VACCINE DELIVERY RESEARCH DIGEST

UNIVERSITY OF WASHINGTON STRATEGIC ANALYSIS, RESEARCH & TRAINING (START) CENTER

REPORT TO THE GATES FOUNDATION

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{Abstract & START Commentary} {Full Article}

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{Abstract & START Commentary} {Full Article}

- Seasonal influenza vaccine availability and seasonal influenza vaccination policies globally were described.

14 Strengthening Capacity for Tailored Immunization Programs Using Adult Learning Principles: A Case Study from Nigeria.

{Abstract & START Commentary} {Full Article}

- Participants' satisfaction, knowledge and competence, behavior changes, and results were assessed after the implementation of a tailored immunization program using adult learning principles.

15 "Build back the confidence": qualitative exploration of community experiences with polio vaccination in the Covid-19 context in Cameroon and Ethiopia.

{Abstract & START Commentary} {Full Article}

- Authors conducted a qualitative study to explore insights from community stakeholders into how Covid-19 influenced perceptions of OPV and vaccination campaigns.

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Details of Articles

1. Cost-Effectiveness Analysis of Pneumococcal Vaccines in the Pediatric Population: A Systematic Review.

Vo N, Pham H, Bui U, Ho H, Bui T.

Healthcare (Basel). 2024 Oct 18;12(19).

PubMed ID: 39408130

ABSTRACT

Objectives: Pneumococcal disease, caused by Streptococcus pneumoniae, is the leading cause of mortality in children worldwide. The tremendous direct cost of hospital admissions and significant indirect costs from productivity loss contribute considerably to its economic burden, with vaccination being the only efficient protection against the illness. Our study aims to summarize the cost-effectiveness of the pneumococcal conjugate vaccine (PCV) implemented in the pediatric population. **Methods:** Employing the online databases PubMed, Embase, and Medline, we looked for economic evaluations from 2018 until March 2024. The Incremental Cost-Effectiveness Ratios (ICER) and Quality-Adjusted Life Years (QALY) were the primary outcomes for measuring the cost-effectiveness of PCVs. A 28-item CHEERS 2022 checklist was applied to assess the quality of the collected studies. **Results**: Of the 16 papers found, 9/16 discussed the lower-valent vaccines (PCV13, PCV10) and 7/16 examined the higher-valent vaccines (PCV20, PCV15). PCV13 and PCV10 involved greater costs and generated more QALY compared to no vaccination. Both PCV15 and PCV20 averted substantial healthcare costs and yielded greater quality of life than PCV13. Additionally, PCV20 was a dominant strategy compared to PCV15. **Conclusions:** Utilizing PCV13 is a very cost-effective option compared to not getting vaccinated. Transitioning from PCV13 to PCV20 would result in higher QALY gain and more cost-saving than switching to PCV15.

WEB: 10.3390/healthcare12191950

IMPACT FACTOR: 2.4

CITED HALF-LIFE: 2.1

START COMMENTARY

Implementation of the 13-valent pneumococcal conjugate vaccine (PCV13) globally would have the greatest impact in Africa and Asia, with an estimated 8.7 million and 3.9 million Disability-Adjusted Life Years (DALYs) averted, respectively. Acute otitis media contributed most to the direct costs of pneumococcal disease in low-and middle-income countries. Implementing PCV13 in countries that do not yet have a PCV program would require an investment of an estimated $4.4 million (USD). All

cost effectiveness analyses comparing PCV15 and PCV20 to PCV13 were conducted in high income countries, limiting generalizability to low and middle income settings.

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2. Intervention-amenable factors associated with lack of HPV vaccination in Kenya: Results from a large national phone survey.

Moucheraud C, Ochieng E, Ogutu V, Chang L, Golub G, Crespi C, et al.

Vaccine. 2024 Oct 10;42(26):126410.

PubMed ID: 39388933

ABSTRACT

BACKGROUND: Coverage of human papillomavirus (HPV) vaccination remains suboptimal in many countries, but the determinants are not well-understood particularly in low- and middle-income countries. We undertook a random digit dialed phone survey across Kenya between July-October 2022, with parents/caregivers of preadolescent girls, to identify intervention-amenable factors associated with respondents' daughter's HPV vaccination status.

METHODS: Informed by the World Health Organization Behavioral and Social Drivers of Vaccination framework, we collected information about respondents' knowledge about and hesitancy toward HPV vaccine, perceived risk of cervical cancer, social norms around HPV vaccination, trust in institutions, and access to HPV vaccination services.

RESULTS: 1416 parents/caregivers completed the survey (97.4 % of those eligible), of whom 38.2 % said that age-eligible girl(s) in their household had received any doses of the HPV vaccine. Knowledge/perceptions: In multivariable models adjusted for sociodemographic characteristics, respondents with less HPV vaccine hesitancy and fewer concerns about safety were more likely to have vaccinated daughter(s), as were those with greater knowledge about HPV vaccine and knowing someone who had died from cervical cancer. Social norms: Having spoken with others about HPV vaccination, although reported by less than half of respondents, and believing that other parents have vaccinated their daughters were associated with having vaccinated daughter(s). Respondents with more trust in information about HPV vaccination from health systems, and with higher trust in institutions, had greater odds of having vaccinated daughter(s). Access: One-fifth of respondents had experienced, or anticipated experiencing, challenges accessing HPV vaccination services, and these respondents had approximately half the odds of having a vaccinated daughter compared to their counterparts.

CONCLUSIONS: Promising areas for intervention include: targeted messaging about safety of the HPV vaccine, increasing parents'/caregivers' knowledge about the vaccine, and leveraging trusted messengers including health workers, faith leaders, and peer parents/caregivers.

WEB: 10.1016/j.vaccine.2024.126410

IMPACT FACTOR: 4.5

CITED HALF-LIFE: 7.9

START COMMENTARY

Nearly half of respondents reported concerns about side effects from human papilloma virus (HPV) vaccine; those with concerns had 40% lower odds of having a vaccinated daughter. Hesitancy scores for routine childhood vaccines were associated with the HPV vaccine hesitancy score but were not associated with HPV vaccine uptake. Those who believed that daughters of others in their networks were vaccinated had three times the odds of having vaccinated daughters.

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3. Head-to-head comparison of influenza vaccines in children: a systematic review and meta-analysis.

Garai R, Jánosi &, Krivácsy P, Herczeg V, Kói T, Nagy R, et al.

J Transl Med. 2024 Oct 05;22(1):903.

PubMed ID: 39367499

ABSTRACT

Although vaccination is considered the most effective weapon against influenza, coverage rates, national vaccination policies, and funding vary largely around the globe. Despite their huge potential for achieving herd immunity, child-focused national vaccination strategies that favor pain-free nasal vaccines are uncommon. CENTRAL, Embase, and MEDLINE were last searched on November 13, 2023. Active-controlled randomized controlled trials comparing the live-attenuated intranasal vaccine with the inactivated intramuscular influenza vaccine in children were included. Event rates of laboratory-confirmed influenza virus infection, all-cause mortality, hospitalization, serious adverse events, adverse events, and financial outcomes were extracted based on the PRISMA 2020 Guideline. PROSPERO: CRD42021285412. Pooled odds ratios (ORs) with 95% confidence intervals (CI) were calculated using the random-effects model when at least three comparable outcomes were available. We found no significant difference between quadrivalent live-attenuated intranasal and trivalent inactivated intramuscular (OR = 1.48; 95% CI 0.49-4.45) or between trivalent live-attenuated intranasal and inactivated intramuscular vaccines (OR = 0.77, CI = 0.44-1.34) regarding their efficacy. However, the subgroup analysis of large, multi-center trials indicated that the trivalent live attenuated intranasal influenza vaccine was superior to the trivalent inactivated intramuscular influenza vaccine (12,154 people, OR = 0.50, CI = 0.28-0.88). Only 23 “vaccine-related serious adverse events” were recorded among 17 833 individuals, with no significant difference between methods. The widespread initiation of pediatric national flu vaccination programs prioritizing the live-attenuated intranasal influenza vaccine would be beneficial. Multi-continent, high-quality studies that include children younger than two years old and those living in subtropical and tropical regions are needed to further enhance our understanding.

WEB: 10.1186/s12967-024-05676-9

IMPACT FACTOR: 6.1

CITED HALF-LIFE: 4.5

START COMMENTARY

In the meta-analysis comparing trivalent influenza vaccines, lower adverse event rates were observed after the nasal vaccine than the injectable vaccine. Twenty-one types of adverse events were compared across the two vaccines, and events were similar aside from nasal symptoms with

lower odds among those receiving the injection. Three studies evaluated cost-effectiveness, with all concluding that the live-attenuated intranasal vaccine was financially beneficial when compared with the injection.

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4. Has Ghana's Rotavirus Vaccine Switch Met Programmatic Expectations? An Analysis of National Surveillance Data; 2018-2022.

Adjei M, Ofori Amoah J, Bonsu G, Okine R, Mohammed N, Amponsa-Achiano K, et al.

Open Forum Infect Dis. 2024 Oct 17;11(10):ofae539.

PubMed ID: 39364172394169 96

ABSTRACT

BACKGROUND: Ghana introduced a 2-dose schedule rotavirus vaccine, Rotarix, into childhood immunization in 2012 but switched to a 3-dose schedule vaccine, Rotavac, in 2020 on account of programmatic advantages offered by the latter, including lower cost per fully immunized child and lower cold chain volume requirement. The objective of the study was to assess the effect of the vaccine switch on the trends of rotavirus vaccine uptake and health facility outpatient department (OPD) attendance due to diarrhea among children aged 1-11 months.

METHODS: A retrospective analysis was conducted on childhood immunization and diarrhea surveillance data for 2018-2022. The uptake of the different rotavirus vaccine products and the proportion of health facility OPD attendance attributed to diarrhea, respectively, were compared between the pre- and postswitch study periods.

RESULTS: The uptake of rotavirus vaccine was sustained following the switch. There were no significant differences in vaccination coverages (rota1, Rotarix coverage [94.3%], vs rota1, Rotavac coverage [95.3%]; P = .757; rota2, Rotarix coverage [91.3%], vs rota2, Rotavac coverage [92.7%]; P = .789). The proportions of health facility OPD attendance due to diarrhea were comparable (preswitch [12.4%] vs postswitch [12.1%]; P = .838).

CONCLUSIONS: Ghana's rotavirus vaccine switch yielded expected programmatic benefits without any untoward effects. The trends of vaccine uptake and reduction in diarrhea morbidity were sustained. These experiences and lessons from the rotavirus vaccine switch are vital for potential switches for other vaccines in the current immunization schedule to mitigate the annual vaccine expenditure.

WEB: 10.1093/ofid/ofae539

IMPACT FACTOR: 3.8

CITED HALF-LIFE: 3.4

START COMMENTARY

The two-dose Rotarix vaccine was used in Ghana during 2018-2019 (pre-switch period); both Rotarix and Rotavac administered during 2020 (switch period), and only the three-dose Rotovac

vaccine administered in 2021-2022 (post switch period). The uptake of the 3rd Rotovac vaccine rose from 18% in 2020 to ≥90% in 2021, indicating that the additional vaccine dose was not a deterrent to completing the vaccine series. Authors suggest that this could be due to the alignment between the Rotovac schedule and the established schedule for other childhood vaccines.

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5. Influenza vaccine allocation in tropical settings under constrained resources.

Servadio J, Choisy M, Thai P, Boni M.

PNAS Nexus. 2024 Oct 08;3(10):pgae379.
PubMed ID: 3935939438370625

ABSTRACT

Influenza virus seasonality, synchronicity, and vaccine supply differ substantially between temperate and tropical settings, and optimal vaccination strategy may differ on this basis. Many national vaccine recommendations focus on high-risk groups, elderly populations, and healthcare workers despite previous analyses demonstrating broad benefits to vaccinating younger high-contact age groups. In this study, we parameterized an age-structured nonseasonal asynchronous epidemiological model of influenza virus transmission for a tropical low-income setting. We evaluated timing and age allocation of vaccines across vaccine supplies ranging from 10 to 90% using decade-based age groups. Year-round vaccination was beneficial when compared with more concentrated annual vaccine distribution. When targeting a single age group for vaccine prioritization, maximum vaccine allocation to the 10-19 high-contact age group minimized annual influenza mortality for all but one vaccine supply. When evaluating across all possible age allocations, optimal strategies always allocated a plurality of vaccines to school-age children (10-19). The converse, however, was not true as not all strategies allocating a plurality to children aged 10-19 minimized mortality. Allocating a high proportion of vaccine supply to the 10-19 age group is necessary but not sufficient to minimize annual mortality as distribution of remaining vaccine doses to other age groups also needs to be optimized. Strategies focusing on indirect benefits (vaccinating children) showed higher variance in mortality outcomes than strategies focusing on direct benefits (vaccinating the elderly). However, the indirect benefit approaches showed a lower mean mortality and a lower minimum mortality than vaccination focused on the elderly.

WEB: 10.1093/pnasnexus/pgae379
IMPACT FACTOR: 3.0
CITED HALF-LIFE: 1.3

START COMMENTARY

Factors influencing influenza epidemiology in low- and middle-income countries (LMICs) include: 1) young populations, 2) irregular and unpredictable seasonality in tropical and subtropical climates, and 3) low vaccine supply. Authors developed an age-structured model of influenza transmission in Vietnam to determine optimal influenza vaccine allocation in subtropical and tropical countries within Southeast Asia. Increasing vaccine supply had a greater impact on reducing mortality than

vaccinating during a particular time of year. The impact of age-based vaccine allocations on mortality differed by vaccine supply availability. When supply was low, focusing on school-age children then elderly and working-aged adults reduced mortality the most. When there was sufficient supply for 30-50% of the population, focusing on vaccinating those between 10 and 49 years was most effective (Figure 4).

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6. An Application of an Initial Full Value of Vaccine Assessment Methodology to Measles-Rubella MAPs for Use in Low- and Middle-Income Countries.

Ko M, Frivold C, Mvundura M, Soble A, Gregory C, Christiansen H, et al.

Vaccines (Basel). 2024 Sep 30;12(9).

PubMed ID: 39340105

ABSTRACT

Measles and rubella micro-array patches (MR-MAPs) are a promising innovation to address limitations of the current needle and syringe (N&S) presentation due to their single-dose presentation, ease of use, and improved thermostability. To direct and accelerate further research and interventions, an initial full value vaccine assessment (iFVVA) was initiated prior to MR-MAPs entering phase I trials to quantify their value and identify key data gaps and challenges. The iFVVA utilized a mixed-methods approach with rapid assessment of literature, stakeholder interviews and surveys, and quantitative data analyses to (i) assess global need for improved MR vaccines and how MR-MAPs could address MR problem statements; (ii) estimate costs and benefits of MR-MAPs; (iii) identify the best pathway from development to delivery; and (iv) identify outstanding areas of need where stakeholder intervention can be helpful. These analyses found that if MR-MAPs are broadly deployed, they can potentially reach an additional 80 million children compared to the N&S presentation between 2030-2040. MR-MAPs can avert up to 37 million measles cases, 400,000 measles deaths, and 26 million disability-adjusted life years (DALYs). MR-MAPs with the most optimal product characteristics of low price, controlled temperature chain (CTC) properties, and small cold chain volumes were shown to be cost saving for routine immunization (RI) in low- and middle-income countries (LMICs) compared to N&S. Uncertainties about price and future vaccine coverage impact the potential cost-effectiveness of introducing MR-MAPs in LMICs, indicating that it could be cost-effective in 16-81% of LMICs. Furthermore, this iFVVA highlighted the importance of upfront donor investment in manufacturing set-up and clinical studies and the critical influence of an appropriate price to ensure country and manufacturer financial sustainability. To ensure that MR-MAPs achieve the greatest public health benefit, MAP developers, vaccine manufacturers, donors, financiers, and policy- and decision-makers will need close collaboration and open communications.

WEB: 10.3390/vaccines12091075

IMPACT FACTOR: 5.2

CITED HALF-LIFE: 2.2

START COMMENTARY

Fifteen problem statements for measles and rubella immunization program implementation were created through a rapid literature review of 125 articles and documents; authors assessed level of

evidence for and magnitude of each problem statement (Figure 3). Problems were grouped into four categories: 1) high human resource requirements, 2) incorrect administration technique, 3) poor Total System Effectiveness (TSE) & negative impact on the environment, and 4) increasing hesitancy. Those with greatest impact on immunization programs were related to high labor costs and challenges associated with equitably delivering vaccines. The Vaccine Implementation Prioritization Strategy (VIPS) Phase II executive summary of microarray patches from March 2020 was used to assess the impact of MR-MAP implementation, finding that MR-MAPs could have a high impact in addressing nearly all identified concerns.

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7. Progress with the Second Dose Measles Vaccine Introduction and Coverage in the WHO African Region.

Masresha B, Shibeshi M, Grant G, Hatcher C, Wiysonge C.

Vaccines (Basel). 2024 Sep 30;12(9).

PubMed ID: 39340099

ABSTRACT

INTRODUCTION: To achieve global and regional measles elimination objectives, the World Health Organization (WHO) recommends coverage of 95% or higher with two doses of measles-containing vaccine. A second dose of measles-containing vaccine (MCV) is typically administered in the second year of life after 12 months of age.

METHODS: We reviewed WHO-UNICEF estimates of national coverage (WUENIC) for the first and second doses of MCV (MCV1 and MCV2, respectively) and calculated drop-out rates between MCV1 and MCV2 for countries in the WHO African Region.

RESULTS: From 2013 to 2023, estimated regional MCV2 coverage increased from 7% to 49%, and at the end of 2023, 43 (91%) countries had introduced MCV2 into their routine immunization programs. Countries with more antigens provided in the second year of life had higher mean and median MCV2 coverage levels, and lower drop-out rates between MCV1 and MCV2, as compared to countries providing only MCV2.

DISCUSSION: Despite substantial progress, MCV2 coverage remains below the required levels to achieve and sustain elimination, and many countries have high drop-out rates between MCV1 and MCV2 coverage, indicating challenges in reaching children over 12 months of age. Increasing coverage of MCV2 and other vaccines in the second year of life is essential to achieving higher and equitable routine immunization coverage. This will require continued efforts to understand and mitigate barriers to reaching children after 12 months of age and accelerated implementation of available tools.

WEB: 10.3390/vaccines12091069

IMPACT FACTOR: 5.2

CITED HALF-LIFE: 2.2

START COMMENTARY

Drop out between dose 1 and dose 2 of measles-containing vaccine (MCV) were lower with increasing time since a second dose of MCV (MCV2) was incorporated into routine vaccine programs; countries that incorporated the MCV2 vaccine for 10+ years, 5 – 9 years, and 3 – 5 years

had a mean drop-out rate of 8%, 16%, and 26%, respectively (Table 1). Countries with 0, 1, or 2 additional vaccines given during the second year of life showed increased MCV2 coverage (39%, 61%, and 92%, respectively) and a decreased drop-out rate of 34%, 26%, and 11%, respectively. No country in the African region reached the Immunization Agenda 2030 goal of ≥95% MCV2 coverage and only three countries attained ≥90% coverage.

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8. Increasing Population Immunity Prior to Globally-Coordinated Cessation of Bivalent Oral Poliovirus Vaccine (bOPV).

Badizadegan N, Wassilak S, Estívariz C, Wiesen E, Burns C, Bolu O, et al.

Pathogens. 2024 Sep 30;13(9).

PubMed ID: 39338995

ABSTRACT

In 2022, global poliovirus modeling suggested that coordinated cessation of bivalent oral poliovirus vaccine (bOPV, containing Sabin-strain types 1 and 3) in 2027 would likely increase the risks of outbreaks and expected paralytic cases caused by circulating vaccine-derived polioviruses (cVDPVs), particularly type 1. The analysis did not include the implementation of planned, preventive supplemental immunization activities (pSIAs) with bOPV to achieve and maintain higher population immunity for types 1 and 3 prior to bOPV cessation. We reviewed prior published OPV cessation modeling studies to support bOPV cessation planning. We applied an integrated global poliovirus transmission and OPV evolution model after updating assumptions to reflect the epidemiology, immunization, and polio eradication plans through the end of 2023. We explored the effects of bOPV cessation in 2027 with and without additional bOPV pSIAs prior to 2027. Increasing population immunity for types 1 and 3 with bOPV pSIAs (i.e., intensification) could substantially reduce the expected global risks of experiencing cVDPV outbreaks and the number of expected polio cases both before and after bOPV cessation. We identified the need for substantial increases in overall bOPV coverage prior to bOPV cessation to achieve a high probability of successful bOPV cessation.

WEB: 10.3390/pathogens13090804

IMPACT FACTOR: 3.3

CITED HALF-LIFE: 2.6

START COMMENTARY

Table 2 provides probability of success (POS) estimates and expected number of cases for different time periods by poliovirus type and immunization scenario. Risk of Type 1 cases may increase to unacceptable levels after bivalent oral poliovirus vaccine (bOPV) use ends despite intensified bOPV preventive supplementary immunization activities to increase population immunity. The model did not account for limitations in vaccine supply, changes in routine immunization coverage, or changes in preventive supplemental immunization activities.

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9. Global parental acceptance, attitudes, and knowledge regarding human papillomavirus vaccinations for their children: a systematic literature review and meta-analysis.

Heyde S, Osmani V, Schauberger G, Cooney C, Klug S.

BMC Womens Health. 2024 Sep 28;24(1):537.

PubMed ID: 39334328

ABSTRACT

BACKGROUND: This systematic literature review aims to summarize global research on parental acceptance, attitudes, and knowledge regarding human papillomavirus vaccinations.

METHODS: The literature search was conducted in PubMed, Web of Science and Scopus, and included publications from 2006 to 2023. Study quality was assessed using the Newcastle-Ottawa Scale. The Grading of Recommendations Assessment, Development, and Evaluation guidelines were used to assess the strength of evidence for the primary outcome. Meta-analyses were performed using random-effects models to estimate pooled parental acceptance of HPV vaccinations. Studies were stratified by study years, and a subgroup analysis was conducted to estimate vaccine acceptance rates by world regions. Additionally, sensitivity analyses examined the role of parents in accepting HPV vaccinations for children of different sexes.

RESULTS: Based on 86 studies, we found that parents generally supported HPV vaccinations for their children, yet HPV vaccine acceptance rates showed high variation (12.0 to 97.5%). The subgroup analysis revealed geographical variations in pooled parental HPV vaccine acceptance rates, with the highest rate observed in Africa (79.6%; 95% CI: 73.5-85.2; $I^2 = 98.3\%$; $p < 0.01$) and the lowest in North America (56.7%; 95% CI: 49.3-64.0; $I^2 = 99.4\%$; $p < 0.01$). Sensitivity analyses showed that acceptance was higher for daughters than for sons, with mothers more willing to get their daughters vaccinated. The proportion of parents reporting barriers or benefits regarding HPV vaccinations varied widely (0.3-95.8%) between study regions. Across all world regions, fear of adverse effects and concerns about vaccine safety were the main barriers, whereas the desire to protect their children from cancer was a significant predictor of vaccine acceptance. Knowledge levels varied widely (6.5 to 100%) between world regions and according to the questions asked. In most studies, knowledge e.g., that HPV is sexually transmitted, and that HPV vaccination provides protection against cervical cancer, ranged from moderate to high.

CONCLUSIONS: The results indicated moderate parental acceptance of HPV vaccines. Public knowledge of HPV infection should be promoted, and special efforts should be made to minimize the existing barriers and increase vaccination accessibility and uptake.

WEB: 10.1186/s12905-024-03377-5

IMPACT FACTOR: 2.4

CITED HALF-LIFE: 4.1

START COMMENTARY

For study inclusion HPV vaccine acceptance was defined as having vaccinated children or intention/willingness to vaccinate children in the future. Acceptance was found to be higher in intention-based studies, which may indicate barriers in translating intent into action. Acceptance rates varied widely across included studies, with the lowest reported acceptance rate of 28% in 2015 and the highest of 94% in 2021 (Figure 2).

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10. An assessment of Ghana's pilot of the RTS,S malaria vaccine implementation programme; 2019-2021: a retrospective study.

Adjei M, Tweneboah P, Bonsu G, Baafi J, Amponsa-Achiano K, Asiedu-Bekoe F, et al.

Malar J. 2024 Sep 28;23(1):290.

PubMed ID: 39334244

ABSTRACT

BACKGROUND: In May 2019, Ghana piloted the introduction of RTS,S malaria vaccine into routine immunization in 42 districts of seven of the 16 regions. The RTS,S malaria vaccine implementation programme (MVIP) post-introduction evaluation (PIE) conducted in Ghana, assessed the immunization system as well as healthcare worker and caregiver experiences during the phase-one rollout but was less expressive on quantitative grading of the respective thematic areas of the vaccine introduction plan. Given the utility of summary statistics in programme evaluation and communication, this follow-up study aimed to provide an overall rating of the country's performance regarding the MVIP .

METHODS: A retrospective study was conducted from 10th January to 5th February 2024. It involved review of records to assess key thematic areas of the national MVIP plan, using a study tool adapted from the WHO New Vaccine Introduction (NVI) checklist. A composite score ranging from zero to 100 per cent was generated to assess the country's overall performance regarding introduction of the malaria vaccine, rated on a Likert scale as comprehensive, good, fair, and poor.

RESULTS: The overall performance in the MVIP was rated 78.9% (30/38) corresponding to a grading of "good" on the Likert scale. Performance indicators under thematic areas including policy, national coordination mechanisms, waste management, health worker training, and pharmacovigilance were completely achieved. However, some weaknesses were exhibited in areas such as financial consideration, cold chain, logistics, and vaccine management, and monitoring and evaluation.

CONCLUSION: Ghana's MVIP demonstrated remarkable strengths worth leveraging to improve the national immunization programme. The weaknesses observed in some of the thematic areas present opportunities to engage key immunization partners and stakeholders towards aligning efforts to ensure a more robust expansion phase. The lessons from the MVIP may be relevant to areas introducing malaria vaccine irrespective of the product type-RTS,S or R21.

WEB: 10.1186/s12936-024-05113-8

IMPACT FACTOR: 2.4

CITED HALF-LIFE: 7.1

START COMMENTARY

Target population and delivery strategies objectives were not met for Ghana's pilot implementation of RTS,S malaria vaccine because some health facilities in the vaccinating districts did not provide malaria vaccines. A composite score of 0/2 was given for financial considerations objectives as no plan was made to mobilize local resources to support implementation efforts. Cold chain, logistics, and vaccine management composite score was 1/2, as additional fridges were procured to increase clinic availability despite existing cold chain capacity having been deemed adequate. A composite score of 3/4 was given for monitoring and evaluation because the post-introduction evaluation planned for 6-12 months after pilot completion did not take place until 24 months later. Delays in incorporating community members and lack of planning for social media use to disseminate information indicate room for growth in advocacy, communication, and social mobilization planning for future vaccine implementation programs.

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11. Zero-dose children and the extended immunisation cascade: Understanding the path to full immunisation with six childhood vaccines in 43 countries.

Cata-Preta B, Silva L, Costa F, Santos T, Mengistu T, Hogan D, et al.

J Glob Health. 2024 Sep 26;14:04199.

PubMed ID: 39325925

ABSTRACT

BACKGROUND: As part of the Immunisation Agenda 2030, the World Health Organization set a goal to reduce the number of children who did not receive any routine vaccine by 50% by 2030. We aimed to describe the patterns of vaccines received for children with zero, one, and up to full vaccination, while considering newly deployed vaccines (pneumococcal conjugate vaccine (PCV) and rotavirus (ROTA) vaccine) alongside longstanding ones such as the Bacille Calmete-Guérin (BCG), diphtheria, tetanus, and pertussis (DPT), and poliomyelitis vaccines, and measles-containing vaccines (MCVs).

METHODS: We used data from national household surveys (Demographic and Health Surveys and Multiple Indicator Cluster Surveys) carried out in 43 low- and middle-income countries since 2014. We calculated the immunisation cascade as a score ranging from zero to six, considering BCG, polio, DPT, and ROTA vaccines, and the MCV and PCV. We also described the most prevalent combination of vaccines. The analyses were pooled across countries and stratified by household wealth quintiles.

RESULTS: In the pooled analyses with all countries combined, 9.0% of children failed to receive any vaccines, 58.6% received at least one dose of each of the six vaccines, and 47.2% were fully vaccinated with all doses. Among the few children receiving 1-5 vaccines, the most frequent were BCG vaccines, polio vaccines, DPT vaccines, PCV, ROTA vaccines, and MCV.

CONCLUSIONS: Targeting children with their initial vaccine is crucial, as those who receive a first vaccine are more likely to undergo subsequent vaccinations. Finding zero-dose children and starting their immunisation is essential to leaving no one behind during the era of Sustainable Development Goals.

WEB: 10.7189/jogh.14.04199

IMPACT FACTOR: 4.5

CITED HALF-LIFE: 3.6

START COMMENTARY

Figure 1 shows the percent of children at each point of the immunization cascade, with 9% of children receiving no vaccines and 59% of children receiving at least one dose of all six vaccines. The figure also provides information about the percentage of children in each group who received a given vaccine. Among those who received only one vaccine, nearly 60% received the BCG vaccine, 35% received a dose of polio vaccine, and less than 5% received a measles containing vaccine. Figures 2 and 3 provide this same information for the lowest quintile and highest quintile of income, respectively. Nearly 18% fewer of children in the lowest quintile had received all six vaccines and 15% fewer were fully vaccinated.

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12. Prevalence and Trends of Not Receiving a Dose of DPT-Containing Vaccine Among Children 12-35 Months: An Analysis of 81 Low- And Middle-Income Countries.

Karlsson O, Rajpal S, Johri M, Kim R, Subramanian S.

J Epidemiol Glob Health. 2024 Sep 19.

PubMed ID: 39298110

ABSTRACT

Not receiving a DPT-containing vaccine in early childhood indicates an absence of routine immunization, which puts children at an elevated risk of mortality, morbidity, and worse human development over the life course. We estimated the percentage of children 12-35 months who did not receive a dose of DPT-containing vaccine (termed zero-dose children) using household surveys from 81 low- and middle-income countries conducted between 2014 and 2023. For 68 countries with more than one survey (with the earlier survey conducted 2000-2013), we estimated the average annual percentage point change in prevalence of zero-dose children between the earliest and latest surveys. We also explored the association of zero-dose prevalence with postneonatal and child mortality, health expenditure, and Gavi-eligibility. Overall, 16% of children in our pooled sample had not received a dose of DPT-containing vaccine. There was a 0.8% point decline in zero-dose prevalence per year on average across the period studied. A single percentage point average annual decline in zero-dose prevalence was associated with an average annual decrease of 1.4 deaths in the postneonatal and childhood period per 1000 live births. Gavi-eligible countries had a much faster decline in zero-dose prevalence than other countries. Large gains have been made in reducing the percentage of children who did not receive a DPT-containing vaccine. Efforts to reduce the number of zero-dose children should focus on countries with high prevalence to achieve the Immunization Agenda 2030. Healthcare spending could be prioritized so that the prevalence of zero-dose children is reduced.

WEB: 10.1007/s44197-024-00294-6

IMPACT FACTOR: 3.8

CITED HALF-LIFE: 3.9

START COMMENTARY

Using data from the Multiple Indicator Cluster Surveys (MICS) and Demographic and Health Surveys (DHS) from 2000 – 2023, authors estimated 27 million children across 81 countries were zero-dose (Table 1). The African region had the highest prevalence of zero-dose children (31% in West & Central Africa and 18% in Eastern & Southern Africa) and the Latin America & the Caribbean region had the lowest prevalence (8%). Among countries with two or more surveys available, Guyana, Zimbabwe, and Sierra Leone had the largest average annual decline in prevalence of zero-dose

children (1.8%, 1.7%, and 1.5%, respectively) while the Maldives, Guinea, and Cote d'Ivoire had the largest average annual increase (1.1%, 0.9%, and 0.8%, respectively).

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13. Seasonal influenza vaccination: A global review of national policies in 194 WHO member states in 2022.

Goldin S, Brooks D, Jorgensen P, Wijesinghe P, Cho H, Attia R, et al.

Vaccine. 2024 Sep 19;42(26):126274.

PubMed ID: 39299001

ABSTRACT

INTRODUCTION: Seasonal influenza vaccination prevents severe influenza disease and death. The World Health Organization (WHO) encourages all countries to consider annual seasonal influenza vaccination for health workers, people with chronic conditions, older adults, pregnant women and other high-risk populations as relevant for their national context. This paper provides a global update on the status of countries' influenza vaccination policies and programmes as of December 2022.

METHODS: We analysed the WHO-UNICEF (United Nations Children's Fund) Joint Reporting Form on Immunization's influenza vaccine-related data. We used STATA 17 to conduct descriptive analyses of reported seasonal influenza vaccine availability and seasonal influenza vaccination policies globally.

RESULTS: Seasonal influenza vaccine doses were available in 74 % of WHO Member States (143/194) in 2022. Fewer countries, 66 % of WHO Member States (128/194), had a seasonal influenza vaccination policy, of which 68 countries reported having a policy for the public sector, 53 for the public and private sectors, two for the private sector only, and five did not report the sector. More than half of WHO Member States (100 countries) recommend annual seasonal influenza vaccination for all four of the WHO recommended priority groups. Influenza vaccination coverage data were reported by 64 countries; globally the median coverage rates varied by group: 37 % for pregnant women, 55 % for older adults and 62 % for health workers.

DISCUSSION: The number of countries using seasonal influenza vaccines has grown over time, but there is still opportunity for continued development and strengthening of national programmes, particularly in low- and middle-income countries (LMICs). To support countries, WHO is providing technical guidance and resources to enable better reporting of influenza vaccination data. More complete and higher quality data will help countries and global health stakeholders to support national decision-making and programme strengthening. Where available, WHO encourages countries to co-administer influenza and COVID-19 vaccination to increase programmatic efficiency and coverage of both vaccines among recommended groups.

WEB: 10.1016/j.vaccine.2024.126274
IMPACT FACTOR: 4.5
CITED HALF-LIFE: 7.9

START COMMENTARY

Seasonal influenza vaccination data was compared across 2014, 2018, and 2022. Between 2014 and 2022, thirteen countries introduced a national influenza vaccination policy, and the number of doses distributed nearly doubled. Availability of seasonal influenza vaccines varied widely between regions, with vaccines available in all countries in the European region but only 30% of countries in the African Region. Overall, 19% of low-income countries reported influenza vaccine availability compared to >95% in high income countries.

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14. Strengthening Capacity for Tailored Immunization Programs Using Adult Learning Principles: A Case Study from Nigeria.

Obi-Jeff C, Oguntimehin F, Adejumo A, Ibrahim A, Ade-Banjo O, Gadzama D, et al.

Glob Health Sci Pract. 2024 Oct 29;12(5).

PubMed ID: 39293821

ABSTRACT

Introduction: Nigeria has the highest number of children who have not received any vaccines in Africa. The training-of-trainers (TOT) model used to train program managers (PMs) and health care workers (HCWs) is ineffective for adult learning and limits immunization programs' success. We incorporated adult learning principles (ALPs) in designing and delivering TOT for immunization PMs and HCWs to use data to engage communities for tailored immunization strategies.

Methods: Our study was implemented in 3 local government areas (LGAs) of the Federal Capital Territory, Nigeria. A training curriculum was developed, integrating ALPs and technical and operational content based on best practices in delivering immunization training and the training needs assessment findings. State PMs (n=10), LGA PMs (n=30), and HCWs (n=42) were trained on the human-centered design for tailoring immunization programs (HCD-TIP) approaches using ALPs. We used interviews and surveys with purposively and conveniently sampled PMs and HCWs, respectively, and observations to assess participants' satisfaction, knowledge and competence, behavior changes, and results. The interviews were analyzed thematically, and surveys were statistically.

Results: There was a high level of satisfaction with the training among LGA PMs (100%), state PMs (91%), and HCWs (85%), with significant knowledge and competence improvements post-training (P<.001). The trained participants conducted 2 HCD sessions with 24 undervaccinated communities and co-designed 24 prototype solutions for testing. Results showed increased coverage of the pentavalent vaccine first dose (54%) and third dose (188%) across 12 participating communities. Improved community collaboration, communication skills, and data-driven approaches were the most cited behavior changes in practice.

Conclusion: The application of ALPs in training, use of HCD-TIP approaches and tools, and supportive supervision enhanced PMs' and HCWs' capacity for tailored interventions. Countries should consider adopting a holistic approach that focuses on using these approaches in immunization programs to strengthen the health system for equitable vaccine coverage.

WEB: 10.9745/GHSP-D-23-00465

IMPACT FACTOR: 2.5

CITED HALF-LIFE: 5.0

START COMMENTARY

Evaluated immunization trainings were guided by participatory, experimental, and reflective adult learning principles (ALPs). Learning objectives and approaches can be found in Table 1. Participants were taught to work with communities to identify immunization challenges, design targeted solutions, and monitor and evaluate the implementation of solutions tailored to community needs. Scenarios and case studies were derived from local immunization data.

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15. "Build back the confidence": qualitative exploration of community experiences with polio vaccination in the Covid-19 context in Cameroon and Ethiopia.

Lorenzetti L, Alam C, Namey E, Monj C, Tsegaye A, Ateeq N, et al.

BMC Public Health. 2024 Sep 18;24(1):2532.

PubMed ID: 39289677

ABSTRACT

BACKGROUND: In 2020, as the Global Polio Eradication Initiative worked to address outbreaks of vaccine-derived poliovirus Type 2, particularly in sub-Saharan Africa, the Covid-19 pandemic suspended routine immunization campaigns worldwide. There were concerns about how Covid-19 - and the introduction of Covid-19 vaccines - might influence uptake of the oral polio vaccine (OPV). To inform communications strategies, we conducted a qualitative study to explore insights from community stakeholders into how Covid-19 influenced perceptions of OPV and vaccination campaigns.

METHODS: We conducted 32 focus group discussions with caregivers of children under 5 and polio frontline workers as well as 22 in-depth interviews with healthcare practitioners and social influencers in Cameroon and Ethiopia. In each country, we purposively sampled stakeholders per discrete eligibility criteria from one urban (Yaoundé and Addis Ababa) and one peri-urban site (Bafia and Adama).

RESULTS: We found that the Covid-19 pandemic and related precautionary measures introduced new challenges for OPV campaigns in Cameroon and Ethiopia, including reduced caregiver confidence in routine immunizations and an erosion of trust between caregivers and frontline workers. A salient concern among caregivers was that Covid-19 vaccines might be delivered in place of OPV. When asked how to maximize community support for future OPV campaigns, stakeholders suggested to rebuild caregiver trust for frontline workers; use a variety of information sources to ensure consistent messaging on vaccination reaches caregivers in a timely manner; increase remuneration, resources, and training for frontline workers; and leverage existing community influencers and groups.

CONCLUSIONS: Despite the challenges to vaccination campaigns experienced during the Covid-19 pandemic, it was anticipated that the Polio Programme would continue to experience community support for OPV with appropriate messaging and community coordination. These efforts would "build back the confidence" among caregivers and other community stakeholders regarding community-based vaccination campaigns. Social and behavior change approaches that leverage clear, consistent messaging from multiple trusted platforms could address caregiver trust and dismantle mis/dis-information that creates confusion surrounding vaccines.

WEB: 10.1186/s12889-024-19860-5

IMPACT FACTOR: 3.5

CITED HALF-LIFE: 5.4

START COMMENTARY

Caregivers suggested having the same workers who run the mobilization events also provide vaccine services to build familiarity and trust. Looking and acting professional while being able to easily answer caregiver questions was important for caregiver acceptance of front-line workers. Given higher levels of distrust for COVID-19 vaccines, frontline workers and healthcare professionals urged separating COVID-19 vaccine campaigns from oral polio vaccine campaigns.

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Additional Articles of Interest

1 A guide to global access to HPV vaccination to all women in low- and middle-income countries; a minireview of innovation and equity. {Full Article}
2 Predictors of measles-rubella vaccination status in the Savannah Region, Ghana: A cross-sectional study among caregivers of children aged 18-59 months. {Full Article}
3 Healthcare worker practices for HPV vaccine recommendation: A systematic review and meta-analysis. {Full Article}
4 Potential impact of rotavirus vaccine introduction in India's Universal Immunisation Programme on private sector vaccine utilisation: an interrupted time series analysis. {Full Article}
5 Age-appropriate vaccination and associated factors among children aged 12-35 months in Ethiopia: A multi-level analysis. {Full Article}
6 Routine Immunization Status and Factors Associated with Immunization Coverage among Children Aged 12-23 Months in Tanzania. {Full Article}
7 The Effects of Numerical Evidence and Message Framing in Communicating Vaccine Efficacy. {Full Article}
8 Effective integration of COVID-19 vaccination with routine immunization: A case study from Kinshasa, DRC. {Full Article}
9 IPVS STATEMENT on HPV vaccination: No longer supply constraints: Towards achieving WHO vaccine targets. {Full Article}
10 Cost-Effectiveness of Bivalent Respiratory Syncytial Virus Prefusion F (RSVpreF) Vaccine During Pregnancy for Prevention of Respiratory Syncytial Virus Among Infants in Argentina. {Full Article}
11 Examining Vaccine Hesitancy Among Ghanaian Parents for the R21/Matrix-M Malaria Vaccine. {Full Article}
12 Enhanced production of recombinant coxsackievirus A16 using a serum-free HEK293A suspension culture system for bivalent enterovirus vaccine development. {Full Article}
13 Mobile Apps for Vaccination Services: Content Analysis and Quality Assessment. {Full Article}
14 Determinants of measles second dose vaccination dropout among children aged 18-24 months in Ejere woreda, central Ethiopia; unmatched case-control study. {Full Article}
15 An integrated blockchain-enabled multi-channel vaccine supply chain network under hybrid uncertainties. {Full Article}
16 Co-designing and pilot testing a digital game to improve vaccine attitudes and misinformation resistance in Ghana. {Full Article}
17 Multilevel and geographically weighted regression analysis of factors associated with full immunization among children aged 12-23 months in Ethiopia. {Full Article}

18 Effectiveness of the enterovirus A71 vaccine on hand, foot, and mouth disease: a real-world study in China. {Full Article}

19 Factors influencing the first dose of measles vaccination uptake in 42 low- and middle-income countries. {Full Article}

20 Exploring Important Attributes, the Potential Use Cases and Feasibility of Introduction of Measles and Rubella Microarray Patches (MR-MAPs): Insights from Nine Countries. {Full Article}

21 Estimates of Potential Demand for Measles and Rubella Microarray Patches. {Full Article}

22 The Effectiveness of Interventions Targeting Adolescents in HPV Vaccination-A Scoping Review. {Full Article}

23 Risk factors of diphtheria outbreak in damt district of Al Dhalea Governorate, 2023 -Yemen: a case-control study. {Full Article}

24 Multilevel approaches to immunization equity. {Full Article}

25 Dengue outbreaks in northern Nigeria: Evaluating the recommended Takeda vaccine and future prevention strategies. {Full Article}

26 Prevalence, spatial variation and determinants of zero-dose children in Ethiopia: Spatial and multilevel analyses. {Full Article}

27 Effect of vaccine dose intervals: Considering immunity levels, vaccine efficacy, and strain variants for disease control strategy. {Full Article}

28 Accelerating HPV vaccination in Africa for health equity. {Full Article}

Appendix

The literature search for the November 2024 Vaccine Delivery Research Digest was conducted on October 19, 2024. We searched English language articles indexed by the US National Library of Medicine and published between September 15, 2024 and October 14, 2024. The search resulted in 416 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 2024/09/15:2024/10/14[Date - Publication]