VACCINE DELIVERY RESEARCH DIGEST

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

REPORT TO THE BILL & MELINDA GATES FOUNDATION

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10 Childhood Immunization in Ethiopia: Accuracy of Maternal Recall Compared to Vaccination Cards
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Appendix

Details of Articles

1. Cost-effectiveness of routine and campaign use of typhoid Vi-conjugate vaccine in Gavi-eligible countries: a modelling study

Blicke J, Antillón M, Pieters Z, Kuylen E, Abboud L, Neuzil KM, et al.

Lancet Infect Dis. 2019 May 23. [Epub ahead of print]

PubMed ID: 31130329

ABSTRACT

BACKGROUND:

Typhoid fever is a major cause of morbidity and mortality in low-income and middle-income countries. In 2017, WHO recommended the programmatic use of typhoid Vi-conjugate vaccine (TCV) in endemic settings, and Gavi, The Vaccine Alliance, has pledged support for vaccine introduction in these countries. Country-level health economic evaluations are now needed to inform decision-making.

METHODS:

In this modelling study, we compared four strategies: no vaccination, routine immunisation at 9 months, and routine immunisation at 9 months with catch-up campaigns to either age 5 years or 15 years. For each of the 54 countries eligible for Gavi support, output from an age-structured transmission-dynamic model was combined with country-specific treatment and vaccine-related costs, treatment outcomes, and disability weights to estimate the reduction in typhoid burden, identify the strategy that maximised average net benefit (ie, the optimal strategy) across a range of country-specific willingness-to-pay (WTP) values, estimate and investigate the uncertainties surrounding our findings, and identify the epidemiological conditions under which vaccination is optimal.

FINDINGS:

The optimal strategy was either no vaccination or TCV immunisation including a catch-up campaign. Routine vaccination with a catch-up campaign to 15 years of age was optimal in 38 countries, assuming a WTP value of at least US$200 per disability-adjusted life-year (DALY) averted, or assuming a WTP value of at least 25% of each country's gross domestic product (GDP) per capita per DALY averted, at a vaccine price of $1·50 per dose (but excluding Gavi's contribution according to each country's transition phase). This vaccination strategy was also optimal in 48 countries assuming a WTP of at least $500 per DALY averted, in 51 with assumed WTP values of at least $1000, in 47 countries assuming a WTP value of at least 50% of GDP per capita per DALY averted,

and in 49 assuming a minimum of 100%. Vaccination was likely to be cost-effective in countries with 300 or more typhoid cases per 100 000 person-years. Uncertainty about the probability of hospital admission (and typhoid incidence and mortality) had the greatest influence on the optimal strategy.
INTERPRETATION:
Countries should establish their own WTP threshold and consider routine TCV introduction, including a catch-up campaign when vaccination is optimal on the basis of this threshold. Obtaining improved estimates of the probability of hospital admission would be valuable whenever the optimal strategy is uncertain.

WEB: 10.1016/S1473-3099(18)30804-1
IMPACT FACTOR: 25.148
CITED HALF-LIFE: 4.70

START COMMENTARY

Blicke et al. adds to the current typhoid Vi-conjugate vaccine economic evaluation literature by conducting a cost-effectiveness analysis with updated information on vaccine cost and Gavi support as well as providing estimates for individual countries. Based on an announcement from Bharat and communication with Gavi, pricing was set at $1.50 per dose minus country-specific Gavi support. Table 2 outlines the input parameters. Figure 1 shows the reduction in cases based on the three vaccination strategies (excluding no vaccination), with routine vaccination with catch-up to age 15 years demonstrating the highest reduction in cases. For more details on methods and results, please refer to the appendix. Limitations of the study include not comparing vaccination strategies to other interventions (e.g., safe water and sanitation) and lack of country-specific typhoid disease and economic burden data. Authors used modeled estimates to serve as proxies for missing data.

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2. RTS,S malaria vaccine pilot studies: addressing the human realities in large-scale clinical trials

van den Berg M, Ogutu B, Sewankambo NK, Biller-Andorno N, Tanner M.

Trials. 2019 May 31;20(1):316.

PubMed ID: 31151473

ABSTRACT

A malaria vaccine as part of the integrated malaria control and elimination efforts will have a major impact on public health in sub-Sahara Africa. The first malaria vaccine, RTS,S, now enters pilot implementation in three African countries. These pilot implementation studies are being initiated in Kenya, Malawi, and Ghana to inform the broader roll-out recommendation. Based on the malaria vaccine clinical trial experiences, key ethical practices for effective clinical trial research in low-resource settings are described. For successful vaccine integration into malaria intervention programs, the relational dynamics between researchers and trial communities must be made explicit. Incorporating community values and returning to research practices that serve the intended benefactors are key strategies that address the human realities in large-scale clinical trials and pilot implementation, leading to positive public health outcomes.

WEB: 10.1186/s13063-019-3391-7

IMPACT FACTOR: 1.975

CITED HALF-LIFE: 3.40

START COMMENTARY

van den Berg et al. highlight the importance of relational interactions between the research group and communities participating in the trials to foster “autonomy, transparency, and respect.” The authors state that establishing a partnership between clinical trial teams and community members results in improved trial participation, citing the success of Community Advisory Boards (CABS) in the RTS,S phase III trials. They also note the need to continue these trial practices for long-term monitoring and evaluation as potential shifts in more severe disease among older children may cause issues if not properly explained.

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3. Maternal Immunization and Antenatal Care Situation Analysis (MIACSA) study protocol: a multiregional, cross-sectional analysis of maternal immunization delivery strategies to reduce maternal and neonatal morbidity and mortality

Roos N, Lambach P, Mantel C, Mason E, Muñoz FM, Giles M, et al.

BMJ Open. 2019 Jun 4;9(6):e024449.

PubMed ID: 31167857

ABSTRACT

INTRODUCTION:

Maternal immunization (MI) with tetanus toxoid containing vaccine, is a safe and cost-effective way of preventing neonatal tetanus. Given the prospect of introducing new maternal vaccines in the near future, it is essential to identify and understand current policies, practices and unmet needs for introducing and/or scaling up MI in low-income and middle-income countries (LMICs).

METHODS AND ANALYSIS:

The Maternal Immunization and Antenatal Care Situation Analysis (MIACSA) is a mixed methods, cross-sectional study that will collect data in four phases: (1) a review of global databases for selected health indicators in 136 LMICs; (2) a structured online survey directed at Maternal, Newborn and Child Health and Expanded Programme on Immunization focal points in all 136 LMICs; (3) semistructured telephone interviews of 30 selected LMICs and (4) 10 week-long country visits, including key informant interviews, health facility visits and focus group discussions. The principal analyses will assess correlations between the various aspects of MI delivery strategies and proxy measures of health systems performance related to vaccine-preventable disease control. The primary outcome will be a typology of existing MI delivery models, and secondary outcomes will include country profiles of child and maternal health indicators, and a MI gaps and needs analysis.

ETHICS AND DISSEMINATION:

The protocol was approved by the WHO Ethics Review Committee (ERC.0002908). The results will be made available in a project report and submitted for publication in peer-reviewed journals that will be shared broadly among global health decision-makers, researchers, product developers and country-level stakeholders.

WEB: 10.1136/bmjopen-2018-024449

IMPACT FACTOR: 3.413

CITED HALF-LIFE: 2.00

START COMMENTARY

Roos et al. present the Maternal Immunization and Antenatal Care Situation Analysis (MIACSA) study protocol, summarizing each of the three phases of the study in Figures 2 to 5. For data collection phase 3, the investigators will use protection at birth, defined as “the proportion of newborns protected at birth against neonatal tetanus” to stratify countries, a more reliable measure than two doses of tetanus toxoid-containing vaccine during pregnancy (TT2+), which may exclude women who had previously been vaccinated. However, the study is still subject to potential limitations, such as lack of data availability. Study results will be shared widely.

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4. Scope and magnitude of private sector financing and provision of immunization in Benin, Malawi and Georgia

Levin A, Munthali S, Vodungbo V, Rukhadze N, Maitra K, Ashagari T, et al.

Vaccine. 2019 Jun 12;37(27):3568-3575. Epub 2019 May 20.

PubMed ID: 31122855

ABSTRACT

BACKGROUND:

Little is known about the role of private sector providers in providing and financing immunization. To fill this gap, the authors conducted a study in Benin, Malawi, and Georgia to estimate (1) the proportion of vaccinations taking place through the private sector; (2) private expenditures for vaccination; and (3) the extent of regulation.

METHODS:

In each country, the authors surveyed a stratified random sample of 50 private providers (private for-profit and not-for-profit) using a standardized, pre-tested questionnaire administered by trained enumerators. In addition, the authors conducted 300 or more client exit interviews in each country.

RESULTS:

The three countries had different models of private service provision of vaccination. In Malawi, 44% of private facilities, predominantly faith-based organizations, administered an estimated 27% of all vaccinations. In Benin, 18% of private for-profit and not-for-profit facilities provided vaccinations, accounting for 8% of total vaccinations. In Georgia, all sample facilities were privately managed, and conducted 100% of private vaccinations. In all three countries, the Ministries of Health (MoHs) supplied vaccines and other support to private facilities. The study found that 6-76% of clients paid nominal fees for vaccination cards and services, and a small percentage (2-26%) chose to pay higher fees for vaccines not within their countries' national schedules. The percentage of private expenditure on vaccination was less than 1% of national health expenditures. The case studies revealed that service quality at private facilities was mixed, a finding that is similar to those of other studies on private sector vaccination. The three countries varied in how well the MoHs managed and supervised private sector services.

DISCUSSION/CONCLUSION:

The private sector plays a growing role in lower-income countries and is expanding access to services. Governments' ability to regulate and monitor immunization services and promote quality and affordable services in the private sector should be a priority.

WEB: 10.1016/j.vaccine.2019.05.023

IMPACT FACTOR: 3.285

CITED HALF-LIFE: 5.50

START COMMENTARY

Benin, Malawi, and Georgia were selected for case studies because they represented low-income or lower middle-income countries and inclusion in Abt's Strethening Health Outcomes through Private Sector (SHOPS) project or privatization of most of its health facilities. Through these case studies, Roos et al. demonstrate the variation in the role of private sector in delivery of immunizations. Of note, author comment on the potential role of Gavi-eligibility in influencing the availability of immunizations through the private sector—for countries that graduated from Gavi, more private-public partnerships may be present. Additionally, authors highlight the proportion of vaccination fees paid by clients (Table 5) and client satisfaction (Table 7).

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5. System within systems: challenges and opportunities for the Expanded Programme on Immunisation in Pakistan

Haq Z, Shaikh BT, Tran N, Hafeez A, Ghaffar A.

Health Res Policy Syst. 2019 May 17;17(1):51.

PubMed ID: 31101060

ABSTRACT

BACKGROUND:

Pakistan has one of the highest infant and child mortality rates in the world, half of these occurring due to vaccine-preventable diseases. The country started its Expanded Programme on immunisation (EPI) in 1978. However, the programme's performance is often questioned, as the Immunisation rates have been chronically low and on-time vaccination unsatisfactory. We explored the programme's insights about its structural and implementation arrangements within the larger governance system, and the ensuing challenges as well as opportunities.

METHODS:

We carried out a qualitative case study comprised of semi-structured, in-depth interviews with 34 purposively selected key informants from various tiers of immunisation policy and programme implementation. The interviews revolved around WHO's six building blocks of a health system, their interactions with EPI counterparts, and with the outer ecological factors. Interviews were transcribed and content analysed for emergent themes.

RESULTS:

The EPI faces several challenges in delivering routine immunisation (RI) to children, including lack of clarity on whether to provide vaccination through fixed centres or mobile teams, scarcity of human resource at various levels, lack of accurate population data, on-ground logistic issues, lack of a separate budget line for EPI, global pressure for polio, less priority to prevention by the policy, security risks for community-based activities, and community misconceptions about vaccines.

CONCLUSIONS:

The fulcrum for most of the challenges lies where EPI service delivery interacts with components of the broader health system. The activities for polio eradication have had implications for RI. Socio-political issues from the national and global environment also impact this system. The interplay of these factors, while posing challenges to effective implementation of RI, also brings opportunities for improvement. Collective effort from local, national and global stakeholders is required for improving the immunisation status of Pakistani children, global health security and the sustainable development goals.

WEB: 10.1186/s12961-019-0452-z
IMPACT FACTOR: 2.179
CITED HALF-LIFE: n/a

START COMMENTARY

Haq et al. used the six building blocks proposed by WHO: service delivery, health workforce, health information system, access to essential medicines, health financing, and governance leadership. In addition to these six building blocks, the authors sought to examine immunization delivery in the context of national policy, security situation, community perceptions and practices, and global environment. Of note, when assessing community perceptions and practices, one participant from a federal EPI stated, “The challenge is that misperceptions may not be the same across proviences and districts; hence a blanket communication is less likely to work.” Additionally, an interesting observation which may be unique to Pakistan was the expectation that vaccines would be delivered door-to-door due to the robust polio vaccination campaigns.

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6. Changes in childhood vaccination coverage over time in the Democratic Republic of the Congo

Alfonso VH, Bratcher A, Ashbaugh H, Doshi R, Gadoth A, Hoff N, et al.

PLoS One. 2019 May 24;14(5):e0217426.

PubMed ID: 31125375

ABSTRACT

Despite increased vaccination rates, the burden, morbidity and mortality associated with vaccine preventable diseases remains high. In the Democratic Republic of the Congo (DRC), potentially unreliable data and geographically varied program provision call for a better understanding of vaccination coverage and its changes over time at the country and province level. To assess changes in the proportion of children who were fully vaccinated over time in the DRC, vaccination histories for children 12-59 months of age were obtained from both the 2007 and 2013-2014 Demographic and Health Surveys (DHS). Changes were assessed, both at the country- and province-levels, to identify potential geographic variations. Vaccination coverage improved 70% between the DHS waves: 26% compared to 44% of 12-59 month-old children met full vaccination criteria in 2007 and 2013-2014, respectively (n2007 = 3032 and n2013-14 = 6619). Similarly, there was an overall trend across both DHS waves where as year of birth increased, so did vaccination coverage. There was geographic variation in immunization changes with most central and eastern provinces increasing in coverage and most northern, western and southern provinces having decreased vaccination coverage at the second time point. Using nationally representative data, we identified significant changes over time in vaccination coverage which may help to inform future policy, interventions and research to improve vaccination rates among children in the DRC. This study is the first of its kind for the population of DRC and provides an important initial step towards better understanding trends in vaccination coverage over time.

WEB: 10.1371/journal.pone.0217426

IMPACT FACTOR: 2.766

CITED HALF-LIFE: 2.70

START COMMENTARY

Alfonso et al. conducted the first nationally representative study assessing differences in vaccination coverage over time. Strengths of this study include the ability to conduct sub-national, geographic assessments and conducting sensitivity analyses on the vaccination status data source (i.e.,

vaccination cards versus maternal recall), a known source of potential error. Limitations of this study included not assessing serologic confirmation of immunity and potential for survival bias (i.e., only including children who survived are more likely to have been vaccinated). It is unclear whether authors assessed any methodological changes from DHS 2007 to DHS 2013-2014 that may contribute to differences observed in the results.

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7. Immunization coverage of 12-23 months old children and its associated factors in Minjar-Shenkora district, Ethiopia: a community-based study

Mekonnen AG, Bayleyegn AD, Ayele ET.

BMC Pediatr. 2019 Jun 14;19(1):198.

PubMed ID: 31200690

ABSTRACT

BACKGROUND:

Childhood vaccinations have been shown to be effective in protecting children against vaccine-preventable diseases. The systematic investigation of the causes of incomplete immunization is critical for the full immunization and develop health system interventions to improve immunization coverage. To date, no community-based immunization coverage assessment study was conducted in Minjar-shenkora district. Therefore, the aim of this study was to assess the immunization coverage and its factors among 12-23 months old children in Minjar-shenkora district, Ethiopia.

METHODS:

Community-based cross-sectional study was conducted from September to November 2017. A total of 566 children aged 12-23 months and their mothers/caregivers were successfully interviewed using structured and pre-tested questionnaire. A stratified sampling technique was employed. Study participants were selected systematically. Data were entered into Epi data version 3.1 and exported into SPSS version 21 for analysis. Logistic regression analyses were done. A significant association was declared at a p-value less than 0.05.

RESULTS:

Three fourth (75.6%) of 12-23 months old children were fully vaccinated. Incorrect appointment date (46.4%), the experience of child sickness with previous vaccination (35.2%) and disrespectful behavior of health professionals (14.3%) were the most common reasons cited by mothers/caregivers for incomplete vaccination of children. Being unmarried (AOR = 3.52, CI = 2.61, 9.15), not being a member of health development army (AOR = 3.31, CI = 2.01, 11.65) and traveling time greater than two hours on foot (AOR = 2.46, CI = 5.01, 17.18) were predictors of incomplete immunization.

CONCLUSIONS:

Child immunization coverage was still below the governmental plan of 90% in 2020. Being unmarried, not being a member of health development army and traveling time greater than two hours on foot were predictors of incomplete immunization. Strengthen health development army

programmatic interventions in the community will improve child vaccination completion in the district. The issue of long travel time should be addressed by increasing the number of new vaccination sites/clusters in the district.

WEB: 10.1186/s12887-019-1575-7
IMPACT FACTOR: 1.983
CITED HALF-LIFE: 4.00

START COMMENTARY

There were several strengths in this study, including a high response rate from the original 573 households selected, the ability to measure drop-out based on vaccination doses, and the ability to compare what factors might be associated with complete and incomplete vaccination status. Limitations of the study included not providing information on what proportion of responses were from vaccination cards versus self-report and the potential for the survey to drive responses. Authors did not discuss the most popular reason for incomplete vaccination—incorrect appointment date. Despite these limitations the authors identified potential areas of intervention.

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8. Barriers and opportunities for improving childhood immunization coverage in slums: A qualitative study

Singh S, Sahu D, Agrawal A, Vashi MD.

Prev Med Rep. 2019 Mar 28;14:100858.

PubMed ID: 30997325

ABSTRACT

There is substantial variability in immunization coverage trends across the globe which can be attributed to a number of factors such as demographic profile, socioeconomic characteristics and political environment. Vaccine preventable diseases contribute to severe disease burden when coverage is low, particularly, in slums. Present qualitative study explored barriers, opportunities, and key facilitators of childhood immunization. This was a community based cross-sectional study conducted in the slum areas of Mumbai, India. Data from the observations of immunization sessions and interviews of end users, healthcare service providers, and influencers were collected and analyzed. Lack of time, poor awareness, fear of adverse event, loss of daily income, and migrant population were some of the major reasons to not get immunized. Also, lack of good behavior of staff was another crucial factor perceived by caretakers as barrier in the immunization. Stakeholders agreed that immunization is a shared responsibility involving community, service providers, and policy makers. There was general consensus that immunization practices have improved over the last few years. However, its positive impact is yet to be fully seen in populations that belong to lower socioeconomic strata, thus warranting additional efforts to improve the immunization coverage in slums. Effective communication, process improvement at various levels, active involvement of communities in the immunization activities, building trust and accountability, and constructive feedback are some of the essential elements to strengthen the immunization program. Strategies to improve immunization services in such settings should be based on interactions with stakeholders and understanding their perspectives.

WEB: 10.1016/j.pmedr.2019.100858

IMPACT FACTOR: n/a

CITED HALF-LIFE: n/a

START COMMENTARY

Singh et al. conducted a community-based study in 55 randomly selected slum health posts from a total of 205 health posts in Mumbai, India, where 62% of its over 20 million inhabitants live in slums.

Participants of the in-depth interviews were purposively selected to receive semi-structured questionnaires. A thematic analysis was conducted to organize the explored barriers and facilitators to vaccination. A common theme found from both the in-depth interviews and non-participatory observations was the lack of up-to-date vaccine information known by caretakers and/or shared with caretakers, namely immunization schedule, benefits, and potential adverse events. The authors also highlighted observations and accounts of poor attitudes from healthcare workers, describing them as, “authoritative demonstrating lack of empathy” and attributing their attitudes to heavy work load and understaffing. Authors identified potential areas of intervention, including a running informational video in waiting rooms and health talks by service providers. Other important points the authors identified in their study were the impact of the introduction of newer vaccines in the national immunization programs, mass vaccination campaigns, and “Mission Indradhanush” to improve awareness and coverage of childhood vaccines, and the recognition that those living in slums are “floating populations from difference states and cultures” and that healthcare providers should strive to “understand their views which will help in building their trust.”

There were several limitations to this study. The study was subject to observer and interviewer effect. Additionally, little information was provided regarding the individuals and conditions under which the observations and interviews were conducted; therefore, it was unclear how authors aimed to reduce subjectivity of observers and interviewers as a potential source of bias. Selection bias may also be an issue as a subset of individuals were purposively sampled within the randomly selected clusters. The study would have benefitted from some grounding of the barriers and facilitators to actual coverage values, as well as a discussion of any heterogeneities across the slums. Authors alluded to a quantitative analysis conducted within the same study clusters, which may explore these points. A strength of the study was the use of both non-participatory observations and in-depth interviews. Each method limits the other method’s potential bias or subjectivity of the observer or the interviewee by providing perspectives from both the healthcare provider/caretaker and the investigator, respectively. Overall, this study highlights key barriers and a few facilitators in the environmental and cultural context of the slums in Mumbai, which offers potential areas for intervention to improve coverage of childhood immunizations.

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9. Rubella Vaccination Coverage Among Women of Childbearing Age in Vietnam

Do TTT, Nguyen AN, Le XTT, Pongsakul A, Nguyen QN, Nguyen TV, et al.

Int J Environ Res Public Health. 2019 May 16;16(10).
PubMed ID: 31100981

ABSTRACT

Despite the availability of effective and safe rubella vaccines for women of childbearing age, prevention and control of congenital rubella syndrome in children remains challenging in Vietnam. In order to examine this issue, we conducted a cross-sectional study, examining the current coverage of rubella vaccination before pregnancy among 807 pregnant women and women with children under 12 months of age in urban and rural districts, Dong Da and Ba Vi, in Hanoi, Vietnam. In this population, we observed an alarming non-compliance rate with rubella vaccination before pregnancy in both localities. Among the 82.0% of participants who remained unvaccinated against this contagious viral infection, 95.8% of them were in Ba Vi district, compared to 68.0% in Dong Da district ($p < 0.001$). Besides the differences in age, number of children, education levels, primary occupations and monthly incomes among the participants between the two districts, other reasons for noncompliance with rubella vaccination includeddisinterest in rubella vaccination, the high cost and long distance to vaccination sites as well as unawareness of vaccination locations. In addition to addressing the unique socio-economicchallenges behind one's accessibility to vaccination services in urban and rural areas, our study supports a continued effort in ensuring proper access to and education about pre-pregnancy vaccines and vaccination among women of childbearing age in order to achieve and sustain sufficient immunization coverage of rubella and other vaccine-preventable diseases in both settings.

WEB: 10.3390/ijerph16101741
IMPACT FACTOR: 2.145
CITED HALF-LIFE: 3.40

START COMMENTARY

Do et al. described the history of rubella in Vietnam in the Background section. The identification of differences in rubella vaccination among women before pregnancy living in rural and urban settings allows interventions to be tailored to the respective setting. Limitations of this study include the inability to determine causal relationships, potential reporting bias, especially of reasons for why women did not receive rubella vaccines before pregnancy, and potential selection bias resulting from

convenience sampling. It may also be interesting to assess whether women were participating in family planning prior to pregnancy.

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10. Childhood Immunization in Ethiopia: Accuracy of Maternal Recall Compared to Vaccination Cards

Porth JM, Wagner AL, Tefera YA, Boulton ML.

Vaccines (Basel). 2019 Jun 7;7(2).

PubMed ID: 31181681

ABSTRACT

Health surveys conducted in low- and middle-income countries typically estimate childhood vaccination status based on written vaccination cards, maternal recall (when cards are not available), or a combination of both. This analysis aimed to assess the accuracy of maternal recall of a child's vaccination status in Ethiopia. Data came from a 2016 cross-sectional study conducted in the Southern Nations, Nationalities, and Peoples' (SNNP) Region of Ethiopia. Vaccine doses received by a given 12-23-month-old child were recorded from both a vaccination card and based on maternal recall and then compared. Concordance, sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and Cohen's Kappa were calculated. Estimates of full immunization coverage were similar when collected via vaccination card (75%) and maternal recall (74%). For fully vaccinated children, comparison of maternal recall versus vaccination card showed high concordance (96%), sensitivity (97%), specificity (93%), PPV (98%), NPV (92%), and Kappa (90%). Accuracy of maternal recall of a child's vaccination status is high in the SNNP region of Ethiopia. Although determination of vaccination status via vaccination card is preferred since it constitutes a written record, maternal recall can also be used with confidence when vaccination cards are not available.

WEB: 10.3390/vaccines7020048

IMPACT FACTOR: 4.760

CITED HALF-LIFE: n/a

START COMMENTARY

As Porth et al. described, understanding the accuracy of maternal recall of childhood immunizations can have implications towards assessing and improving vaccination coverage. The positive predictive value (PPV) and negative predictive value (NPV) observed in this study suggest that given a mother's response, the probability of estimating the true vaccination status of a child is high. However, Porth et al. found low specificity (25 to 50%) for four vaccines (Bacillus Calmette-Guérin [BCG], pentavalent [including diphtheria, tetanus, pertussis, hepatitis B, and *Haemophilus influenzae*

type B], pneumococcal conjugate vaccine [PCV], and rotavirus), suggesting that among children who are unvaccinated, the ability of mothers to accurately identify their child as unvaccinated is low. Authors noted this finding to be “especially concerning as it potentially represents a worst-case scenario” of mothers not vaccinating their unvaccinated child due to the belief that their child had been vaccinated. Furthermore, the magnitude of this scenario could be high due to the large population of children who are not fully vaccinated in Ethiopia. Alternatively, the authors posited the possibility that mother’s recall was accurate and documentation of vaccination on vaccination cards was missing, putting into question the validity of the “gold standard.” There were several limitations, but the most significant was that 51% of the original sample were excluded because they did not have a vaccination card. The authors cited the association between possession of a vaccination card and vaccination status, and so the potential for selection bias of the population of interest (i.e., individuals without vaccination cards) is high. These points should be considered when interpreting the results of this study.

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Appendix

The literature search for the July 2019 Vaccine Delivery Research Digest was conducted on June 18, 2019. We searched English language articles indexed by the US National Library of Medicine and published between May 15, 2019 and June 14, 2019. The search resulted in 231 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]) ("2019/05/15"[PDAT] : "2019/06/14"[PDAT]))