VACCINE DELIVERY RESEARCH DIGEST

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

REPORT TO THE BILL & MELINDA GATES FOUNDATION

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1. Maternal immunization in Malawi: A mixed methods study of community perceptions, programmatic considerations, and recommendations for future planning

Fleming JA, Munthali A, Ngwira B, Kadzandira J, Jamili-Phiri M, Ortiz JR, et al.

Vaccine. 2019 Jul 26;37(32):4568-4575.

PubMed ID: 31319932

ABSTRACT

BACKGROUND:

Safe, effective vaccines are given to pregnant women to protect their infants and/or themselves against certain infectious agents; however, apart from tetanus vaccination, maternal immunization in low- and middle-income countries (LMICs) remains low. Tetanus toxoid vaccine is integrated into antenatal care services in Malawi with high coverage and provides an opportunity to identify factors that facilitate successful immunization delivery to pregnant women in LMICs.

METHODS:

PATH and the University of Malawi's Centre for Social Research conducted a mixed-methods study in 2015 to document community perceptions of maternal immunization, using tetanus vaccine as an example, and to identify factors perceived to be important to successfully introducing other maternal vaccines, such as influenza vaccine, in Malawi. We conducted 18 focus group discussions with pregnant and recently pregnant women and their family members and 76 semi-structured interviews with pregnant and recently pregnant women, community leaders, health workers, public health program managers, non-governmental partners, and policy makers.

RESULTS:

We identified factors perceived to support the introduction of new maternal vaccines, including strong maternal vaccine acceptance in the community, an existing strategy for maternal tetanus vaccine delivery, and positive health workers' views about the introduction of additional maternal vaccines. Potential challenges to adoption and acceptance included identifying and tracking the target population and monitoring adverse events, and the need to ensure operational capacity of the health system to support the introduction and wide-scale use of an additional vaccine. For influenza vaccine specifically, additional challenges included limited awareness of influenza disease and its low prioritization among health needs.

CONCLUSIONS:
Lessons from the successful delivery of maternal tetanus immunization in Malawi may be informative for similar countries considering new vaccines for pregnant women or striving to optimize the delivery of those currently provided.

WEB: 10.1016/j.vaccine.2019.06.020
IMPACT FACTOR: 3.269
CITED HALF-LIFE: 5.50

START COMMENTARY

Fleming et al. conducted a mixed methods study to better understand perceptions and factors associated with maternal immunization delivery and uptake in Malawi. Generally, authors found high acceptance of maternal immunization. Of note, there were differing opinions of country-level maternal immunization planning. Some recommended nationwide administration to avoid perceptions of differential treatment, while others recommended a staged approach to learn lessons as vaccination is scaled up. A major limitation of the study was the lack of representation of women who refused ANC services as they may be an important missed population. These lessons can inform the administration of maternal influenza vaccines and can inform future decision-making of new maternal immunizations in Malawi and similar settings.

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2. Impact of vaccination delay on deaths averted by pneumococcal conjugate vaccine: Modeled effects in 8 country scenarios

Carter ED, Tam Y, Walker N.

Vaccine. 2019 Aug23;37(36):5242-5249. Epub 2019 Jul 30.

PubMed ID: 31375441

ABSTRACT

Delay in vaccination from schedule has been frequently documented and varies by vaccine, dose, and setting. Vaccination delay may result in the failure to prevent deaths that would have been averted by on-schedule vaccination. We constructed a model to assess the impact of delay in vaccination with pneumococcal conjugate vaccine (PCV) on under-five mortality. The model accounted for the week of age-specific risk of pneumococcal mortality, direct effect of vaccination, and herd protection. For each model run, a cohort of children were exposed to the risk of mortality and protective effect of PCV for each week of age from birth to age five. The model was run with and without vaccination delay and difference in number of deaths averted was calculated. We applied the model to eight country-specific vaccination scenarios, reflecting variations in observed vaccination delay, PCV coverage, herd effect, mortality risk, and vaccination schedule. As PCV is currently being scaled up in India, we additionally evaluated the impact of vaccination delay in India under various delay scenarios and coverage levels. We found deaths averted by PCV with and without delay to be comparable in all of the country scenarios when accounting for herd protection. In India, the greatest relative difference in deaths averted was observed at low coverage levels and greatest absolute difference was observed around 60% vaccination coverage. Under moderate delay scenarios, vaccination delay had modest impact on deaths averted by PCV in India across levels of coverage or vaccination schedule. Without accounting for herd protection, vaccination delay resulted in much greater failure to avert deaths. Our model suggests that realistic vaccination delay has a minimal impact on the number of deaths averted by PCV when accounting for herd effect. High population coverage can largely over-ride the deleterious effect of vaccination delay through herd protection.

WEB: 10.1016/j.vaccine.2019.07.063

IMPACT FACTOR: 3.269

CITED HALF-LIFE: 5.50

START COMMENTARY

Using a deterministic mathematical model, Carter et al. assessed the impact of delaying pneumococcal conjugate vaccination in eight countries and found no substantial difference in protection due to herd immunity. Carter et al. used methods from Liu et al., assuming no herd protection with coverage below 13% and herd protection based on vaccination coverage and proportion of invasive pneumococcal disease (IPD) caused by vaccine-type serotypes. Herd protection was assumed constant across child ages and population mixing (or clustering) was not accounted for in this calculation. Authors also noted that competing mortality risks nor country migration were not assessed, which could impact interpretation of results.

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3. Oral cholera vaccine delivery strategy in India: Routine or campaign?–A scoping review

Ray A, Sarkar K, Haldar P, Ghosh R.

Vaccine. 2019 Jul 31. [Epub ahead of print]

PubMed ID: 31377080

ABSTRACT

Oral Cholera Vaccine (OCV) has been recognized as an adjunct tool for prevention and control of cholera. However, policy directions are currently unavailable in India to guide the vaccine delivery. We conducted a scoping review to inform the policy about the scopes and challenges of different strategic choices of OCV delivery in India in light of current evidences, highlighting the scope of new research.

METHODS:

Adopting the Arksey and O'Malley Framework for review, we searched for literatures on "efficacy", "effectiveness", and "cost" of oral cholera vaccine delivery through different strategies in Pubmed and Scopus.

RESULTS:

We found that the protective efficacy of OCV depends on its coverage. Evidence on effectiveness of OCV are available for both reactive and pre-vaccination campaigns. Reactive high-risk vaccination is more effective than reactive ring and mass vaccination. Pre-vaccination campaigns are more effective than reactive vaccination when vaccine availability is adequate. Pre-vaccination through school campaigns in 1-14 years age group have been cost effective in India. Vaccination campaigns in under-5 children are also cost effective in spite of low efficacy due to the scope of averting a higher number of cases. However, no evidence is available regarding efficacy and effectiveness of OCV in children <1 year as well as the effectiveness of delivering OCV through routine immunization.

CONCLUSION:

Little evidence exist to depict mass-campaign as more economic and effective than routine expanded programme on immunization (EPI) session for delivery of OCV. Considering operational feasibility, it needs to be explored whether OCV delivery strategy is compatible with India's current EPI, if it can be introduced in routine immunization at measles containing vaccine age-schedule, optionally preceded by a campaign in targeted hot-spots in the 1-14 year age-group. Safety and efficacy data of OCV during infancy as well as hot-spot surveillance are pre-requisites for formulation of such EPI policy.

WEB: 10.1016/j.vaccine.2019.07.082
IMPACT FACTOR: 3.269
CITED HALF-LIFE: 5.50

START COMMENTARY

Ray et al. conducted a scoping review per the Arksey and O'Malley Framework to gather evidence on the efficacy, effectiveness, and cost of oral cholera vaccine (OCV) delivered through different strategies. A summary of their findings in an "evidence to policy framework" is depicted in figure 2. They found that pre-vaccination would have greater benefit than a reactive vaccination strategy, but note information gaps, such as efficacy and effectiveness for children under 1 year. A limitation of this study is the lack of quality assessment as they only used publication in a peer-reviewed journal as a proxy of quality.

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4. Differences between coverage of yellow fever vaccine and the first dose of measles-containing vaccine: A desk review of global data sources

Adrien N, Hyde TB, Gacic-Dobo M, Hombach J, Krishnaswamy A, Lambach P.

Vaccine. 2019 Jul 26;37(32):4511-4517. Epub 2019 Jun 29.

PubMed ID: 31266670

ABSTRACT

INTRODUCTION:

The strategy to Eliminate Yellow Fever Epidemics (EYE) is a global initiative that includes all countries with risk of yellow fever (YF) virus transmission. Of these, 40 countries (27 in Africa and 13 in the Americas) are considered high-risk and targeted for interventions to increase coverage of YF vaccine. Even though the World Health Organization (WHO) recommends that YF vaccine be given concurrently with the first dose of measles-containing vaccine (MCV1) in YF-endemic settings, estimated coverage for MCV1 and YF vaccine have varied widely. The objective of this study was to review global data sources to assess discrepancies in YF vaccine and MCV1 coverage and identify plausible reasons for these discrepancies.

METHODS:

We conducted a desk review of data from 34 countries (22 in Africa, 12 in Latin America), from 2006 to 2016, with national introduction of YF vaccine and listed as high-risk by the EYE strategy. Data reviewed included procured and administered doses, immunization schedules, routine coverage estimates and reported vaccine stock-outs. In the 30 countries included in the comparitive analysis, differences greater than 3 percentage points between YF vaccine and MCV1 coverage were considered meaningful.

RESULTS:

In America, there were meaningful differences (7-45%) in coverage of the two vaccines in 6 (67%) of the 9 countries. In Africa, there were meaningful differences (4-27%) in coverage of the two vaccines in 9 (43%) of the 21 countries. Nine countries (26%) reported MVC1 stock-outs while sixteen countries (47%) reported YF vaccine stock-outs for three or more years during 2006-2016.

CONCLUSION:

In countries reporting significant differences in coverage of the two vaccines, differences may be driven by different target populations and vaccine availability. However,these were not sufficient to completely explain observed differences. Further follow-up is needed to identify possible reasons for differences in coverage rates in several countries where these could not fully be explained.

WEB: 10.1016/j.vaccine.2019.06.063
IMPACT FACTOR: 3.269
CITED HALF-LIFE: 5.50

START COMMENTARY

Adrien et al. conducted a desk review of WHO/UNICEF data (see Table 1 for specific data sources) on yellow fever (YF) and measles vaccines (MCV1). Authors noted a limitation to their study is the potential bias from using outdated census data and other data gaps that may arise from using administrative vaccination data. Additionally, survey data may be subject to recall bias. Authors also highlighted the potential for under-reporting of vaccine availability, as voiced by SAGE in 2014. Understanding the discrepancies between YF and MCV1 coverage may illuminate how best to improve coverage for both vaccines.

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5. Assessing the quality and accuracy of national immunization program reported target population estimates from 2000 to 2016

Vaughan K, Ozaltin A, Mallow M, Moi F, Wilkason C, Stone J, et al.

Vaccine X. 2019 Jul 15;2:100034.

PubMed ID: 31428741

ABSTRACT

INTRODUCTION:

Information on immunization delivery costs (IDCs) is essential for better planning and budgeting for the sustainability and performance of national programs. However, delivery cost evidence is fragmented and of variable quality, making it difficult for policymakers, planners, and other stakeholders to understand and use. This study aimed to consolidate and summarize the evidence on delivery costs, answering the question: What are the unit costs of vaccine delivery across low- and middle-income countries (LMICs) and through a variety of delivery strategies?

METHODS:

We conducted a systematic review of over 15,000 published and unpublished resources from 2005 to 2018 that included IDCs in LMICs. We quality-rated and extracted data from 61 resources that contained 410 immunization delivery unit costs (e.g., cost per dose, cost per fully immunized child). We converted cost findings to a common year (2016) and currency (U.S. dollars) to ensure comparability across studies and settings. We performed a descriptive and gap analysis and developed immunization delivery cost ranges using comparable unit costs for single vaccines and schedules of vaccines.

RESULTS:

The majority of IDC evidence comes from low-income countries and Sub-Saharan Africa. Most unit costs are presented as cost per dose and represent health facility-based delivery.

DISCUSSION:

The cost ranges may be higher than current estimates used in many LMICs for budgeting: $0.16-$2.54 incremental cost per dose (including economic, financial, and fiscal costs) for single, newly introduced vaccines, and $0.75-$9.45 full cost per dose (economic costs) for schedules of four to eight vaccines delivered to children under one.

CONCLUSIONS:

Despite increased attention on improving coverage and strengthening immunization delivery, evidence on the cost of delivery is nascent but growing. The cost ranges can inform planning and policymaking, but should be used with caution given their width and the few unit costs used in their development.

WEB: 10.1016/j.jvacx.2019.100034
IMPACT FACTOR: 3.269 (Vaccine)
CITED HALF-LIFE: 5.50 (Vaccine)

START COMMENTARY

Vaughan et al. conducted a systematic review of vaccine delivery costs as part of the Immunization Costing Action Network (ICAN). Authors created a 14-item tool to assess the quality of data based on methodological rigor and reporting standards, uncertainty of results, and risk of bias and limitations (see supplementary appendix 2 for the 14-item criteria). Figure 2 shows the geographic representation of immunization delivery costing data and figure 3 shows percentage of unit costs by vaccines. Authors noted several limitations to their study, including the lack of reporting on methodology and heterogeneity of data. Of note, authors made their work available in an accessible catalogue, but as the authors highlighted, appropriate caution should be used when referencing these data. The Immunization Delivery Cost Catalogue may be accessed here: http://immunizationeconomics.org/ican-idcc.

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6. Trends of inequalities in childhood immunization coverage among children aged 12-23 months in Kenya, Ghana, and Côte d'Ivoire

Donfouet HPP, Agesa G, Mutua MK.

BMC Public Health. 2019 Jul 23;19(1):988.

PubMed ID: 31337384

ABSTRACT

BACKGROUND:

Immunization is one of the most cost-effective health intervention to halt the spread of childhood diseases, and improve child health. Yet, there is a substantial disparity in childhood immunization coverage. The overall objective of the study is to investigate the trends of within-country inequalities in childhood immunization coverage among children aged 12-23 months in Kenya, Ghana, and Côte d'Ivoire. The three countries included in this study are countries that are on the verge of entering the accelerated phase of the Gavi, the Vaccine Alliance's co-sharing of costs of vaccine and eventually assuming full costs of vaccines. Côte d'Ivoire is in the Gavi preparatory transition phase, entering the accelerated transition phase in 2020, with an expected transition to full self-financing in 2025. Ghana is expected to enter the accelerated transition phase in 2021 and to full self-financing in 2026 while Kenya will enter in 2022 and fully self-finance in 2027. We examine the pattern of inequality in childhood immunization coverage over time through an equity lens by mainly exploring the direction of inequality in coverage.

METHODS:

We use data from the Demographic Health Surveys and Multiple Indicator Cluster Surveys. The rate difference, rate ratio, and relative concentration index are used as measures of inequality.

RESULTS:

Results of the study suggest that in most years inequality in immunization coverage in the three countries persist over time, and it favors the most-advantaged households. However, there is a sharp decrease pattern in inequalities in childhood immunization coverage in Ghana over time.

CONCLUSION:

Policymakers could be more strategic in addressing pro-rich inequality in immunization coverage by designing health interventions through an equity lens. Using inequality data and putting disadvantaged households at the center of health intervention designs could increase the efficiency of the primary health care system and reduce the incidence of mortality and morbidity as a result of vaccine-preventable disease.

WEB: 10.1186/s12889-019-7309-9
IMPACT FACTOR: 2.567
CITED HALF-LIFE: 3.90

START COMMENTARY

Donfouet et al. used the Health Equity Assessment Toolkit (HEAT) to assess five dimensions of inequality: economic status, education, place of residence, subnational region, and child's sex). Table 2 summaries the inequality measures used in the study, comparing most-advantaged and most-disadvantaged subgroups. Using the inequality measures, authors examined inequality in immunization coverage across several years: 1993–2014 in Kenya and Ghana, and 1994–2011 in Côte d'Ivoire. Authors discussed the shape of inequality in immunization coverage and differences in results between the countries, noting the role of Civil Society Organizations and community health volunteers, but also noted that their findings do not entirely explain childhood immunization coverage over time. Donfouet et al. highlighted the importance of examining health interventions with an equity lens.

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7. Door – to – door immunization strategy for improving access and utilization of immunization Services in Hard-to-Reach Areas: a case of Migori County, Kenya

Shikuku DN, Muganda M, Amunga SO, Obwanda EO, Muga A, Matete T, et al.

BMC Public Health. 2019 Aug 7;19(1):1064.

PubMed ID: 31391028

ABSTRACT

BACKGROUND:

Access to quality essential healthcare services and vaccines for all is key to achieving universal health coverage. Inequities driven by differences in place of residence and socio-economic status persist among different communities hindering the achievement of sustained performance on immunization indicators. Innovative community-based Reach Every Child (REC) interventions at the sub-county and county level can reduce these local inequities. This study determines the effect of an enhanced door-to-door immunization strategy on improving immunization coverage in hard-to-reach areas of Migori.

METHODS:

This was a cross-sectional review of District Health Information System 2 immunization data for July and August 2018 for Migori County. During the presidential immunization rapid results initiative (RRI) in July 2018, poorly performing wards/facilities were mapped using the Quantum Geographic Information Systems methodology, and unreached rural-urban populations identified. Through review of facility level Kenya Expanded Programme on Immunization data, 64 health facilities with over 100 unimmunized children each between January 2017 and June 2018 in all sub-counties were prioritized. In August 2018, intensified fixed-point immunization services were offered within the prioritized facilities. Further, a 3-day door-to-door defaulter tracing by community health volunteers and household level immunization by nurses was conducted. Immunization coverage performance for access and utilization for the two periods were compared using z-tests/t-tests.

RESULTS:

Cumulatively, a total of 10,744 and 14,809 children were reached with immunization in July and August respectively for the 64 facilities. There were significant increases in the immunization coverage for BCG (74.4% vs 89.9%, P = 0.0001), Penta 1(96.2% vs 102%, P = 0.0649), Penta 3 (92.3% vs 112.1%, P = 0.0001), MR1 (81.7% vs 111.5%, P < 0.0001) and the fully immunized children at 1 year (78.6% vs 103.9%, P < 0.0001). Penta 3 and MR1 drop-out rates (3.99% vs -

9.86%, P = 0.0007; 15.06% vs - 9.27%, P = 0.0001 respectively) decreased significantly. Similar significant effects were observed at the subcounty levels (P < 0.05).
CONCLUSION:
Hard-to-reach populations require multiple REC strategies to reach every child with immunization. Health facilities should actively analyze and use routine immunization data and invest in community health strengthening systems to identify hard-to-reach areas to be targeted with outreaches to improve immunization coverage.

WEB: 10.1186/s12889-019-7415-8
IMPACT FACTOR: 2.567
CITED HALF-LIFE: 3.90

START COMMENTARY

Shikuku et al. conducted a study to assess the impact of a door-to-door immunization strategy on vaccination coverage in hard-to-reach communities in Migori County, Kenya. Maps using the Quantum Geographical Information System (QGIS) and the District Health Information System 2 (DHIS2) were used to help identify health facilities with high numbers of unvaccinated children. Figure 2 shows a map of 64 health facilities categorized by proportion unvaccinated in July 2018, before implementation of the intervention. Figure 3 shows the same map of the 64 health facilities in August 2018, after implementation of the intervention, demonstrating more facilities with lower proportions of unimmunized children. Authors noted a limitation of the study included the small number of facilities providing the intervention services and the short interval of time to compare findings. Without control sites, causal inferences of the door-to-door immunization efforts on immunization coverage differences observed from July to August are limited. Authors also noted potential data quality issues in the DHIS2 system.

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8. Full immunization coverage and its associated factors among children aged 12-23 months in Ethiopia: further analysis from the 2016 Ethiopia demographic and health survey

Tamirat KS, Sisay MM.

BMC Public Health. 2019 Jul 30;19(1):1019.

PubMed ID: 31362790

ABSTRACT

BACKGROUND:

Vaccination is one of the cost effective strategies reducing childhood morbidity and mortality. Further improvement of immunization coverage would halt about 1.5 million additional deaths globally. Understanding the level of immunization among children is vital to design appropriate interventions. Therefore, this study aimed to assess full immunization coverage and its determinants among children aged 12-23 months in Ethiopia.

METHODS:

The study was based on secondary data analysis from the 2016 Ethiopia Demographic and Health Survey (EDHS). Information about 1,909 babies aged 12-23 months was extracted from children dataset. Both bivariate and multivariable logistic regression models were utilized to assess the status and factors associated with full immunization. Adjusted odds ratio (AOR) with a 95% confidence interval (CI) was computed. Variables with less than 0.05 p-values in the multivariable logistic regression model were considered as statistically and significantly associated with the outcome variable.

RESULTS:

The overall full immunization coverage was 38.3% (95% CI: 36.7, 41.2). Rural residence (AOR = 0.60, 95% CI: 0.43, 0.84), employed (AOR = 1.62, 95% CI: 1.31, 2.0), female household head (AOR = 0.58, 95% CI: 0.44, 0.76), wealth index [middle (AOR = 1.44, 95% CI: 1.07, 1.94) and richness (AOR = 1.65, 95% CI: 1.25,2.19)], primary school maternal education (AOR = 1.38,95% CI: 1.07, 1.78), secondary school maternal education (AOR = 2.19, 95% CI: 1.43, 3.36), diploma graduated mothers (AOR = 1.99, 95% CI: 1.09, 3.61), ANC follow ups (AOR = 2.79, 95% CI:2.17 3.59), and delivery at health facilities (AOR = 1.76, 95% CI: 1.36, 2.24) were significantly associated factors with full immunization.

CONCLUSION:

Full immunization coverage in Ethiopia was significantly lower than the global target. Female household head and rural dwellings were negatively associated with full immunization. In contrast

higher maternal education, employment, middle and rich economic status, ANC follow up, and delivery at health facility were positively associated with full immunization among 12-23 months old children. This suggests that improved health education and service expansion to remote areas are necessary to step immunization access.

WEB: 10.1186/s12889-019-7356-2
IMPACT FACTOR: 2.567
CITED HALF-LIFE: 3.90

START COMMENTARY

Tamirat et al. identified several factors associated with full immunization among children aged 12-23 months, including mother's wealth index and education level. Authors also found high variability of full immunization coverage by administrative regions, ranging from 8.8% to 86.6%. Figure 1 shows coverage levels for each vaccine. Authors noted that overall coverage was much lower than what had been reported in government reports (38.3% versus 86%). Reasons for this discrepancy are unknown, but authors hypothesized false reports from health facilities as a potential reason. Authors also noted that since maternal recall was used to obtain child vaccination status when vaccination cards were unavailable, this study may be subject to recall or social desirability bias. It is unclear what proportion of responses were based on vaccination cards versus maternal recall.

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9. Low immunization coverage in Wonago district, southern Ethiopia: A community-based cross-sectional study

Hailu S, Astatkie A, Johansson KA, Lindtjørn B.

PLoS One. 2019 Jun 20;14(6):e0213882.

PubMed ID: 31339939

ABSTRACT

INTRODUCTION:

Immunization is a cost-effective intervention that prevented more than 5 million deaths worldwide from 2010 to 2015. Despite increased vaccination coverage over the past four decades in many African countries, including Ethiopia, universal coverage has not yet been reached. Only 39% of children aged 12-23 months received full vaccinations in Ethiopia, according to the 2016 Ethiopian Demographic Health Survey. This study aimed to evaluate immunization coverage and identify individual and community factors that explain incomplete vaccination coverage among children aged 6-36 months in the Wonago district of southern Ethiopia.

METHODS:

We conducted a community-based, cross-sectional study in three randomly selected kebeles in the Wonago district from June to July 2017. Our nested sample of 1,116 children aged 6-36 months included 923 child-mother pairs (level 1) within kebeles (level 2). We conducted multilevel regression analysis using STATA software.

RESULTS:

Among participants, 85.0% of children aged 12-36 months received at least one vaccine, and 52.4% had complete immunization coverage. After controlling for several individual and community variables, we identified six significant predictor variables for complete immunization: Older mothers' age (AOR = 1.05, 95% CI: 1.00-1.09), higher utilization of antenatal care (AOR = 1.36, 95% CI: 1.14-1.62), one or more tetanus-toxoid vaccination during pregnancy (AOR = 2.64, 95% CI: 1.43-4.86), mothers knowing the age at which to complete child's vaccinations (AOR = 2.00, 95% CI: 1.25-3.20), being a female (AOR = 0.64, 95% CI: 0.43-0.95), and child receiving vitamin A supplementation within the last 6 months (AOR = 2.79, 95% CI: 1.59-4.90). We observed a clustering effect at the individual and community levels with an intra-cluster correlation coefficient of 48.1%.

CONCLUSIONS:

We found low immunization coverage among children in the Wonago district of southern Ethiopia, with significant differences across communities. Promoting maternal health care and community service could enhance immunization coverage.

WEB: 10.1371/journal.pone.0220144
IMPACT FACTOR: 2.776
CITED HALF-LIFE: 2.70

START COMMENTARY

Hailu et al. conducted a community-based, cross-sectional study to assess individual- and community-level factors associated with completion of childhood immunizations. Data were obtained from structured questionnaires, with questions from the Demographic and Health Survey of Ethiopia and from literature reviews. Limitations of the study include limited causal inference due to the cross-sectional study design and potential for recall or social desirability bias by using maternal recall to establish completion of immunizations. It is also unclear to what extent sampling multiple children from the same household may impact the results. A strength of this study is the assessment of random clustering effects by kebele.

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10. Electronic Immunization Registries in Tanzania and Zambia: Shaping a Minimum Viable Product for Scaled Solutions

Seymour D, Werner L, Mwansa FD, Bulula N, Mwanyika H, Dube M, et al.

Front Public Health. 2019 Aug 7;7:218.

PubMed ID: 31440494

ABSTRACT

As part of the work the Better Immunization Data (BID) Initiative undertook starting in 2013 to improve countries' collection, quality, and use of immunization data, PATH partnered with countries to identify the critical requirements for an electronic immunization registry (EIR). An EIR became the core intervention to address the data challenges that countries faced but also presented complexities during the development process to ensure that it met the core needs of the users. The work began with collecting common system requirements from 10 sub-Saharan African countries; these requirements represented the countries' vision of an ideal system to track individual child vaccination schedules and elements of supply chain. Through iterative development processes in both Tanzania and Zambia, the common requirements were modified and adapted to better fit the country contexts and users' needs, as well as to be developed with the technology available at the time. This process happened across four different software platforms. This paper outlines the process undertaken and analyzes similarities and differences across the iterations of the EIR in both countries, culminating in the development of a registry in Zambia that includes the most critical aspects required for initially deploying the registry and embodies what could be considered the minimum viable product for an EIR.

WEB: 10.3389/fpubh.2019.00218
IMPACT FACTOR: 2.031
CITED HALF-LIFE: n/a

START COMMENTARY

Seymour et al. described the efforts of the Better Immunization Data (BID) Initiative to define a minimum viable product (MVP) for an electronic immunization registry (EIR) using the Collaborative Requirements Development Methodology. (An example of a requirement is “Search and match on partial information (such as partial birthdates).”) Figure 1 depicts a timeline of EIR development in Tanzania and Zambia, with Tanzania selecting the Generic Immunization Information System (GIIS) in 2014 and then adopting the Open Immunize (OpenIZ) in 2016 and Zambia selecting the District

Health Information Software (DHIS2) Patient Tracker in 2015 and switching to the Open Smart Registry Platform (OpenSRP) in 2017. The modified requirements were categorized into five themes: Registration and Search Requirements, Vaccine Administration Requirements, Client Management Requirements, Stock Management Requirements, and Reports (see Table 1). For the full list of requirements and comparison of requirements across the software platforms, refer to the supplementary tables. Eighty-five requirements in the OpenSRP platform (referred to as the Zambia Electronic Immunization Registry) were identified as the minimum set of requirements for an MVP.

Return to List of Articles

Appendix

The literature search for the September 2019 Vaccine Delivery Research Digest was conducted on September 9, 2019. We searched English language articles indexed by the US National Library of Medicine and published between July 15, 2019 and August 14, 2019. The search resulted in 264 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]) ("2019/07/15"[PDAT] : "2019/08/14"[PDAT]))