VACCINE DELIVERY RESEARCH DIGEST

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

REPORT TO THE BILL & MELINDA GATES FOUNDATION

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- Provided information from twenty-two studies that evaluated cost-effectiveness of influenza vaccine introduction in low and middle-income countries

9 The clinical effectiveness of one-dose vaccination with an HPV vaccine: A meta-analysis of 902,368 vaccinated women.

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- Examined the comparative effectiveness of the one-dose vaccination with an HPV vaccine against two- and three-dose regimens and concluded that a single-dose HPV vaccine may offer effectiveness on par with two- or three-dose schedules

10 The urban-poor vaccination: Challenges and strategies in low-and-middle income countries.

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- Provided insight into key challenges to vaccination among low-income urban populations and proposed community-based solutions

11 Vaccine Mandates and Cultural Safety.

{Abstract & START Commentary} {Full Article}

- Explained the impact of mandatory vaccination policy on First Nations communities in the context of systemic violence, racism, and colonialism

12 Determinants of immunization in polio super high-risk union councils of Pakistan.

{Abstract & START Commentary} {Full Article}

- Described polio virus vaccine coverage and reported reasons given for missed vaccine doses in 39 super-high-risk union councils (SHRUCs) in Pakistan

13 Knowledge and attitudes of community pharmacists on vaccination, barriers and willingness to implement community pharmacy-based vaccination services in Ethiopia.

{Abstract & START Commentary} {Full Article}

- Analyzed survey responses of 423 community pharmacists in Ethiopia to evaluate vaccine knowledge and attitudes, and to assess barriers to implementing community pharmacy-based vaccination services

14 Protecting the healthcare workers in low- and lower-middle-income countries through vaccination: barriers, leverages, and next steps.

{Abstract & START Commentary} {Full Article}

- Highlighted the World Federation of Public Health Associations' policy statement 'Protecting the Healthcare Workforce in Low- and Middle-Income Countries through Vaccination' and called for the prioritization of vaccine programs for healthcare workers

15 Economic and cost-effectiveness aspects of vaccines in combating antibiotic resistance.

{Abstract & START Commentary} {Full Article}

- Found existing literature on cost-effectiveness of vaccines in combating antimicrobial resistance to be sparse, with literature focused exclusively on pneumococcal conjugate vaccine (PCV)

Appendix

Details of Articles

1. A cross-sectional assessment of the effects of select training modalities on vaccine cold chain management.

Daniel A, Oloro J, Hahirwa I, Rizinde T, Mukanyangezi M.

J Pharm Policy Pract. 2024 Jan 19;17(1):232-248.

PubMed ID: 38234993

ABSTRACT

BACKGROUND: Vaccines offer arguably the most cost-effective public health intervention. Vaccine supply chain management which is a critical building block faces many Human resources challenges mainly due to the special attributes of vaccines.

OBJECTIVE: This study attempted to measure the effect of training on vaccine cold chain handler knowledge and practices.

METHODS: A cross-sectional research design, using predominantly quantitative data collection techniques, was used. Facilities that have offered vaccination services for more than a year and report through the HMIS system were eligible for selection. Observation checklists and structured questionnaires were used. SPSS was used to analyse data.

RESULTS: Vaccine cold chain management among the study group had an average score of 65.33% range (31-85%). The average knowledge score among the study respondents was 62.42% with a range (45-95%). The knowledge of respondents generally increases with an additional increase in the number of training modalities.

CONCLUSIONS: The status of VCCM is at about 65.33% below the target of 80% set by the EVM. The trainings have an effect on both knowledge of handlers and their practice especially when deployed in a multi-pronged design and thus these trainings need to be aligned to achieve synergy.

ABBREVIATIONS: CCE, Cold Chain Equipment; DHIS2, District Health Information Systems 2; DHO, District Health Officer; DPT, Diphtheria, Pertussis, Tetanus; DVS, District Vaccine Stores; EPI, Expanded Program for Immunisation; EVM, Effective Vaccine Management; FEFO, First Expiry First Out; GAVI, Global Alliance for Vaccines and Immunisation; HMIS, Health Information Management Systems; IRC, International Rescue Committee; KII, Key Informant Interview; LIAT, logistics indicator assessment tool; PATH, Program for Appropriate Technology in Health; PHC, Primary Health Care; QPPU, Quantification and Planning and Procurement Unit; SOPs, Standard Operating Procedures; SPSS, Statistical Package for Social Sciences; UNEPI, Uganda National Expanded

Program for Immunisation; UNICEF, United Nations Children's Fund; VPD, Vaccine Preventable Diseases; VVM, Vaccine Vial Monitors; WHO, World Health Organisation.

WEB: 10.1080/20523211.2023.2292717
IMPACT FACTOR: 4.2
CITED HALF-LIFE: 2.6

START COMMENTARY

This study by Daniel et al. was conducted in the Lango sub-region in northern Uganda, a location chosen for its mix of public and private facility types across levels of care offering immunization services, poverty levels, and tropical climate that is challenging for cold chain logistics. The 375 health care facilities in Lango were stratified by district and level of care to ensure representativeness, with a final sample of 57 centers. Of the vaccine cold chain management practices assessed, full compliance at all facilities was found for vaccine vial monitor application and vaccine storage unit access control. Temperature excursion incident reporting and wastage recording were accurately managed the least often, with no compliance for incident reporting and only 1 facility (1.75%) correctly practicing wastage recording. Five training modalities for vaccine management were assessed: classroom training in vaccine cold chain management, availability of reference materials, peer-to-peer learning, internet training, and technical support supervision. All respondents reported exposure to at least two training modalities with most being exposed to at least four, although it was unclear how exposure was defined. Knowledge scores increased by just 3% with reported exposure to each additional training modality.

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2. Use of a catch-up programme to improve routine immunization in 13 provinces of Papua New Guinea, 2020-2022.

Mekonnen D, Bauri M, Pogo M, Shang M, Bettels D, Kabir S, et al.

Western Pac Surveill Response J. 2024 Jan 18;14(4):1-6.
PubMed ID: 38230256

ABSTRACT

OBJECTIVE: Routine immunization coverage in Papua New Guinea has decreased in the past 5 years. This persistently low routine immunization coverage has resulted in low population immunity and frequent outbreaks of vaccine-preventable disease across the country. We describe the use of a catch-up programme to improve routine immunization during the coronavirus disease pandemic in Papua New Guinea during 2020-2022.

METHODS: In June 2020, 13 provinces of Papua New Guinea were selected to undergo a vaccination catch-up programme, with technical support from the World Health Organization (WHO) and the United Nations Children's Fund. Twelve provinces received financial and logistic support through the Accelerated Immunization and Health Systems Strengthening programme, and one received support from WHO. All stakeholders were involved in planning and implementing the catch-up programme.

RESULTS: Between July 2020 and June 2022, about 340 health facilities conducted catch-up activities. The highest number of children aged under 1 year were vaccinated in 2022 (n = 33 652 for third dose of pentavalent vaccine). The national coverage of routine immunization (including the catch-up vaccinations) increased between 2019 and 2020 - by 5% for the third dose of pentavalent vaccine, 11% for the measles-rubella vaccine and 16% for the inactivated poliovirus vaccine. The coverage declined slightly in 2021 before increasing again in 2022.

DISCUSSION: The catch-up programme was an instrumental tool to improve routine immunization coverage between 2020 and 2022 and during the pandemic in Papua New Guinea. With appropriate technical and logistic support, including financial and human resources, catch-up programmes can strengthen routine immunization coverage across the country.

WEB: 10.5365/wpsar.2023.14.4.1055
IMPACT FACTOR: N/A
CITED HALF-LIFE: N/A

START COMMENTARY

While the vaccination catch-up program detailed in this study by Mekonnen et al. offered vaccines to zero-dose children and those who were missing doses who were younger than 2 years, the analysis focused only on those with complete data, which was only available for children younger than 1 year. Thus, the full impact of this program is unknown. The authors attribute the small decline in routine immunization coverage in 2021 to the introduction of COVID-19 vaccination and diversion of resources to COVID-19 vaccination efforts. Difficulties encountered during the catch-up vaccination program included a shortage of health care workers and limited resources in remote areas.

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3. Leveraging COVID-19 Vaccine Safety Monitoring in Ethiopia and Pakistan to Enhance System-Wide Safety Surveillance.

Hagos A, Sahile Z, Ahmed W, Phanouvong S.

Glob Health Sci Pract. 2024 Jan 12.

PubMed ID: 38216210

ABSTRACT

The rapid development, introduction, and global uptake of COVID-19 vaccines required countries to have strong pharmacovigilance systems in place to monitor and address adverse events following immunization (AEFIs). These systems provide timely data on vaccine safety that support decisions about the potential risks of vaccine adverse events relative to the benefit of disease prevention. In Ethiopia, the monitoring system was limited by the lack of data being submitted through its passive surveillance system, delays in investigating serious adverse events and conducting causality assessments, and the lack of reporting to the World Health Organization (WHO) global database, VigiBase. In Pakistan, the pharmacovigilance system lacked reporting requirements and guidance documentation, regulatory policies were insufficient, and staff lacked the capacity to evaluate AEFI reports. Several interventions were implemented in both countries to improve pharmacovigilance systems and processes necessary to collect, analyze, and report AEFIs from health care facilities to the national level and facilitate the use of global and national electronic reporting tools. In addition, Pakistan improved the regulatory policy environment and engaged vaccine manufacturers and private sector health facilities in AEFI reporting for the first time in the country. Outcomes include an increased number of COVID-19 vaccine-related AEFIs reported and causality assessments completed, which means that potential safety issues were being analyzed more quickly, comprehensively, and accurately. The number of AEFI reports submitted to VigiBase by Pakistan's regulatory authority more than quintupled from approximately 5,000/quarter in 2021 to 28,555/quarter in 2022. In Ethiopia, by October 2022, 44,000 AEFI reports had been received, and 40 causality assessments completed. In both countries, timely AEFI data review and analysis led to prompt recommendations and regulatory actions, highlighting the far-reaching implications of strengthening the country-level pharmacovigilance systems. These strengthened systems are now in place for use with all vaccines.

WEB: 10.9745/GHSP-D-23-00161

IMPACT FACTOR: 4.0

CITED HALF-LIFE: 4.5

START COMMENTARY

This report by Hagos et al. described the processes and outcomes of the Promoting the Quality of Medicines Plus (PQM+) program to strengthen adverse event following immunization (AEFI) surveillance for COVID-19 vaccination in Pakistan and Ethiopia. In both countries, existing surveillance systems were assessed, and system-based interventions were designed to address specific gaps found in the ability to collect, analyze, report, and act on AEFI data. The authors identified inadequate training and lack of resources and infrastructure as ongoing challenges to effective AEFI surveillance.

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4. Is health expenditure on immunisation associated with immunisation coverage in sub-Saharan Africa? A multicountry analysis, 2013-2017.

Idris I, Ouma L, Tapkigen J, Ayomoh F, Ayeni G.

BMJ Open. 2024 Jan 15;14(1):e073789.
PubMed ID: 38216207

ABSTRACT

OBJECTIVES: The designing of contextually tailored sustainable plans to finance the procurement of vaccines and the running of appropriate immunisation programmes are necessary to address the high burden of vaccine-preventable diseases and low immunisation coverage in sub-Saharan Africa (SSA). We sought to estimate the minimum fraction of a country's health budget that should be invested in national immunisation programmes to achieve national immunisation coverage of 80% or greater depending on the context, with and without donors' support.

DESIGN: Multicountry analysis of secondary data using retrieved publicly available data from the WHO, Global Alliance for Vaccines and Immunization (GAVI) and World Bank databases.

SETTING: Data on 24 SSA countries, between 2013 and 2017.

METHODS: We model the variations in immunisation coverage across the different SSA countries using a fractional logit model. Three different generalised linear models were fitted to explore how various explanatory variables accounted for the variability in each of the three different vaccines-measles-containing vaccine (MCV)1, diphtheria, pertussis, tetanus (DPT3) and BCG.

RESULTS: We observed an association between current health expenditure (as a percentage of gross domestic product) and immunisation coverage for BCG (OR=1.01, 95% CI: 1.01 to 1.04, p=0.008) and DPT3 (OR=1.01, 95% CI: 1.0 to 1.02, p=0.020) vaccines. However, there was no evidence to indicate that health expenditure on immunisation (as a proportion of current health expenditure) could be a strong predictor of immunisation coverage (DPT, OR 0.96 (95% CI 0.78 to 1.19; p=0.702); BCG, OR 0.91 (0.69 to 1.19; p=0.492); MCV, OR 0.91 (0.69 to 1.19; p=0.482)). We demonstrate in selected countries that to achieve the GAVI target of 80% in the countries with low DPT3 coverage, health expenditure would need to be increased by more than 45%.

CONCLUSIONS: There is a need to facilitate the development of strategies that support African countries to increase domestic financing for national immunisation programmes towards achieving 2030 targets for immunisation coverage.

WEB: 10.1136/bmjopen-2023-073789

IMPACT FACTOR: 2.9

CITED HALF-LIFE: 4.0

START COMMENTARY

Idris et al. found that immunization coverage and percentage of health budget spent on immunization were not correlated. As an example, Republic of the Congo had 90% DPT3 coverage with 0.03% current health expenditure on immunization, while Sierra Leone had 83% DPT3 coverage with 0.4% of health expenditure spent on immunization. Other countries with similar reported percentage health expenditures had widely varying coverage estimates; Chad and Eritrea both reported 0.1% expenditure on immunization, yet Chad had 41% DPT3 coverage while Eritrea had 95% DPT3 coverage. The authors suggest that the finding of no association between health expenditure on immunization and immunization coverage may be attributable in part to internal security issues in some countries, availability and use of external funding for vaccines allowing for less immunization-specific expenditure in the health budget, and supplementary immunization activity costs not being accounted for in the country's health expenditure for immunization. Additionally, percentage expenditure may not reflect absolute differences in costs spent on immunization.

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5. Predicting the potential impact of scaling up four pneumonia interventions on under-five pneumonia mortality: A prospective Lives Saved Tool (LiST) analysis for Bangladesh, Chad, and Ethiopia.

Pfurtscheller T, Lam F, Shah R, Shohel R, Sans M, Tounaikok N, et al.

J Glob Health. 2024 Jan 15;14:04001.

PubMed ID: 38214911

ABSTRACT

BACKGROUND: Pneumonia remains the leading cause of mortality in under-five children outside the neonatal period. Progress has slowed down in the last decade, necessitating increased efforts to scale up effective pneumonia interventions.

METHODS: We used the Lives Saved Tool (LiST), a modelling software for child mortality in low- and middle-income settings, to prospectively analyse the potential impact of upscaling pneumonia interventions in Bangladesh, Chad, and Ethiopia from 2023 to 2030. We included Haemophilus influenzae type B (Hib) vaccination, pneumococcal conjugate vaccine (PCV), oral antibiotics, pulse oximetry, and oxygen as pneumonia interventions in our analysis. Outcomes of interest were the number of pneumonia deaths averted, the proportion of deaths averted by intervention, and changes in the under-five mortality rate.

FINDINGS: We found that 19 775 lives of children under-five could be saved in Bangladesh, 76 470 in Chad, and 97 343 in Ethiopia by scaling intervention coverages to ≥90% by 2030. Our estimated reductions in pneumonia deaths among children under five range from 44.61% to 57.91% in the respective countries. Increased coverage of oral antibiotics, pulse oximetry, and oxygen show similar effects in all three countries, averting between 18.80% and 23.65% of expected pneumonia deaths. Scaling-up PCV has a prominent effect, especially in Chad, where it could avert 14.04% of expected pneumonia deaths. Under-five mortality could be reduced by 1.42 per 1000 live births in Bangladesh, 22.52 per 1000 live births in Chad, and 5.48 per 1000 live births in Ethiopia.

CONCLUSIONS: This analysis shows the high impact of upscaling pneumonia interventions. The lack of data regarding coverage indicators is a barrier for further research, policy, and implementation, all requiring increased attention.

WEB: 10.7189/jogh.14.04001

IMPACT FACTOR: 7.2

CITED HALF-LIFE: 3.1

START COMMENTARY

Pfurtscheller et al. focused their analysis on Bangladesh, Chad, and Ethiopia due to their different demographic, economic, and social profiles and the high burden of childhood pneumonia. Bangladesh has high (>90%) Haemophilus influenzae type B (Hib) vaccine and pneumococcal conjugate vaccine (PCV) coverage, so scale up of vaccine coverage would not greatly impact pneumonia deaths. In Ethiopia, where Hib vaccine coverage and PCV coverage in 2023 are estimated to be 71% and 66%, respectively, incrementally increasing coverage of those two vaccines each year between 2023 and 2030 to reach 90% coverage by 2030 would result in an estimated 8300 additional lives saved. In Chad, where 2023 Hib vaccine coverage is estimated to be 62% and PCV coverage is only estimated to be 11%, incrementally increasing coverage of both vaccines each year until 90% coverage is reached in 2030 would result in an estimated 24,000 additional lives saved.

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6. Group-based trajectory models of integrated vaccine delivery and equity in low- and middle-income countries.

Ravi S, Vecino-Ortiz A, Potter C, Merritt M, Patenaude B.

Int J Equity Health. 2024 Jan 11;23(1):5.

PubMed ID: 38195588

ABSTRACT

BACKGROUND: Integrated vaccine delivery - the linkage of routine vaccination with provision of other essential health services - is a hallmark of robust primary care systems that has been linked to equitable improvements in population health outcomes.

METHODS: We gathered longitudinal data relating to routine immunization coverage and vaccination equity in 78 low- and middle-income countries that have ever received support from Gavi, the Vaccine Alliance, using multiple imputation to handle missing values. We then estimated several group-based trajectory models to describe the relationship between integrated vaccine delivery and vaccination equity in these countries. Finally, we used multinomial logistic regression to identify predictors of group membership.

RESULTS: We identified five distinct trajectories of geographic vaccination equity across both the imputed and non-imputed datasets, along with two and four trajectories of socioeconomic vaccination equity in the imputed and non-imputed datasets, respectively. Integration was associated with reductions in the slope index of inequality of measles vaccination in the countries analyzed. Integration was also associated with an increase in the percentage of districts reporting high measles vaccination coverage.

CONCLUSIONS: Integrated vaccine delivery is most strongly associated with improvements in vaccination equity in settings with high baseline levels of inequity. Continued scholarship is needed to further characterize the relationship between integration and health equity, as well as to improve measurement of vaccination coverage and integration.

WEB: 10.1186/s12939-023-02088-x

IMPACT FACTOR: 4.8

CITED HALF-LIFE: 5.0

START COMMENTARY

Ravi et al. note that groupings devised from group-based trajectory models are latent constructs, and that grouping is a strategy for summarizing trends across highly diverse settings. Thus, future vaccine equity outcomes cannot be predicted for any specific country based on group or trajectory.

Limitations discussed were data quality and availability, particularly for socioeconomic equity data. Small sample size prevented the detection of small or medium associations between integration and equity, so future iterations of this analysis with more data points may help elucidate further associations.

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7. Unlocking the potential of novel RTS, S/AS01, and R21/Matrix-M™ malaria vaccines in African nations.

Oduoye M, Haider M, Marsool M, Kareem M, Adedayo A, Abdulkarim A, et al.

Health Sci Rep. 2024 Jan 09;7(1):e1797.
PubMed ID: 38186933

ABSTRACT

INTRODUCTION: Mass malaria vaccination, rather than vaccinating only children below age 5, has been proven to have the potential to reduce morbidity and mortality among those vaccinated, both young and old. Addressing vaccine scepticism and misinformation is crucial in African nations to build public trust in malaria prevention. Therefore, including a wider range of demographics in vaccine trials is necessary for equitable representation and achieving herd immunity against malaria.

AIM: This present article aims to identify some of the obstacles that impede malaria vaccination usage and acceptability in African Nations in combating malaria in the region as it continues to pose a significant global public health problem.

METHODOLOGY: A literature search was done on the Malaria vaccine between 2000 and 2023. Past and present articles/studies on this topic were consulted on PubMed, Google Scholar, Scopus and Web of Science using the following keywords; “Malaria,” “Vaccines,” “African Nations,” “Obstacles, Strategies,” and “Public Health.”

RESULTS: The recently approved RTS, S/AS01, and R21/Matrix-M™ Malaria vaccines have the potential to prevent numerous deaths and cases of Malaria in Africa. These vaccines Malaria vaccines are cost-effective in African areas with moderate to high plasmodium falciparum and can be delivered through routine immunization.

CONCLUSION: To combat malaria effectively in African Nations, African leaders need to set up a comprehensive approach that involves; prevention, healthcare access, implementation research strategies towards adoption and acceptance of malaria vaccines in Africa as well as community engagement with the religious leaders, the market women, community heads, schools, as well as students’ union towards the willingness and acceptability of the malaria vaccines among the African populations.

WEB: 10.1002/hsr2.1797
IMPACT FACTOR: 2.0
CITED HALF-LIFE: 1.8

START COMMENTARY

Oduoye et al. briefly highlights malaria burden in Africa and summarizes information about vaccines for malaria prevention that are or soon will be available. The authors summarize challenges faced by African countries during the implementation of vaccine strategies for malaria prevention (Table 1); these include vaccine skepticism and misinformation, vaccine distribution and storage issues, limited inclusion of certain subpopulations in clinical trials of malaria vaccines, insufficient knowledge among health workers, lack of funding for vaccine program implementation, infrastructure and logistical challenges, and challenges in fostering community engagement.

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8. Costs and cost-effectiveness of influenza illness and vaccination in low- and middle-income countries: A systematic review from 2012 to 2022.

Gharpure R, Chard A, Cabrera Escobar M, Zhou W, Valleau M, Yau T, et al.

PLoS Med. 2024 Jan 23;21(1):e1004333.

PubMed ID: 38181066

ABSTRACT

BACKGROUND: Historically, lack of data on cost-effectiveness of influenza vaccination has been identified as a barrier to vaccine use in low- and middle-income countries. We conducted a systematic review of economic evaluations describing (1) costs of influenza illness; (2) costs of influenza vaccination programs; and (3) vaccination cost-effectiveness from low- and middle-income countries to assess if gaps persist that could hinder global implementation of influenza vaccination programs.

METHODS AND FINDINGS: We performed a systematic search in Medline, Embase, Cochrane Library, CINAHL, and Scopus in January 2022 and October 2023 using a combination of the following key words: “influenza” AND “cost” OR “economic.” The search included studies with publication years 2012 through 2022. Studies were eligible if they (1) presented original, peer-reviewed findings on cost of illness, cost of vaccination program, or cost-effectiveness of vaccination for seasonal influenza; and (2) included data for at least 1 low- or middle-income country. We abstracted general study characteristics and data specific to each of the 3 study types. Of 54 included studies, 26 presented data on cost-effectiveness, 24 on cost-of-illness, and 5 on program costs. Represented countries were classified as upper-middle income (UMIC; n = 12), lower-middle income (LMIC; n = 7), and low-income (LIC; n = 3). The most evaluated target groups were children (n = 26 studies), older adults (n = 17), and persons with chronic medical conditions (n = 12); fewer studies evaluated pregnant persons (n = 9), healthcare workers (n = 5), and persons in congregate living settings (n = 1). Costs-of-illness were generally higher in UMICs than in LMICs/LICs; however, the highest national economic burden, as a percent of gross domestic product and national health expenditure, was reported from an LIC. Among studies that evaluated the cost-effectiveness of influenza vaccine introduction, most (88%) interpreted at least 1 scenario per target group as either cost-effective or cost-saving, based on thresholds designated in the study. Key limitations of this work included (1) heterogeneity across included studies; (2) restrictiveness of the inclusion criteria used; and (3) potential for missed influenza burden from use of sentinel surveillance systems.

CONCLUSIONS: The 54 studies identified in this review suggest an increased momentum to generate economic evidence about influenza illness and vaccination from low- and middle-income countries during 2012 to 2022. However, given that we observed substantial heterogeneity, continued evaluation of the economic burden of influenza illness and costs/cost-effectiveness of

influenza vaccination, particularly in LICs and among underrepresented target groups (e.g., healthcare workers and pregnant persons), is needed. Use of standardized methodology could facilitate pooling across settings and knowledge sharing to strengthen global influenza vaccination programs.

WEB: 10.1371/journal.pmed.1004333
IMPACT FACTOR: 15.8
CITED HALF-LIFE: 7.6

START COMMENTARY

Of the twenty-two studies evaluating cost-effectiveness of vaccine introduction included in this systematic review by Gharpure et al., all but three reported at least one modeled scenario as either cost-effective or cost-saving (Figure 3). Influenza vaccine was considered cost-saving or cost-effective for children in 75% (6/8) of studies. It was found to be either cost-saving or cost-effective in all studies with results for pregnant persons (n=4) and those with chronic medical conditions (n=4), as well as 5 of 6 studies (83%) with results for older adults. All three studies that focused on healthcare workers found influenza vaccine to be cost saving. Of note, there were no studies from low- or lower-middle income countries with results for persons with chronic medical conditions or congregate living settings.

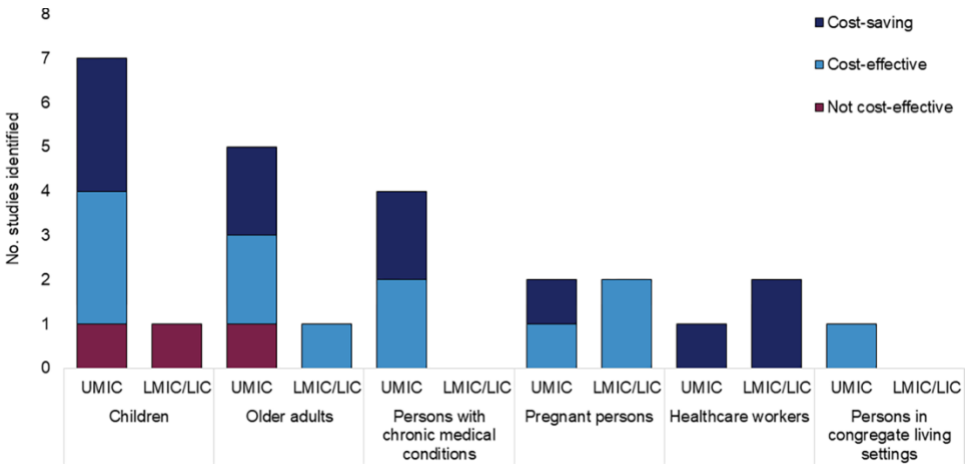

Figure 3. Cost-effectiveness results of studies evaluating Influenza vaccination, by Strategic Advisory Committee of Experts on Immunization (SAGE) target group, in low- and middle-income countries.

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9. The clinical effectiveness of one-dose vaccination with an HPV vaccine: A meta-analysis of 902,368 vaccinated women.

Setiawan D, Nurulita N, Khoirunnisa S, Postma M.

PLoS One. 2024 Jan 08;19(1):e0290808.

PubMed ID: 38180991

ABSTRACT

BACKGROUND: The comprehensive effectiveness of the HPV vaccine has been widely acknowledged. However, challenges such as dosing adherence and limited budgets have led to delays in HPV vaccination implementation in many countries. A potential solution to these issues could lie in a one-dose vaccination with an HPV vaccine, as indicated by promising outcomes in multiple studies.

METHODS: In this systematic review and meta-analysis, we examine the comparative effectiveness of the one-dose vaccination with an HPV vaccine against two- and three-dose regimens. Our investigation focuses on clinical efficacy, encompassing the prevention of HPV16, HPV18, and hrHPV infections, HSIL or ASC-H incidence, and CIN2/3 incidence.

RESULTS: Our analysis suggests that a single-dose HPV vaccine may offer effectiveness on par with two- or three-dose schedules. This conclusion is drawn from its capacity to confer immunogenic protection for at least 8 years of follow-up, coupled with its ability to mitigate infections and pre-cancerous occurrences.

CONCLUSION: While our findings underscore the potential of the one-dose vaccination with an HPV vaccine, further research and prolonged study durations are necessary to establish robust evidence supporting this recommendation. As such, continued investigation will be critical for informing vaccination strategies.

WEB: 10.1371/journal.pone.0290808

IMPACT FACTOR: 3.7

CITED HALF-LIFE: 7.3

START COMMENTARY

Fourteen of the 23 studies included in this systematic review and meta-analysis report that one dose of HPV vaccine provided similar vaccine effectiveness to two or three doses of the vaccine. Three studies conclude that one dose of HPV vaccine did not significantly reduce the risk of incident pre-cancer or HPV infection. Two studies conclude that one-dose of HPV vaccine reduced incidence of pre-cancers but did not provide equal protection to two or three doses of HPV vaccine. Meta-

analysis results from this study indicate that one dose of HPV vaccine is comparable with multiple doses in preventing pre-cancer for at least 8 years, though one dose is not as effective in preventing infection with high risk HPV types as multiple doses of HPV vaccine.

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10. The urban-poor vaccination: Challenges and strategies in low-and-middle income countries.

Zimba B, Mpinganjira S, Msosa T, Bickton F.

Hum Vaccin Immunother. 2024 Jan 05;20(1):2295977.

PubMed ID: 38166597

ABSTRACT

Vaccination is one of the success stories of public health. The benefit of vaccination goes beyond individual protection to include promoting population well-being, improving cognitive development, and increasing economic productivity. However, the existing inequalities in the access to vaccination undermines its impact. There are significant variations in the coverage of vaccination between and within countries. Despite that urban populations have better access to health services; evidence has shown that the urban poor have the worst health indicators including vaccination uptake. Additionally, there are unique challenges affecting vaccination in urban settings, especially in urban slums. This paper has discussed key challenges some of the proposed interventions that can improve urban vaccination service delivery.

WEB: 10.1080/21645515.2023.2295977

IMPACT FACTOR: 4.8

CITED HALF-LIFE: 3.9

START COMMENTARY

Key challenges to vaccination among low-income urban populations include high levels of mobility in these populations that prevent continuity of care, restrictive working conditions in conjunction with traditional schedules for vaccination sessions that limit the ability to utilize non-urgent healthcare, and widely diverse cultural and religious backgrounds that require many different strategies to encourage vaccine uptake. To overcome these challenges authors suggest working with the community. The authors also suggest partnering with religious and traditional leaders and using community structures that are already in place to effectively plan, deliver, and monitor routine vaccination delivery. In addition, using non-traditional sites such as churches and markets, and providing clinics on weekends or extending clinic hours may increase vaccine uptake.

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11. Vaccine Mandates and Cultural Safety.

Matthews R, Menzel K.

J Bioeth Inq. 2024 Jan 02.

PubMed ID: 38165556

ABSTRACT

The issues and problems of mandatory vaccination policy and roll out in First Nations communities are unique and do not concern the safety and effectiveness of vaccines. These issues are also independent of more specific arguments of mandatory vaccination of healthcare workers as a condition of employment. As important as these issues are, they do not consider the complex politics of ongoing settler colonialism and First Nations community relations. In this paper, we also set aside the very real problems of disinformation, hesitancy, scientific and health illiteracy, and other concerns that drive vaccine hesitancy and refusal. These affect all communities, including First Nations communities. We, instead describe the dominant arguments in favour of mandatory vaccination and critique them in terms of the disputed legitimacy of Settler-Colonial decision-making as it impacts First Nations communities. We contend cultural responsiveness and safety-not state compulsion-must remain the first principles of any engagement-including vaccination-with First Nations Peoples, families, and communities.

WEB: 10.1007/s11673-023-10319-7

IMPACT FACTOR: 2.4

CITED HALF-LIFE: 4.5

START COMMENTARY

Matthews and Menzel thoughtfully explain the impact of mandatory vaccination policy in First Nations communities in the context of systemic violence, racism, and colonialism. They conclude that it is not justifiable to impose mandatory vaccination on First Nations People and communities in the name of public good as the “public good” argument has been invoked throughout colonial history to justify and excuse acts of state exploitation and violence. The authors state that successful vaccination programs for marginalized and oppressed populations are dependent on cultural safety, cultural humility, and cultural responsiveness.

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12. Determinants of immunization in polio super high-risk union councils of Pakistan.

Khan A, Hussain I, Rhoda D, Umer M, Ansari U, Ahmed I, et al.

Vaccine. 2023 Dec 24.
PubMed ID: 38143197

ABSTRACT

BACKGROUND: The current polio epidemiology in Pakistan poses a unique challenge for global eradication as the country is affected by ongoing endemic poliovirus transmission. Across the country, 40 union councils (UCs) which serve as core reservoirs for poliovirus with continuous incidences of polio cases are categorized as super-high-risk union councils (SHRUCs).

METHODOLOGY: A cross-sectional survey was conducted in 39 SHRUCs using a two-stage stratified cluster sampling technique. 6,976 children aged 12-23 months were covered. A structured questionnaire was used for data collection. Data were analyzed using STATA version 17.

RESULTS: Based on both vaccination records and recall, 48.3% of children were fully-, 35.4 % were partially-, and 16.3% were non-vaccinated in the SHRUC districts. A child is considered fully vaccinated when h/she completed vaccination for BCG, OPV0, OPV 1-3, Penta 1-3, PCV 1-3, IPV, and MCV1. Vaccination cards were seen for over half of the children in the SHRUC districts of Khyber Pakhtunkhwa (KP) and the majority of the SHRUC districts in Sindh, except for the SHRUC district of Malir the districts of Balochistan. Results for polio vacancies show that 60.9% of children from the SHRUC districts were vaccinated with at least three doses of OPV and one dose of IPV, while 20.4% were vaccinated with any OPV doses or IPV and 18.7% of children did not receive any polio vaccines. The dropout rate between vaccine visits was higher than the WHO-recommended cutoff point of 10% for all vaccine doses in the SHRUC districts. The likelihood of being fully vaccinated was higher among the children of educated parents. Full vaccination was found significant among the children of any SHRUC districts compared to district Killa Abdullah.

CONCLUSION: Context-specific strategies with more focus on community engagement and targeted mobilization, along with robust monitoring mechanisms, would help address the underlying challenges of under-immunization in the SHRUCs.

WEB: 10.1016/j.vaccine.2023.12.056
IMPACT FACTOR: 5.5
CITED HALF-LIFE: 7.2

START COMMENTARY

In this study by Khan et al., the proportion of children under 2 years of age who had received at least three doses of oral polio vaccine (OPV) and one dose of inactivated polio vaccine (IPV) was below 60% in all but one of the 39 super-high-risk union councils (SHRUCs) within eight Pakistan districts. The dropout rate between the initial OPV dose and the third OPV dose ranged from 17.4% in Peshawar to 31.6% in Pishin. Reasons given for missing vaccinations were misinformation, lack of faith in vaccine efficacy, concerns about side effects, difficulty accessing vaccination sites, and lack of time.

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13. Knowledge and attitudes of community pharmacists on vaccination, barriers and willingness to implement community pharmacy-based vaccination services in Ethiopia.

Tadele S, Demissie B, Tamiru M, Tadesse T.

Hum Vaccin Immunother. 2023 Dec 20;19(3):2291243.

PubMed ID: 38111325

ABSTRACT

This study aimed to evaluate the knowledge and attitudes of community pharmacists (CPs) on vaccination and assess the barriers and willingness to implement community pharmacy-based vaccination services (CPBVS) in Ethiopia. An online cross-sectional study was conducted on 423 CPs in Ethiopia, and questionnaires were distributed to CPs through the Ethiopian Pharmaceutical Association telegram group and e-mail invitations. Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 27. Most CPs (92%) had good knowledge of vaccination, and 43.5% strongly agreed that the population's immunization rates would rise if CPs were authorized to provide vaccinations. The overall mean attitude score (±SD) toward vaccination was 35.95 (±4.11) out of a total score of 45, with 187 (44.2%) scoring below the mean. The most common barriers were lack of authorization (94.1%), costs and time associated with professional development and training (71.4%), time requirements for professional development (70%), and insufficient staff or resources for implementation (70%). Two hundred thirty CPs (54.4%) expressed a willingness to implement CPBVS. Educational qualifications were significantly associated with knowledge of CPs regarding vaccination. Those with inadequate knowledge had about 2.5 times (AOR = 2.51, 95% CI: 1.19, 5.31, p = .016) a poorer attitude toward vaccination services compared with those with adequate knowledge. Those study participants who had a good attitude toward vaccination services were nearly seven (AOR = 6.80, 95% CI: 4.36-10.59, p = .0001) times more willing to provide CPBVS when compared with their counterparts. Implementing CPBVS in Ethiopia requires overcoming barriers and providing professional development opportunities.

WEB: 10.1080/21645515.2023.2291243

IMPACT FACTOR: 4.8

CITED HALF-LIFE: 3.9

START COMMENTARY

Community pharmacists in Ethiopia reported that they did not receive adequate training in vaccination in their pharmacy studies. Respondents suggested the need for a formal training program and certification process for pharmacists who would be willing to provide vaccination services. While this study provides important insight, it is important to note that 71% of respondents worked in Addis Ababa, which limits generalizability to other areas in Ethiopia. In addition, the survey

link was distributed through various social media platforms and e-mail, and no data on response rate is available so response bias could not be assessed.

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14. Protecting the healthcare workers in low- and lower-middle-income countries through vaccination: barriers, leverages, and next steps.

Kroflin K, Gonzalez Utrilla M, Moore M, Lomazzi M.

Glob Health Action. 2023 Jul 28;16(1):2239031.

PubMed ID: 37496447

ABSTRACT

Healthcare workers play a critical role in providing medical care to individuals and communities. Due to the nature of their work, compared to the general public, healthcare workers are at a higher risk of exposure to infectious diseases, including vaccine-preventable ones. The routine vaccination of healthcare workers in low- and lower-middle-income countries is a critical issue. Vaccination not only protects healthcare workers from contracting infectious diseases but also prevents the spread of diseases to the patients, reduces healthcare costs, increases healthcare workers' morale and productivity, and demonstrates a commitment to health and safety. However, the implementation of policies for routine vaccination of healthcare workers in low- and lower-middle-income countries faces several challenges, including lack of funds, lack of evidence-based data, vaccination hesitancy through misguided beliefs, and low literacy among healthcare workers. In this article, we discuss the need for a policy for routine vaccination of healthcare workers in low- and lower-middle-income countries. We also analyse the barriers and recommendations for policy implementation and the role of partnerships. Additionally, we highlight the main points of the World Federation of Public Health Associations' policy statement 'Protecting the Healthcare Workforce in Low- and Middle-Income Countries through Vaccination' which has the potential to drive policy-makers and healthcare organisations worldwide into prioritising routine vaccination of healthcare workers in low- and lower-middle-income countries.

WEB: 10.1080/16549716.2023.2239031

IMPACT FACTOR: 2.6

CITED HALF-LIFE: 6.6

START COMMENTARY

Given the importance of health care workers in providing care to communities, Kroflin et al. call for governments to create a vaccination program with guidelines that specifically prioritize healthcare workers (HCWs). They advocate for access to free vaccinations for healthcare professionals as it is currently common for HCWs to pay for their own vaccines in low-income countries (LICs) and lower-middle-income countries (LMICs). The authors note the lack of research focusing on vaccination for HCWs in LICs and LMICs.

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15. Economic and cost-effectiveness aspects of vaccines in combating antibiotic resistance.

Yemeke T, Chen H, Ozawa S.

Hum Vaccin Immunother. 2023 May 31;19(1):2215149.

PubMed ID: 37248971

ABSTRACT

Antimicrobial resistance (AMR) is a global public health threat causing substantial morbidity and mortality as well as significant economic costs. Vaccines can contribute to combating antimicrobial resistance by reducing the incidence of resistant disease cases and lowering overall antibiotic use. Greater utilization and investments in vaccines as a tool for combating AMR might be hampered by limited economic evidence demonstrating the AMR-related value of vaccines. We reviewed the existing literature to assess the state of evidence. We found two modeling studies that provided estimates of AMR-related costs averted by pneumococcal vaccination and a few cost-effectiveness studies that exclusively focused on serotype replacement effects on overall vaccine cost-effectiveness. We did not find any cost-effectiveness studies that directly examined the cost-effectiveness of vaccines in slowing the development of AMR. Further evidence on the cost-effectiveness and economic value of vaccines in controlling AMR can help inform resource allocation decisions and guide development priorities.

WEB: 10.1080/21645515.2023.2215149

IMPACT FACTOR: 4.8

CITED HALF-LIFE: 3.9

START COMMENTARY

Yemeke et al. suggest that understanding the value of vaccines in averting development of antimicrobial resistance (AMR) may combat growing vaccine complacency that develops as vaccine-preventable disease prevalence decreases. As all identified articles focused on pneumococcal vaccine, their review highlights a notable gap in research. They suggest studies of cost-effectiveness of existing vaccines for other pathogens such as Haemophilus influenzae type b (Hib) or typhoid fever that have been classified as priority pathogens for AMR.

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Additional Articles of Interest

1 Influence of the COVID-19 pandemic on caregiver beliefs and experiences of routine childhood immunisation in Indonesia. {Full Article}
2 Trade-offs of different poliovirus vaccine options for outbreak response in the United States and other countries that only use inactivated poliovirus vaccine (IPV) in routine immunization. {Full Article}
3 A comprehensive narrative review of challenges and facilitators in the implementation of various HPV vaccination program worldwide. {Full Article}
4 Trends in childhood vaccination in Pakistan and associated factors; 2006-2018. {Full Article}
5 The 2020 immunization programme landscape: Piloting an assessment metric to evaluate the maturity of national immunization programmes across the life course. {Full Article}
6 Piloting delivery of PfSPZ vaccines for malaria through a cryogenic vaccine cold chain to travel and military medicine clinics. {Full Article}
7 Conflicting and complementary notions of responsibility in caregiver's and health care workers' vaccination narratives in the Philippines. {Full Article}
8 Immunisation coverage and factors associated with incomplete immunisation in children under two during the COVID-19 pandemic in Sierra Leone. {Full Article}
9 Caregivers' perceptions on routine childhood vaccination: A qualitative study on vaccine hesitancy in a South Brazil state capital. {Full Article}
10 Routine pediatric vaccinations during the COVID-19 pandemic: A review of the global impact. {Full Article}
11 Pentavalent and poliomyelitis vaccines: a review of the vaccination coverage in Brazilian children in the last 10 years. {Full Article}
12 The association of caregiver attitudes, information sources, and trust with HPV vaccine initiation among adolescents. {Full Article}
13 Investigating the impact of vaccine hesitancy on an emerging infectious disease: a mathematical and numerical analysis. {Full Article}
14 Examining age, period and cohort effects in attitude change to childhood vaccinations in a representative New Zealand survey: a multiyear cohort-sequential growth modelling study. {Full Article}
15 Association Between Influenza Vaccine Uptake and Health Awareness: A Cross-Sectional Questionnaire-Based Study Among Medical Students and Healthcare Workers in Northern Vietnam. {Full Article}
16 Do vaccines increase or decrease susceptibility to diseases other than those they protect against? {Full Article}

17 Pharmacist-led vaccination services in the Middle East. {Full Article}
18 Costs of seasonal influenza vaccine delivery in a pediatric demonstration project for children aged 6-23 months - Nakuru and Mombasa Counties, Kenya, 2019-2021. {Full Article}
19 Impact of the COVID-19 pandemic on the coverage and timeliness of routine childhood vaccinations in the Gambia, 2015-2021. {Full Article}
20 Biodegradable polymeric insulin microneedles - a design and materials perspective review. {Full Article}
21 Decolonizing Global Health: Increasing Capacity of Community Health Worker Programs. {Full Article}
22 Optimal vaccination ages for emerging infectious diseases under limited vaccine supply. {Full Article}
23 Achieving COVID-19 and Routine Immunization Data Systems Integration on the Electronic Management of Immunization Data System in Nigeria. {Full Article}
24 Virus-like particles as powerful vaccination strategy against human viruses. {Full Article}
25 Public perceptions of Ebola vaccines and confidence in health services to treat Ebola, malaria, and tuberculosis: Findings from a cross-sectional household survey in Uganda, 2020. {Full Article}
26 Vaccine inequity: a threat to Africa's recovery from COVID-19. {Full Article}
27 Comparing performance of year-round and campaign-mode influenza vaccination strategies among children aged 6-23 months in Kenya: 2019-2021. {Full Article}
28 Characterizing Attitudes Toward Maternal RSV Vaccines Among Pregnant and Lactating Persons in Kenya: Key Considerations for Demand Generation Efforts for Vaccine Acceptance. {Full Article}
29 Is decision-making based on the internet during pregnancy a predictive factor for vaccine hesitancy in pregnant women during the pandemic? {Full Article}

Appendix

The literature search for the February 2024 Vaccine Delivery Research Digest was conducted on January 19, 2024. We searched English language articles indexed by the US National Library of Medicine and published between December 15, 2023 and January 14, 2024. The search resulted in 496 items.

SEARCH TERMS

(((((vaccine[tiab] OR vaccines[tiab] OR vaccination[tiab] OR immunization[tiab] OR immunisation[tiab] OR vaccine[mesh] OR immunization[mesh]) 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[LA]) (“2023/15/12”[PDAT] : “2024/14/01”[PDAT]))