VACCINE DELIVERY RESEARCH DIGEST

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

REPORT TO THE GATES FOUNDATION

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

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1 Active vaccine safety surveillance in low- and middle-income countries: Challenges for vaccine manufacturers from emerging countries.

{Abstract & START Commentary} {Full Article}

- Challenges faced by vaccine manufacturers from emerging countries when developing active vaccine surveillance studies were identified through surveys and workshops.

2 The recent landscape of RSV vaccine research.

{Abstract & START Commentary} {Full Article}

- An overview of RSV biology, infection epidemiology and strategies to manage or prevent infection were highlighted.

3 Effect of mass campaigns with full and fractional doses of pneumococcal conjugate vaccine (Pneumosil) on the reduction of nasopharyngeal pneumococcal carriage in Niger: a three-arm, open-label, cluster-randomised trial.

{Abstract & START Commentary} {Full Article}

- The effect of mass campaigns on nasopharyngeal pneumococcal carriage of Pneumosil (PCV10) in children aged 1-9 years in Niger was evaluated.

4 Three in four children age 12-23 months missed opportunities for vaccination in Sub-Saharan African countries: a multilevel mixed effect analysis of demographic health and surveys 2016-2023.

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- Methods used in costing studies that assessed interventions to increase vaccine coverage were investigated.

6 Improving Childhood Immunization Service Delivery in Cameroon: A Synthesis of Caregiver Experiences and Recommendations.

{Abstract & START Commentary} {Full Article}

- Immunization experiences of children's caregivers in Cameroon were assessed and potential barriers for timely and complete immunization were identified.

7 Stakeholder Consultation Workshop on the Perceived Value of Thermostable Vaccines to Relieve Program Barriers: A Case Study from Côte d'Ivoire.

{Abstract & START Commentary} {Full Article}

- Stakeholder perceptions regarding the value of vaccine thermostability to address barriers to outreach and equity in immunization programs were examined.

8 Rotavirus vaccine coverage, completion, and compliance: A systematic literature review.

{Abstract & START Commentary} {Full Article}

- Global rotavirus coverage, completion, and compliance of in various settings was evaluated, and factors influencing vaccine coverage were identified.

9 Inequalities in ownership and availability of home-based vaccination records in 82 low- and middle-income countries.

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- Levels and inequalities in home-based vaccination record ownership were evaluated in low-income and middle-income countries.

10 The long-term impact of vaccine clinical research on national stakeholders involved: Experience from a low-income Country.

{Abstract & START Commentary} {Full Article}

- The impact of vaccine clinical research on local capacities, infrastructure and healthcare system in Nepal was described.

11 Cost-Effectiveness of Aerial Logistics for Immunization: A Model-Based Evaluation of Centralized Storage and Drone Delivery of Vaccines in Ghana Using Empirical Data.

{Abstract & START Commentary} {Full Article}

- The cost-effectiveness of an aerial logistics intervention to improve immunization coverage in Ghana was assessed.

12 The impact of information and communication technology on immunisation and immunisation programmes in low-income and middle-income countries: a systematic review and meta-analysis.

{Abstract & START Commentary} {Full Article}

- The effectiveness of information and communication technology (ICT) for improving vaccine delivery in low- and middle-income countries was assessed.

13 Using qualitative systems mapping to analyze the linkages between the behavioral and social (BeSD) determinants of routine childhood immunization in LMICs.

{Abstract & START Commentary} {Full Article}

- The relationships between the Behavioral and Social Drivers (BeSD) of routine immunization were analyzed using qualitative systems mapping.

14 Gathering information on maternal immunization readiness in Bangladesh, Ghana, Kenya, Mozambique, and Nepal: Applying a WHO checklist.

{Abstract & START Commentary} {Full Article}

- Usefulness of the World Health Organization's Maternal Immunization and Antenatal Care Situation Analysis (MIACSA) checklist was assessed.

Appendix

Details of Articles

1. Active vaccine safety surveillance in low- and middle-income countries: Challenges for vaccine manufacturers from emerging countries.

de Oliveira P, Hartmann K, Bhamare C, Lucchesi M.

Vaccine. 2025 Jan 15;48:126727.

PubMed ID: 39813974

ABSTRACT

Developing Countries Vaccine Manufacturers Network (DCVMN) is an alliance of vaccine developers, manufacturers, and marketing authorization holders (MAHs) from low- and middle-income countries (LMICs) that plays a vital role in ensuring equitable, inclusive, accountable, and timely access to affordable, high-quality vaccines in these countries. Besides research and development, this network promotes manufacturing and global supply chains for effective strengthening of regulatory and pharmacovigilance activities. Traditionally, vaccine safety surveillance systems in LMICs rely on spontaneous reporting. However, especially in resource-limited settings, robust passive surveillance is lacking, and active vaccine safety surveillance (AVSS) can complement passive surveillance by actively collecting adverse events at sentinel sites or via formally designed observational (non-interventional) studies. The rapid introduction of novel vaccines during the COVID-19 pandemic with rather limited safety information at deployment accelerated the need for comprehensive AVSS in LMICs to detect potential safety concerns that may not have been identified in pre-licensure trials. In this context, national regulatory agencies (NRAs) and the World Health Organization (WHO) prequalification team requested risk management plans (RMPs) in line with Pharmacovigilance Planning guideline. The submitted RMPs contained the companies' commitments to pharmacovigilance activities encompassing both post-approval routine surveillance (passive) and additional active surveillance activities. These AVSS activities were either committed voluntarily by the manufacturers/MAHs or imposed by the NRA/WHO prequalification in case of important identified or potential risks, or important missing information. Unlike passive surveillance, AVSS relies on various epidemiological methodologies that require resources and expertise. DCVMN initiated a "learn-by-doing" project to support manufacturers/MAHs in performing AVSS. This project focused on improving the understanding of AVSS and its tools, investigated the support needs, opportunities, challenges, and barriers to performing AVSS activities in LMICs, and proposed solutions that could be used to mitigate the main challenges in performing AVSS activities in these countries.

WEB: 10.1016/j.vaccine.2025.126727

IMPACT FACTOR: 4.5

CITED HALF-LIFE: 7.9

START COMMENTARY

94% of companies in the Developing Countries Vaccine Manufacturers Network (DCVMN) who responded to the survey indicated that they needed support in choosing which safety risks to evaluate. More than 80% indicated they needed support determining optimal study design methodology or choosing the appropriate study setting/data sources (Table 4). Overall, 75% reported needing support to develop an appropriate research question and more than half reported needing support for active vaccine safety surveillance (AVSS) studies. Despite expressing concerns about their ability to conduct active vaccine safety surveillance studies, 7 of the 16 companies were already performing AVSS.

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2. The recent landscape of RSV vaccine research.

Kelleher K, Subramaniam N, Drysdale S.

Ther Adv Vaccines Immunother. 2025 Jan 14;13:25151355241310601.
PubMed ID: 39802673

ABSTRACT

Respiratory syncytial virus (RSV) causes a significant burden of acute respiratory illness across all ages, particularly for infants and older adults. Infants, especially those born prematurely or with underlying health conditions, face a high risk of severe RSV-related lower respiratory tract infections (LRTIs). Globally, RSV contributes to millions of LRTI cases annually, with a disproportionate burden in low- and middle-income countries (LMICs). The RSV virion outer capsule contains glycoproteins G and F which are essential for viral entry into respiratory epithelial cells and represent key targets for therapeutics development. The F-glycoprotein has several highly conserved antigenic sites that have proven useful targets for the development of monoclonal antibodies (mAbs) against RSV. Historically, prevention in infants was limited to the mAb palivizumab, which, despite its efficacy, was costly and inaccessible in many regions. Recent advancements include nirsevimab, a long-acting mAb that has shown substantial efficacy in reducing medically attended RSV-related disease in infants, in phase III clinical trials, early regional and national real-world data. In addition, three new vaccines have been approved: two protein subunit vaccines and a messenger RNA vaccine. The vaccines are all licenced for use in older adults, with one also approved as a maternal vaccine. Promising candidates in development include the mAb clesrovimab, which has an extended half-life and high levels in the nasal epithelial lining and high safety and efficacy profiles in late-stage trials. There are also a wide range of vaccine candidates currently in late-stage clinical trials. These developments signify a major advancement in RSV prevention strategies, offering improved protection for high-risk populations. With the ongoing rollout of the recently licenced vaccines and mAbs internationally, the landscape of RSV care is rapidly changing. We also must ensure these advances reach those in LMICs who need these therapies most.

WEB: 10.1177/25151355241310601
IMPACT FACTOR: N/A
CITED HALF-LIFE: N/A

START COMMENTARY

After summarizing the biology and epidemiology of respiratory syncytial virus (RSV), authors describe currently available prevention measures and vaccines in development. Potential vaccines primarily target pediatric or elderly populations (Table 3). Currently, there is only one vaccine

targeting pregnant individuals, an mRNA vaccine in phase II trials which is already approved for older adults. Nearly half of all vaccines in development are intranasal live-attenuated vaccines, with one manufactured by Sanofi for infants and toddlers in phase III trials.

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3. Effect of mass campaigns with full and fractional doses of pneumococcal conjugate vaccine (Pneumosil) on the reduction of nasopharyngeal pneumococcal carriage in Niger: a three-arm, open-label, cluster-randomised trial.

Coldiron M, Soumana I, Baudin E, Langendorf C, Mamiafo Tchoula C, Brah S, et al.

Lancet Infect Dis. 2025 Jan 11.

PubMed ID: 39798587

ABSTRACT

BACKGROUND: In settings with low pneumococcal conjugate vaccine (PCV) coverage, multi-age cohort mass campaigns could increase population immunity, and fractional dosing could increase affordability. We aimed to evaluate the effect of mass campaigns on nasopharyngeal pneumococcal carriage of Pneumosil (PCV10) in children aged 1-9 years in Niger.

METHODS: In this three-arm, open-label, cluster-randomised trial, 63 clusters of one to four villages in Niger were randomly assigned (3:3:1) using block randomisation to receive campaigns consisting of a single full dose of a 10-valent PCV (Pneumosil), a single one-fifth dose of Pneumosil, or no campaign. Independently sampled carriage surveys were done among 2268 households 6 months before and after vaccination, collecting nasopharyngeal swabs from healthy children for culture and serotyping; those with contraindication to nasopharyngeal swabbing were excluded. The primary outcome was nasopharyngeal carriage of vaccine-serotype pneumococcus. We tested whether vaccine-type carriage was reduced in full-dose versus control clusters; and whether fractional doses were non-inferior to full-doses (lower bound 95% CI more than -7·5%), using generalised estimating equations to analyse cluster summaries at baseline and follow-up, controlling for covariates to estimate risk differences and their 95% CIs. The study is registered with ClinicalTrials.gov (NCT05175014) and the Pan-African Clinical Trials Registry (PACTR20211257448484).

FINDINGS: Surveys were done between Dec 22, 2021, and March 18, 2022, and between Dec 12, 2022, and March 9, 2023. The vaccination campaign ran from June 15 to Aug 2, 2022. Participants' characteristics were consistent across surveys and groups. Pre-vaccination, vaccine-type carriage was 15·6% (149 of 955 participants) in the full-dose group, 17·9% (170 of 948) in the fractional-dose group, and 18·8% (60 of 320) in the control group. Post-vaccination, vaccine-type carriage was 4·6% (44 of 967) in the full-dose group, 8·0% (77 of 962) in the fractional-dose group, and 16·5% (53 of 321) in the control group. The primary analysis showed a risk difference of -16·2% (95% CI -28·6 to -3·0) between the full-dose group and control group (p=0·002 for superiority), and -3·8% (-6·1 to -1·6) between the full-dose group and fractional-dose group, meeting the non-inferiority criteria. No adverse events were judged to be related to vaccination.

INTERPRETATION: Multi-age cohort campaigns had a marked effect on vaccine-type carriage and fractional-dose campaigns met non-inferiority criteria. Such campaigns should be considered in low-coverage settings, including humanitarian emergencies, to accelerate population protection.

FUNDING: EDCTP2 programme supported by the EU.

TRANSLATION: For the French translation of the abstract see Supplementary Materials section.

WEB: 10.1016/S1473-3099(24)00719-9
IMPACT FACTOR: 36.4
CITED HALF-LIFE: 4.4

START COMMENTARY

Carriage prevalence at baseline and 6 months post-vaccination for serotypes included in the Pneumosil vaccine are found in Supplemental Figure 2. In the group which received a full dose of Pneumosil, prevalence was lower for all vaccine serotypes post-vaccination. In the group which received a fractional dose, prevalence was lower post-vaccination for all serotypes found in the pre-vaccine survey, but a low prevalence of 6A/6B was found post-vaccination when no 6A/6B serotype carriage had been detected prior to vaccination. Prevalence of pneumococcal carriage pre- and post-vaccination by age are presented in Table 3.

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4. Three in four children age 12-23 months missed opportunities for vaccination in Sub-Saharan African countries: a multilevel mixed effect analysis of demographic health and surveys 2016-2023.

Jejaw M, Tafere T, Tiruneh M, Hagos A, Teshale G, Tilahun M, et al.

BMC Public Health. 2025 Jan 08;25(1):62.

PubMed ID: 39773467

ABSTRACT

BACKGROUND: Despite vaccination being the most cost-effective means to prevent disease and its adverse consequences, missing opportunities for vaccination remains a critical public health challenge. Many SSA countries still couldn't reach the target endorsed by the Global Vaccine Action Plan. Identifying contributing factors helps policymakers and planners to design potential interventions to avert missing opportunities for vaccination. Thus, this study aimed to assess the prevalence and factors associated with missed opportunities for vaccination.

METHODS: This study used nationally representative demographic and health survey data collected from 2016 to 2023 among 44,149 children aged 12 to 23 months in SSA countries. Stata version 14 statistical package was used. Bi-variable and multivariable logistic regression analyses were done to ascertain factors associated with a missed opportunity for vaccination at a p-value less than 0.05 with adjusted odds ratios (AORs) with a 95% confidence interval.

RESULT: The overall prevalence of missed opportunity for vaccination (MOV) was 75.46% (95% CI: 75.04, 75.87%). The highest prevalence of MOV occurred in Gambia (93.85%), whereas the lowest was reported in Mauritania (41.59%). Children age: 12 to 15 months (AOR = 1.3, 95%CI:1.22, 1.36) and 16 to 18 months (AOR = 1.1, 95%CI: 1.04, 1.16), maternal age 35 to 49 (AOR = 1.1, 95%CI: 1.02, 1.17), married mother (AOR = 0.85, 95%CI: 0.80, 0.90), education: didn't attend formal education (AOR = 1.13, 95%CI: 1.10, 1.22) and completed primary education (AOR = 1.1, 95%CI: 1.02, 1.16), ANC: never attend (AOR = 0.76, 95%CI:0.71, 0.82) and having four and above ANC visit (AOR = 0.9, 95%CI:0.85, 0.96), health insurance users (AOR = 1.4, 95%CI: 1.25, 1.49), male headed household (AOR = 1.35, 95%CI: 1.27, 1.43), religion: Muslim (AOR = 1.5, 95%CI:1.38, 1.57), Animist (AOR = 1.5, 95%CI:1.31, 1.64), and Catholic followers (AOR = 1.2, 95%CI:1.13, 1.31) and Protestant (AOR = 0.88, 95%CI:0.82, 0.95), home delivery (AOR = 0.79, 95%CI:0.75, 0.84), rural dwellers (AOR = 1.1, 95%CI: 1.04, 1.17), ever had media exposure (AOR = 0.91, 95%CI:0.86, 0.97), big problem to reach health facility (AOR = 1.1, 95%CI: 1.02, 1.14), high community wealth status (AOR = 0.91, 95%CI: 0.83, 0.99), low community level educational status (AOR = 1.2, 95%CI: 1.14, 1.38) and human development index: middle (AOR = 1.4, 95%CI: 1.21, 1.59) were factors associated with MOV.

CONCLUSION AND RECOMMENDATION: The overall pooled prevalence of missed opportunities for vaccination in Sub-Saharan remains high. Children's age, maternal age, marital status, education, antenatal care visit, health insurance utilization, sex of household head, religion, place of delivery, residence, media exposure, distance to reach health facility, community wealth status, community educational status, and human development index of the countries were significantly associated with MOV. Policymakers have to encourage technology to promote multimedia exposure to increase community awareness about vaccination, encourage engagement of male partner, and religious leaders in child health. Additionally, potential stakeholders should give great emphasis for accessibility of education and health service for rural and remote areas, and poor segments of population through fostering community health workers and outreach programs, and financial support to increase vaccine coverage by averting missed opportunities for vaccinations. Qualitative research is recommended to explore the facilitators and barriers of missed opportunities for vaccinations among children.

WEB: 10.1186/s12889-024-21273-3
IMPACT FACTOR: 3.5
CITED HALF-LIFE: 5.4

START COMMENTARY

Missed opportunities for vaccination was defined as an eligible child not receiving a vaccine during contact with a health facility despite being eligible to receive a vaccine at that visit. Routine vaccine services were impacted by the COVID-19 pandemic response which may have led to more missed opportunities for vaccinations in 2020 and 2021, potentially skewing overall results as the analysis included data from 2016-2023. Country-level information for survey year, number of children, and percentage of children with missed opportunities for vaccination are found in Table 1.

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5. Scoping Review of Current Costing Literature on Interventions to Reach Zero-Dose Children in Low- and Middle-Income Countries.

Levin A, Fisseha T, Reynolds H, Corrêa G, Mengistu T, Vollmer N.

Vaccines (Basel). 2025 Jan 30;12(12).

PubMed ID: 39772091

ABSTRACT

Introduction: A limited number of studies focus on estimating the costs of interventions to increase childhood immunization coverage in low- and middle-income countries (LMICs). Existing reviews often compare estimated costs but lack information on the methods used. The objective of this review is to summarize the methods used in costing studies that assessed interventions to reach zero-dose (ZD) children. **Methods:** We conducted a review of existing studies that estimate the costs of increasing childhood vaccination and reducing prevalence of ZD children in LMICs. We conducted searches of PubMed using terms including “immunization”, “cost”, “coverage increase”, “zero-dose”, and “LMIC”, and further extended our search to bibliographies and gray literature from organizations working to reach ZD children. We only included articles that estimated the cost of interventions to increase childhood vaccination and/or reach ZD children and not articles about introducing new vaccines or other age groups. We categorized each article according to their costing methods, cost components, types of costs calculated, and presence of uncertainty analysis. **Results:** Eleven articles met our inclusion criteria. Interventions costs varied from USD 0.08 per additional dose for SMS reminders in Kenya to USD 67 per dose for cash transfers in Nicaragua. Most of the studies were from South Asia: India (4), Pakistan (2), and Bangladesh (1). The rest were from Africa (3) and Latin America (1). Most articles did not include a description of their costing methods. Only three described their methods in detail. **Conclusions:** Few studies have estimated the costs of increasing childhood vaccination coverage and reducing the number of ZD children in LMICs. The wide variation in intervention costs underscores the need for standardized costing methodologies to enhance comparability across studies. Only three studies detailed their costing methods, making comparisons challenging. Establishing research principles for costing ZD interventions could strengthen future evidence for policymaking.

WEB: 10.3390/vaccines12121431

IMPACT FACTOR: 5.2

CITED HALF-LIFE: 2.2

START COMMENTARY

No studies were found that addressed the cost of reaching zero-dose children, so inclusion criteria were expanded to include all studies conducted in low- and middle-income countries that estimated

the cost of interventions to increase childhood vaccination. The most frequent outcome of interest was DTP3 receipt (5 studies). Intervention cost and costing method details for each study are found in Table 2.

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6. Improving Childhood Immunization Service Delivery in Cameroon: A Synthesis of Caregiver Experiences and Recommendations.

Saidu Y, Gu J, Michael Ngenge B, Nchinjoh S, Adidja A, Edwidge N, et al.

Vaccines (Basel). 2025 Jan 15;12(12).
PubMed ID: 39772090

ABSTRACT

BACKGROUND/OBJECTIVES: A “people-centered” approach is one of the core principles of the Immunization Agenda (IA) 2030 and emphasizes the need for services to be organized around the needs and expectations of individuals and the community. A better understanding of the immunization experience from the client’s perspective is key to guiding the design of policies and interventions aimed at improving immunization delivery and coverage. This study provides a synthesis of the immunization experiences of children’s caregivers in Cameroon, highlighting potential barriers for timely and complete immunization.

METHODS: A descriptive cross-sectional study was conducted, targeting caregivers of children brought to selected health facilities for immunization in all ten regions of Cameroon. Using structured questionnaires, data were collected from caregivers and analyzed using STATA version 13.

RESULTS: In total, 1230 caregivers were interviewed in 265 health facilities. The median age of participants was 27 years and the median number of children per caregiver was two children. Most (87%) of the study participants reported to be satisfied with immunization service delivery. The median waiting time for vaccination was 1 h 48 min, with regional median waiting times ranging from 18 min in the South region to 4 h 6 min in the North region. About a quarter (24%) of surveyed participants reported to have presented to a health facility for immunization services and were turned away without achieving the purpose for which they came at least once. About half (48%) of the caregivers had never heard about planned vaccination activities in their communities.

CONCLUSION: While most caregivers appeared to be satisfied with immunization service delivery in Cameroon, our study highlights some notable caregiver concerns (long waiting times, unproductive immunization visits and inadequate information about outreach activities) which, if addressed, may go a long way to enhance the immunization experience of caregivers in Cameroon, build trust in immunization services and thus improve vaccination uptake.

WEB: 10.3390/vaccines12121430
IMPACT FACTOR: 5.2
CITED HALF-LIFE: 2.2

START COMMENTARY

Areas with fewer health facilities reported longer wait times, with a median of three or more hours in the five regions with the lowest health facility per capita ratios. Caregivers suggested increasing the number of health workers and upgrading the size and vaccine storage capacity of facilities to decrease wait times. Easily accessible information about specific days when vaccines would be available and better communication with caregivers during vaccine visits were identified as interventions to increase caregiver satisfaction.

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7. Stakeholder Consultation Workshop on the Perceived Value of Thermostable Vaccines to Relieve Program Barriers: A Case Study from Côte d'Ivoire.

Kahn A, Spasenoska D, Ekra K, Coulibaly S, Yao K, Kouadio S, et al.

Vaccines (Basel). 2025 Jan 08;12(12).
PubMed ID: 39772076

ABSTRACT

BACKGROUND: Persistent inequities in access to vaccinations pose challenges for immunization programs worldwide. Innovations facilitating vaccine delivery, such as leveraging vaccine thermostability through a Controlled Temperature Chain (CTC), have emerged as a potential solution to increase coverage in low- and middle-income countries (LMICs) countries such as Côte d'Ivoire, reducing dependence on the cold chain and improving vaccine delivery efficiency. However, the added value of thermostable vaccines and their integration into national immunization programs is under-recognized by stakeholders. This consultation aimed to convene key immunization stakeholders in Côte d'Ivoire in order to examine their perceptions regarding the value of vaccine thermostability to address barriers to outreach and equity in immunization programs.

METHODS: A novel workshop model involving structured group discussions was used to document the viewpoints of national stakeholders representing different areas of the immunization program. They prioritized barriers undermining coverage and equity in their country and explored the potential impact of CTC on the immunization program in the context of thermostable vaccines. The vaccines discussed were for Hepatitis B, Human Papillomavirus, and Meningitis.

RESULTS: The workshop outcomes highlighted the context and vaccine-specific variation of the importance of certain barriers, emphasizing the need for tailored strategies. The barriers considered most likely to be alleviated by vaccine thermostability were under the categories of human resource management, vaccine supply and logistics, and services delivery. The least relevant category of barriers concerned demand generation.

CONCLUSIONS: The consultation provided valuable insights into stakeholder perspectives, priorities, and conditions for the effective integration of thermostable vaccines, informing future product development and policy decisions to optimize vaccine delivery and address immunization challenges in LMICs.

WEB: 10.3390/vaccines12121414
IMPACT FACTOR: 5.2
CITED HALF-LIFE: 2.2

START COMMENTARY

Controlled Temperature Chain (CTC) is a vaccine management strategy allowing some vaccines to be briefly kept at temperatures above standard cold chain under carefully monitored and controlled conditions after demonstrating stability through a pre-qualification process. This would allow the vaccine to be stored at ambient temperatures of <40°C in the days prior to administration. To better understand the impact of CTC on vaccine programs in Côte d'Ivoire, a workshop was held with 32 stakeholders chosen for their expertise in one of the seven thematic areas of the Expanded Programme on Immunization (EPI): project management and financing; human resource management; vaccine supply, quality and logistics; service delivery; immunization coverage and adverse events monitoring; disease surveillance; and demand generation.

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8. Rotavirus vaccine coverage, completion, and compliance: A systematic literature review.

Tahrat H, Munir A, Marchetti F.

Hum Vaccin Immunother. 2025 Jan 03;21(1):2442780.

PubMed ID: 39751000

ABSTRACT

Rotavirus, a leading cause of severe acute gastroenteritis in children, is largely preventable through immunization with two internationally licensed oral rotavirus vaccines (RVVs) included in national programs across over 100 countries. These RVVs are administered in either two (Rotarix™; 2D-RV) or three (RotaTeq®; 3D-RV) doses. We aimed to assess the global coverage, completion, and compliance of 2D-RV and 3D-RV in various settings, and to identify factors influencing vaccine coverage. We conducted a systematic review of PubMed and Embase for articles published between 2006 and 2021. We included 74 publications across 31 countries. RVV coverage rates and the factors associated with coverage varied widely among countries based on income level, RVV used, and the year of vaccination. Due to market bias and insufficient studies, valid RVVs coverage comparisons couldn't be made. However, 2D-RV had better completion/compliance rates than 3D-RV in Italy, Mexico, and the US.

WEB: 10.1080/21645515.2024.2442780

IMPACT FACTOR: 4.1

CITED HALF-LIFE: 4.1

START COMMENTARY

Full coverage was defined as children vaccinated with the last dose of either the 2-dose or 3-dose rotavirus vaccine (RVV) among all children eligible for vaccination, completion was defined as the proportion of children receiving all required doses out of the total number of children receiving at least one dose, and compliance was defined as the administration of all doses according to the established vaccine schedule among those who had received all vaccines. In studies conducted in low-income countries, factors associated with rotavirus vaccine (RVV) coverage, completion, or compliance included mother's education level, distance to the vaccination site, and perinatal care received. In studies conducted in middle-income countries, income and education were most frequently associated with RVV coverage.

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9. Inequalities in ownership and availability of home-based vaccination records in 82 low- and middle-income countries.

Cata-Preta B, Santos T, Wendt A, Arroyave L, Mengistu T, Hogan D, et al.

BMJ Glob Health. 2024 Dec 28;9(12).

PubMed ID: 39732475

ABSTRACT

INTRODUCTION: Home-based records (HBRs) are widely used for recording health information including child immunisations. We studied levels and inequalities in HBR ownership in low-income and middle-income countries (LMICs) using data from national surveys conducted since 2010.

METHODS: We used data from national household surveys (Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS)) from 82 LMICs. 465 060 children aged 6-35 months were classified into four categories: HBR seen by the interviewer; mother/caregiver never had an HBR; mother/caregiver had an HBR that was lost; and reportedly have an HBR that was not seen by the interviewer. Inequalities according to age, sex, household wealth, maternal education, antenatal care and giving birth in an institutional setting were studied, as were associations between HBR ownership and vaccine coverage. Pooled analyses were carried out using country weights based on child populations.

RESULTS: An HBR was seen for 67.8% (95% CI 67.4% to 68.2%) of the children, 9.2% (95% CI 9.0% to 9.4%) no longer had an HBR, 12.8% (95% CI 12.5% to 13.0%) reportedly had an HBR that was not seen and 10.2% (95% CI 9.9% to 10.5%) had never received one. The lowest percentages of HBRs seen were in Kiribati (22.1%), the Democratic Republic of Congo (24.5%), Central African Republic (24.7%), Chad (27.9%) and Mauritania (35.5%). The proportions of HBRs seen declined with age and were inversely associated with household wealth and maternal schooling. Antenatal care and giving birth in an institutional setting were positively associated with ownership. There were no differences between boys and girls. When an HBR was seen, higher immunisation coverage and lower vaccine dropout rates were observed, but the direction of this association remains unclear.

INTERPRETATION: HBR coverage levels were remarkably low in many LMICs, particularly among children from the poorest families and those whose mothers had low schooling. Contact with antenatal and delivery care was associated with higher HBR coverage. Interventions are urgently needed to ensure that all children are issued HBRs, and to promote proper storage of such cards by families.

WEB: 10.1136/bmjgh-2024-016054

IMPACT FACTOR: 7.1

CITED HALF-LIFE: 3.2

START COMMENTARY

More than 95% of children born in health facilities had received a home-based record (HBR) compared with ~75% of those born at home. Children from rural areas were more likely to have received an HBR but also more likely to have lost or misplaced it when compared to children from urban areas. Because vaccine receipt information for children without HBRs relied on caregiver recall, estimates of immunization rates for the “HBR not seen”, “HBR lost”, and “HBR never received” groups should be interpreted with caution.

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10. The long-term impact of vaccine clinical research on national stakeholders involved: Experience from a low-income Country.

Haque Pial R, Rai G, Shrestha R, Das S, Chapagain R, Chaudhary S, et al.

Hum Vaccin Immunother. 2024 Dec 26;21(1):2441425.

PubMed ID: 39723535

ABSTRACT

Clinical trials are the most rigorous scientific and regulated method to investigate the safety and efficacy of vaccines or drugs in pre-licensure stage. Clinical trial design and implementation are complex, time-consuming and involves close engagement with country's regulatory authority, clinical trial sites, investigators, and the healthcare system. Over the past few decades, a significant number of clinical trials have been conducted in low- and middle-income countries (LMICs), particularly in resource-limited settings. Conducting clinical research in LMICs leads to significant capacity building in terms of training and infrastructure, which adds to the improvement in overall public health benefits of the country. Here, we describe the advances in local capacities, infrastructure and healthcare system following the implementation of clinical trials with the contribution of the International Vaccine Institute at different trial sites in Nepal from 2017 to 2024 in urban, semi-urban, and rural settings. We highlight how, in addition to achieving the study-specific objectives, this experience has built local scientific, ethical, and regulatory oversight capabilities and physical infrastructure. Such positive experiences will provide additional rationale for health research organizations, pharmaceutical companies, and funders to engage in the implementation of further vaccine clinical research with LMICs which bear a heavy burden of infectious diseases.

WEB: 10.1080/21645515.2024.2441425

IMPACT FACTOR: 4.1

CITED HALF-LIFE: 4.1

START COMMENTARY

Authors provide insight into how the International Vaccine Institute (IVI) built sustainable clinical research infrastructure, skilled workforce, and community goodwill through their clinical trial work in Nepal. IVI involved community and international collaborators throughout the process of designing and implementing clinical trials. Researchers were trained in accordance with global clinical research standards so that their skills would translate to research projects with other international organizations. Authors suggest that the general population was more aware of the importance of clinical research because of IVI's presence in Nepal which improved acceptance of COVID-19 vaccine campaigns.

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11. Cost-Effectiveness of Aerial Logistics for Immunization: A Model-Based Evaluation of Centralized Storage and Drone Delivery of Vaccines in Ghana Using Empirical Data.

Ospina-Fadul M, Kremer P, Stevens S, Haruna F, Okoh-Owusu M, Sarpong G, et al.

Value Health Reg Issues. 2024 Dec 22;46:101066.

PubMed ID: 39709942

ABSTRACT

OBJECTIVES: In mid-2020, the Ghana Health Service introduced Zipline's aerial logistics (centralized storage and delivery by drones) in the Western North Region to enhance health supply chain resilience. This intervention led to improved vaccination coverage in high-utilization districts. This study assessed the cost-effectiveness of aerial logistics as an intervention to improve immunization coverage.

METHODS: An attack rate model, adjusted for vaccination coverage and vaccine efficacy, was used to estimate disease incidence among vaccinated and unvaccinated populations, focusing on 17,022 infants. Incremental cost-effectiveness ratios of US dollar per averted disability-adjusted life-year (DALY) were evaluated from societal and government perspectives, using real-world operations data. Probabilistic sensitivity analysis was performed using Monte Carlo simulations.

RESULTS: In 2021, aerial logistics averted 688 disease cases. Incremental cost-effectiveness ratios were $41 and $58 per averted DALY from the societal and government perspectives, respectively. The intervention was cost-saving when at least 20% of vaccines delivered by aerial logistics replaced those that would have been delivered by ground transportation, with potential government savings of up to $250 per averted DALY. Sensitivity analysis confirmed the robustness of these findings.

CONCLUSIONS: Under conservative assumptions, aerial logistics was a highly cost-effective intervention to increase immunization coverage. The intervention was cost-saving even with low levels of replacement of traditional last mile delivery. These findings support expanding aerial logistics within the national immunization program and have significant implications for other low- and middle-income countries seeking cost-effective health supply chain solutions.

WEB: 10.1016/j.vhri.2024.101066

IMPACT FACTOR: 1.4

CITED HALF-LIFE: 4.3

START COMMENTARY

In 2021, aerial logistics in the Western North Region in Ghana contributed to 14,979 immunizations of BCG, measles and rubella-containing vaccines, pneumococcal conjugate vaccines, and pentavalent vaccines, preventing an estimated 4 deaths due to vaccine-preventable diseases (VPD). Authors suggest that nearly 28,000 cases of VPD and 198 deaths in rural Ghana could have been prevented in 2021 among children under two years of age if aerial logistics been in place to provide vaccines throughout all of Ghana.

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12. The impact of information and communication technology on immunisation and immunisation programmes in low-income and middle-income countries: a systematic review and meta-analysis.

Zarekar M, Al-Shehabi H, Dörner R, Weishaar H, Lennemann T, El Bcheraoui C, et al.

EBioMedicine. 2025 Jan 16;111:105520.

PubMed ID: 39709769

ABSTRACT

BACKGROUND: Low-income and Middle-income Countries (LMIC) are continually working to ensure everyone can access life-saving vaccines. Recognising the considerable impact of Information and Communication Technology (ICT) in healthcare, we performed a systematic review and meta-analysis to summarise ICT effectiveness in improving vaccine delivery in LMICs.

METHODS: A systematic search from January 2010 to August 2023 in MEDLINE, EMBASE, Cochrane Library, BMJ Health & Care Informatics, and grey literature was performed. This search focused on randomised controlled trials (RCTs), non-RCTs, observational, and mixed-methods studies in English, examining ICT's effects on childhood immunisation in LMICs. Risk of bias in RCTs and non-RCTs was assessed using the Joanna Briggs Institute tool, and mixed-methods studies were evaluated with the Mixed Methods Appraisal Tool. A meta-analysis summarised ICT's impact on third pentavalent dose coverage and full immunisation by age one. The study is registered with PROSPERO (CRD42023446062).

FINDINGS: Of 6535 screened studies, 27 involving 354,979 children were included. All apart from one study demonstrated a positive impact on immunisation coverage and timeliness, completeness and accuracy of records, number of adverse events reporting, vaccine stockouts, and cold chain expansion. The meta-analysis demonstrated that reminders effectively improved coverage rate of the third dose of the pentavalent vaccine (OR 2.32, 95% CI 1.34-4.03) and the full immunisation at one year of age (OR 2.61, 95% CI 1.2-5.67) with significant degrees of heterogeneity, respectively I2 82% and I2 89%. Main concerns for bias in RCTs included unblinded outcome assessors and intervention providers. Interpreting quasi-experimental studies was more challenging due to the higher risk of baseline differences between study arms, statistical methods, and dropouts. Mixed-methods studies often lacked clarity in integrating qualitative and quantitative data.

INTERPRETATION: This systematic review confirms the benefits of ICT in immunisation programmes by enhancing various stages of vaccine delivery. Specifically, reminders have been shown to enhance childhood immunisation coverage rates.

FUNDING: Deutsche Gesellschaft für Internationale Zusammenarbeit (German Corporation for International Cooperation, GIZ) as part of the Digital Innovation in Pandemic Control (DIPC)

Initiative, financed by the Bundesministerium für Wirtschaftliche Zusammenarbeit (Federal Ministry for Economic Cooperation and Development, BMZ).

WEB: 10.1016/j.ebiom.2024.105520
IMPACT FACTOR: 9.7
CITED HALF-LIFE: 3.9

START COMMENTARY

Types of Information and Communication Technology (ICT) evaluated in this study varied widely and are summarized in Supplemental File 4. Digital reminders for vaccine appointments (19 studies) were found to improve vaccine uptake and timelines, and to reduce dropout rates. Both studies that assessed adverse events following immunization (AEFI) reporting by caregivers using digital alert reminders found increased reporting rates. Studies evaluating effective vaccine management (EVM) tools found increases in cold chain capacity, reduced stockouts, and improvement in cold storage space utilization.

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13. Using qualitative systems mapping to analyze the linkages between the behavioral and social (BeSD) determinants of routine childhood immunization in LMICs.

Vadrevu L, Parsekar S, Jain M, Taneja G, Menon S.

BMC Public Health. 2024 Dec 19;24(1):3419.

PubMed ID: 39695455

ABSTRACT

BACKGROUND: Designing effective immunization programs requires a strong understanding of how the factors affecting vaccine uptake interplay. In this review, we analyze the relationships between the Behavioral and Social Drivers (BeSD) of routine immunization using qualitative systems mapping (QSM).

METHODS: In this review, we analyzed 92 experimental and quasi-experimental impact evaluations (IEs) from 11 LMICs that were published between 2010 and 2020. Secondary literature on the study context or the intervention was also included. The WHO's behavioral and social determinants (BeSD) framework was used to code the determinants identified in these IEs, and their relationships were mapped using qualitative systems mapping. We computed the in-degree (influenced by other determinants) and out-degree scores (influencing other determinants) to assess the extent of the influence of the BeSD determinants on one another.

RESULTS: The results identified that knowledge regarding immunization, trust in the health system and quality of immunization services, and community engagement by the health workers was influenced by several other determinants and had a high in-degree score. Caregivers perceptions of quality of immunization services, health provider availability, religious leaders, community engagement by health workers, and physical accessibility had a high out-degree score. We also identified two feedback loops between health provider availability and physical accessibility, and trust and perceptions of immunization quality.

CONCLUSIONS: QSM analysis shows that the determinants of immunization uptake were interlinked with each other in complex ways. Our research identified BeSD drivers that affected multiple factors and can be viewed as key leverage points. Programs for improving vaccination uptake need to account for the strong role that caregivers' experience of immunization services and their trust in the health system play in indirectly affecting immunization uptake. There is also a need to acknowledge that fear of vaccination is fear of the opportunity and monetary costs associated with vaccine side-effects. The results from this review can inform discussion and form the basis for context specific research on the factors affecting immunization.

WEB: 10.1186/s12889-024-20850-w

IMPACT FACTOR: 3.5

CITED HALF-LIFE: 5.4

START COMMENTARY

Leveraging existing social and community groups to provide health and immunization information is an effective way to increase awareness and alleviate fears. Caregiver experience with immunizations was found to depend on both health care infrastructure and provider capacity. Qualitative systems mapping-linkages between attitudinal and social barriers and qualitative systems mapping-linkages between practical constraints and service delivery issues can be found in Figures 2 and 3, respectively.

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14. Gathering information on maternal immunization readiness in Bangladesh, Ghana, Kenya, Mozambique, and Nepal: Applying a WHO checklist.

Baral R, Knudson S, Barros I, Cofie P, Dapaah P, Khan S, et al.

Hum Vaccin Immunother. 2024 Dec 17;20(1):2437258.

PubMed ID: 39687966

ABSTRACT

New respiratory syncytial virus (RSV) maternal vaccines have begun roll out in some countries, with efforts in progress to broaden access worldwide and shorten the timeline to access for low- and middle-income countries (LMICs). Prior to new maternal immunization (MI) introductions, countries will need to evaluate their capacity and readiness for successful introduction. The World Health Organization's Maternal Immunization and Antenatal Care Situation Analysis (MIACSA) project (2016-2019) developed a checklist for countries to self-evaluate their capacity to introduce new maternal vaccines. Here, we report on our use of the MIACSA checklist in Bangladesh, Ghana, Kenya, Mozambique, and Nepal to gather country stakeholders' perceptions of MI readiness and provide additional considerations for implementers when using the checklist to optimize its usefulness.

WEB: 10.1080/21645515.2024.2437258

IMPACT FACTOR: 4.1

CITED HALF-LIFE: 4.1

START COMMENTARY

The World Health Organization's Maternal Immunization and Antenatal Care Situation Analysis (MIACSA) checklist assesses a nation's readiness to introduce new maternal immunization through questions focused on national policy and governance; immunization, antenatal care services, and coordination; vaccine delivery; disease surveillance; monitoring and evaluation; vaccine hesitancy; and demand creation. This Gates Foundation funded study was conducted by PATH in countries chosen to represent diverse geography, respiratory syncytial virus (RSV) burden, and immunization and maternal health system capacity. Workshops in each country included representatives from ministries of health, local and regional district health offices, immunization advisory bodies, academic and research organizations, and non-governmental public health organizations. Key findings for individual countries were explored. Common issues across countries included the need to strengthen current maternal immunization coverage, insufficient resources available to administer existing vaccines, and lack of communication strategies in communities to disseminate information about maternal immunization programs.

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Additional Articles of Interest

1 Exploring factors influencing childhood immunization status in East Africa using multilevel ordinal logistic regression analysis. {Full Article}
2 The 30-year evolution of oral cholera vaccines: A case study of a collaborative network alternative innovation model. {Full Article}
3 Delayed completion of pneumococcal conjugate vaccination among children 4-48 months in rural Uganda: a socio-demographic inquiry. {Full Article}
4 Routine childhood rabies pre-exposure prophylaxis can be cost effective in low- and middle-income countries. {Full Article}
5 Regional disparities of full pentavalent vaccine uptake and the determinants in Ethiopia: Mapping and spatial analysis using the EDHS data. {Full Article}
6 Assessing the Feasibility of Drone-Mediated Vaccine Delivery: An Exploratory Study. {Full Article}
7 Individual and community level maternal factors for zero-dose children in Ethiopia using mini-EDHS 2019: a mixed effects model. {Full Article}
8 Knowledge, attitudes, practices, and vaccination coverage of medical students toward hepatitis B virus in North Sudan, 2023. {Full Article}
9 Core-genome guided novel therapeutic targets identification and chimeric vaccine designing against Rickettsia rickettsii. {Full Article}
10 Long-term impact of 10-valent pneumococcal conjugate vaccine among children <5 years, Uganda, 2014-2021. {Full Article}
11 Routine malaria vaccination in Africa: a step toward malaria eradication? {Full Article}
12 Nanocarrier vaccines for respiratory infections. {Full Article}
13 Is economic inequality in maternal and child healthcare decreasing in India? Trends between 2005-2006, 2015-2016 and 2019-2021. {Full Article}
14 The impact of risk compensation adaptive behavior on the final epidemic size. {Full Article}
15 Prevalence and determinants of full vaccination coverage according to the national schedule among children aged 12-35 months in Ghana. {Full Article}
16 System vaccinology analysis of predictors and mechanisms of antibody response durability to multiple vaccines in humans. {Full Article}
17 Factors associated with vaccine default in Southern Ghana based on data from the RTSS malaria vaccine trial in Cape Coast. {Full Article}
18 A systematic review to identify research gaps in studies modeling MenB vaccinations against Neisseria infections. {Full Article}
19 Establishing the African region monitoring vaccine effectiveness (AFRO-MoVE) network for respiratory pathogens. {Full Article}

20 Childhood Vaccinations and Associated Factors in 35 Sub-Saharan African Countries: Secondary Analysis of Demographic and Health Surveys Data from 358 949 Under-5 Children. {Full Article}

21 Geospatial mapping to assess the distribution and determinants of zero dose vaccination status hot spots among children in Ethiopia using EDHS 2019: Spatial and geographical weighted regression. {Full Article}

22 Respiratory Virus Vaccines: Pathways to Recommendations and Enhanced Coverage for At-Risk Populations. {Full Article}

23 Spatial co-distribution of tuberculosis prevalence and low BCG vaccination coverage in Ethiopia. {Full Article}

24 Controlling vaccine kinetics using tannic acid for enhanced humoral immunity. {Full Article}

25 Determinants of vaccination status among Somali children: evidence from a Countrywide cross-sectional survey. {Full Article}

26 What will it take? Perspectives from five low- and middle-income countries on opportunities and challenges of introducing new maternal vaccines. {Full Article}

27 Challenges and strategies for sustainable and resilient immunization systems in sub-Saharan Africa: A comprehensive scoping review. {Full Article}

28 Impact on meningococcal disease of different vaccination strategies with 4CMenB and MenACWY-CRM197 in infants and adolescents in Argentina. {Full Article}

29 Socioeconomic and geographical inequalities in polio immunisation coverage among two-year-olds in Sierra Leone, 2008-2019. {Full Article}

30 Understanding cervical cancer prevention in Africa: a qualitative systematic review of the role of men. {Full Article}

31 Decision-making for childhood vaccination in crisis settings: a survey of practice & barriers. {Full Article}

32 Vaccination strategies to identify and reach zero-dose and under-immunized children in crisis-affected states in Sudan: a qualitative study. {Full Article}

33 Low IgG Seroconversion among Persons Vaccinated against Measles, Republic of Congo. {Full Article}

34 Evaluating hepatitis B screening, prevalence, vaccination coverage, and linkage to care in Abuja, Nigeria: insights from a cross-sectional study. {Full Article}

35 NERVE 2.0: boosting the new enhanced reverse vaccinology environment via artificial intelligence and a user-friendly web interface. {Full Article}

36 Standardized study performance, quality assurance, and quality control in a cluster-randomized trial: the Pneumococcal Vaccine Schedules trial. {Full Article}

37 Global challenges and solutions to achieving and sustaining measles and rubella elimination. {Full Article}

38 Pertactin deficiency of Bordetella pertussis: Insights into epidemiology, and perspectives on surveillance and public health impact. {Full Article}

Appendix

The literature search for the February 2025 Vaccine Delivery Research Digest was conducted on January 17, 2025. We searched English language articles indexed by the US National Library of Medicine and published between December 15, 2024 and January 14, 2025. The search resulted in 592 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 2024/12/15:2025/01/14[Date - Publication]