligence Network (eVIN) is a digital logistics management information system that tracks vaccine stocks and cold-chain temperatures using mobile technology. Its implementation has improved vaccine utilization, stock management, and data quality throughout the immunization supply chain. Greater visibility into replenishment, supply, and consumption patterns has supported better demand forecasting and distribution planning, reduced vaccine wastage, and strengthened adherence to the "First Expiry, First Out" principle. eVIN has also improved recordkeeping and shortened the time between vaccine requests and delivery, helping mitigate stockouts.

The authors demonstrate the potential of digital systems to strengthen vaccine management but emphasize that successful adoption requires investment in training and capacity building for personnel, which may be challenging in resource-constrained settings. They recommend that further research compare centralized and decentralized system architectures to identify best practices for specific contexts, assess interoperability and change-management strategies to inform system rollouts, and investigate the underlying causes of vaccine wastage, stockouts, and equipment-maintenance problems.

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10. [Leading from behind the scenes: Community birth attendants, the unsung heroines of childhood vaccination in Ibadan urban slum communities.](#)

Balogun F, Omobowale O.

PLOS Glob Public Health. 2026 Jun 16;6(6):e0006691.

PubMed ID: 42302038

ABSTRACT

Community birth attendants (CBAs) represent an insufficiently integrated resource in childhood immunization programs, particularly in urban slum communities where healthcare access remains challenging. Their role as birth attendants has been well documented, however, understanding their role in infant vaccination uptake is crucial for improving immunization uptake and child welfare. This study explored the knowledge of CBAs about infant immunization and assessed their roles in promoting vaccination uptake in urban slum communities of Ibadan, Nigeria. A narrative study design was employed across eight urban slum communities in three local government areas of Ibadan. Six focus group discussions were conducted with 37 CBAs using an interview guide developed in Yoruba language. Data were analyzed using content analysis, guided by the knowledge, attitude and practice model. CBAs had a good understanding of immunization as a disease prevention strategy and had comprehensive knowledge of birth dose vaccines' (BCG, OPV, Hepatitis B) names and timing. However, knowledge about the other immunization visits' timing varied considerably among them. CBAs generally had positive attitude towards immunization. They played diverse roles in immunization process including community mobilization for immunization campaigns, health education, referral to immunization clinics, appointment reminders, identification and support of zero-dose children, and providing transportation assistance when mothers were unable to attend clinics. Their trusted position within communities and informal collaboration with primary health centers positioned them as vital intermediaries in vaccination uptake. Key barriers included limited vaccine knowledge, lack of formal recognition by healthcare workers, and poor self-efficacy in navigating vaccination procedures. Despite knowledge gaps and systemic barriers, CBAs serve as crucial facilitators of infant immunization in urban slum communities in Ibadan, through their trusted relationships and comprehensive support activities. Formal integration of CBAs into immunization programs, coupled with targeted training and recognition, could significantly enhance vaccination coverage in disadvantaged urban populations.

WEB: [10.1371/journal.pgph.0006691](https://doi.org/10.1371/journal.pgph.0006691)

IMPACT FACTOR: 2.8

CITED HALF-LIFE: 2.5

START COMMENTARY

This narrative study explored community birth attendants' (CBAs) knowledge and attitudes toward infant immunization and their roles in supporting vaccination in urban slum communities in Ibadan, Nigeria. CBAs described performing a wide range of activities to connect families with immunization services. Some had worked as ad hoc staff during vaccination campaigns by mobilizing community members and informing caregivers when vaccination teams would visit. They also provided immunization education during community meetings and in churches and mosques and routinely referred mothers and newborns to immunization clinics.

CBAs additionally supported vaccination between clinic visits. They reminded caregivers about upcoming doses during home visits or by phone, checked children's vaccination cards to determine whether doses had been received, and followed up when children missed appointments. Their close relationships with families also allowed them to identify zero-dose children and connect them with vaccination services. Some CBAs provided direct assistance to families, including accompanying caregivers to clinics, transporting infants when mothers were unable to attend, and visiting homes to remind caregivers of appointments when they could not initially be reached.

The authors suggest that CBAs represent an important and underused link between marginalized communities and the formal immunization system, particularly for identifying and reaching zero-dose and under-immunized children. However, gaps in CBA knowledge of vaccination schedules and lack of formal recognition within immunization programs suggest that greater involvement would need to be accompanied by targeted training, supervision, and formalized integration into existing health services. Future research should assess whether communities with active CBA involvement achieve better vaccination coverage and timeliness compared to those without, identify effective models for training and integrating CBAs into immunization programs, and evaluate the cost-effectiveness of CBA involvement compared to other community-based strategies.

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Additional Articles of Interest

- 1 Cost-effectiveness analysis of a hypothetical vaccine for schistosomiasis in Madagascar and Burkina Faso. [{Full Article}](#)
- 2 Geospatial approaches for mapping zero-dose prevalence and routine childhood immunisation coverage in low- and lower-middle-income countries: A scoping review. [{Full Article}](#)
- 3 Malaria serology for surveillance, insights into immunity, and vaccine development. [{Full Article}](#)
- 4 HPV vaccination policies and implementation for adolescents in low- and middle-income countries: a scoping review. [{Full Article}](#)
- 5 Barriers to uptake of vaccination among communities in the city of Kigali, 2025. [{Full Article}](#)
- 6 Accessibility, safety, and early effect of the malaria vaccine in routine immunisation practice among children under 36 months in the Soa Health District, Cameroon. [{Full Article}](#)
- 7 Investigating predictors and barriers to vaccine uptake in children at Konye Health District, South West region Cameroon. [{Full Article}](#)
- 8 Approximating vaccine delivery costs to reach zero-dose children: a Bayesian meta-regression analysis. [{Full Article}](#)
- 9 Leadership practices and maternal and child health outcomes in Sub-Saharan Africa: a systematic review. [{Full Article}](#)
- 10 Health Equity Barriers to Accessing Vaccination and Screening Services in Low- and Middle-Income Countries: A Narrative Review. [{Full Article}](#)
- 11 Correlates of Full, Partial, and Non-Immunisation among Children Aged 12-23 Months in Gokwe South District, Rural Zimbabwe. [{Full Article}](#)
- 12 Extended cost-effectiveness analysis in global health systems: a scoping review of geographic gaps and research trends. [{Full Article}](#)
- 13 Geospatial variations in the prevalence of children missing out of diphtheria-pertussis-tetanus vaccination in Nigeria: estimates from multiple household surveys. [{Full Article}](#)
- 14 Factors Associated with Childhood Vaccination in Sub-Saharan African Countries Experiencing Armed Conflicts: A Scoping Review. [{Full Article}](#)
- 15 HPV vaccine awareness, perceptions, uptake, and school-based information channels during Nigeria's national rollout: a cross-sectional study among adolescent girls in rural Oyo State. [{Full Article}](#)
- 16 Determinants of BCG vaccine coverage among 0-2 months aged Somali children: Promoting equality in vaccination. [{Full Article}](#)
- 17 Pakistan's 2025 HPV Vaccine Phase I Rollout: Community Response, Implementation Challenges & Way Forward. [{Full Article}](#)

- 18 Applying a human-centered design approach to increase immunization coverage and reduce the number of zero-dose children in Tshopo Province, Democratic Republic of the Congo: A costing analysis. [{Full Article}](#)
- 19 Vaccination coverage and timeliness among children in Ethiopia. [{Full Article}](#)
- 20 Clinical communication to improve uptake of pentavalent vaccine in children under 5 years in Cameroon: a best practice implementation project. [{Full Article}](#)
- 21 Vaccination coverage and inequalities in childhood immunisation in Ethiopia: a secondary analysis of the PMA national longitudinal survey. [{Full Article}](#)
- 22 Gaps and barriers preventing sustained delivery of HPV vaccination in Kano, Kaduna, and Lagos states: An exploratory qualitative study. [{Full Article}](#)
- 23 Behavioural and social drivers of childhood immunisation uptake in sub-Saharan Africa: A rapid qualitative review. [{Full Article}](#)
- 24 The Malaria Vaccine Implementation Programme reduced clinical malaria in Kenya, 2020 to 2022 : Impact evaluation with predictive time-series models of routine surveillance data. [{Full Article}](#)
- 25 Cost-effectiveness evaluation of a radio campaign to improve full vaccination coverage among children under-five in Ethiopia. [{Full Article}](#)
- 26 Factors contributing to incomplete vaccination among children aged 12 to 59 months in Mbale city, Eastern Uganda: a caregivers and health workers' perspective. [{Full Article}](#)
- 27 Economic implications of switching to the hexavalent infant vaccine in an immunization program in India. [{Full Article}](#)

Appendix

The literature search for the August 2026 Vaccine Delivery Research Digest was conducted on July 23, 2026. We searched English language articles indexed by the US National Library of Medicine and published between June 15, 2026 and July 14, 2026. The search resulted in 588 items.

SEARCH TERMS

(((((“vaccine”[tiab] OR “vaccines”[tiab] OR “vaccination”[tiab] OR “immunization”[tiab] OR “immunisation”[tiab] OR “vaccines”[MeSH Terms] OR (“vaccination”[MeSH Terms] OR “immunization”[MeSH Terms])) AND (“logistics”[tiab] OR “supply”[tiab] OR “supply chain”[tiab] OR “implementation”[tiab] OR “expenditures”[tiab] OR “financing”[tiab] OR “economics”[tiab] OR “Cost effectiveness”[tiab] OR “coverage”[tiab] OR “attitudes”[tiab] OR “belief”[tiab] OR “beliefs”[tiab] OR “refusal”[tiab] OR “Procurement”[tiab] OR “timeliness”[tiab] OR “systems”[tiab])) OR “vaccine delivery”[tiab] OR “vaccination refusal”[MeSH Terms] OR “immunization programs”[MeSH Terms] OR “zero dose”[tiab] OR “unvaccinated children”[tiab] OR “gavi”[tiab]) NOT (“in vitro”[tiab] OR “immune response”[tiab] OR “gene”[tiab] OR “chemistry”[tiab] OR “genotox”[tiab] OR “sequencing”[tiab] OR “nanoparticle”[tiab] OR “bacteriophage”[tiab] OR “exome”[tiab] OR “exogenous”[tiab] OR “electropor*”[tiab] OR “systems biology”[tiab] OR “animal model”[tiab] OR “cattle”[tiab] OR “sheep”[tiab] OR “goat”[tiab] OR “rat”[tiab] OR “pig”[tiab] OR “mice”[tiab] OR “mouse”[tiab] OR “murine”[tiab] OR “porcine”[tiab] OR “ovine”[tiab] OR “rodent”[tiab] OR “fish”[tiab])) AND “English”[Language] AND 2026/06/15:2026/07/14[Date - Publication]

