

VACCINE DELIVERY RESEARCH DIGEST

UNIVERSITY OF WASHINGTON STRATEGIC ANALYSIS,
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REPORT TO THE GATES FOUNDATION

PRODUCED BY: SUTTON, A. & SHARMA, M.

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Details of Articles

1. [Creating the vaccination improvement potential index.](#)

Rios Casas F, Armitage J, Yuan J, Liu S, Mokdad A.

Heliyon. 2024 Aug 17;10(14):e34906.

PubMed ID: 39149088

ABSTRACT

BACKGROUND: Numerous social and behavioral factors have been implicated in vaccination coverage. There is no single measure that describes a country's ability to improve or maintain its immunization coverage.

METHODS: We estimated the "Vaccination Improvement Potential" (VIP) by taking the geometric mean of 13 different indicators on health financing, vaccine confidence, and socio-demographics for more than 200 countries across 30 years. Potential VIP Index values range from 0 to 1, with a higher score indicating greater potential to improve or maintain high vaccination rates.

FINDINGS: In 1990, the mean VIP score was 0.49 (range = 0.13 to 0.86). In 2019, the mean score was 0.59 (range = 0.25 to 0.84). Consistent high performers included countries in Western Europe and high-income North America and East Asia. Important differences in subcomponents of the index drove major trends including vaccine hesitancy in Western Europe and Asia as well as lower levels of per capita health spending and development assistance in sub-Saharan Africa.

INTERPRETATION: The VIP Index is a first-of-its-kind tool for understanding the capacity that exists in a country to realize improved immunization rates. It is a new resource that can guide researchers, policymakers, and health officials to more effectively deploy resources to realize improvements in vaccination coverage, assess the impact of those improvements, and identify countries that might require additional support to improve vaccine coverage.

FUNDING: Merck Sharp & Dohme Corp.

WEB: [10.1016/j.heliyon.2024.e34906](https://doi.org/10.1016/j.heliyon.2024.e34906)

IMPACT FACTOR: 3.4

CITED HALF-LIFE: 2.7

START COMMENTARY

The Vaccine Improvement Potential (VIP) Index is composed of data from the 2017 Institute for Health Metrics and Evaluation Financing Global Health Report, the World Values Survey, Transparency International, the United Nations, the Vaccine Confidence Project, and Global Burden of Disease estimates (Table 2). Heat maps of index components for each year were constructed (Figure 3). Persistent or emerging issues of concern that were Identified include vaccine hesitancy in Western Europe, East Asia, and Southeast Asia and declining public trust in government in Latin America, North Africa, the Middle East, and Central Europe.

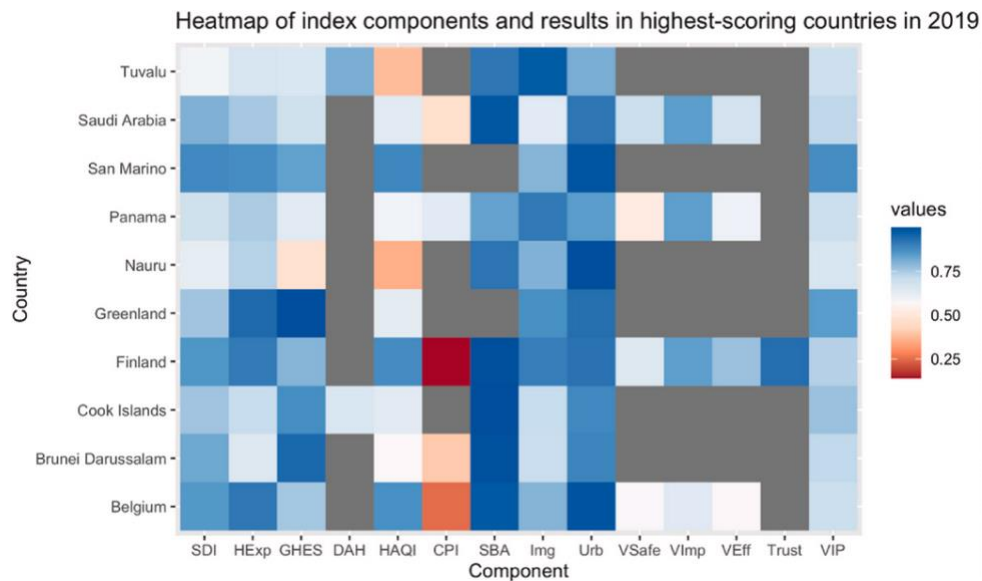


Figure 3. Component scores and final VIP value for highest-scoring countries in 2019.

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2. [Developing a roadmap to reach and sustain 90% full immunization coverage through a cross-sectoral system strengthening strategy in Bihar, India.](#)

Ratna M, Singh S, Sinha N, Kannure M, Bhatia M, Aggarwal M, et al.

BMC Health Serv Res. 2024 Aug 14;24(1):933.

PubMed ID: 39143542

ABSTRACT

INTRODUCTION: Reducing childhood mortality by curtailing the incidence of vaccine preventable diseases is contingent upon a robust and high-performing routine immunization system. According to the available data, the full immunization coverage (FIC) in the state of Bihar (India) has reached ~ 71%. While the government aspires to reach 90% FIC, a systematic evidence-based investigation of the reasons behind underimmunization as well as the identification of drivers and enablers to reach and sustain 90% FIC is critical. This study aimed to review the factors leading to underimmunized children in the state of Bihar and develop a forward-looking roadmap to reach and sustain 90% FIC by adopting a system strengthening approach.

METHOD: We conducted a desk review, followed by extensive stakeholder interviews and field visits to document and analyze the data and evidence relevant to routine immunization system performance in the state of Bihar. The stakeholders included the State Immunization Officer, District Immunization Officers, Block-level health officials, representatives from development agencies, healthcare workers, and caregivers. A total of eighty-six structured interviews were conducted, which included qualitative and quantitative parameters.

RESULT: While positive results were observed from the assessment of Bihar's immunization system, the implementation of targeted strategies for supply, service delivery and demand can provide a means to achieve FIC of 90%. The roadmap developed by the Government of Bihar enlists 40+ interventions across key thematic areas and has been prioritized over a 5-year time horizon as short, medium, and long-term milestones to achieve 90% FIC. These interventions include strengthening the data availability and quality, improving the governance and review mechanism, augmenting the capacity of health workers involve with immunization programme, and initiatives to increase demand for immunization services.

CONCLUSION: The Bihar's Immunization Roadmap development project work follows a methodical approach to assess and identify intervention to improve immunization coverage and can provide information and reference to other states and countries that are aiming to formulate similar action plans.

WEB: [10.1186/s12913-024-11380-7](https://doi.org/10.1186/s12913-024-11380-7)

IMPACT FACTOR: 2.7

CITED HALF-LIFE: 5.6

START COMMENTARY

Roadmaps included interventions grouped under identified themes. To be included, interventions were required to allow for decentralized decision-making and local context-specific solutions. Program components were assigned an initial value on a 4-point maturity scale (Basic, Developing, Advanced, Leading), used to determine feasibility and establish a timeline for intervention implementation (Figure 6).

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3. [Field Effectiveness of a Typhoid Conjugate Vaccine: The 2018 Navi Mumbai Pediatric TCV Campaign.](#)

Date K, LeBoa C, Hoffman S, Haldar P, Harvey P, An Q, et al.

Am J Trop Med Hyg. 2024 Aug 28.

PubMed ID: 39137766

ABSTRACT

Typbar-TCV®, a typhoid conjugate vaccine (TCV), was prequalified by the World Health Organization in 2017. We evaluated its effectiveness in a mass vaccination program targeting children 9 months to 14 years in Navi Mumbai, India, from September 2018 to July 2020. We compared laboratory-confirmed typhoid cases from six clinical sites with age-matched community controls. Of 38 cases, three (8.6%) received TCV through the campaign, compared with 53 (37%) of 140 controls. The adjusted odds ratio of typhoid fever among vaccinated children was 0.16 (95% CI: 0.05-0.55), equivalent to a vaccine effectiveness of 83.7% (95% CI: 45.0-95.3). Vaccine effectiveness of Typbar-TCV in this large public sector vaccine introduction was similar to prior randomized controlled trials, providing reassurance to policymakers that TCV effectiveness is robust in a large-scale implementation.

WEB: [10.4269/ajtmh.24-0181](https://doi.org/10.4269/ajtmh.24-0181)

IMPACT FACTOR: 1.9

CITED HALF-LIFE: 10.3

START COMMENTARY

This case-control study evaluated the effectiveness of a single-dose typhoid conjugate vaccine administered during a pediatric vaccination campaign that reached over 113,000 children in 2018. Data collection was complicated by the COVID-19 pandemic, so available case numbers were small (n=35). Among children 5-14 years of age, vaccine effectiveness was 87%.

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4. [Optimal human papillomavirus vaccination strategies in the context of vaccine supply constraints in 100 countries.](#)

Prem K, Cernuschi T, Malvoti S, Brisson M, Jit M.

EClinicalMedicine. 2024 Aug 30;74:102735.

PubMed ID: 39091671

ABSTRACT

BACKGROUND: Countries are recommended to immunise adolescent girls routinely with one or two doses of human papillomavirus (HPV) vaccines to eliminate cervical cancer as a public health problem. With most existing vaccine doses absorbed by countries (mostly high-income) with existing HPV vaccination programmes, limited supply has been left for new country introductions until 2022; many of those, low- and middle-income countries with higher mortality. Several vaccination strategies were considered by the Strategic Advisory Group of Experts on Immunization to allow more countries to introduce vaccination despite constrained supplies.

METHODS: We examined the impact of nine strategies for allocating limited vaccine doses to 100 pre-introduction countries from 2020 to 2030. Two algorithms were used to optimise the total number of cancer deaths that can be averted worldwide by a limited number of doses (knapsack and decreasing order of country-specific mortality rates), and an unoptimised algorithm (decreasing order of Human Development Index) were used.

FINDINGS: Routinely vaccinating 14-year-old girls with either one or two doses and switching to a routine 9-year-old programme when supply is no longer constrained could prevent the most cervical cancer deaths, regardless of allocation algorithm. The unoptimised allocation averts fewer deaths because it allocates first to higher-income countries, usually with lower cervical cancer mortality.

INTERPRETATION: To optimise the deaths averted through vaccination when supply is limited, it is important to prioritise high-burden countries and vaccinating older girls first.

FUNDING: WHO, Bill & Melinda Gates Foundation.

WEB: [10.1016/j.eclinm.2024.102735](https://doi.org/10.1016/j.eclinm.2024.102735)

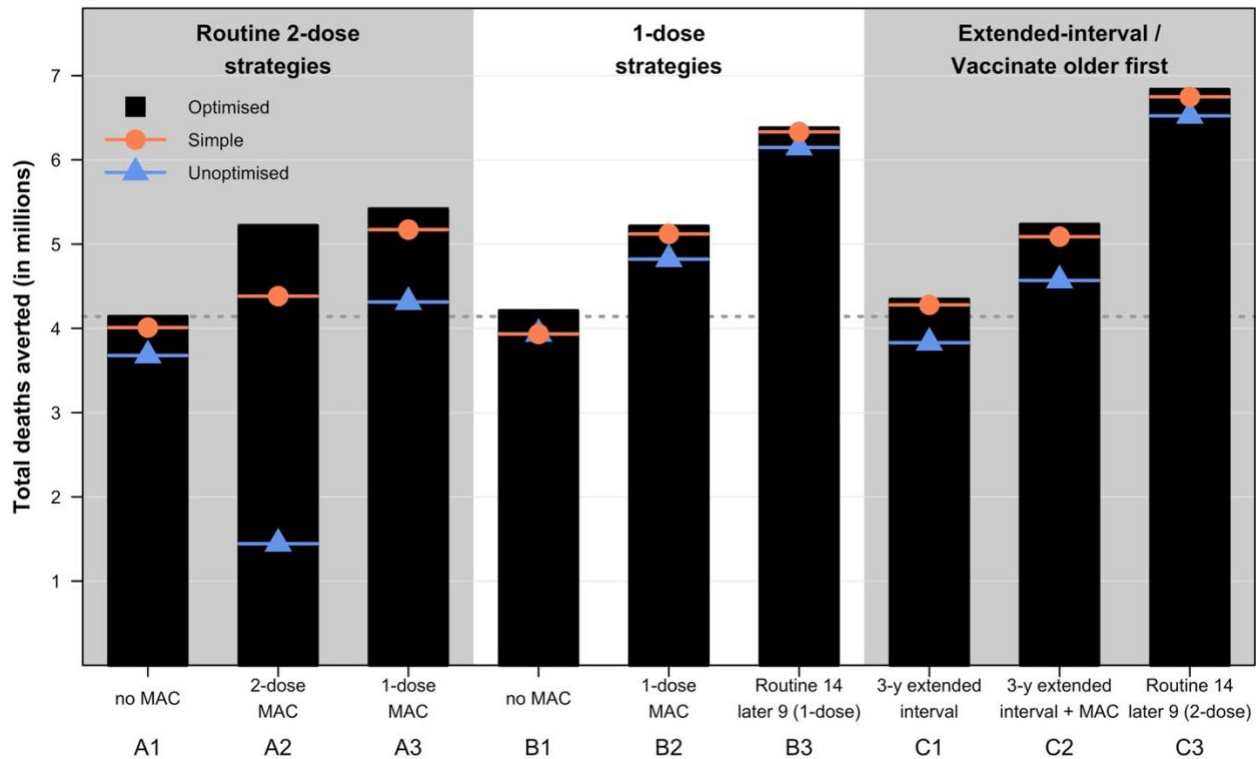
IMPACT FACTOR: 9.6

CITED HALF-LIFE: 2.4

START COMMENTARY

Figure 5 (below) shows total projected number of cervical cancer deaths averted of each of the nine vaccine strategies from 2020 to 2030. The optimized algorithm, represented by the black bars, uses

a computational approach to maximize the number of cervical cancer deaths averted in the context of limited doses. The simple algorithm, represented by the orange line, allocates vaccines in order of decreasing pre-vaccination cervical cancer mortality incidence, allocating vaccines to countries with the highest number of cervical cancer deaths first. The unoptimized algorithm, represented by the blue line, allocates supplies to countries based on decreasing Human Development Index scores without taking cervical cancer burden into account, which has been the historical norm. Vaccine strategies reflect those considered by the World Health Organization’s Strategic Advisory Group of Experts on Immunization: 1) combinations of one or two dose schedules; 2) multiple age-cohort (MAC) vaccinations for those 10-14 years old in addition to routine vaccines for 9 year olds; 3) initial routine vaccination of 14 year olds, switching to 9 year olds once vaccine supply is no longer constrained; or 4) extended interval schedules where second doses are given 3 years post first dose (Supplementary Table 1).



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5. [The use of community-oriented primary care \(COPC\) model to generate vaccine demand: The case of a remote fishing community in Cameroon.](#)

Sangwe C, Budzi M, Shifu I, Ghangha J, Njedock S.

Vaccine. 2024 Aug 01:126173.

PubMed ID: 39089959

ABSTRACT

BACKGROUND: Cameroon, a country in sub-Saharan Africa, ranks among the top 15 countries worldwide with the highest number of zero-dose (unvaccinated) children. Among other reasons, pockets of hard-to-reach communities that traditionally miss essential healthcare services, including childhood immunization, largely contribute to this sub-optimal vaccination coverage. This is the case of Manoka Health District (MHD), an archipelago district with a zero-dose proportion of 91.7%. High disease burdens such as malaria and water-borne diseases have forced the population to depend on herbalists and roadside drug vendors, eroding trust in the primary healthcare system and worsening vaccine hesitancy. This study, therefore, aims to describe how a project optimized vaccine demand generation in these hard-to-reach settlements using an integrated community health worker service delivery package developed using the Community-oriented primary healthcare (COPC) model.

METHODOLOGY: This cross-sectional descriptive study was based on data collected from November 2021 to August 2022 in three project-implementing health areas (Kombo Moukoko, Kooh, and Toube) in the Manoka health district. Data was collected on the integrated health packages offered by Community Health Workers (CHWs). It comprised health education on malaria and water-borne diseases, screening for malaria using Rapid Diagnostic Test (RDT), treatment of under-5 for uncomplicated malaria and diarrhea, conduct of essential Antenatal Care (ANC) services, and vaccination counseling and referral in the three health areas. Microsoft Excel 2013 was used to analyze descriptive data and expressed results as percentages, with tables and column charts used for data visualization. All missing data were considered in the final analysis.

RESULTS: Over 550 under-5 children and 187 pregnant women were identified to be in need of curative and preventive care services during the project period. About 81% of pregnant women received a minimum ANC package by CHWs, and 47% adhered to referrals to health facilities for continuous ANC and delivery. Half of the children under 5 with health issues were diagnosed and managed for uncomplicated malaria. Also, during home visits, 617 under-immunized and zero-dose children less than two years of age were identified, referred, and vaccinated either during an outreach program or at the nearest health post in a neighboring health area, representing about 64% (617/964) of under-2 children identified in these communities. There was a gradual increase from

0% vaccine acceptance post-referral in the first month to 47% after six months and 64% at one year of intervention.

CONCLUSION: The use of the COPC model to co-develop integrated essential health service packages that meet the needs of communities showed value in building trust and increasing childhood immunization uptake in hard-to-reach communities.

WEB: [10.1016/j.vaccine.2024.126173](https://doi.org/10.1016/j.vaccine.2024.126173)

IMPACT FACTOR: 4.5

CITED HALF-LIFE: 7.9

START COMMENTARY

This intervention followed the Community Oriented Primary Health Care Model's community diagnostic phase and iterative intervention cycle (Figure 1). Representatives from the Rural Doctors group met with community leaders and recruited Community Health Workers (CHWs) from within targeted communities. CHWs were trained to conduct home visits and provide priority health services. Zero-dose and under-immunized children identified during visits were referred to the nearest health post for vaccination and added to a line-list for vaccine outreach sessions. Vaccine coverage increased from <10% at baseline to 64% at the end of the one-year intervention.

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6. [Timing of pertussis vaccination during pregnancy: Evidence and implementation - A systematic review.](#)

De Weerd L, Herzog S, Van Damme P, Maertens K.

Vaccine. 2024 Aug 21;42(21):126152.

PubMed ID: 39088988

ABSTRACT

BACKGROUND: Pertussis vaccination in pregnancy has been introduced in an increasing number of countries to better protect infants against the disease in their first weeks of life. The optimal timing of pertussis vaccination in pregnancy is however still under debate.

METHODS: We systematically reviewed published literature on safety, immunogenicity and effectiveness of pertussis vaccination in pregnancy related to timing of vaccination. The search was conducted using PubMed, MEDLINE and Web of Science and yielded 1623 articles, thereof 777 duplicates. Screening resulted in the inclusion of 45 publications reporting on safety (n = 11), immunogenicity (n = 26) and/or effectiveness (n = 9). We also mapped pertussis recommendations in pregnancy by government institutions globally according to the recommended timing of vaccination.

RESULTS: Overall, the selected publications did not indicate increased safety concerns associated with timing of pertussis vaccination in pregnancy. Immunogenicity studies often suggested optimal protection at birth after early third trimester vaccination. Few studies investigated qualitative antibody characteristics, and none investigated antibody titers in breastmilk or cellular-mediated immunity related to timing of vaccination. Effectiveness studies showed decreased vaccine effectiveness of late third trimester pertussis vaccination compared to vaccination earlier in pregnancy. Worldwide, a general recommendation for pertussis vaccination in pregnancy was found for 58 countries, with as many as 22 different recommended timings registered.

CONCLUSION: The timing of pertussis vaccination in pregnancy seems to impact immunogenicity and vaccine effectiveness, with optimal immune responses at birth suggested following early third trimester vaccination and reduced vaccine effectiveness of late third trimester pertussis vaccination suggested compared to vaccination earlier in pregnancy. However, inconsistent and lacking data are reflected in the divergent national recommendations for pertussis vaccination in pregnancy worldwide.

SUMMARY: Pertussis vaccination in pregnancy aims to protect infants in their first weeks of life. Our review suggests that immunogenicity and vaccine effectiveness are impacted by the timing of vaccination in pregnancy.

WEB: [10.1016/j.vaccine.2024.07.053](https://doi.org/10.1016/j.vaccine.2024.07.053)

IMPACT FACTOR: 4.5

CITED HALF-LIFE: 7.9

START COMMENTARY

In eleven studies evaluating pertussis vaccine safety during pregnancy, no increased risk of adverse maternal reactions, major birth defects, or adverse infant health outcomes were found (Table 1).

Seven countries with national recommendations for pertussis vaccination did not specify timing while 51 recommended vaccination in the 2nd or 3rd trimester. Recommendations are primarily from countries in the Americas and Europe (Figure 2).

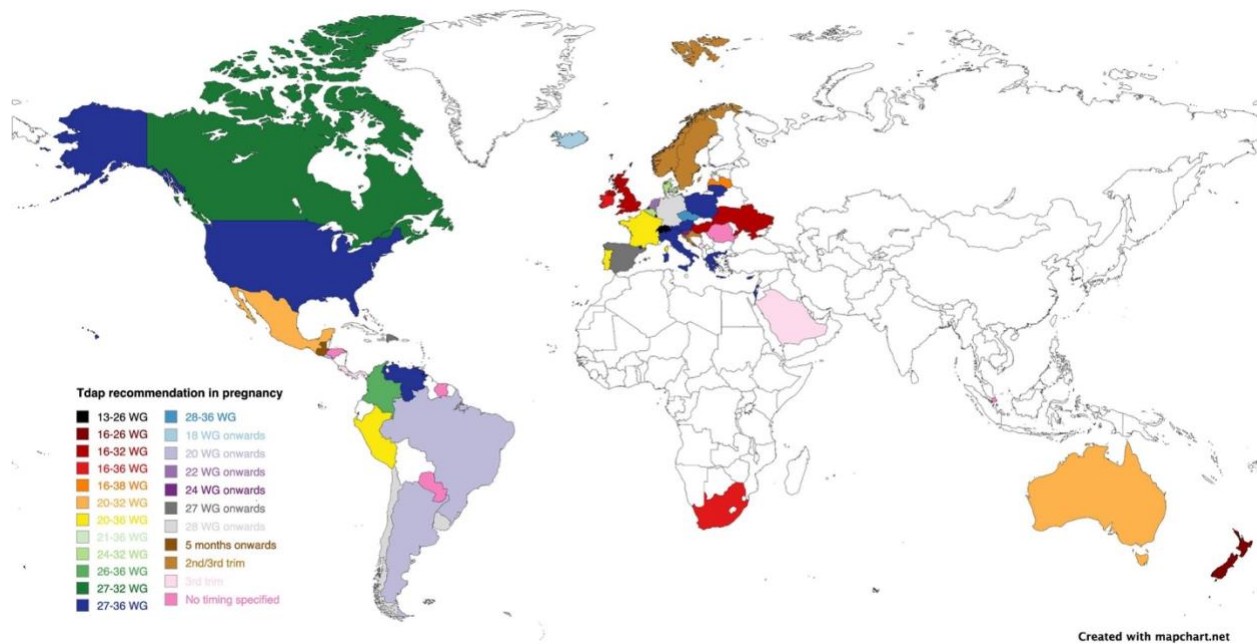


Figure 2. Countries worldwide with recommendation for pertussis vaccination in pregnancy in place, specified by recommended timing of vaccine administration. No national pertussis recommendation in pregnancy was found for countries in white.

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7. [Readiness of and barriers for community pharmacy professionals in providing and implementing vaccination services.](#)

Ayene W, Anagaw Y, Limenh L, Simegn W, Bizuneh G, Bitew T, et al.

BMC Health Serv Res. 2024 Jul 31;24(1):867.

PubMed ID: 39080749

ABSTRACT

BACKGROUND: Community pharmacy professionals are essential for healthcare delivery, particularly for administering vaccination services. However, there is a lack of substantial evidence documenting their role in vaccination within Ethiopia.

OBJECTIVES: This study aimed to assess community pharmacy professionals' readiness to provide vaccination services, identify barriers hindering the implementation of these services, and determine factors influencing the provision of vaccination services by community pharmacy professionals.

METHODS: A cross-sectional study was conducted among community pharmacy professionals in Debre Markos and Injibara Town from April 15 to May 13, 2024. The data were collected using a structured questionnaire, and descriptive statistics were used to analyze the findings.

RESULTS: The study revealed that a significant majority of community pharmacy professionals perceived that they had adequate vaccine knowledge and were easily accessible to the community. However, barriers such as lack of regulation, time constraints, workload concerns, patient trust issues, and infrastructure challenges hinder the implementation of vaccination services. Factors influencing the provision of vaccination services included the need for enhanced education and training, financial reimbursement, patient demand, infrastructure improvements, collaboration with other healthcare providers, and pharmacists' special interest in vaccination.

CONCLUSIONS: Community pharmacy professionals exhibit readiness to provide vaccination services. However, significant barriers such as regulatory constraints, time pressures, workload concerns, patient trust issues, and infrastructure challenges hinder their full participation. Addressing these barriers and leveraging pharmacists' expertise is essential for optimizing service delivery and improving public health outcomes. Advocating for policy changes, developing comprehensive training programs, establishing clear guidelines, investing in infrastructure improvements, conducting public awareness campaigns, and fostering collaboration with other healthcare providers are recommended to facilitate the provision and implementation of vaccination services by community pharmacy professionals in Ethiopia.

WEB: [10.1186/s12913-024-11349-6](https://doi.org/10.1186/s12913-024-11349-6)

IMPACT FACTOR: 2.7

CITED HALF-LIFE: 5.6

START COMMENTARY

Survey responses were recorded on a 5-point scale ranging from “Strongly Disagree” to “Strongly Agree”. More than 78% of the 46 Ethiopian pharmacists surveyed agreed or strongly agreed that providing vaccination through community pharmacies would improve vaccination rates. 56% of those surveyed agreed or strongly agreed that pharmacists lack training to provide vaccines (Table 3). Approximately 70% strongly agreed that lack of regulations specifically allowing community pharmacists to provide vaccination services was a barrier (Table 4).

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8. [The role of community health and nutrition volunteers in improving the health and nutrition status of infant and young children in remote areas, Hajjah, Yemen.](#)

Nassar A, Al-Haddad A.

BMC Pediatr. 2024 Jul 28;24(1):481.

PubMed ID: 39068418

ABSTRACT

BACKGROUND: In Yemen, morbidity and malnutrition are major public health problems. The Community Health and Nutrition Volunteers (CHNVs) program was launched to tackle these problems through providing services to mothers and their children residing in remote villages. Since establishment of the CHNVs program in Yemen, its outcome has never been evaluated. Therefore, the aim of this study was to assess the role of CHNVs in improving the immunization, morbidity and nutritional status of infant and young children (IYC).

METHODS: A comparative cross-sectional study design was conducted in Al-Maghrabah and Bani-Qais districts, Hajjah governorate. It was carried out between January and April 2023. A three-stage cluster sampling method was used. A total of 926 IYC with their mothers were interviewed using a pre-tested questionnaire. SPSS 26 was used for data analysis. The multinomial logistic regression and chi-square or fisher exact tests were used to compare the vaccination, morbidity and nutritional status of IYC between the volunteer and non-volunteer villages. Odds Ratio (OR) with 95% Confidence Interval (CI) were calculated. A p value < 0.05 was considered statistically significant.

RESULTS: The IYC in volunteer villages were more likely to be fully or partially vaccinated compared to those in non-volunteer villages [OR = 2.3, 95% CI: 1.5-3.7, p < 0.0001, and OR = 1.9, 95% CI: 1.3-2.8, p = 0.001, respectively]. The specific coverage rates for BCG, and the 1st and 2nd doses of OPV/Pentavalent/Pneumo/Rota vaccines were significantly higher in the volunteer compared to non-volunteer villages [(OR = 1.8, 95% CI: 1.3-2.5, p < 0.0001), (OR = 1.5, 95% CI: 1.2-2.1, p = 0.003), and (OR = 1.5, 95% CI: 1.2-2.0, p = 0.002), respectively]. Moreover, the prevalence of diarrhea and fever among IYC was significantly lower in the volunteer compared to non-volunteer villages [(OR = 0.7, 95% CI: 0.5-0.9, p = 0.004) and (OR = 0.7 95% CI: 0.5-0.9, p = 0.045), respectively].

CONCLUSIONS: The study found that CHNVs play a significant role in improving vaccination status and the coverage rate for BCG, and 1st and 2nd doses of OPV/Pentavalent/Pneumo/Rota vaccines, and reducing the prevalence of diarrhea and fever among IYC in their villages compared to non-volunteer villages, in Hajjah governorate. Future follow-up study and expansion to other settings in different governorates is recommended.

WEB: [10.1186/s12887-024-04958-x](https://doi.org/10.1186/s12887-024-04958-x)

IMPACT FACTOR: 2.0

CITED HALF-LIFE: 5.2

START COMMENTARY

Despite increased vaccine coverage among infants and young children in villages with community health and nutrition volunteers (CHNVs), vaccination coverage for each included vaccine was well below the Expanded Program on Immunization's recommended coverage rate of 90% (Table 2). The study found no difference in timeliness of vaccines between villages with and without CHNVs. Additional training and support of CHNVs could increase the impact of CHNVs within their communities.

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9. [Optimal Timing Regularly Outperforms Higher Coverage in Preventative Measles Supplementary Immunization Campaigns.](#)

Rosenfeld K, Frey K, McCarthy K.

Vaccines (Basel). 2024 Jul 29;12(7).

PubMed ID: 39066459

ABSTRACT

Measles threatens the lives and livelihoods of tens of millions of children and there are countries where routine immunization systems miss enough individuals to create the risk of large outbreaks. To help address this threat, measles supplementary immunization activities are time-limited, coordinated campaigns to immunize en masse a target population. Timing campaigns to be concurrent with building outbreak risk is an important consideration, but current programmatic standards focus on campaigns achieving a high coverage of at least 95%. We show that there is a dramatic trade-off between campaign timeliness and coverage. Optimal timing at coverages as low as 50% for areas with weak routine immunization systems is shown to outperform the current standard, which is delayed by as little as 6 months. Measured coverage alone is revealed as a potentially misleading performance metric.

WEB: [10.3390/vaccines12070820](https://doi.org/10.3390/vaccines12070820)

IMPACT FACTOR: 5.2

CITED HALF-LIFE: 2.2

START COMMENTARY

In this modeling analysis, impact of supplementary immunization activity (SIA) coverage of 50%, 70%, and 95% was simulated in populations with routine immunization (RI) coverage of 30% (low RI) and 70% (high RI) with delays of 1, 2, 4, and 6 months after optimal timing for outbreak prevention. Outbreak size (total number of people infected over the year following the supplemental immunization activity) and outbreak intensity (maximum daily incidence over the year following the supplemental immunization activity) were calculated for each scenario (Figure 2). In the 30% RI coverage scenario, an SIA with 50% coverage delayed by 1 month resulted in smaller and less intense outbreaks than the scenario with 95% SIA coverage delayed by 6 months.

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10. [Mathematical modelling of the 100-day target for vaccine availability after the detection of a novel pathogen: A case study in Indonesia.](#)

Bilgin G, Munira S, Lokuge K, Glass K.

Vaccine. 2024 Aug 21;42(21):126163.

PubMed ID: 39060201

ABSTRACT

Globally, there has been a commitment to produce and distribute a vaccine within 100 days of the next pandemic. This 100-day target will place pressure on countries to make swift decisions on how to optimise vaccine delivery. We used data from the COVID-19 pandemic to inform mathematical modelling of future pandemics in Indonesia for a wide range of pandemic characteristics. We explored the benefits of vaccination programs with different start dates, rollout capacity, and age-specific prioritisation within a year of the detection of a novel pathogen. Early vaccine availability, public uptake of vaccines, and capacity for consistent vaccine delivery were the key factors influencing vaccine benefit. Monitoring age-specific severity will be essential for optimising vaccine benefit. Our study complements existing pathogen-specific pandemic preparedness plans and contributes a tool for the rapid assessment of future threats in Indonesia and similar middle-income countries.

WEB: [10.1016/j.vaccine.2024.126163](https://doi.org/10.1016/j.vaccine.2024.126163)

IMPACT FACTOR: 4.5

CITED HALF-LIFE: 7.9

START COMMENTARY

Time between novel pathogen detection and vaccine availability contributed most to vaccine impact in this model; twice as many infections occurred if vaccine delivery was delayed from 100 to 200 days after detection, assuming a basic reproduction number of 2 and vaccine supply sufficient for 20% of the population within 1 year. Vaccinating children was more effective than vaccinating older adults in all cases except when older adults were at substantially higher risk than other ages. The model did not account for waning immunity, multi-dose schedules, or varying effectiveness of available vaccines.

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11. [Determinants of wealth-related inequalities in full vaccination coverage among children in Nepal: a decomposition analysis of nationally representative household survey data.](#)

Singh B, Khatri R.

BMC Public Health. 2024 Jul 26;24(1):1990.

PubMed ID: 39054494

ABSTRACT

BACKGROUND: Over the past two decades, child health indicators in Nepal have improved significantly at the national level. Yet, this progress hasn't been uniform across various population subsets. This study identified the determinants associated with childhood full vaccination, assessed wealth-related inequalities, and delved into the key factors driving this inequality.

METHODS: Data for this study were taken from the most recent nationally representative Nepal Demographic and Health Survey 2022. A total of 959 children aged 12-23 months who had received routine childhood basic antigens as per the national immunisation program were considered for analysis. Binary logistic regression models were conducted to identify the associated factors with outcome variable (uptake of full vaccination). The concentration curve and Erreygers normalized concentration index were used to assess inequality in full vaccination. Household wealth quintile index scores were used to measure wealth-related inequality and decomposition analysis was conducted to identify determinants explaining wealth-related inequality in the uptake of childhood vaccination.

RESULTS: The coverage of full vaccination among children was 79.8% at national level. Several factors, including maternal health service utilisation variables (e.g., antenatal care, institutional delivery), financial challenges related to visiting health facilities, and mothers' awareness of health mother group meetings within their ward, were associated with the uptake of full vaccination coverage among children. The concentration curve was below the line of equality, and the relative Erreygers normalized concentration index was 0.090, indicating that full vaccination was disproportionately higher among children from wealthy groups. The decomposition analysis identified institutional delivery (20.21%), the money needed to visit health facilities (14.25%), maternal education (16.79%), maternal age (8.53%), and caste (3.03%) were important contributors to wealth related inequalities in childhood full vaccination uptake.

CONCLUSIONS: There was notable wealth-related inequality in full vaccine uptake among children in Nepal. Multisectoral actions involving responsible stakeholders are pivotal in reducing the inequalities, including promoting access to maternal health services and improving educational attainment among mothers from socioeconomically disadvantaged communities.

WEB: [10.1186/s12889-024-19456-z](https://doi.org/10.1186/s12889-024-19456-z)

IMPACT FACTOR: 3.5

CITED HALF-LIFE: 5.4

START COMMENTARY

A 13% reduction in socioeconomic inequality in the decomposition analysis was associated with awareness of local Healthy Mother Group (HMG) meetings. These community meetings are led by female community health volunteers to promote maternal, newborn, and child health. The findings suggest health education led by trusted community members can mitigate wealth-related inequality in vaccine uptake.

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12. [Estimating the Potential Public Health Value of BCG Revaccination.](#)

Clark R, Sumner T, Weerasuriya C, Bakker R, Scriba T, White R.

J Infect Dis. 2024 Jul 25;230(1):e139-e143.

PubMed ID: 39052744

ABSTRACT

An upcoming trial may provide further evidence that adolescent/adult-targeted BCG revaccination prevents sustained Mycobacterium tuberculosis infection, but its public health value depends on its impact on overall tuberculosis morbidity and mortality, which will remain unknown. Using previously calibrated models for India and South Africa, we simulated BCG revaccination assuming 45% prevention-of-infection efficacy, and we evaluated scenarios varying additional prevention-of-disease efficacy between +50% (reducing risk) and -50% (increasing risk). Given the assumed prevention-of-infection efficacy and range in prevention-of-disease efficacy, BCG revaccination may have a positive health impact and be cost-effective. This may be useful when considering future evaluations and implementation of adolescent/adult BCG revaccination.

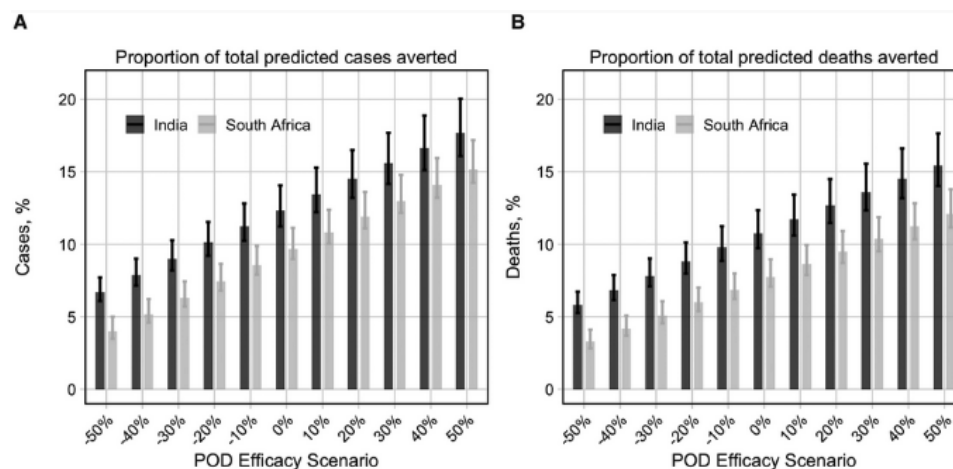
WEB: [10.1093/infdis/jiae089](https://doi.org/10.1093/infdis/jiae089)

IMPACT FACTOR: 5.0

CITED HALF-LIFE: 9.9

START COMMENTARY

Assuming 45% prevention-of-infection with BCG revaccination with no impact on prevention of disease, the model projects that 9 million tuberculosis cases and 1.5 million deaths could be averted in India by 2050. Prevention-of-disease (POD) efficacy of 50% increased predicted deaths averted by up to 44% and 56% in India and South Africa, respectively (Figures A and B). Decreasing POD efficacy to -50% remained cost-effective in both countries.



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13. [Progress Toward Achieving and Sustaining Maternal and Neonatal Tetanus Elimination - Worldwide, 2000-2022.](#)

Jones C, Yusuf N, Ahmed B, Kassogue M, Wasley A, Kanu F.

MMWR Morb Mortal Wkly Rep. 2024 Jul 18;73(28):614-621.

PubMed ID: 39024183

ABSTRACT

Tetanus remains a considerable cause of mortality among undervaccinated mothers and their infants following unhygienic deliveries, especially in low-income countries. Strategies of the maternal and neonatal tetanus elimination (MNTE) initiative, which targets 59 priority countries, include strengthening antenatal immunization of pregnant women with tetanus toxoid-containing vaccines (TTCVs); conducting TTCV supplementary immunization activities among women of reproductive age in high-risk districts; optimizing access to skilled birth attendants to ensure clean deliveries and umbilical cord care practices; and identifying and investigating suspected neonatal tetanus cases. This report updates a previous report and describes progress toward MNTE during 2000-2022. By December 2022, 47 (80%) of 59 priority countries were validated to have achieved MNTE. In 2022, among the 50 countries that reported coverage with ≥ 2 doses of TTCV among pregnant women, 16 (32%) reported coverage of $\geq 80\%$. In 2022, among 47 validated countries, 26 (55%) reported that $\geq 70\%$ of births were assisted by skilled birth attendants. Reported neonatal tetanus cases worldwide decreased 89%, from 17,935 in 2000 to 1,995 in 2021; estimated neonatal tetanus deaths decreased 84%, from 46,898 to 7,719. However, the global disruption of routine immunization caused by the COVID-19 pandemic impeded MNTE progress. Since 2020, reported neonatal tetanus cases have increased in 18 (31%) priority countries. Integration of MNTE strategies into priority countries' national postpandemic immunization recovery activities is needed to achieve and sustain global elimination.

WEB: [10.15585/mmwr.mm7328a1](https://doi.org/10.15585/mmwr.mm7328a1)

IMPACT FACTOR: 25.4

CITED HALF-LIFE: 3.5

START COMMENTARY

Of the 43 priority countries that had achieved maternal and neonatal tetanus elimination (MNTE) status by 2020, only 1/3 had maintained vaccination coverage at the recommended levels of among children, adolescents, and pregnant women as of 2022. Integrating neonatal tetanus case-based surveillance into existing surveillance for other vaccine preventable disease should be considered. Continued prioritization and focus on MNTE goals is necessary to sustain gains.

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Additional Articles of Interest

- 1 Knowledge of caregivers regarding pneumococcal diseases and pneumococcal conjugate vaccine (PCV): A cross sectional study at a district in India. [{Full Article}](#)
- 2 Real-time temperature anomaly detection in vaccine refrigeration systems using deep learning on a resource-constrained microcontroller. [{Full Article}](#)
- 3 Sustainability of pneumococcal conjugate vaccination in Ghana: a cost-effectiveness analysis in the context of donor transition. [{Full Article}](#)
- 4 Current Approaches in Postapproval Vaccine Safety Studies Using Real-World Data: A Systematic Review of Published Literature. [{Full Article}](#)
- 5 Measles second dose vaccine uptake and associated factors among under-five children in Jigjiga City, Somali Region, Eastern Ethiopia: a community-based cross-sectional study. [{Full Article}](#)
- 6 Effect of rotavirus vaccination on the burden of rotavirus disease and associated antibiotic use in India: A dynamic agent-based simulation analysis. [{Full Article}](#)
- 7 Post-introduction evaluation (PIE) of rotavirus vaccine in India. [{Full Article}](#)
- 8 Seroprevalence of anti-diphtheria toxoid antibody and implications for vaccination policy in Vietnam's South-central coast: a cross-sectional study. [{Full Article}](#)
- 9 Creating a Culturally Safe Online Data Collection Instrument to Measure Vaccine Confidence Among Indigenous Youth: Indigenous Consensus Method. [{Full Article}](#)
- 10 Disparities in hepatitis B virus healthcare service access among marginalised poor populations: a mixed-method systematic review. [{Full Article}](#)
- 11 Vaccines and monoclonal antibodies to prevent healthcare-associated bacterial infections. [{Full Article}](#)
- 12 Exploring the complexity of the implementation determinants of human papillomavirus vaccination in Africa through a systems thinking lens: A rapid review. [{Full Article}](#)
- 13 Bayesian spatial analysis of incomplete vaccination among children aged 12-23 months in Nigeria. [{Full Article}](#)
- 14 Improving HPV Vaccination Uptake Among Adolescents in Low Resource Settings: Sociocultural and Socioeconomic Barriers and Facilitators. [{Full Article}](#)
- 15 Assessment of expanded programme on immunization routine data quality in the upper east region of Ghana. [{Full Article}](#)
- 16 Factors contributing to immunization coverage among children less than 5 years in Nadowli-Kaleo District of Upper West Region, Ghana. [{Full Article}](#)
- 17 Trust in institutions affects vaccination campaign outcomes. [{Full Article}](#)
- 18 June 2024 ACIP Meeting Update: Influenza, COVID-19, RSV and Other Vaccines. [{Full Article}](#)
- 19 Development of mRNA rabies vaccines. [{Full Article}](#)

- 20 Hesitant but vaccinated: Lessons learned from hesitant adopters. [{Full Article}](#)
- 21 The Problem with Delaying Measles Elimination. [{Full Article}](#)
- 22 “Anees Has Measles”: Storytelling and Singing to Enhance MMR Vaccination in Child Care Centers Amid Religious Hesitancy. [{Full Article}](#)
- 23 Vaccination Week in the Americas: An Ongoing Initiative to Strengthen and Sustain Measles and Rubella Elimination in the Region. [{Full Article}](#)
- 24 Congenital Rubella Syndrome Does Not Increase with Introduction of Rubella-Containing Vaccine. [{Full Article}](#)
- 25 High-Resolution Geospatial Mapping of Zero-Dose and Underimmunized Children Following Nigeria’s 2021 Multiple Indicator Cluster Survey/National Immunization Coverage Survey. [{Full Article}](#)
- 26 Estimating immunization coverage at the district level: A case study of measles and diphtheria-pertussis-tetanus-Hib-HepB vaccines in Ethiopia. [{Full Article}](#)
- 27 Cost-effectiveness of seasonal influenza vaccination in WHO-defined high-risk populations in Bangladesh. [{Full Article}](#)

Appendix

The literature search for the September 2024 Vaccine Delivery Research Digest was conducted on August 22, 2024. We searched English language articles indexed by the US National Library of Medicine and published between July 15, 2024 and August 14, 2024. The search resulted in 453 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 2024/07/15:2024/08/14[Date - Publication]