

VACCINE DELIVERY RESEARCH DIGEST

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REPORT TO THE GATES FOUNDATION

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List of Articles

- 1 Influenza Vaccine Technology Transfer: A Mixed-Methods Study with Vaccine Manufacturers and Global Experts to Assess Successes, Challenges, and Opportunities.
{[Abstract & START Commentary](#)} {[Full Article](#)}
 - Influenza vaccine technology transfer is most successful when there is strong government and regulatory support.
- 2 HPV Vaccination Uptake and Acceptability of HPV/HIV Integrated Services Models for Adolescent Girls in Mozambique and Zimbabwe: The AIM-HPV Implementation Research Study.
{[Abstract & START Commentary](#)} {[Full Article](#)}
 - Integrating HPV vaccination with routine HIV care and treatment programs led to substantial increases in coverage.
- 3 Accelerating Shigella vaccines: from decades of research to global access.
{[Abstract & START Commentary](#)} {[Full Article](#)}
 - Despite challenges, Shigella vaccine development is gaining momentum, with several promising candidates approaching licensure.
- 4 Geospatial Settlement Data and Immunization Reach in Polio SIAs: Evidence from Axis of Intractable Transmission States in Northern Nigeria.
{[Abstract & START Commentary](#)} {[Full Article](#)}
 - Geospatial tools improved polio campaign reach, but results varied across northern Nigerian states.
- 5 Global, regional, and national impact of the Expanded Programme on Immunization against 14 pathogens from 1974 to 2024: an economic evaluation.
{[Abstract & START Commentary](#)} {[Full Article](#)}
 - Benefit-cost ratios for the EPI remain high but have declined over time, likely reflecting rising vaccine costs and shifting demographic and epidemiologic conditions.
- 6 Catch-up and life-course vaccination policies for adult and adolescent migrants in low-and-middle income countries: A policy analysis.
{[Abstract & START Commentary](#)} {[Full Article](#)}
 - Most LMICs lack systematic catch-up and life-course vaccination policies for adolescent and adult migrants, particularly outside outbreak and occupational settings.

- 7 African Vaccination Week as a catalyst for integrated services and immunisation equity: synthesis of implementation insights from countries in the WHO African Region.
{[Abstract & START Commentary](#)} {[Full Article](#)}
 - African vaccination week is a valuable opportunity for integrating immunization strategies with primary healthcare.
- 8 Health-seeking amid conflict and climate stress: how climate disaster shapes maternal and child healthcare behavior in fragile and conflict-affected settings.
{[Abstract & START Commentary](#)} {[Full Article](#)}
 - Destruction of medical records played a major role in service delivery gaps following a major flooding event.
- 9 Leveraging artificial intelligence to predict non-adherence to pediatric immunization schedules: a systematic review.
{[Abstract & START Commentary](#)} {[Full Article](#)}
 - AI may help immunization programs identify children at risk of missing vaccines, but external validation ins needed to improve real-world performance.
- 10 The influence of women's empowerment on childhood vaccination coverage in Nigeria: a spatio-temporal analysis.
{[Abstract & START Commentary](#)} {[Full Article](#)}
 - Women's empowerment improved vaccination uptake, but local barriers limited impact.
- 11 Quantifying relative health impact across Gavi, the Vaccine Alliance's portfolio in 117 countries at the subregional level: a modelling study.
{[Abstract & START Commentary](#)} {[Full Article](#)}
 - Vaccine impact ratios can inform prioritization but should be considered alongside broader contextual factors.

[Additional Articles of Interest](#)

[Appendix](#)

Details of Articles

1. [Influenza Vaccine Technology Transfer: A Mixed-Methods Study with Vaccine Manufacturers and Global Experts to Assess Successes, Challenges, and Opportunities.](#)

Chadwick C, Sparrow E, Nannei C, Taaffe J, Ampofo W, Flahault A, et al.

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

PubMed ID: 42347643

ABSTRACT

BACKGROUND/OBJECTIVES: Technology transfer (TT) has been identified as a global health priority due to its impact on improving access to vaccines, including for pandemic influenza preparedness and response through bilateral and multilateral mechanisms. This study aimed to (1) characterize examples of influenza vaccine TT (IVTT) and (2) identify key lessons learned that may inform future activities relevant for next-generation influenza vaccine technologies.

METHODS: Using a contingent effectiveness model, a convergent mixed-methods study was conducted with vaccine manufacturers and global experts to capture quantitative survey data on IVTT activities and enablers and qualitative data on successes, challenges, and opportunities for IVTT through interviews, complemented by secondary data from peer-reviewed and grey literature to characterize additional IVTT observations.

RESULTS: This study included 24 participants, including 14 representatives from 13 vaccine manufacturers and 10 experts. Interviews were conducted with representatives from eight manufacturers and seven experts. Eighteen IVTT observations were identified through the surveys and interviews, of which 15 IVTT transfers were completed and 13 resulted in an approved vaccine. Secondary data provided additional evidence on eight IVTT recipients and one supplier, expanding the range of institutional and programmatic contexts assessed. Shorter IVTT completion and vaccine approval timelines were observed in association with prior TT experience and private management structures for manufacturers, for pre-pandemic/pandemic influenza vaccines versus seasonal influenza vaccines, and among bilateral transfer mechanisms (versus multilateral mechanisms) and fill/finish transfer methods. Manufacturers also described spillover benefits, including the use of IVTT-related know-how for the development of COVID-19 and routine vaccines. Both manufacturers and experts generally agreed on a list of 17 enablers for successful IVTT and ranked government commitment to vaccine production and procurement as the top enabler. Findings from the literature-based observations were consistent with primary data and included additional public sector recipient

experiences, evidence of widespread human capital development, and a commentary on the importance of the demand environment.

CONCLUSIONS: Assessed IVTT activities across primary and secondary data sources yielded commercial and spillover benefits as described in the contingent effectiveness model and provided a triangulated analysis of IVTT experiences across manufacturers, experts, and documented cases. Participants agreed that effective technology transfer is contingent upon a host of determinants. Using a systematic application of the contingent effectiveness model to IVTT, this study provided an exploratory analysis of past activities among vaccine manufacturers and experts. While certain nuances for influenza were identified, the lessons learned from this study may be applicable for other TT activities, including those to support pandemic preparedness. The contingent effectiveness model is a useful tool to inform and evaluate future TT activities.

WEB: [10.3390/vaccines14060522](https://doi.org/10.3390/vaccines14060522)

IMPACT FACTOR: 3.4

CITED HALF-LIFE: 2.8

START COMMENTARY

Technology transfer (TT) involves transferring vaccine production processes, technical knowledge, and manufacturing capabilities from one organization to another. These activities can expand local production and improve vaccine access, especially in resource-limited settings by reducing some of the costs, risks, and technical barriers associated with vaccine development. As next-generation influenza vaccines are developed, TT may provide a pathway for LMICs to access and produce these technologies. This study examined determinants, outcomes, and enabling conditions associated with influenza vaccine technology transfer (IVTT).

The most important enablers of TT included sustained government commitment to local production and procurement, a viable and accessible domestic market, shared values and trust among partners, and a strong national regulatory authority (NRA). Participants emphasized that a strong regulatory environment was crucial for initiating technology transfer. Regulatory capacity is especially important for influenza vaccines because NRAs must authorize the timely release of new vaccine batches each year. Government commitment was also important because influenza vaccine production and procurement follow narrow seasonal timelines that leave a short amount of time for contract negotiations. Additionally, influenza vaccines are not routinely included in many national immunization programs and are not typically provided by global procurement programs like Gavi. Governments must therefore understand influenza seasonality and provide sustained political and financial support for local production. Participants also discussed the importance of trust, shared values, and long-term commitment between suppliers and recipients. Strong relationships can help

partners manage risks and allow recipients to draw on suppliers' technical expertise and professional networks when challenges arise.

A strength of the study was its diverse sample, which included manufacturers from five WHO regions with varying ownership structures, production capacities, and product development. However, the small sample may have been biased toward recipient perspectives and partnerships with more successful outcomes. The authors suggest future research should include more suppliers and unsuccessful or discontinued partnerships to better identify barriers to effective IVTT.

[Return to List of Articles](#)

2. [HPV Vaccination Uptake and Acceptability of HPV/HIV Integrated Services Models for Adolescent Girls in Mozambique and Zimbabwe: The AIM-HPV Implementation Research Study.](#)

Gill M, Chissaque A, Viegas E, Chinyanganya L, Bara H, Greenberg L, et al.

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

PubMed ID: 42347624

ABSTRACT

BACKGROUND/OBJECTIVES: Girls living with HIV (GLHIV) or vulnerable to HIV have a higher risk of HPV infection and cervical cancer as they age. We determined acceptability and vaccination uptake after integrating HPV vaccination into HIV prevention and treatment services for girls in Mozambique and Zimbabwe.

METHODS: Pre-integration and integration HPV vaccination information were abstracted from routine records of girls aged 9-14 years offered HPV vaccine through HIV services in 54 health facilities (HFs) and surrounding communities between February and December 2025. Caregivers participated in quantitative surveys about vaccine perceptions and integration model experiences in a subset of 16 HFs.

RESULTS: In total, 6377 records of girls (median age: 11 years) were abstracted. Among the vaccine recipients, 63 (3.0%) girls received vaccine pre-integration and 2019 (97.0%) post-integration in Mozambique and 743 (17.3%) pre-integration and 3541 (82.7%) post-integration in Zimbabwe. Among GLHIV, 95.8% and 69.6% received a first HPV vaccine in Zimbabwe and Mozambique, respectively. Full vaccination with two doses occurred in 49.1% of eligible girls in Mozambique and 73.9% in Zimbabwe. Overall, 461 (67.8%) caregivers had heard of the HPV vaccine and 85.9% of cervical cancer, 99.6% were satisfied with vaccination in integration settings, and 78.6% preferred facility-based vaccination models.

CONCLUSIONS: We demonstrated that HPV/HIV service integration was an effective strategy to increase HPV vaccine uptake among young girls at increased risk of HPV and cervical cancer. We found high vaccine and model acceptability and awareness of cervical cancer among caregivers. Optimization of this approach requires better integrated tools and model adaptations to fit the needs of girls and health systems.

WEB: [10.3390/vaccines14060503](https://doi.org/10.3390/vaccines14060503)

IMPACT FACTOR: 3.4

CITED HALF-LIFE: 2.8

START COMMENTARY

This mixed-methods, quasi-experimental study assessed the acceptability and effectiveness of integrating HPV vaccination into HIV prevention, care, and treatment services for adolescent girls in Mozambique and Zimbabwe. The intervention incorporated a two-dose HPV vaccine schedule for girls living with HIV (GLHIV) and a single-dose schedule for girls receiving HIV prevention services. It leveraged existing health, education, psychosocial, and caregiver support platforms that already maintain regular contact with these vulnerable populations.

The integration model achieved high first-dose coverage among GLHIV, reaching nearly all eligible girls in Zimbabwe and approximately 70% in Mozambique. However, second-dose coverage among eligible GLHIV was lower, at 74% in Zimbabwe and 49% in Mozambique, indicating missed opportunities for full vaccination. Potential barriers included longer intervals between ART visits under multi-month dispensing schedules with fewer clinic visits, unsuccessful follow-up, and incomplete vaccination documentation when girls were referred to another department without a clinic escort or tracking mechanism. Integrating HPV vaccination into HIV services may be especially valuable as countries transition to different dosing schedules based on HIV status. School-based and national vaccination campaigns often do not assess HIV status because of confidentiality and stigma concerns. However, HIV care and treatment providers already know their patient's status and can incorporate vaccination education, documentation, and follow-up into existing care.

A major strength of the study is its use of routine service data alongside caregiver surveys across two distinct delivery models and settings. Limitations include incomplete documentation of prior vaccination and refusals, a short implementation period, and possible overestimation of acceptability because few caregivers who refused vaccination were surveyed. The findings support stronger integration of HIV and immunization records, active tracking for second doses, and locally adapted delivery models that also reach out-of-school girls.

[Return to List of Articles](#)

3. [Accelerating Shigella vaccines: from decades of research to global access.](#)

Tilahun S, Kim S, D'Cor N, Cowden J, Saluja T.

Expert Rev Vaccines. 2026 Jun 14;25(1):2686291.

PubMed ID: 42249601

ABSTRACT

INTRODUCTION: Shigella remains one of the leading causes of severe pediatric diarrheal deaths, especially in low- and middle-income countries. Despite more than a century of sustained research efforts, there is no globally licensed Shigella vaccine.

AREAS COVERED: This review examines the epidemiology, pathogenesis, historical development, and vaccine landscape of Shigella, highlighting investigational vaccine candidates. Evidence from the WHO International Clinical Trials Registry Platform (ICTRP) further indicates that several vaccine candidates have progressed to Phase II and III clinical trials across diverse geographic regions worldwide. However, licensure remains constrained by scientific, public health, and programmatic challenges.

EXPERT OPINION: Next-generation Shigella vaccine platforms offer promising opportunities to improve immunogenicity, scalability, and serotype coverage. However, key challenges remain, including antigenic diversity, the lack of defined correlates of protection, and the complexity of conducting efficacy trials in high-burden settings. Accelerating vaccine development will require continued innovation, strengthened clinical trial capacity in endemic regions, and coordinated global partnerships. Addressing these priorities could facilitate vaccine licensure and enable effective deployment, ultimately reducing the global burden of shigellosis, and contributing to efforts to combat antimicrobial resistance.

WEB: [10.1080/14760584.2026.2686291](https://doi.org/10.1080/14760584.2026.2686291)

IMPACT FACTOR: 5.6

CITED HALF-LIFE: 7.3

START COMMENTARY

This review provides an overview of Shigella vaccine development and addresses scientific and regulatory challenges, as well as strategies to accelerate licensure and distribution. Early Shigella vaccine trials have predominantly taken place in high-income countries, despite the highest burden of disease affecting children under five in LMIC settings. The authors recommend that late-stage studies prioritize highly endemic regions, including sub-Saharan Africa and South Asia. Within these settings, it will also be important to prioritize populations at greatest risk, including young children,

individuals living with HIV, those living in overcrowded or unsanitary conditions, and communities where transmission of drug-resistant strains is high. However, conducting vaccine trials in endemic areas presents unique challenges. High baseline antibody levels and preexisting immunity may complicate the assessment of vaccine efficacy.

Another scientific and clinical challenge is accounting for polymicrobial infections in trial design and analysis. Prior studies have shown that diarrheal episodes among young children in LMICs often involve co-infection with multiple pathogens, making single-pathogen attribution and conventional diagnostic methods less reliable. Future trials should incorporate co-infection-adjusted analyses, pathogen-specific stratification, and enhanced diagnostics to more accurately measure Shigella-specific disease burden and vaccine impact.

Despite these challenges, Shigella vaccine development is experiencing significant momentum driven by new vaccine technologies and global commitment to licensure. The most promising near-term candidates two are subunit vaccines in late-stage development. A tetravalent bioconjugate vaccine has received US FDA Fast Track designation, showing that there is strong regulatory support for a Shigella vaccine. Generalized Modules for Membrane Antigens (GMMA)-based vaccines are also progressing rapidly, with partnerships such as Bharat Biotech helping to support large-scale, affordable production for endemic settings.

[Return to List of Articles](#)

4. [Geospatial Settlement Data and Immunization Reach in Polio SIAs: Evidence from Axis of Intractable Transmission States in Northern Nigeria.](#)

Shehu A, Metiboba L, Ohiaeri N, Ilesanmi O, Akpan D, Fashoto B, et al.

Gates Open Res. 2026 Jun 06;10:32.

PubMed ID: 42244932

ABSTRACT

BACKGROUND: The persistent transmission of circulating vaccine-derived poliovirus type 2 (cVDPV2) in Northern Nigeria, especially in the Axis of Intractable Transmission (AIT) states, Kebbi, Sokoto, Katsina, and Zamfara, despite national certification of wild poliovirus interruption, is strongly associated with fragmented settlement visibility, population denominator inaccuracies, and uneven implementation of Supplementary Immunization Activities (SIAs). This study examines whether these geospatial investments as broader ecosystem of interventions improve immunization reach and operational quality during cVDPV2 SIAs.

METHODS: A retrospective operational analysis was conducted using data from nine consecutive SIAs (April 2024-June 2025). We extracted state-level indicators from the Master List of Settlements (MLoS) geospatial records and campaign data, which included (1) geospatial completeness, defined as the proportion of settlements with validated coordinates; (2) settlement tracking coverage; (3) MLoS-derived population targets for children; and (4) number of children vaccinated. Descriptive statistics, bivariate exploratory relationships, and temporal learning analysis were performed to evaluate how geospatial status influenced tracking outcomes.

RESULTS: Geospatial completeness ranged from 92.1% (Zamfara) to 100% (Kebbi) and was associated with higher, more stable tracking coverage. Kebbi, with complete geolocation of settlements, demonstrated consistently strong tracking performance (mean 93%). Settlement tracking correlated positively with vaccination outputs in Kebbi and Sokoto but demonstrated saturation effects in Katsina and diminishing returns in Zamfara. Operational learning was observed in Sokoto, Katsina, and Zamfara, each demonstrating 8 to 10 percentage point improvements in tracking coverage across rounds.

CONCLUSION: In addition to other contributory factors, settlement-level geolocation improves the quality and reach of cVDPV2 SIAs by strengthening visibility of target populations and promoting more reliable tracking. The MLoS updates and tracking of settlements and vaccination teams demonstrated transformative potential in optimizing vaccination campaigns by improving equity, accountability, and efficiency. Its deployment offers valuable lessons for enhancing immunization efforts in resource-constrained and security-compromised settings, emphasizing the importance of strategic integration and sustained investments in public health innovation.

WEB: [10.12688/gatesopenres.16387.1](https://doi.org/10.12688/gatesopenres.16387.1)

START COMMENTARY

This study examines whether geospatial settlement mapping and vaccination-team tracking improved the reach and quality of polio supplementary immunization activities across four high-risk states in northern Nigeria: Kebbi, Sokoto, Katsina, and Zamfara. The authors used data from polio vaccine campaigns to compare geospatial completeness, defined as the proportion of settlements with validated coordinates; settlement tracking coverage, defined as the proportion of mapped settlements actually visited or monitored during campaigns; and vaccination coverage measures.

Notably, the relationship between settlement tracking and vaccination outcomes varied across states. In Kebbi and Sokoto, campaigns that tracked more settlements tended to vaccinate more children, showing that a broader geographic reach was accompanied by proportional gains in vaccination. However, in Katsina, vaccination levels remained high even when the number of tracked settlements fluctuated which suggests potential campaign saturation in this region. In Zamfara, expanding settlement tracking was associated with lower vaccination coverage. The authors suggest that newly reached settlements in this state may have been smaller, more remote, or affected by insecurity, where campaigns could strain fragile health systems and have diminishing returns.

A strength of the study is its use of data across multiple states and repeated campaign rounds. However, the state-level data may not account for more granular local variation. The findings support implementing tailored strategies across states. States with robust geospatial infrastructure like Kebbi could serve as learning hubs. Balanced states like Sokoto could show how geospatial readiness and reliable population denominators can produce accurate coverage data. High-throughput states like Katsina require improved population denominators and Zamfara may need mapping improvements and security-sensitive outreach strategies.

[Return to List of Articles](#)

5. [Global, regional, and national impact of the Expanded Programme on Immunization against 14 pathogens from 1974 to 2024: an economic evaluation.](#)

Lai X, Abbas K, Pouwels K, Jit M, Fang H.

Lancet Glob Health. 2026 Jun 04:103965.

PubMed ID: 42242275

ABSTRACT

BACKGROUND: 2024 marked the 50th anniversary of the Expanded Programme on Immunization (EPI), launched by WHO. Despite its crucial role in preventing infectious diseases, EPI's 50-year economic impact has not been systematically evaluated. This study aims to estimate the benefit-cost ratios (BCRs) and incremental cost-effectiveness ratios (ICERs) of EPI at global, regional, and national levels.

METHODS: We conducted an economic evaluation of EPI for 14 globally important pathogens with robust long-term data availability: *Corynebacterium diphtheriae* (diphtheria), *Haemophilus influenzae* type b, hepatitis B virus (hepatitis B), Japanese encephalitis virus (Japanese encephalitis), measles virus (measles), *Neisseria meningitidis* group A (meningitis A), *Streptococcus pneumoniae*, *Bordetella pertussis* (pertussis), poliovirus (polio), rotavirus, rubella virus (rubella), *Clostridium tetani* (tetanus), *Mycobacterium tuberculosis* (tuberculosis), and yellow fever virus (yellow fever) from Jan 1, 1974, to Dec 31, 2024, across 194 WHO member states. We compared costs (procurement, administration, and family additional costs from time spent synthesised from authoritative global databases and systematic literature reviews) and benefits (primarily averted mortality retrieved from published global burden estimates) between observed EPI implementation and a counterfactual scenario of no vaccination, from which BCRs and ICERs were derived.

FINDINGS: From 1974 to 2024, the cost of EPI reached US\$937 billion (95% CI 699-1187), offset by \$15 050 billion (12 609-17 605) in averted productivity losses due to mortality (aggregate BCR 16·06 [95% CI 10·62-25·20]; ICER cost-saving). Immunisation against all 14 pathogens showed favourable economic outcomes. Measles vaccination produced the highest BCR (73·97 [45·78-124·06]), and the ICERs for all vaccines remained below conventional cost-effectiveness thresholds. EPI against 14 pathogens in aggregate achieved cost savings (BCR>1) in all 194 WHO member states. Economic returns varied across six WHO regions and four World Bank income groups, with the Eastern Mediterranean region (BCR 17·22 [11·22-28·67]) and low-income countries (BCR 23·63 [16·87-34·32]) showing the highest BCRs.

INTERPRETATION: The 50-year EPI has proven highly cost-effective at global, regional, and national levels, and remains a worthwhile investment. The EPI delivered impactful life-saving benefits and favourable economic returns, especially in high-burden and low-income settings.

FUNDING: The National Natural Science Foundation of China, the China Postdoctoral Science Foundation, the Vaccine Impact Modelling Consortium, and the Japan Agency for Medical Research and Development.

WEB: [10.1016/j.jlanglo.2026.103965](https://doi.org/10.1016/j.jlanglo.2026.103965)

IMPACT FACTOR: 22.5

CITED HALF-LIFE: 5.2

START COMMENTARY

This study estimates the health and economic impact of 50 years of immunization against 14 pathogens included in the Expanded Program on Immunization (EPI) across 194 WHO member states from 1974 to 2024. The authors focused specifically on productivity losses averted due to premature mortality and did not include costs associated with treating disease cases.

The authors calculated benefit-cost ratios (BCRs) for the EPI over the full study period with BCRs from 1974–1999 and 2000–2024. While the EPI was cost-saving (BCR >1) in all countries over the 50-year study period, there was a trend of decreasing benefit-cost ratios over time. The global aggregate BCR from 1974 to 2024 was 16.06 (95% CI: 10.62, 25.20), with the BCR decreasing from 58.12 in 1974 to 4.89 in 2024. However, from 2000 to 2024, the global average BCR remained high at 7.53 (95% CI: 5.36, 11.07), showing that the EPI continues to generate substantial economic benefits. The authors also observed a sustained upward trend in total immunization costs over the study period, likely due to demographic changes, expanded coverage, and the introduction of new vaccines that increased the number of children vaccinated against a broader set of pathogens. Newer vaccines, such as pneumococcal conjugate and rotavirus vaccines, are more expensive than older vaccines and have contributed to higher average unit costs for the EPI. While these rising costs are closely associated with declining BCR values, the authors note that temporal changes in BCRs likely reflect multiple interacting factors, including changing epidemiological conditions, improvements in population health, and shifting demographic and economic contexts.

This study addresses an important evidence gap by including a broad scope of countries over a long timeframe, whereas many previous studies have focused on low-income or middle-income countries or shorter study periods. However, the findings are limited by the exclusion of vaccines such as HPV, which likely underestimates the EPI's full public health benefits. Regional variations in economic impact highlight the importance of optimizing resource allocation and tailoring immunization strategies based on regional, national, and pathogen-specific economic impact. The authors also emphasize the value of promoting vaccine price reductions and implementing tiered pricing models based on country income level.

[Return to List of Articles](#)

6. [Catch-up and life-course vaccination policies for adult and adolescent migrants in low- and middle income countries: A policy analysis.](#)

Faijue D, Bouaddi O, Segui A, Morias B, Bojang S, Deal A, et al.

Vaccine. 2026 Jun 10;85:128645.

PubMed ID: 42172819

ABSTRACT

BACKGROUND: Adolescent and adult migrants in low- and middle-income countries (LMICs) are often under-immunised because of disrupted vaccination in childhood and barriers to care, increasing the risk of vaccine-preventable diseases. WHO's Immunization Agenda 2030 strengthens calls for life-course immunisation and inclusion of marginalised groups in catch-up initiatives (including Td/Tdap, IPV, MR/MMR, HepB, HPV). Despite evidence from Europe that migrants are frequently missed, it is unclear how far LMIC policies include adolescents and adults beyond child-focused programmes. We analysed catch-up and life-course vaccination policies, operational guidance, laws and frameworks across 136 LMICs.

METHODS: Using framework analysis, we conducted a comparative policy analysis of national and subnational policies, operational guidance, laws and frameworks on catch-up and life-course vaccination for adolescents (10-19 years) and/or adults (>19 years) migrants (including refugees, undocumented migrants, asylum seekers, Internally Displaced Person (IDPs) and migrants workers) across LMICs. We did systematic database and grey-literature searches including and Ministry of Health websites, key international organisations (Jan 2000-Feb 2025), and contacted health ministries and national experts to locate unpublished policies and guidelines.

RESULTS: 33 policy and guidance sources met the inclusion criteria (15 peer-reviewed; 18 grey literature), reporting vaccination policies for migrants across 57 LMICs. Evidence clustered into two policy domains, routine vaccinations and COVID-19. We found that migrant-inclusive catch-up or life-course vaccination policies for routine vaccines were rare, identified in only 9 (6.6%) of 136 LMICs. 3 (33.3%) of these countries focused on outbreak-responsive or ad hoc provisions only, 4 (44.4%) applied general national immunisation schedules with opportunistic catch-up to migrants (but without migrant-specific operational guidance), and 2 (22.2%) recognised migrant entitlement through formal policy frameworks or structured partnerships. Policies targeted both adolescents and adults in 9 (6.6%) of 136 LMICs, and refugees in 9 (6.6%) LMICs, while other migrant groups were less consistently specified. Vaccines most commonly appearing in guidelines for adolescent and adult migrants in LMICs were HPV in 6 (4.4% of 136 LMICs) and MR/MMR in 5 (3.7%), followed by OCV and HepB in 3 (2.2%) countries each. Polio, tetanus and typhoid were also included in rare cases. Where vaccination history was uncertain, only 3 (33.3%) countries explicitly recommended presumptive catch-up vaccination. For COVID-19, vaccination policies demonstrated broad migrant

inclusion: 57 (41.9%) of 136 LMICs documented migrant-inclusive policies or rollout targeting adolescents and/or adult migrants through national deployment plans or emergency strategies.

CONCLUSION: Most LMICs lack policies ensuring adolescent and adult migrants access catch-up and life-course vaccination, despite ample evidence that these are under-immunised populations. Governments should clarify entitlements, adopt migrant-inclusive guidance, and strengthen delivery and monitoring systems to reach people who miss vaccines, doses, and boosters in origin countries or during transit, and who face barriers to care.

WEB: [10.1016/j.vaccine.2026.128645](https://doi.org/10.1016/j.vaccine.2026.128645)

IMPACT FACTOR: 3.4

CITED HALF-LIFE: 8.4

START COMMENTARY

This policy analysis examines how LMICs address catch-up and life-course vaccination for adolescent and adult migrants and refugees. The study identified only nine out of 136 LMICs with non-COVID-19 vaccination policies for this population including: Bangladesh, Brazil, Egypt, India, Jordan, Kenya, Lebanon, Morocco, and Uganda.

Where policies existed, they primarily addressed adolescents through school-based or outreach delivery of vaccines such as HPV, measles-containing vaccines, polio, and tetanus–diphtheria-containing vaccines. Adult vaccination was less consistently addressed and was generally limited to specific circumstances like occupational vaccination, including hepatitis B vaccination for health and sanitation workers, outbreak-responsive measles vaccination, or tetanus-containing vaccines offered through antenatal care. The authors suggest that these programs show adult migrants are not typically systematically incorporated into routine life-course immunization programs but are instead reached through fragmented or reactive services. Notably, low vaccination uptake among migrants may reflect structural and policy barriers rather than vaccine hesitancy. The authors discuss qualitative interviews finding that adult migrants were largely willing to receive catch-up vaccination but faced limited awareness of their eligibility, language barriers, difficulty navigating health services, problems accessing appointments, and uncertainty about prior vaccination histories.

A strength of the study is its broad scope that combines peer-reviewed literature, grey literature, and policy documents across 136 LMICs. However, some policies may have been missed because documents were unavailable, unpublished, or did not explicitly mention migrants. The study also assessed policy content rather than implementation or vaccination coverage. These findings support shifting vaccination policies for migrants in LMICs away from outbreak-based and occupational approaches toward integration with routine systems that clearly define eligibility, provide catch-up vaccination through accessible services, address missing vaccination records, and track whether

migrant populations are being reached.

[Return to List of Articles](#)

7. [African Vaccination Week as a catalyst for integrated services and immunisation equity: synthesis of implementation insights from countries in the WHO African Region.](#)

Teka Bekele A, Dadjo C, Manga P, Bwaka A, Masembe Y, Wanyoike S, et al.

BMJ Public Health. 2026 May 20;4(Suppl 1):e004798.

PubMed ID: 42158716

ABSTRACT

INTRODUCTION: The African Vaccination Week (AVW) is a coordinated initiative designed to raise awareness, strengthen immunisation delivery and promote equity across the WHO African Region. In 2025, AVW coincided with the Immunisation Agenda 2030 midpoint, offering a strategic opportunity to accelerate progress towards reaching zero-dose and under-vaccinated populations.

METHODS: We conducted a cross-sectional synthesis using aggregated secondary data from country implementation reports submitted to the WHO Regional Office for Africa and insights from postimplementation regional webinars. Data were analysed descriptively to summarise vaccination outputs, integrated service delivery and implementation innovations across countries.

RESULTS: 25 countries reported implementing AVW 2025 activities. Approximately 11.5 million children were vaccinated, including 353 133 zero-dose children. Around 100 000 adults received vaccines, primarily tetanus-diphtheria and COVID-19 vaccines. Other interventions delivered along with vaccination included vitamin A supplementation and deworming for over 250 000 children. Several countries leveraged AVW 2025 to introduce vaccines, launch their national immunisation strategy and strengthen integration with primary healthcare services.

CONCLUSIONS: The AVW 2025 functioned as a regional implementation platform for highlighting immunisation priorities, reaching missed children and supporting integrated primary healthcare delivery across the WHO African Region. Country experiences indicate that AVW achieves the greatest impact when aligned with national programmes and embedded within routine planning processes. Variations in participation and reporting point to the need for stronger advance preparation, sustained engagement with all Member States and adaptable support tailored to country contexts. Positioning AVW as a feasible, low-opportunity-cost mechanism for advocacy, visibility and service delivery alignment can contribute meaningfully to broader immunisation and primary healthcare goals in the Region.

WEB: [10.1136/bmjph-2025-004798](https://doi.org/10.1136/bmjph-2025-004798)

IMPACT FACTOR: 1.7

CITED HALF-LIFE: 1.4

START COMMENTARY

Since 2011, African Vaccination Week (AVW) has served as a regional platform to promote vaccine awareness and uptake while mobilizing political and community support. This report summarizes AVW 2025 implementation data from country reports submitted to WHO, subregional coordination documentation, and pre- and post-AVW webinars to examine its contribution to integrated immunization and primary healthcare service delivery.

Several countries used AVW 2025 to advance broader national health system goals. For example, Malawi launched a new National Immunization Strategy and EPI Field Manual, while three countries introduced malaria vaccines or strengthened follow-up for children with incomplete malaria vaccine series. Burundi used the week to support malaria vaccine rollout, and Ghana integrated AVW with its national Child Health Promotion Week to deliver immunization alongside nutrition services, deworming, and civil registration. In Sierra Leone, AVW events engaged political leaders to address misinformation and reinforce links between primary healthcare and routine immunization.

However, the findings are limited by the fact that only 25 of 47 WHO African Region Member States submitted reports which reduces regional representativeness. The authors also caution that AVW should not become a stand-alone commemorative activity requiring substantial new resources and that the event is most useful when aligned with existing national priorities and used to enhance visibility, coordination, and advocacy.

[Return to List of Articles](#)

8. [Health-seeking amid conflict and climate stress: how climate disaster shapes maternal and child healthcare behavior in fragile and conflict-affected settings.](#)

Adeyanju G, Abreu L, Schrage P, Brinkel J, Jalo R, Bello M, et al.

BMC Health Serv Res. 2026 Jun 24;26(1).

PubMed ID: 42157176

ABSTRACT

BACKGROUND: Floods can have significant adverse health consequences, placing an additional burden on healthcare systems and altering healthcare-seeking behavior. However, its effects on the health-wellbeing of vulnerable groups, such as pregnant women and children, in resource-constrained and conflict-affected Nigerian communities remain underexplored. This study examines the impact of the 2024 floods in Borno State, Nigeria, on maternal and child healthcare-seeking behavior.

METHODS: A qualitative phenomenological approach was employed, with semi-structured Focus Group Discussions serving as the primary data collection method. Participants were selected purposively, focusing on households with pregnant women and children under five years old. Six FGDs, each comprising eight participants, were conducted across six geopolitical constituencies. The data were transcribed, framed, coded and analyzed thematically using Nvivo.

RESULTS: The 2024 flood in Borno exacerbated existing vulnerabilities in social and healthcare infrastructure, disrupting essential maternal and child healthcare services. Public healthcare facilities were overwhelmed, with some healthcare facilities being repurposed as shelters, which further compounded the hardships experienced by vulnerable populations. The flood led to massive displacement, emotional trauma and increased health risks, particularly among children and pregnant women. The flood led to outbreaks of infectious diseases, long-term deterioration in access to antenatal care and immunization services, destruction of healthcare facilities, loss of medical supplies, and damage and contamination of existing drugs, as well as the destruction of cold chain systems critical for vaccine preservation. Cultural beliefs and environmental mismanagement further intensified the crisis.

CONCLUSION: The findings underscore the urgent need for climate-resilient healthcare systems to improve disaster preparedness and management in the context of climate change. The resulting displacement, emotional trauma and health risks, particularly for marginalized groups, emphasize the need for integrated, climate-resilient systems that safeguard both infrastructure and vital public healthcare services.

WEB: [10.1186/s12913-026-14744-3](https://doi.org/10.1186/s12913-026-14744-3)

IMPACT FACTOR: 3.3

CITED HALF-LIFE: 5.3

START COMMENTARY

This qualitative study explores how extreme climate events such as flooding affect maternal and child healthcare-seeking behavior in resource-limited and conflict-affected settings. The authors conducted focus group discussions in Maiduguri, Borno State, Nigeria, which was severely affected by flooding in the fall of 2024.

The most significant disruption to essential systems and healthcare services was the physical destruction of hospitals, schools, and other community facilities. Health care facilities that were not destroyed were often repurposed as shelters for displaced individuals, making routine health services inaccessible. Notably, floodwater also destroyed or contaminated medicines, healthcare records, and diagnostic tools. The loss of medical records, including antenatal care (ANC) and child vaccination cards, emerged as another major barrier to routine service delivery. Participants described being denied immunizations for their children or being turned away from ANC visits near their due dates because they could not provide documentation of their previous medical history. The loss of supplies and records highlighted the vulnerability of healthcare systems in flood-affected areas, undermining recovery efforts and contributing to long-term gaps in care.

A strength of this study is the use of focus group discussions, which allowed authors to generate rich insights and capture shared community experiences beyond what individual interviews may have provided. However, the study is limited by its focus on a small geographic area, which may not be representative of Borno State or Nigeria as a whole. The authors recommend integrating disaster preparedness and climate adaptation into national healthcare policies, particularly for maternal and child healthcare in fragile settings. This would require investment in resilient healthcare infrastructure, protection of medical supply chains, and digitization of health records to reduce service disruptions during future disasters.

[Return to List of Articles](#)

9. [Leveraging artificial intelligence to predict non-adherence to pediatric immunization schedules: a systematic review.](#)

Rey R, L'Huillier A, Pittet L.

Eur J Pediatr. 2026 May 15;185(6).

PubMed ID: 42141249

ABSTRACT

UNLABELLED: Immunization is one of the most effective interventions to prevent infectious diseases. Identifying individuals at risk of non-adherence to immunization schedules could enable early interventions to improve coverage. With the increasing availability of large datasets with sociodemographic, medical, and geographic data, artificial intelligence (AI) offers new possibilities for identifying predictive patterns. We performed a systematic literature review of original studies that used AI to predict immunization non-adherence in children. Searches were conducted in PubMed, Embase, and Web of Science and no restrictions were applied regarding publication year, language, or study design. Study characteristics, dataset size, AI methods, performance metrics, and validation approaches were extracted. Risk of bias was assessed using PROBAST + AI. A total of 843 records were identified; after screening, 12 studies were included. Nine of 12 studies were conducted in low- and middle-income countries, used cross-sectional survey data, and analyzed vaccines from routine immunization schedules. Model performance was generally high; 9/12 studies reported an accuracy or an area under the receiver operating characteristic curve exceeding 80%, but no study conducted external validation. Predictors clustered into seven categories: maternal, paternal, family, child, geographic, wealth, and others. Among maternal and child-related factors, prenatal care and previous immunization history had a high predictive weight.

CONCLUSION: AI demonstrates a promising potential for identifying individuals at risk of vaccine non-adherence. However, the lack of external validation raises concerns about model overfitting and limits real-world applicability. Demographic health surveys were routinely repeated across countries and time periods and could therefore represent an ideal resource for external validation.

WHAT IS KNOWN: • Geographic, sociodemographic, and medical factors contribute to non-adherence to the immunization schedule. • Identifying these individuals can guide early interventions to improve immunization coverage.

WHAT IS NEW: • Artificial intelligence can reveal unknown influential factors; prenatal care and delivery setting emerged as key factors in this systematic review.

WEB: [10.1007/s00431-026-07067-2](https://doi.org/10.1007/s00431-026-07067-2)

IMPACT FACTOR: 2.9

CITED HALF-LIFE: 5.6

START COMMENTARY

This systematic review evaluates the performance of artificial intelligence (AI) models in predicting non-adherence to immunization schedules among pediatric populations. Across the 12 included studies, AI models identified several maternal and health-service factors as important predictors of non-adherence. Prenatal care, delivery setting, and previous immunization history often carried substantial predictive weight which suggests that children with limited early contact with health services may be particularly important targets for vaccination outreach. In contrast, factors such as paternal age and education and the child's sex generally contributed less to model performance.

However, the review also highlights important methodological concerns. Since fully vaccinated children greatly outnumbered children who were incompletely vaccinated, zero-dose, or lost to follow-up in the datasets used to train the models, AI may have become better at identifying the vaccinated majority than detecting the smaller group most in need of intervention. This imbalance can make model accuracy appear high even when the model performs poorly among children at risk of non-adherence. The most significant limitation was the absence of external validation of models across different populations, settings, and time periods. Although most studies reported strong predictive performance, none tested their models using data from different locations or time periods. Reported accuracy for AI models may be overestimated and may decline when models are applied to new populations or health systems. Differences in vaccines, algorithms, predictors, and definitions of non-adherence also make findings across models challenging to compare. The findings show that AI shows promise for helping immunization programs target outreach, but these models require stronger validation before they can be reliably used in public health practice.

[Return to List of Articles](#)

10. [The influence of women's empowerment on childhood vaccination coverage in Nigeria: a spatio-temporal analysis.](#)

Gayawan E, Egbon O, Utazi C, Umar J, Trotter C.

Sci Rep. 2026 May 15.

PubMed ID: 42141066

ABSTRACT

Immunization is one of the most impactful public health achievements, significantly reducing childhood morbidity and mortality worldwide. However, gender disparity and women's disempowerment constitute structural barriers in accessing vaccine services in low- and middle-income countries. In Nigeria, widespread differences in social norms and cultural values affect gender roles and influence women's ability to decide their own healthcare needs and participate in household decision-making. This leads to attitudinal differences in uptake of immunization depending on the child's location of residence. Using data from four waves of the Nigeria Demographic and Health Survey, we constructed two empowerment indices that determine whether caregivers participate in household decision-making and have the ability to decide on their healthcare needs. We used a structured spatiotemporal statistical model to determine whether a significant part of childhood vaccination coverage disparities can be attributed to these women's empowerment measures and predicted events at the third administrative level of the country. We considered five vaccination indicators: Bacillus Calmette-Guerin (BCG), zero-dose, receiving a complete dose of DPT, MCV-1 (first dose of measles-containing vaccine), and receipt of all basic vaccinations. The adopted model was validated by comparing the empirical estimates of vaccination coverage level from the data with model projections at the second administrative level. The findings indicate that although empowerment regarding participation in household decision-making and agency over healthcare access is generally associated with increased vaccine uptake, their effects vary considerably across locations and notably among the highly empowered category of women. Although there are efforts to bridge immunization gaps within the country, the study emphasizes the need for tailored strategies that target up-scaling the ability of women and the wider community to participate in the decision-making process and be able to decide on healthcare needs to address regional disparities and improve vaccination coverage.

WEB: [10.1038/s41598-026-51266-8](https://doi.org/10.1038/s41598-026-51266-8)

IMPACT FACTOR: 4.9

CITED HALF-LIFE: 5.0

START COMMENTARY

This study examines how women's empowerment interacts with local context and changing conditions over time to shape childhood vaccination coverage in Nigeria. The authors used Nigeria Demographic Health Survey data to create empowerment measures based on women's participation in household decision-making and their agency in accessing healthcare. Although increased women's empowerment was generally associated with improved vaccination uptake, effects varied substantially across geographic locations and vaccine types. These differences were particularly pronounced among highly empowered women, while the effects among moderately empowered women were generally weaker and more consistent. Coverage of all basic vaccines also remained low, at approximately 10% across most of the country throughout the study period.

An important finding is that empowerment alone may not be sufficient to improve vaccination coverage. Although empowered women may have greater control over household resources and be able to seek care without a partner's permission, employment and other responsibilities faced by highly empowered women may create time constraints that interfere with vaccination visits. Flexible clinic hours, mobile outreach, community childcare support, and other strategies that reduce the opportunity costs of vaccination may be necessary to improve vaccination uptake for families with highly empowered women who are leading household health decisions. Regional barriers also emerged in this study. In northern Nigeria, even moderately and highly empowered women were often less likely to have children who received BCG and other vaccines. Lower use of antenatal care and facility-based delivery, alongside vaccine mistrust, religious norms, and family disapproval, are possible explanations of this localized pattern. A strength of the study is its use of spatio-temporal modeling to identify local differences that national estimates may not capture. However, the cross-sectional survey data limits causal inference, and some conflict-affected areas were underrepresented. The findings suggest that women's empowerment initiatives should be paired with locally tailored health-system and community interventions to improve vaccination coverage.

[Return to List of Articles](#)

11. [Quantifying relative health impact across Gavi, the Vaccine Alliance's portfolio in 117 countries at the subregional level: a modelling study.](#)

Gaythorpe K, Li X, Shankar M, Hartner A, Gibney Z, Abbas K, et al.

Lancet. 2026 May 14;407(10542):1941-1952.

PubMed ID: 42134355

ABSTRACT

BACKGROUND: Estimates of vaccine impact have typically been used to quantify the effects of, and inform, immunisation strategies. Given the growing resource constraints on health systems worldwide, robust estimates of vaccine impact that allow comparison across different vaccines are now more crucial for decision making than ever. Building on previous modelling studies, we aimed to estimate vaccine impact ratios for an expanded portfolio of Gavi, the Vaccine Alliance-supported vaccination programmes against 14 vaccine-preventable diseases across 117 low-income and middle-income countries using multiple models.

METHODS: In this modelling study, we have presented Vaccine Impact Modelling Consortium estimates of vaccine impact ratios, defined as deaths or disability-adjusted life-years averted per 1000 vaccinations, for the Gavi portfolio of vaccines. Modelling groups used standardised inputs for demographic data and vaccination coverage assumptions, including a no-vaccination counterfactual, and accounted for structural, parameter, and stochastic uncertainty to produce burden estimates. These estimates were then compared to calculate vaccine impact ratios, disaggregated by immunisation activity type and geographical subregions for vaccinations given between 2000 and 2030 (or 2000 and 2040 for cholera).

FINDINGS: Overall, we observed human papillomavirus (11·24 [95% uncertainty interval 10·88-11·64]) and measles (6·09 [4·90-7·07]) vaccines averting a higher number of deaths per 1000 vaccinations than others. For other vaccines, the impact ratios varied across subregions and activity types. Due to parameter, structural, and stochastic uncertainty, the ranges of these ratios often overlap.

INTERPRETATION: Decisions around which vaccines to use are increasingly important in the context of Gavi's country vaccine budgets. Robust metrics that allow comparison between vaccines are thus essential to inform discussions. The vaccine impact ratios presented in this study can be used to complement other evidence to support effective planning and prioritisation in national immunisation programmes.

FUNDING: Gavi, the Vaccine Alliance, Gates Foundation, and Wellcome Trust.

WEB: [10.1016/S0140-6736\(26\)00555-6](https://doi.org/10.1016/S0140-6736(26)00555-6)

IMPACT FACTOR: 109.0

CITED HALF-LIFE: 8.0

START COMMENTARY

This modelling study compares the health impact of Gavi-supported vaccination programs against 14 vaccine-preventable diseases across 117 LMICs. Health impact was measured using vaccine impact ratios, defined as deaths or disability-adjusted life-years (DALYs) averted per 1,000 vaccinations. When measured by deaths averted, across all regions and immunization activities, HPV and measles vaccines had the highest estimated impact ratios, averting 11.24 and 6.09 deaths per 1,000 vaccinations, respectively.

One notable finding was that vaccine rankings differed depending on whether impact was measured using deaths or DALYs. Malaria vaccination ranked higher when DALYs were considered because it prevents deaths primarily among young children, resulting in a greater number of years of life saved. In contrast, diseases such as hepatitis B and Japanese encephalitis may cause substantial long-term illness or disability, which is associated with higher DALYs and affects how their overall health impact is represented. This illustrates how a single outcome measure cannot holistically quantify the value of a vaccine.

A major strength of the study was that the authors used standardized demographic data, vaccination coverage assumptions, and modelling methods. However, COVID-19 and meningitis were each represented by only one model. The authors suggest future vaccine-prioritization decisions should combine impact ratios with cost-effectiveness, equity, outbreak risk, and country-specific disease burden rather than relying on these estimates alone.

[Return to List of Articles](#)

Additional Articles of Interest

- 1 From Global Insights to Local Action: Bridging Vaccine Design and Manufacturing Gaps in H5N1 Pandemic Readiness. [{Full Article}](#)
- 2 The 2025 Expanded Programme on Immunization (EPI) Managers Meeting in West Africa: A Health Systems Analysis of a Decade of Stagnating Routine Immunization Performance. [{Full Article}](#)
- 3 Community-Led Defaulter Tracking for Catch-Up Vaccination: Implementation Experience in Uganda, 2022 and 2024. [{Full Article}](#)
- 4 Community and health workers' perspectives on introducing HPV vaccination in a nonrollout district of Rajasthan, India: A qualitative study. [{Full Article}](#)
- 5 Immunization continuity failures and measles vaccine dropout in a fragile urban setting: Evidence from Mogadishu, Somalia. [{Full Article}](#)
- 6 Early implementation and contextual determinants of the human papillomavirus vaccine rollout and uptake in Nigeria: a mixed-methods study. [{Full Article}](#)
- 7 Participation pathways in global vaccine partnerships and their implications for immunization systems: a comparative analysis of China and India in Gavi. [{Full Article}](#)
- 8 Cost analysis of a nationwide typhoid conjugate vaccine campaign in Burkina Faso. [{Full Article}](#)
- 9 Superstitions on Human Papillomavirus in Africa: A Scoping Review. [{Full Article}](#)
- 10 Acceptability and preferences regarding RSV immunisation during pregnancy: a cross-sectional study in diverse global settings. [{Full Article}](#)
- 11 Uncovering and investigating reasons for inaccuracies in vaccine card records in Kiyawa LGA Jigawa, Nigeria: a mixed method study. [{Full Article}](#)
- 12 Progress and gaps in childhood immunization among two-year-olds in Ghana (1993-2022): A trend and equity analysis. [{Full Article}](#)
- 13 Accelerating vaccine research and development for skin neglected tropical diseases: A case for leishmaniasis, leprosy, and Buruli ulcer. [{Full Article}](#)
- 14 A strategic blueprint for strengthening respiratory syncytial virus prevention among under-five children in low- and middle-income countries: Bangladesh as a model for new immunisation approaches. [{Full Article}](#)
- 15 Community-based intervention to reach the last mile of childhood vaccination coverage in Burera district, Rwanda: a mixed method study. [{Full Article}](#)
- 16 Toward equitable digital health: an integrated framework addressing exclusion, ethics, and implementation across healthcare systems. [{Full Article}](#)
- 17 Message framing, identity congruence, and polio vaccine acceptance in Pakistan: Testing a social identity-based communication framework. [{Full Article}](#)

- 18 Health worker practices and challenges surrounding routine immunisation service delivery of measles-containing vaccine: a cross-sectional assessment of health facilities in Oromia region, Ethiopia - 2021. [{Full Article}](#)
- 19 Social Context Considerations for Future HIV Vaccine Introduction and Implementation. [{Full Article}](#)
- 20 Social Marketing to Enhance Community Empowerment and Ownership for a Successful Implementation of the “Big Catch-Up” in Togo in 2025: A Mixed-Methods Study. [{Full Article}](#)
- 21 Incomplete vaccination among children aged 12-35 months in West Arsi Zone, Ethiopia. [{Full Article}](#)
- 22 A regional coalition for Lassa fever vaccine development and preparedness in West Africa: A practice-based perspective. [{Full Article}](#)
- 23 A landscape analysis of enablers and barriers to digital payments to health workers during large-scale immunisation campaigns in sub-Saharan Africa: a scoping review and in-depth interviews. [{Full Article}](#)
- 24 Developing a global framework to assess a country’s readiness and resilience to introduce a new vaccine or improve uptake of an underutilized vaccine. [{Full Article}](#)
- 25 Coverage and determinants of childhood immunization in Somalia: A systematic review and meta-analysis. [{Full Article}](#)
- 26 Typhoid knowledge, prevention practices, and vaccine awareness in high-risk communities of Lilongwe, Malawi. [{Full Article}](#)

Appendix

The literature search for the July 2026 Vaccine Delivery Research Digest was conducted on June 29, 2026. We searched English language articles indexed by the US National Library of Medicine and published between May 15, 2026 and June 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 2026/05/15:2026/06/14[Date - Publication]

