VACCINE DELIVERY RESEARCH DIGEST

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

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1. Editorial: Current Status of Two Adjuvanted Malaria Vaccines and the World Health Organization (WHO) Strategy to Eradicate Malaria by 2030.

Parums D.

Med Sci Monit. 2023 Jan 03;29:e939357.

PubMed ID: 36587274

ABSTRACT

There is hope that 2023 could bring regulatory approval, licensing, and implementation programs for safe and effective adjuvanted vaccines to prevent malaria. Clinical trials involving the two leading adjuvanted malaria vaccines directed to the Plasmodium falciparum circumsporozoite protein (PfCSP) are ongoing. These vaccines are RTS,S/ASO1 (Mosquirix®) and R21/Matrix-M™ (R21/MM). This year, the World Health Organization (WHO) updated its strategy to eradicate malaria by 2030. The hope is that major advances in global health security from effective malarial vaccines could reduce morbidity and save the lives of millions of people living in malaria-endemic countries to achieve the goals recommended by the WHO. This Editorial aims to give an update on recent findings from key clinical trials on the safety and efficacy of RTS,S/ASO1 and R21/MM malaria vaccines and to provide an insight into the importance of key ongoing clinical trials that will report in early 2023.

WEB: 10.12659/MSM.939357

IMPACT FACTOR: 3.386

CITED HALF-LIFE: 3.8

START COMMENTARY

In this editorial, Parums addresses the current status of two malaria vaccines, RTS,S/ASO1 (Mosquirix) and R21/Matrix-M (R21/MM), and provides updates on recent findings from safety and efficacy clinical trials. *Table 1* summarizes key information about Mosquirix and R21/MM, including the vaccine targets, clinical trials, and vaccine characteristics. It is worth noting that Mosquirix has been approved by WHO for children in endemic areas, whereas R21/MM has not yet been approved, but has reached the WHO goal of 75% efficacy. Mosquirix is the first and only malaria vaccine to achieve ongoing post-licensing large-scale pilot implementation programs and has been given to hundreds of thousands of infants and children in Kenya, Ghana, and Malawi. R21/MM has ongoing phase 3 safety and efficacy trials which includes 4,800 infants and children across four endemic countries; results are expected in early 2023. It is the hope that R21/MM will be approved

and licensed in 2023, and that these ongoing trials will provide strong enough evidence to support larger implementation for both Mosquirix and R21/MM, as the benefit of an effective malaria vaccine could save millions.

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2. Accelerating access for all through research and innovation in immunization: Recommendations from Strategic Priority 7 of the Immunization Agenda 2030.

Sarley D, Hwang A, Fenton Hall B, Ford A, Giersing B, Kaslow D, et al.

Vaccine. 2022 Dec 18.

PubMed ID: 36529593

ABSTRACT

Research and innovation have been fundamental to many of the successes in immunization thus far, and will play important roles in the future success of Immunization Agenda 2030 (IA2030). Strategic Priority 7 (SP7) of IA2030, which addresses research and innovation, is explicitly informed by country needs and priorities, and aims to strengthen the innovation ecosystem through capacity building and collaboration at country, regional, and global levels. SP7 identifies four key focus areas: (1) “needs-based innovation”, (2) “new and improved products, services, and practices”, (3) “evidence for implementation”, and (4) “local capacity”. Strategic interventions in these key focus areas apply the lessons of the Global Vaccine Action Plan and the “Decade of Vaccines” to emphasize local innovation, promote the use of research by countries to improve program performance and impact, and encourage capacity building for the development and implementation of innovations. The proposed approach will maintain a focus on the development of new vaccines and the improvement of existing vaccines, and increase attention to innovation in service delivery. Monitoring and evaluation will foster evidence-based priority setting at the country level and help to ground the global research and development (R&D) agenda in the needs of communities. Together, these approaches are intended to harness the power of research and innovation more effectively, to meet the challenges of the future and achieve the ambitious goals of IA2030.

WEB: 10.1016/j.vaccine.2022.11.041

IMPACT FACTOR: 4.169

CITED HALF-LIFE: 7.3

START COMMENTARY

In this review, the World Health Organization’s Immunization Agenda 2030 (IA2030) Strategic Priority 7 (SP7) Technical Working Group provides recommendations for building capacity for research and innovation on immunization. The overall goals of the recommendations are to increase the reach and impact of immunization programs though establishing and strengthening capacity, foster the development of novel vaccines and technologies, improve of existing services, and evaluate innovations. *Figure 2* details the Path to Impact for products, services, and practices, detailing how the four focus areas fit together across the cycle of ideation through scaling up of innovations. The recommendations also detail indicators to monitor and evaluate efforts towards the

agenda: 1) Proportion of countries with an immunization research agenda and 2) Progress towards global research and development targets. Overall, the approach to SP7 intentionally is informed by country priorities and focuses capacity building to advance research and innovation impact.
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3. Building and sustaining public and political commitment to the value of vaccination: Recommendations for the Immunization Agenda 2030 (Strategic Priority Area 2).

Olayinka F, Sauer M, Menning L, Summers D, Wonodi C, Mackay S, et al.

Vaccine. 2022 Dec 17.

PubMed ID: 36528448

ABSTRACT

Vaccines have contributed to substantial improvements in health and social development outcomes for millions in recent decades. However, equitable access to immunization remains a critical challenge that has stalled progress toward improving several health indicators around the world. The COVID-19 pandemic has also negatively impacted routine immunization services around the world further threatening universal access to the benefits of lifesaving vaccines. To overcome these challenges, the Immunization Agenda 2030 (IA2030) focuses on increasing both commitment and demand for vaccines. There are three broad barriers that will need to be addressed in order to achieve national and subnational immunization targets: (1) shifting leadership priorities and resource constraints, (2) visibility of disease burden, and (3) social and behavioral drivers. IA2030 proposes a set of interventions to address these barriers. First, efforts to ensure government engagement on immunization financing, regulatory, and legislative frameworks. Next, those in subnational leadership positions and local community members need to be further engaged to ensure local commitment and demand. Governance structures and health agencies must accept responsibility and be held accountable for delivering inclusive, quality, and accessible services and for achieving national targets. Further, the availability of quality immunization services and commitment to adequate financing and resourcing must go hand-in-hand with public health programs to increase access to and demand for vaccination. Last, strengthening trust in immunization systems and improving individual and program resilience can help mitigate the risk of vaccine confidence crises. These interventions together can help ensure a world where everyone, everywhere has access to and uses vaccines for lifesaving vaccination.

WEB: 10.1016/j.vaccine.2022.11.038
IMPACT FACTOR: 4.169
CITED HALF-LIFE: 7.3

START COMMENTARY

In this review, the World Health Organization's Immunization Agenda 2030 (IA2030) Strategic Priority 2 (SP2) Technical Working Group details recommendations for commitment and demand for vaccines. The overall goal of SP2 is for immunization to be valued and sought after by all, and for a commitment to vaccine availability from health authorities. *Figure 3* displays the global demand

planning framework, identifying social & political will, risk & resilience, behaviorally informed interventions, service experience, and social & behavioral data for resilient demand centered around people. Recommended approaches include building national commitments, subnational leadership support and stakeholder engagement, establishing accountability, promoting context-specific acceptance and demand, and addressing reluctance and barriers. Overall, this approach centers people to promote demand for vaccinations and equitable vaccine programming.

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4. Estimated public health impact of human rotavirus vaccine (HRV) and pneumococcal polysaccharide protein D-conjugate vaccine (PHiD-CV) on child morbidity and mortality in Gavi-supported countries.

Marijam A, Schuerman L, Izurieta P, Pereira P, Van Oorschot D, Mehta S, et al.

Hum Vaccin Immunother. 2022 Dec 21;18(7):2135916.

PubMed ID: 36507685

ABSTRACT

Vaccine impact models against rotavirus disease (RD) and pneumococcal disease (PD) in low- and middle-income countries assume vaccine coverage based on other vaccines. We propose to assess the impact on severe disease cases and deaths avoided based on vaccine doses delivered by one manufacturer to Gavi-supported countries. From the number of human rotavirus vaccine (HRV) and pneumococcal polysaccharide protein D-conjugate vaccine (PHiD-CV) doses delivered, we estimated the averted burden of disease 1) in a specific year and 2) for all children vaccinated during the study period followed-up until 5 years (y) of age. Uncertainty of the estimated impact was assessed in a probabilistic sensitivity analysis using Monte-Carlo simulations to provide 95% confidence intervals. From 2009 to 2019, approximately 143 million children received HRV in 57 Gavi-supported countries, avoiding an estimated 18.7 million severe RD cases and 153,000, deaths. From 2011 to 2019, approximately 146 million children received PHiD-CV in 36 countries, avoiding an estimated 5.0 million severe PD cases and 587,000 deaths. The number of severe cases and deaths averted for all children vaccinated during the study period until 5 years of age were about 23.2 million and 190,000, respectively, for HRV, and 6.6 million and 749,000, respectively, for PHiD-CV. Models based on doses delivered help to assess the impact of vaccination, plan vaccination programs and understand public health benefits. In 2019, HRV and PHiD-CV doses delivered over a 5-y period may have, on average, averted nine severe disease cases every minute and one child death every 4 min.

What is the context? The WHO added the pneumococcal conjugate vaccine and the rotavirus vaccine in the recommended vaccination schedule of all countries in 2007 and 2009, respectively.Previous studies estimated the public health benefit of these vaccines by approximating the number of children who received them.What is new?We used an alternative approach to estimate the benefit based on actual number of doses of the vaccines, human rotavirus vaccine (HRV; Rotarix) and pneumococcal polysaccharide protein D-conjugate vaccine (PHiD-CV; Synflorix) delivered to each country considered.The study analyzed data from children under 5 years of age in 60 Gavi-supported countries by identifying the number of vaccine doses delivered, estimating the number of children fully covered, applying the country-specific disease epidemiology, estimating the number of severe disease cases and deaths avoided.From 2009 to 2019, approximately 143 million

children were vaccinated with HRV avoiding an estimated 18.7 million severe rotavirus disease cases and 153,000 deaths.From 2011 to 2019, about 146 million children were vaccinated with pneumococcal vaccine avoiding an estimated 5.0 million severe pneumococcal disease cases and 587,000 deaths. What is the impact? The benefit of HRV and PHiD-CV in Gavi-supported countries is often estimated based on assumptions of vaccine coverage rates.A modeling approach based on doses delivered by the vaccine manufacturer can provide an additional view on the potential vaccine benefits and improve planning, contribution, and sustainability of the immunization programs at a country level.In 2019, HRV and PHiD-CV together averted nine cases of severe disease each minute and one child death every 4 minutes.

WEB: 10.1080/21645515.2022.2135916
IMPACT FACTOR: 4.526
CITED HALF-LIFE: 4.0

START COMMENTARY

In this modeling analysis, Marijam *et al.* assess the impact of the introduction of vaccines against rotavirus disease (RD) and pneumococcal disease (PD) on severe disease and deaths in low- and middle-income countries (LMICs). Vaccines against RD and PD were added to the recommended vaccination schedule by the World Health Organization (WHO) by 2009. Figures 5 & 6 show the total estimated severe cases and deaths averted for all children (follow up through age 5) during the study period in selected countries for RD and PD, respectively. Notably, Pakistan ranked number one for burden averted for both RD and PD. The authors used the actual number of doses of vaccines delivered by the manufacturer, which differs from previous studies that estimated the impact through the number of children who received the vaccines. The estimated benefits from this model are consistent with previous studies. Potential limitations of this study was that it did not account for vaccine wastage, vaccine doses supplied by other manufacturers, or herd effects of the vaccines.

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5. Unveiling and addressing implementation barriers of vaccination communication strategy: Perspectives from government officials at national and provincial levels.

Aslam F, Babar Z, Madni A, Asghar M, Yue Y.

Hum Vaccin Immunother. 2022 Dec 21;18(7):2153513.

PubMed ID: 36494089

ABSTRACT

Communication strategy is one of the support of primary health care (PHC) that can address demand-side barriers and socio-cultural factors to promote better services. Conversely, communication strategies have not been a distinct emphasis of vaccination research in the country until now. Therefore, this study aimed to find the elements that influence the provision of vaccination communication in Pakistan. Twenty-two semi-structured interviews with key stakeholders in vaccine communication were conducted using qualitative methodologies (Jan 2022-March 2022). The interviews revolved around factors affecting the implementation of communication. Interviews were transcribed and analyzed using thematic analysis. By using the SURE framework, numerous factors that affect vaccination communication were identified under three major themes such as organizational-level, constitutional, and community-level factors. Five subthemes marked the organizational-level factors such as constrained budget, infrastructure deficits, inconsistent comprehensive strategy, health workforce, and inadequate training. Two subthemes are derived regarding constitutional and community-level factors, respectively, such as governance and leadership, health communication interventions not a policymaker's priority, community perceptions and practices, and formal partnership lacking between national and local stakeholders. Additionally, employment of established communication committees, improved money allocation, engagement of traditional and religious institutions, and political backing were identified as solutions for improvement. Communication activities are an important part of immunization programs in order to increase vaccination coverage. To be able to execute communication interventions more successfully, national and provincial stakeholders must work together to identify the elements that affect vaccine provision. Additional rigorous implementation studies could aid in the development of clearer knowledge of the system-wide constraints obstructing the program's efficiency.

WEB: 10.1080/21645515.2022.2153513

IMPACT FACTOR: 4.526

CITED HALF-LIFE: 4.0

START COMMENTARY

In this article, Aslam *et al* assess strategies that influence vaccination communication in Pakistan. Individuals who participated in the development or execution of vaccine communication strategies at

various levels of health care delivery were interviewed; this included policymakers, program administrators, members of the National Health Ministry, and representatives from EPI programs, government, development sector, and civil society. *Figure 2* details the themes identified from interviews, separated into organization-level factors, political/constitutional factors, community-level factors, and major challenges. One major finding from this research is that policymakers do not have a strong understanding of and strategy for vaccination communication, and community awareness and engagement is inconsistent. Authors also found financing of vaccination communication to be a major theme and recommend state and local governments consider reallocating funds to provide a more consistent and sustainable source of money.

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6. Key decision-making factors for human papillomavirus (HPV) vaccine program introduction in low-and-middle-income-countries: Global and national stakeholder perspectives.

Guillaume D, Waheed D, Schlieff M, Muralidharan K, Vorsters A, Limaye R.

Hum Vaccin Immunother. 2022 Dec 21;18(7):2150454.

PubMed ID: 36485172

ABSTRACT

Low-and-middle-income countries (LMICs) experience a high burden of cervical cancer. The human papillomavirus (HPV) vaccine prevents high-risk strains of HPV that cause cervical cancer; however, the integration of HPV vaccines into national immunization programs within many LMICs has been suboptimal. Our study evaluated key factors that drive the decision-making process for the implementation of HPV vaccine programs in LMICs. Stakeholder analysis and semi-structured in-depth interviews were conducted with national and global stakeholders. Interview data were analyzed through qualitative descriptive methods. Findings from our study revealed the decision-making process for HPV vaccines requires the involvement of multiple institutions and stakeholders from national and global levels, with decision-making being a country-specific process. Partner considerations, locally driven processes, availability of data, and infrastructure and resource considerations were found to be critical factors in the decision-making process. Future programs should evaluate the best approaches for investing in initiatives to enhance coordination, ensure vaccine introduction is locally driven, increase the availability of data needed for decision-making, and equip countries with the necessary resources to guide country decision-making in the face of increasingly complex decision-making environments.

WEB: 10.1080/21645515.2022.2150454

IMPACT FACTOR: 4.526

CITED HALF-LIFE: 4.0

START COMMENTARY

In this qualitative study, Guillaume et al. evaluated factors impacting the implementation of HPV vaccine programs though stakeholder analysis and semi-structured interviews. Authors included low- and middle- income countries within Africa and Asia that planned to introduce or already introduced HPV vaccination at a national level. Stakeholders grouped into two major categories national stakeholders and global stakeholders and consisted of academic researchers in high-income countries and LMICs, as well as global immunization partners. *Table 3* summarizes decision-making factors at the national and global level, and are grouped into five major themes: decision-making process, coordination among stakeholders, transparent and participatory process/locally driven

processes, data for decision-making, and infrastructure and resource consideration. Findings demonstrate that although engagement with global partners improves HPV vaccines introduction, local partners engagement with an emphasis on capturing country-specific nuances were essential to decision-making success.

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7. Mapping the distribution of zero-dose children to assess the performance of vaccine delivery strategies and their relationships with measles incidence in Nigeria.

Utazi C, Aheto J, Wigley A, Tejedor-Garavito N, Bonnie A, Nnanatu C, et al.

Vaccine. 2022 Dec 20;41(1):170-181.
PubMed ID: 36414476

ABSTRACT

Geographically precise identification and targeting of populations at risk of vaccine-preventable diseases has gained renewed attention within the global health community over the last few years. District level estimates of vaccination coverage and corresponding zero-dose prevalence constitute a potentially useful evidence base to evaluate the performance of vaccination strategies. These estimates are also valuable for identifying missed communities, hence enabling targeted interventions and better resource allocation. Here, we fit Bayesian geostatistical models to map the routine coverage of the first doses of diphtheria-tetanus-pertussis vaccine (DTP1) and measles-containing vaccine (MCV1) and corresponding zero-dose estimates in Nigeria at 1x1 km resolution and the district level using geospatial data sets. We also map MCV1 coverage before and after the 2019 measles vaccination campaign in the northern states to further explore variations in routine vaccine coverage and to evaluate the effectiveness of both routine immunization (RI) and campaigns in reaching zero-dose children. Additionally, we map the spatial distributions of reported measles cases during 2018 to 2020 and explore their relationships with MCV zero-dose prevalence to highlight the public health implications of varying performance of vaccination strategies across the country. Our analysis revealed strong similarities between the spatial distributions of DTP and MCV zero dose prevalence, with districts with the highest prevalence concentrated mostly in the northwest and the northeast, but also in other areas such as Lagos state and the Federal Capital Territory. Although the 2019 campaign reduced MCV zero-dose prevalence substantially in the north, pockets of vulnerabilities remained in areas that had among the highest prevalence prior to the campaign. Importantly, we found strong correlations between measles case counts and MCV RI zero-dose estimates, which provides a strong indication that measles incidence in the country is mostly affected by RI coverage. Our analyses reveal an urgent and highly significant need to strengthen the country's RI program as a longer-term measure for disease control, whilst ensuring effective campaigns in the short term.

WEB: 10.1016/j.vaccine.2022.11.026
IMPACT FACTOR: 4.169
CITED HALF-LIFE: 7.3

START COMMENTARY

In this paper, Utazi et al. used geospatial methods to map district-level estimates of vaccination coverage and estimate zero-dose prevalence to evaluate the performance of vaccination strategies in Nigeria. Diphtheria-tetanus-pertussis vaccine (DTP1) and Measles-containing vaccine (MCV1) were found to have similar coverage patterns; in 2018, among children aged under 5 years old in Nigeria, approximately 8.9 million and 12.6 million had not received routine DTP1 and MCV1 respectively. Figure 3 shows estimates for DTP and MCV coverage in 2018 and after MCV campaigns in 2019, with a notable change in coverage of at least one dose of MCV after the campaign. The authors found a stronger correlation between MCV zero-dose estimates and measles case counts at a state vs. district-level. Additionally, other studies found that opportunistic administration of MCV1 was more frequently missed in norther states than southern states, data which used in combination with this research could be beneficial in designing effective strategies to reach zero-dose children. Future studies would benefit from exploring the use the zero-dose estimates for the placement and improvement of vaccination posts both for routine immunization activities and supplemental immunization activities, as well as integration with health facility catchments to facilitate the design and implementation of localized interventions to improve vaccination services.

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8. Inclusionary Trials: A Review of Lessons Not Learned.

Adkins-Jackson P, Burke N, Espinosa P, Ison J, Goold S, Rosas L, et al.

Epidemiol Rev. 2022 Dec 26;44(1):78-86.
PubMed ID: 36124656

ABSTRACT

The COVID-19 pandemic revealed weaknesses in the public health infrastructure of the United States, including persistent barriers to engaging marginalized communities toward inclusion in clinical research, including trials. Inclusive participation in clinical trials is crucial for promoting vaccine confidence, public trust, and addressing disparate health outcomes. A long-standing body of literature describes the value of community-based participatory research in increasing marginalized community participation in research. Community-based participatory research emphasizes shared leadership with community members in all phases of the research process, including in the planning and implementation, interpretation, and dissemination. Shared leadership between academic and industry with marginalized communities can assist with inclusive participation in vaccine trials and increase public trust in the development of the vaccines and other therapies used during public emergencies. Nevertheless, epidemiologic and clinical research do not yet have a strong culture of community partnership in the scientific process, which takes time to build and therefore may be difficult to develop and rapidly scale to respond to the pandemic. We outline practices that contribute to a lack of inclusive participation and suggest steps that trialists and other researchers can take to increase marginalized communities' participation in research. Practices include planning for community engagement during the planning and recruitment phases, having regular dialogues with communities about their priorities, supporting them throughout a study, and navigating complex structural determinants of health. Additionally, we discuss how research institutions can support inclusive practices by reexamining their policies to increase participation in clinical trials and instilling institutional trustworthiness.

WEB: 10.1093/epirev/mxac007
IMPACT FACTOR: 4.280
CITED HALF-LIFE: 13.7

START COMMENTARY

In this review article, Adkins-Jackson et al. discuss continued barriers to uptake of community-based participatory research (CBPR) in the scientific process, despite a large body of evidence showing community-participation in research as a facilitator to improved outcomes and equity. Diversity in clinical trials is a persistent issue that limits the generalization of results, undermines the success of

health research into real-world settings. Exclusionary practices are reinforced within institutions when researchers fail to seek, or devalue community input. These practices perpetuate discrimination, and instead reinforce community distrust in research, science, and academic institutions. Numerous institutional policies contribute to the exclusion of underrepresented voices, and often leave out those who are disproportionately affected by conditions of interest. To counteract these exclusionary policies, researchers must engage with communities through information sharing and respectful listening and create true partnership. *Table 1* summarizes best practices in community engagement that provides benefit back to the community, which includes: increasing knowledge and access to trustworthy information, trust building in research, strengthening community access to resources, and building community capacity. Overall, in designing and implementing inclusionary trials, we must reexamine polices, challenge institutional norms, and shift the power to center communities.

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9. Potential impact and cost-effectiveness of injectable next-generation rotavirus vaccines in 137 LMICs: a modelling study.

Debellut F, Pecenka C, Hausdorff W, Clark A.

Hum Vaccin Immunother. 2022 Apr 14;18(1):2040329.

PubMed ID: 35240926

ABSTRACT

While current live, oral rotavirus vaccines (LORVs) are reducing severe diarrhea everywhere, their effectiveness is lower in high burden settings. Alternative approaches are in advanced stages of clinical development, including injectable next-generation rotavirus vaccine (iNGRV) candidates, which have the potential to better protect children, be combined with existing routine immunizations and be more affordable than current LORVs. In an effort to better understand the real public health value of iNGRVs and to help inform decisions by international agencies, funders, and vaccine manufacturers, we conducted an impact and cost-effectiveness analysis examining 20 rotavirus vaccine use cases. We evaluated several currently licensed LORVs, one neonatal oral NGRV (oNGRV), one iNGRV, and one iNGRV-DTP (iNGRV comprising part of a DTP-containing combination) over a ten-year timeframe in 137 low- and middle-income countries. The most promising use case identified was a high efficacy iNGRV-DTP, predicted to have the lowest vaccine program cost (U 1.4 billion),the highest vaccine benefit (750,000 rotavirus deaths averted, 13 million rotavirus hospital admissions averted, US 2.7 billion health-care cost averted), and most favorable cost-effectiveness (cost-saving). iNGRV-DTP vaccine remained the most affordable, safe, and cost-effective option even when it was assumed to have equivalent efficacy to the current LORVs. This study shows that while the development of iNGRVs with superior efficacy to currently licensed LORVs would be ideal, iNGRVs with similar efficacy to LORVs would offer substantial public health value. It also highlights the economic value of accelerating the development of DTP-based combination vaccines that include iNGRV to provide rotavirus protection.

WEB: 10.1080/21645515.2022.2040329

IMPACT FACTOR: 4.526

CITED HALF-LIFE: 4.0

START COMMENTARY

In this modeling study, Debellut et al. examine the cost-effectiveness of injectable next-generation rotavius vaccine (iNGRV) candidates in reducing severe diarrhea in high-burden settings. The authors evaluated 20 rotavirus vaccine scenarios in 137 low- and middle income countries (LMICs). Products modeled included live, oral rotavirus vaccines (LORVs), neonatal NGRV (oNGRV), iNGRV, and iNGRV-DTP vaccines. *Table 2* summarizes vaccine characteristics, price per dose, and

additional vaccine parameters used in the scenarios. *Table 3* summarizes the potential health impact and cost-effectiveness of the 20 scenarios for all LMICs over 10 years, beginning in 2025. The most cost-saving vaccination scenario was the iNGRV-DTP combination vaccine. These results highlight the economic value of accelerating the development of DTP-containing vaccines combined with iNGRV to provide rotavirus protection.

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10. Capacity Building for Vaccine Manufacturing Across Developing Countries: The Way Forward.

Kumraj G, Pathak S, Shah S, Majumder P, Jain J, Bhati D, et al.

Hum Vaccin Immunother. 2022 Apr 07;18(1):2020529.

PubMed ID: 35086416

ABSTRACT

Approved vaccines prevent 2 to 3 million deaths per year. There is a lack of equitable access to vaccines in the low- and middle-income developing nations. Challenges in the life cycle of vaccine production include process development, lead time, intellectual property, and local vaccine production. A robust and stable manufacturing process and constant raw material supplies over decades is critical. In a continuously evolving vaccine landscape, the need of the hour for developing nations is to manufacture their own vaccines besides having supply security, control over production scheduling and sustainability, control of costs, socio-economic development, and rapid response to local epidemics. There is a need for capacity building of workforce development, technology transfer, and financial support. Technology transfer has improved vaccine access and reduced prices of vaccines. Capacity building for the manufacturing of vaccines in developing countries has always been an area of paramount importance and more so in a pandemic situation.

WEB: 10.1080/21645515.2021.2020529

IMPACT FACTOR: 4.526

CITED HALF-LIFE: 4.0

START COMMENTARY

In this review paper, Kumraj et al. detail how vaccine manufacturing capacity building can improve equitable access to vaccines in low- and middle- income countries (LMICs). Throughout the vaccine manufacturing process, challenges exist at every step, particularly in LMICs. These include workforce development, technology transfer, regulatory standard challenges, and lack of capacity. *Table 1* details cost and timeline estimates for fully integrated and form-fill only vaccine facilities, which range from as little as $14 million, to upwards of $225 million, dependent upon time horizon and doses required. Authors describe the roles which various organizations play in capacity building of vaccine manufacturing, detailing the Bill & Melinda Gates Foundation, GAVI, the Clinton Health Access Initiative, International Vaccine Access Center, and COVAX, among others. Focusing largely on equity, capacity building, long-term development of workforce, financial planning, and collaborations are imperative to improving vaccine manufacturing in LMICs.

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Appendix

The literature search for the February 2023 Vaccine Delivery Research Digest was conducted on January 28, 2023. We searched English language articles indexed by the US National Library of Medicine and published between [December] 15, 2022 and [January] 14, 2023. The search resulted in 624 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])) 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]) (“2022/15/12”[PDAT] : “2023/14/1”[PDAT]))