VACCINE DELIVERY RESEARCH DIGEST

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

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1. Immunogenicity and safety of an adjuvanted inactivated polio vaccine, IPV-Al, compared to standard IPV: A phase 3 observer-blinded, randomised, controlled trial in infants vaccinated at 6, 10, 14 weeks and 9 months of age

Bravo LC, Carlos JC, Gatchalian SR, Montellano MEB, Tabora CFCB, Thierry-Carstensen B, et al.

Vaccine. 2019 Nov 5. [Epub ahead of print]

PubMed ID: 31703934

ABSTRACT

BACKGROUND:

A dose-sparing inactivated polio vaccine (IPV-Al), obtained by adsorption of inactivated virus to an aluminium hydroxide adjuvant, can help mitigate global supply and the cost constraints of IPV. The objective of this trial was to demonstrate the non-inferiority of IPV-Al to standard IPV.

METHODS:

This phase 3, observer-blinded, randomised, controlled trial was conducted at 5 investigational sites in the Philippines. Infants not previously vaccinated with any polio vaccines were randomised to receive three IPV-Al (n = 502) or IPV vaccinations (n = 500) at 6, 10 and 14 weeks of age plus a booster vaccination at 9 months. The primary endpoint was type-specific seroconversion, defined as an antibody titre ≥4-fold higher than the estimated maternal antibody titre and a titre ≥8, one month after the primary vaccination series.

RESULTS:

Seroconversion rates following primary vaccination with IPV-Al (483 infants in the per-protocol analysis set) or IPV (478 infants) were: polio type 1, 97.1% versus 99.0%; type 2, 94.2% versus 99.0%; and type 3, 98.3% versus 99.6%. IPV-Al was non-inferior to IPV, as the lower 95% confidence limits of the treatment differences were above the predefined -10%-point limit: type 1, -1.85% (-3.85; -0.05); type 2, -4.75% (-7.28; -2.52); type 3, -1.24 (-2.84; 0.13). The booster effect (geometric mean titre (GMT) post-booster / GMT pre-booster) was: type 1, 63 versus 43; type 2, 54 versus 47; type 3, 112 versus 80. IPV-Al was well tolerated with a safety profile comparable to that

of IPV. Serious adverse events were recorded for 29 infants (5.8%, 37 events) in the IPV-Al group compared to 28 (5.6%, 48 events) in the IPV group.
CONCLUSION:
Non-inferiority of IPV-Al to IPV with respect to seroconversion was confirmed and a robust booster response was demonstrated. Both vaccines had a similar safety profile. ClinicalTrials.gov identifier: NCT03032419.

WEB: 10.1016/j.vaccine.2019.10.064
IMPACT FACTOR: 3.269
CITED HALF-LIFE: 3.1

START COMMENTARY

Bravo et al. conducted a phase 3 non-inferiority study comparing inactivated polio vaccine with an aluminum hydroxide adjuvant (IPV-AI) to standard inactivated polio vaccine (IPV). Dose-sparing IPV-AI uses one tenth of each antigen in IPV, which is intended to increase vaccine supply and lower costs. To determine non-inferiority of IPV-AI to IPV, Bravo et al. set a non-inferiority margin of 10% for their primary endpoint, proportion of infants demonstrating both seroconversion and seroprotection one month after the primary vaccination series (i.e., 3 doses at 6, 10, and 14 weeks). Authors justified this less conservative margin with the recent decreasing risk of poliomyelitis infection and by having a stricter primary endpoint of seroconversion and seroprotection (versus only seroprotection). Authors did not adjust for pre-booster GMTs and both pre-booster and post-booster GMTs were found to be lower among infants receiving IPV-AI compared to infants receiving IPV, a limitation of the study (see Table 3). Table 3 and figure 2 demonstrate that while infants from both IPV-AI and IPV groups achieved high seroprotection post-booster vaccination at 10 months, seroprotection pre-booster vaccination at 9 months was lower among infants receiving IPV-AI for Type 1 (88.0% vs. 100%) and Type 3 (93.5% vs. 99.8%) compared to IPV. This observation highlights the importance of administering booster vaccinations, a challenge in some settings. Despite these limitations, Bravo et al. demonstrated that IPV-AI could be a potential solution to address vaccine supply and cost challenges.

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2. Future Directions for Meningitis Surveillance and Vaccine Evaluation in the Meningitis Belt of Sub-Saharan Africa

Novak RT, Ronveaux O, Bita AF, Aké HF, Lessa FC, Wang X, et al.

J Infect Dis. 2019 Oct 31;220(Supplement_4):S279-S285.

PubMed ID: 31671452

ABSTRACT

In sub-Saharan Africa, bacterial meningitis remains a significant public health problem, especially in the countries of the meningitis belt, where Neisseria meningitidis serogroup A historically caused large-scale epidemics. In 2014, MenAfriNet was established as a consortium of partners supporting strategic implementation of case-based meningitis surveillance to monitor meningitis epidemiology and impact of meningococcal serogroup A conjugate vaccine (MACV). MenAfriNet improved data quality through use of standardized tools, procedures, and laboratory diagnostics. MenAfriNet surveillance and study data provided evidence of ongoing MACV impact, characterized the burden of non-serogroup A meningococcal disease (including the emergence of a new epidemic clone of serogroup C), and documented the impact of pneumococcal conjugate vaccine. New vaccines and schedules have been proposed for future implementation to address the remaining burden of meningitis. To support the goals of "Defeating Meningitis by 2030," MenAfriNet will continue to strengthen surveillance and support research and modeling to monitor the impact of these programs on meningitis burden in sub-Saharan Africa.

WEB: 10.1093/infdis/jiz421

IMPACT FACTOR: 5.045

CITED HALF-LIFE: 9.6

START COMMENTARY

Through MenAfriNet's case-based surveillance, decreases in meningitis due to *Neisseria Meningitidis* serogroup A were observed post-introduction of the meningococcal serogroup A conjugate vaccine. These surveillance data showed an emergence of serogroups C, W, and X. Novak et al. noted the opportunity for MenAfriNet to facilitate meningococcal and pneumococcal vaccine studies, specifically studies of new formulations and new vaccination strategies. MenAfriNet also seeks to focus case-based surveillance in two high-risk countries and focus on improving regional technical assistance. Another area for improvement is to enhance laboratory capacity in order to make whole-genome sequencing more accessible for low-resources settings. For more

information on MenAfriNet and vaccines studies, refer to the Journal of Infectious Diseases supplement (https://academic.oup.com/jid/issue/220/Supplement_4).

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3. Patient and provider perspectives on how trust influences maternal vaccine acceptance among pregnant women in Kenya

Nganga SW, Otieno NA, Adero M, Ouma D, Chaves SS, Verani JR, et al.

BMC Health Serv Res. 2019 Oct 24;19(1):747.

PubMed ID: 31651307

ABSTRACT

BACKGROUND:

Pregnant women and newborns are at high risk for infectious diseases. Altered immunity status during pregnancy and challenges fully vaccinating newborns contribute to this medical reality. Maternal immunization is a strategy to protect pregnant women and their newborns. This study aimed to find out how patient-provider relationships affect maternal vaccine uptake, particularly in the context of a lower middle- income country where limited research in this area exists.

METHODS:

We conducted semi-structured, in-depth narrative interviews of both providers and pregnant women from four sites in Kenya: Siaya, Nairobi, Mombasa, and Marsabit. Interviews were conducted in either English or one of the local regional languages.

RESULTS:

We found that patient trust in health care providers (HCPs) is integral to vaccine acceptance among pregnant women in Kenya. The HCP-patient relationship is a fiduciary one, whereby the patients' trusts is primarily rooted in the provider's social position as a person who is highly educated in matters of health. Furthermore, patient health education and provider attitudes are crucial for reinstating and fostering that trust, especially in cases where trust was impeded by rumors, community myths and misperceptions, and religious and cultural factors.

CONCLUSION:

Patient trust in providers is a strong facilitator contributing to vaccine acceptance among pregnant women in Kenya. To maintain and increase immunization trust, providers have a critical role in cultivating a positive environment that allows for favorable interactions and patient health education. This includes educating providers on maternal immunizations and enhancing knowledge of effective risk communication tactics in clinical encounters.

WEB: 10.1186/s12913-019-4537-8

IMPACT FACTOR: 1.932

CITED HALF-LIFE: 5.4

START COMMENTARY

A convenience sample of 328 pregnant women and 112 healthcare providers were interviewed. Interview questions were developed using grounded theory. Intercoder testing was conducted to ensure adequate agreement (kappa $\geq$ 0.80) on codes. While there were examples of patient acceptance of provider authoritative approaches, Nganga et al. noted the importance of shifting to a more communicative and mutually respectful patient-provider relationship. Interestingly, authors noted a couple differences between urban and rural perspectives. Selection bias may be a limitation of this study. Only pregnant women seeking antenatal care at public facilities were interviewed. Women attending private facilities or who do not seek care may have different perspectives on trust and vaccine acceptance. Furthermore, a nurses' strike occurred during the study period and may also impact responses.

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4. Systematic review of the costs and effectiveness of interventions to increase infant vaccination coverage in low- and middle-income countries

Munk C, Portnoy A, Suharlim C, Clarke-Deelder E, Brenzel L, Resch SC, et al.

BMC Health Serv Res. 2019 Oct 22;19(1):741.

PubMed ID: 31640687

ABSTRACT

BACKGROUND:

In recent years, several large studies have assessed the costs of national infant immunization programs, and the results of these studies are used to support planning and budgeting in low- and middle-income countries. However, few studies have addressed the costs and cost-effectiveness of interventions to improve immunization coverage, despite this being a major focus of policy attention. Without this information, countries and international stakeholders have little objective evidence on the efficiency of competing interventions for improving coverage.

METHODS:

We conducted a systematic literature review on the costs and cost-effectiveness of interventions to improve immunization coverage in low- and middle-income countries, including both published and unpublished reports. We evaluated the quality of included studies and extracted data on costs and incremental coverage. Where possible, we calculated incremental cost-effectiveness ratios (ICERs) to describe the efficiency of each intervention in increasing coverage.

RESULTS:

A total of 14 out of 41 full text articles reviewed met criteria for inclusion in the final review. Interventions for increasing immunization coverage included demand generation, modified delivery approaches, cash transfer programs, health systems strengthening, and novel technology usage. We observed substantial heterogeneity in costing methods and incompleteness of cost and coverage reporting. Most studies reported increases in coverage following the interventions, with coverage increasing by an average of 23 percentage points post-intervention across studies. ICERs ranged from $0.66 to $161.95 per child vaccinated in 2017 USD. We did not conduct a meta-analysis given the small number of estimates and variety of interventions included.

CONCLUSIONS:

There is little quantitative evidence on the costs and cost-effectiveness of interventions for improving immunization coverage, despite this being a major objective for national immunization programs. Efforts to improve the level of costing evidence-such as by integrating cost analysis within

implementation studies and trials of immunization scale up-could allow programs to better allocate resources for coverage improvement. Greater adoption of standardized cost reporting methods would also enable the synthesis and use of cost data.

WEB: 10.1186/s12913-019-4468-4
IMPACT FACTOR: 1.932
CITED HALF-LIFE: 5.4

START COMMENTARY

Building upon reviews conducted by Pegurri et al. and Batt et al., Munk et al. conducted a systematic review of literature published since 2003 on the cost and cost-effectiveness of interventions designed to increase coverage of vaccination for infants aged 1 year or younger. Munk et al. conducted a robust search from 15 databases and using “sensitivity- and specificity-optimized search strategies.” They also assessed quality of studies with the Consensus on Health Economic Criteria checklist and found an average score of 14 out of 17. Only 11 of the 14 studies provided enough information to calculate ICERs. Authors caution comparison of ICERs as differences in values may be due to study design differences rather than differences in interventions. For a summary of findings by study, refer to Table 2.

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5. The impact of an integrated electronic immunization registry and logistics management information system (EIR-eLMIS) on vaccine availability in three regions in Tanzania: A pre-post and time-series analysis

Gilbert SS, Bulula N, Yohana E, Thompson J, Beylerian E, Werner L, et al.

Vaccine. 2019 Nov 7. [Epub ahead of print]

PubMed ID: 31706808

ABSTRACT

BACKGROUND:

Since 2016, the Government of Tanzania has been implementing TImR, an integrated Electronic Immunization registry-logistics management information system (EIR-LMIS) that includes stock notifications. The objective of this study is to estimate the impact of this intervention on vaccine availability.

METHODS:

Monthly stock-out data were collected from paper registers at facilities, an Excel-based system at districts, and the new system (TImR) across all 924 health facilities in Arusha, Tanga and Kilimanjaro Regions. Six months of stockout rates pre- and post-introduction, by antigen, were compared via a two-way analysis of variance (ANOVA). A mixed-effects logistic regression model with the TImR data identified predictors of vaccine availability across antigens.

FINDINGS:

Post-introduction, ANOVA models estimated that overall stock-out rates declined from a monthly average of 7.1% to 2.1% ($p < 0.01$). Three specific vaccines had fewer stock-outs; OPV's monthly average dropped from 12.5% to 2.1% ($p < 0.01$), MR from 9.4% to 1.0% ($p < 0.01$) and DTP-HepB-HiB from 8.1% to 1.7% ($p < 0.01$). In the mixed-effects logistic regression model, controlling for antigen, odds of stock-out were 4.1% (95% CI: 3.3 - 4.9) lower for each week of tenure. Compared to DTP-HepB-HiB vaccine, odds of BCG vaccine being stocked out were 4.31 as high (95% CI: 3.1 - 5.0). The odds of being stocked-out were 29.7% lower for PCV (95% CI: 8.8 - 45.8) and 26.6% (95% CI: 3.4 - 44.1) lower for rotavirus vaccines compared to DTP-HepB-HiB. The odds of stock out were 37.7% lower for MR vaccine than DTP-HepB-HiB (95% CI: 18.1 - 52.6).

CONCLUSIONS:

Tanzania's integrated EIR-eLMIS may increase vaccine availability compared to its paper and Excel based system. Post-introduction of an eLMIS, the odds of a vaccine stock-out reduced over time.

Further research could determine the impact of this intervention on vaccine wastage and replenishment response times.

WEB: 10.1016/j.vaccine.2019.10.059
IMPACT FACTOR: 3.269
CITED HALF-LIFE: 3.1

START COMMENTARY

Gilbert et al. conducted two main analyses, comparing stock-out rates pre- and post-introduction of TImR and assessing the relationship between time since implementation of TImR and stock-outs. Over 80% of the total 924 facilities were excluded from the analysis due to incomplete data, including all facilities from the Kilimanjaro region. While vaccine availability was high post-TImR implementation in facilities in Arusha and Tanga regions, these results have limited generalizability. Facilities with complete data may more likely be higher performing than facilities with incomplete data. If there are seasonal differences in stock-outs, comparing six-month periods instead of 12-month periods may also be a limitation of the study.

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6. An integrated health delivery platform, targeting soil-transmitted helminths (STH) and canine mediated human rabies, results in cost savings and increased breadth of treatment for STH in remote communities in Tanzania

Lankester F, Davis A, Kinung'hi S, Yoder J, Bunga C, Alkara S, et al.

BMC Public Health. 2019 Oct 28;19(1):1398.

PubMed ID: 31660915

ABSTRACT

BACKGROUND:

Achieving the Sustainable Development Goal of a 90% reduction in neglected tropical diseases (NTDs) by 2030 requires innovative control strategies. This proof-of-concept study examined the effectiveness of integrating control programs for two NTDs: mass drug administration (MDA) for soil-transmitted helminths in humans and mass dog rabies vaccination (MDRV).

METHODS:

The study was carried out in 24 Tanzanian villages. The primary goal was to demonstrate the feasibility of integrating community-wide MDA for STH and MDRV for rabies. The objectives were to investigate the popularity, participation and cost and time savings of integrated delivery, and to investigate the reach of the MDA with respect to primary school-aged children and other community members. To implement, we randomly allocated villages for delivery of MDA and MDRV (Arm A), MDA only (Arm B) or MDRV only (Arm C).

RESULTS:

Community support for the integrated delivery was strong (e.g. 85% of focus group discussions concluded that it would result in people getting "two for one" health treatments). A high proportion of households participated in the integrated Arm A events (81.7% MDA, 80.4% MDRV), and these proportions were similar to those in Arms B and C. These findings suggest that coverage might not be reduced when interventions are integrated. Moreover, in addition to time savings, integrated delivery resulted in a 33% lower cost per deworming dose and a 16% lower cost per rabies vaccination. The median percentage of enrolled primary school children treated by this study was 76%. However, because 37% of the primary school aged children that received deworming treatment were not enrolled in school, we hypothesize that the employed strategy could reach more school-aged children than would be reached through a solely school-based delivery strategy.

CONCLUSIONS:

Integrated delivery platforms for health interventions can be feasible, popular, cost and time saving. The insights gained could be applicable in areas of sub-Saharan Africa that are remote or underserved by health services. These results indicate the utility of integrated One Health delivery platforms and suggest an important role in the global campaign to reduce the burden of NTDs, especially in hard-to-reach communities.
TRIAL REGISTRATION:
clinicaltrials.gov NCT03667079 , retrospectively registered 11th September 2018.

WEB: 10.1186/s12889-019-7737-6
IMPACT FACTOR: 2.567
CITED HALF-LIFE: 5.5

START COMMENTARY

Lankester et al. demonstrated the feasibility of conducting an integrated mass drug administration against soil-transmitted helminth and mass dog rabies vaccination in Tanzania. Furthermore, they found general acceptability of the integrated approach, lower costs compared to independent administration of interventions (see Tables 1 and 2), and a greater reach when compared to school-based de-worming programs that only cover school-aged children enrolled in school (see Figure 2). The authors did highlight potential challenges: some participants found the integrated intervention approach unfavorable as it was seen as “unhygienic” or “difficult” and some parts of the study were not conducted in all villages due to budgetary and time constraints and inclement weather. A limitation of the study was the difficulty in determining accurate denominators for village level human populations. Interestingly, authors noted that the study fostered a collaborative experience between veterinary and medical teams.

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7. Seasonal influenza vaccination in middle-income countries: Assessment of immunization practices in Belarus, Morocco, and Thailand

Mantel C, Chu SY, Hyde TB, Lambach P; IPIE Pilot Implementation Group.

Vaccine. 2019 Nov 4. [Epub ahead of print]

PubMed ID: 31699507

ABSTRACT

BACKGROUND:

Vaccines for the control of seasonal influenza are recommended by the World Health Organization (WHO) for use in specific risk groups, but their use requires operational considerations that may challenge immunization programs. Several middle-income countries have recently implemented seasonal influenza vaccination. Early program evaluation following vaccine introduction can help ascertain positive lessons learned and areas for improvement.

METHODS:

An influenza vaccine post-introduction evaluation (IPIE) tool was developed jointly by WHO and the U.S. Centers for Disease Control and Prevention to provide a systematic approach to assess influenza vaccine implementation processes. The tool was used in 2017 in three middle-income countries: Belarus, Morocco and Thailand.

RESULTS:

Data from the three countries highlighted a number of critical factors: Health workers (HWs) are a key target group, given their roles as key influencers of acceptance by other groups, and for ensuring vaccine delivery and improved coverage. Despite WHO recommendations, pregnant women were not always prioritized and may present unique challenges for acceptance. Target group denominators need to be better defined, and vaccine coverage should be validated with vaccine distribution data, including from the private sector. There is a need for strengthening adverse events reporting and for addressing potential vaccine hesitancy through the establishment of risk communication plans. The assessments led to improvements in the countries' influenza vaccination programs, including a revision of policies, changes in vaccine management and coverage estimation, enhanced strategies for educating HWs and intensified collaboration between departments involved in implementing seasonal influenza vaccination.

CONCLUSION:

The IPIE tool was found useful for delineating operational strengths and weaknesses of seasonal influenza vaccination programs. HWs emerged as a critical target group to be addressed in follow-up

action. Findings from this study can help direct influenza vaccination programs in other countries, as well as contribute to pandemic preparedness efforts. The updated IPIE tool is available on the WHO website http://www.who.int/immunization/research/development/influenza/en/index1.html.

WEB: 10.1016/j.vaccine.2019.10.028
IMPACT FACTOR: 3.269
CITED HALF-LIFE: 3.1

START COMMENTARY

Mantel et al. chose Belarus, Morocco, and Thailand because they were in varying levels of influenza vaccination program development. Table 1 summarizes the Influenza Vaccine Post-Introduction Evaluation (IPIE) for each country. While this study has limited generalizability due to the small number of countries assessed, this study demonstrates the value of conducting IPIE. Authors stated that IPIE discussions helped participating countries identify challenges and best practices. Study results were similar to what has been observed in the literature and suggested actions were provided in the conclusion.

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8. Implementation fidelity of village health and nutrition days in Hardoi District, Uttar Pradesh, India: a cross-sectional survey

Johri M, Rodgers L, Chandra D, Abou-Rizk C, Nash E, Mathur AK.

BMC Health Serv Res. 2019 Oct 26;19(1):756.

PubMed ID: 31655588

ABSTRACT

BACKGROUND:

Village Health and Nutrition Days (VHNDs) are a cornerstone of the Government of India's strategy to provide first-contact primary health care to rural areas. Recent government programmes such as the Janani Suraksha Yojana (JSY) and Mission Indradhanush (MI) have catalysed important changes impacting VHNDs. To learn how VHNDs are currently being delivered, we assessed the fidelity of services provided as compared to government norms in a priority district of Uttar Pradesh.

METHODS:

We fielded a cross-sectional study of VHNDs to provide a snapshot of health services functioning. Process evaluation data were collected via administrative sources, non-participant observation using a standardised form, and structured questionnaires. Questionnaires were designed using a framework to assess implementation fidelity. Key respondents were VHND participants, front-line workers involved in VHND delivery, and VHND non-participants (pregnant women due for antenatal care or children due for vaccination as per administrative records). Results were summarised as counts, frequencies, and proportions.

RESULTS:

In the 30 villages randomly selected for inclusion, 36 VHNDs were scheduled but four (11.1%) were cancelled and one VHND was not surveyed. Vaccination and antenatal care were offered at 96.8% (30/31) and child weighing at 83.9% (26/31) of VHNDs. Other normed services were infrequently provided or completely absent. Health education and promotion were particularly weak; institutional delivery was the only topic discussed in a majority of VHNDs. The true proportion of any serious problem impeding vaccine delivery was 47.2% (17/36), comprising 4 VHND cancellations and 13 VHNDs experiencing vaccine shortages. Of the 13 incidents of vaccine shortage, 11 related to an unexpected global shortage of injectable polio vaccine (IPV). Over the 31 VHNDs, 37.8% (171 of the 452 scheduled beneficiaries) did not participate. Analysis of missed opportunities for vaccination highlighted inaccuracies in beneficiary identification and tracking and demand side-factors.

CONCLUSIONS:

The transformative potential of VHNDs to improve population health is only partially being met. A core subset of high-priority services for antenatal care, institutional delivery, and vaccination

associated with high-priority government programmes (JSY, MI) is now being provided quite successfully. Other basic health promotion and prevention services are largely not provided, constituting a critical missed opportunity.

WEB: 10.1186/s12913-019-4625-9
IMPACT FACTOR: 1.932
CITED HALF-LIFE: 5.4

START COMMENTARY

Figure 1 describes the flow diagram of village health and nutrition days (VHND) and number of participants surveyed. The study period was from December 2016 to March 2017. A summary of reasons for non-participation in VHND is summarized in Table 4. This study highlights the challenges of reaching migrating families and delivering services that “operate through complex behavioural pathways.” Limitations of this study include the inability to conduct a qualitative assessment of implementation fidelity, the inability to examine the quality of equipment, the inability to verify administrative due list completeness, and lack of generalizability to outside the study district. Despite these limitations, authors believe VHND have had a positive impact in Uttar Pradesh and hold great potential for delivering prevention services.

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9. Comparisons of Vaccine Hesitancy across Five Low- and Middle-Income Countries

Wagner AL, Masters NB, Domek GJ, Mathew JL, Sun X, Asturias EJ, et al.

Vaccines (Basel). 2019 Oct 18;7(4).

PubMed ID: 31635270

ABSTRACT

Vaccine hesitancy is a continuum of behaviors ranging from delay in receipt to vaccination refusal. Prior studies have typically focused on high-income countries, where vaccine hesitancy is particularly prevalent in more affluent groups, but the relationship between socioeconomic status and vaccine hesitancy in Low- and Middle-Income Countries (LMICs) is less clear. The aim of this study was to describe vaccine hesitancy in five LMICs. Mothers of children in Sirajganj, Bangladesh (n = 60), Shanghai, China (n = 788), Addis Ababa, Ethiopia (n = 341), Guatemala City and Quetzaltenango, Guatemala (n = 767), and Chandigarh, India (n = 309), completed a survey between 2016 and 2018 using the WHO's 10-item Vaccine Hesitancy Scale. The scores of different constructs were compared across countries and by the mother's education level using linear regression models with generalized estimating equations. Compared to mothers in China, mothers in Bangladesh perceived less vaccination benefit (β: 0.56, P = 0.0001), however, mothers in Ethiopia (β: -0.54, P < 0.0001) and Guatemala (β: -0.74, P = 0.0004) perceived greater benefit. Education level was not significantly linked with vaccine hesitancy. Local circumstances are important to consider when developing programs to promote vaccines. We did not find consistent associations between education and vaccine hesitancy. More research is needed to understand socio-cultural influences on vaccine decision-making.

WEB: 10.3390/vaccines7040155

IMPACT FACTOR: 4.760

CITED HALF-LIFE: 6.9

START COMMENTARY

The WHO SAGE Vaccine Hesitancy Scale is a ten-item scale. A summary of responses to the items across the five countries is found in Figure 1 and Table 4. This study is limited in the variation of study sites and methods and the inability to examine individual-level predictors due to variable datasets across studies. Authors highlight the importance of local context when developing vaccination programs and call for additional studies to better understand vaccine hesitancy.

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10. Implementation strategy and cost of Mozambique's HPV vaccine demonstration project

Soi C, Babigumira JB, Chilundo B, Muchanga V, Matsinhe L, Gimbel S, et al.

BMC Public Health. 2019 Oct 29;19(1):1406.

PubMed ID: 31664976

ABSTRACT

BACKGROUND:

Cost is an important determinant of health program implementation. In this study, we conducted a comprehensive evaluation of the implementation strategy of Mozambique's school-based HPV vaccine demonstration project. We sought to estimate the total costs for the program, cost per fully immunized girl (FIG), and compute projections for the total cost of implementing a similar national level vaccination program.

METHODS:

We collected primary data through document review, participatory observation, and key informant interviews at all levels of the national health system and Ministry of Education. We used a combination of micro-costing methods-identification and measurement of resource quantities and valuation by application of unit costs, and gross costing-for consideration of resource bundles as they apply to the number of vaccinated girls. We extrapolated the cost per FIG to the HPV-vaccine-eligible population of Mozambique, to demonstrate the projected total annual cost for two scenarios of a similarly executed HPV vaccine program.

RESULTS:

The total cost of the Mozambique HPV vaccine demonstration project was $523,602. The mean cost per FIG was $72 (Credibility Intervals (CI): $62 - $83) in year one, $38 (CI: $37 - $40) in year two, and $54 CI: $49 - $61) for years one and two. The mean cost per FIG with the third HPV vaccine dose excluded from consideration was $60 (CI: $50 - $72) in year one, $38 (CI: $31 - $46) in year two, and $48 (CI: $42 - $55) for years one and two. The mean cost per FIG when only one HPV vaccine dose is considered was $30 (CI: $27 - $33)) in year one, $19 (CI: $15-$23) in year two, and $24 (CI: $22-$27) for both years. The projected annual cost of a two-and one-dose vaccine program targeting all 10-year-old girls in the country was $18.2 m (CI: $15.9 m - $20.7 m) and $9 m (CI: $8 m - $10 m) respectively.

CONCLUSION:

National adaptation and scale-up of Mozambique's school-based HPV vaccine strategy may result in substantial costs depending on dosing. For sustainability, stakeholders will need to negotiate vaccine price and achieve higher efficiency in startup activities and demand creation.

WEB: 10.1186/s12889-019-7793-y
IMPACT FACTOR: 2.567
CITED HALF-LIFE: 5.5

START COMMENTARY

Soi et al. conducted a study to estimate costs around HPV vaccine implementation based on a school-based HPV vaccine demonstration project in Mozambique. The study was based on the payer perspective, the Government of Mozambique through the Ministry of Health. In year one, eligible girls received three doses of bivalent Cerarix, and in year two, a new group of eligible girls received two doses. A summary of project costs is found in Table 2 and projected costs for 1 year of two- and one-dose HPV vaccination programs in Table 3. Limitations of the study include potential inaccuracies from obtaining data through health worker and teacher interviews and estimations based on data proxies. However, authors note that biases would be reflected in uncertainty estimates.

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Appendix

The literature search for the December 2019 Vaccine Delivery Research Digest was conducted on November 18, 2019. We searched English language articles indexed by the US National Library of Medicine and published between October 15, 2019 and November 14, 2019. The search resulted in 292 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]) ("2019/10/15"[PDAT] : "2019/11/14"[PDAT]))