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1. [Influence of Pneumococcal Vaccination on the Hospitalization of Healthy Pediatric Patients Due to Typical Community-Acquired Pneumonia.](#)

Martínez AI, Fernández JM, Frías JP, Pérez DM.

International Journal of Infectious Diseases. 2020 June 14.

PubMed ID: 32553718

ABSTRACT

INTRODUCTION: Community-Acquired Pneumonia (CAP) is one of the most frequent causes of hospital admission in children. Our objective is to measure the impact of the introduction of pneumococcal conjugate vaccines on the hospitalization of previously healthy children due to CAP.

METHOD: From 2011-2016 a partially retrospective and prospective and descriptive study was carried out on healthy paediatric patients (3 months - 14 years old) with CAP, who required hospital admission. Clinical, epidemiological and demographic characteristics were collected and vaccination status was obtained from medical records.

RESULTS: A total of 292 cases were included, with a mean age of 33.4 months, 54% males. There was a progressive and significant 42% decrease in the number of admissions each year, without significant changes in the annual percentage of parapneumonic pleural effusion (PPE). The 56% of patients were immunized with a pneumococcal conjugate vaccine (PCV). The percentage of children who were not vaccinated decreased by 14% and the coverage with PCV13 increased by 46%. This revealed a significant increase of PPE in vaccinated patients with PCV-7 (63%) compared with unvaccinated (45%) and with PCV-13 (57%), without association to the presence of severe PPE. Moreover, no significant differences in severity or hospital stay were observed in unvaccinated patients, compared with those who were vaccinated. In >2 years old we observed a significant increase in PPE (59%) compared with 45% in younger children.

CONCLUSION: The increase in vaccination coverage with PCV-13 resulted in a decrease in hospitalizations due to CAP and PPE. Vaccination with PCV-7 is associated in our sample with an increase in PPE but not with severe PPE or an increase in hospital stay. There was an epidemiological shift of severe forms of pneumonia and empyema at later ages (> 2 yrs.).

WEB: [10.1016/j.ijid.2020.06.034](https://doi.org/10.1016/j.ijid.2020.06.034)

IMPACT FACTOR: 3.202

CITED HALF-LIFE: 5.3

START COMMENTARY

In this retrospective cohort study of children with typical community-acquired pneumonia (CAP) requiring hospitalization, Martínez et al. describe clinical, epidemiological, and prognosis factors of pediatric patients hospitalized with community-acquired pneumonia. Martínez et al. describe hospitalization after the introduction of new pneumococcal conjugate vaccines (PCV-7 in 2000 and PCV-13 in 2011). Findings include a decrease in admissions due to pneumonia, a 12% decrease in the annual percentage of patients with parapneumonic pleural effusion (PPE), and a decrease in the detection of *Streptococcus pneumoniae* as a causative agent of pneumonia each year since the introduction of new pneumococcal conjugate. The study found that though 56% of patients were vaccinated (with 56% receiving PCV-13 and 40% receiving PCV-7), only 35% followed the correct vaccine schedule and dosage for their age. Surprisingly, the prevalence of pleural effusion was higher in those vaccinated with PCV-7 compared with those not vaccinated and compared to those vaccinated with PCV-13 ($p < 0.05$) but this was not associated with higher severity or longer hospitalization. Key strengths of this study include the evaluation of many cases ($N=292$) which were followed up over time to assess vaccination, disease outcomes, and severity of those outcomes. Key limitations include the lack of isolation of the causative agent in many cases, with the aetiologic agent being confirmed in only 18% cases and no information about specific serotypes, which are relevant for understanding the impact of the vaccinations. However, this article provides insight to the impact of PCVs on pneumonia admissions, which is highly relevant considering the burden of CAP among children globally.

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2. Cost-Effectiveness of Dengue Vaccination in Indonesia: Considering Integrated Programs With Wolbachia-Infected Mosquitos and Health Education.

Suwantika AA, Kautsar AP, Supadmi W, et al.

Int J Environ Res Public Health. 2020;17(12).

PubMed ID: 32545688

ABSTRACT

Despite the fact that morbidity and mortality rates due to dengue infection in Indonesia are relatively high, a dengue vaccination has not yet been introduced. Next to vaccination, Wolbachia-infected mosquitoes and health education have been considered to be potential interventions to prevent dengue infection in Indonesia. This study was aimed to analyse the cost-effectiveness of dengue vaccination in Indonesia whilst taking Wolbachia and health education programs into account. An age-structured decision tree model was developed to assess the cost-effectiveness. Approximately 4,701,100 children were followed-up in a 10-year time horizon within a 1-year analytical cycle. We compared three vaccination strategies: one focusing on vaccination only, another combining vaccination and a Wolbachia program, and a third scenario combining vaccination and health education. All scenarios were compared with a no-intervention strategy. The result showed that only vaccination would reduce dengue fever (DF), dengue haemorrhagic fever (DHF), and dengue shock syndrome (DSS) by 123,203; 97,140 and 283 cases, respectively. It would save treatment cost at \$10.3 million and \$6.2 million from the healthcare and payer perspectives, respectively. The combination of vaccination and a Wolbachia program would reduce DF, DHF and DSS by 292,488; 230,541; and 672 cases, respectively. It would also save treatment cost at \$24.3 million and \$14.6 million from the healthcare and payer perspectives, respectively. The combination of vaccination and health education would reduce DF, DHF, and DSS by 187,986; 148,220; and 432 cases, respectively. It would save treatment cost at \$15.6 million and \$9.4 million from the healthcare and payer perspectives, respectively. The incremental cost-effectiveness ratios (ICERs) from the healthcare perspective were estimated to be \$9,995, \$4,460, and \$6,399 per quality-adjusted life year (QALY) gained for the respective scenarios. ICERs from the payer perspective were slightly higher. It can be concluded that vaccination combined with a Wolbachia program was confirmed to be the most cost-effective intervention. Dengue infection rate, vaccine efficacy, cost of Wolbachia program, underreporting factor for hospitalization, vaccine price and mortality rate were considered to be the most influential parameters affecting the ICERs.

WEB: [10.3390/ijerph17124217](https://doi.org/10.3390/ijerph17124217)

IMPACT FACTOR: 2.849

CITED HALF-LIFE: 3.2

START COMMENTARY

Suwantika et al. analyze the cost-effectiveness of dengue vaccination while considering other existing interventions for dengue in Indonesia, such as *Wolbachia* and health education programs. This article is impactful as it describes the economic case for introducing dengue vaccination as part of an integrated approach to achieve dengue control in a country that has one of the highest dengue burdens in the world. In this study, Suwantika et al. assumed a vaccine efficacy of 44%, that the *Wolbachia* intervention is 86% effective, and that health education would reduce dengue by 50%. Based on these and other input parameters, from the payer perspective, the ICERs would be \$10,174 for vaccination alone; \$4,639 for vaccination and *Wolbachia*; and \$5,554 for vaccination and health education per QALY gained, which are all cost effective given that all scenarios result in ICERs between 1-3 times GDP per capita. One of the main strengths of the study is the presentation of many types of data to inform the development of an integrated dengue prevention program. The types of data presented include cost-effectiveness results from a healthcare and payer perspective (Figure 4), sensitivity analysis results to understand which parameters influenced ICERs (Figure 5), cost-effectiveness acceptability curves (Figure 6), and lastly, affordability curves to show at what threshold the scenarios would be implementable (Figure 7).

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3. Environmental Modifiers of RTS,S/AS01 Malaria Vaccine Efficacy in Lilongwe, Malawi.

Bell GJ, Loop MS, Mvalo T, et al.

BMC Public Health. 2020;20(1):910.

PubMed ID: 32532234

ABSTRACT

BACKGROUND: RTS,S/AS01 is the first vaccine against malaria to undergo pilot implementation, beginning in 2019 and vaccinating 360,000 children per year in Malawi, Ghana, and Kenya. The four-dose vaccine is given as a primary three-dose series with a fourth dose given approximately 18 months later. The efficacy of RTS,S/AS01 was variable among the 11 sites participating in the 2009-2014 phase III trial (MALARIA-055, NCT00866619), possibly due to differences in transmission intensity. However, a within-site examination of environmental factors related to transmission intensity and their impact on vaccine efficacy has yet to be conducted.

METHODS: We implemented the phase III RTS,S/AS01 trial at the Malawi site, which enrolled 1578 infants (6-12 weeks) and children (5-17 months) living in the Lilongwe District in Central Malawi and followed them for 3 years between 2009 and 2014. A global positioning system survey and an ecological questionnaire were conducted to collect participant household locations and characteristics, while additional data on background malaria prevalence were obtained from a concurrent Malaria Transmission Intensity (MTI) survey. Negative binomial regression models were used to assess whether the efficacy of the vaccine varied by estimated background malaria prevalence, household roof type, or amount of nearby vegetation.

RESULTS: Vaccine efficacy did not significantly vary by estimated malaria prevalence or by roof type. However, increased vegetation cover was associated with an increase in the efficacy of the three-dose primary RTS,S/AS01 series in the 18 months before the fourth dose and a decrease in the efficacy of the primary vaccine series in the second 18 months following, if the fourth dose was not given. Vegetation cover did not alter the efficacy of the fourth dose in a statistically or practically significant manner.

CONCLUSIONS: Vegetation coverage in this study site might be a proxy for nearness to rivers or branching, shallow wetlands called "dambos" which could serve as breeding sites for mosquitoes. We observed statistically significant modification of the efficacy of RTS,S/AS01 by forest cover, suggesting that initial vaccine efficacy and the importance of the fourth dose varies based on ecological context.

WEB: [10.1186/s12889-020-09039-z](https://doi.org/10.1186/s12889-020-09039-z)

IMPACT FACTOR: 2.521

CITED HALF-LIFE: 6.0

START COMMENTARY

Bell et al. use household locations and micro-environmental variables as proxies for household-specific transmission to understand the relationship between environmental factors and RTS,S/AS01 malaria vaccine efficacy. The authors found that background malaria prevalence ranged from 0.50% to 66.44%. Malaria transmission intensity (MTI) was significantly associated with participant risk of malaria with an increase of 1% in MTI prevalence yielding an incidence rate ratio of 1.04 (95% CI: 1.02 to 1.06). Having a grass roof, versus metal, was positively associated with malaria incidence (IRR: 1.76, 95% CI: 1.39 to 2.22). Among the households in this study, vegetation coverage within 100 m ranged from 0 to 22%. A 1% increase vegetation cover was significantly associated with increased malaria incidence (IRR: 1.15, 95% CI: 1.10, 1.20).

When assessing the association with the environmental factors and vaccine efficacy, it was found that only increased vegetation cover was associated with an increase in the efficacy of the three-dose primary RTS,S/AS01 series in the 18 months before the fourth dose; at 0% vegetation cover, the primary vaccine series series had an estimated 33.84% (95% CI: 3.68 to 54.56%) efficacy in the first 18 months whereas at 10% vegetation cover, the primary vaccine series had an estimated 72.11% (95% CI: 52.52 to 83.62%) efficacy in the first 18 months. However, there was a noted decrease in the efficacy of the primary vaccine series in second 18 months without a fourth dose; at 0% vegetative cover without receiving a fourth dose, the vaccine series had an estimated 46.60% (95% CI: 7.43 to 69.19%) efficacy in the second 18 months compared to 10% vegetation cover, the primary vaccine series had an estimated -48.98% (95% CI: -198.94 to 25.76%) efficacy indicating a harmful effect. The increased efficacy in high forest cover areas in the first 18 months after vaccination is promising as these are areas with a higher burden of malaria, given vegetation cover is a proxy for standing water, an ideal breeding ground for anopheline mosquitoes.

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4. [Modeling of Rotavirus Transmission Dynamics and Impact of Vaccination in Ghana.](#)

Asare EO, Al-Mamun MA, Armah GE, et al.

Vaccine. 2020;38(31):4820-4828.

PubMed ID: 32513513

ABSTRACT

BACKGROUND: Rotavirus incidence remains relatively high in low-income countries (LICs) compared to high-income countries (HICs) after vaccine introduction. Ghana introduced monovalent rotavirus vaccine in April 2012 and despite the high coverage, vaccine performance has been modest compared to developed countries. The predictors of low vaccine effectiveness in LICs are poorly understood, and the drivers of subnational heterogeneity in rotavirus vaccine impact are unknown.

METHODS: We used mathematical models to investigate variations in rotavirus incidence in children <5 years old in Ghana. We fit models to surveillance and case-control data from three different hospitals: Korle-Bu Teaching Hospital in Accra, Komfo Anokye Teaching Hospital in Kumasi, and War Memorial Hospital in Navrongo. The models were fitted to both pre- and post-vaccine data to estimate parameters describing the transmission rate, waning of maternal immunity, and vaccine response rate.

RESULTS: The seasonal pattern and age distribution of rotavirus cases varied among the three study sites in Ghana. Our model was able to capture the spatio-temporal variations in rotavirus incidence across the three sites and showed good agreement with the age distribution of observed cases. The rotavirus transmission rate was highest in Accra and lowest in Navrongo, while the estimated duration of maternal immunity was longer (~5 months) in Accra and Kumasi and shorter (~3 months) in Navrongo. The proportion of infants who responded to the vaccine was estimated to be high in Accra and Kumasi and low in Navrongo.

CONCLUSIONS: Rotavirus vaccine impact varies within Ghana. A low vaccine response rate was estimated for Navrongo, where rotavirus is highly seasonal and incidence limited to a few months of the year. Our findings highlight the need to further explore the relationship between rotavirus seasonality, maternal immunity, and vaccine response rate to determine how they influence vaccine effectiveness and to develop strategies to improve vaccine impact.

WEB: [10.1016/j.vaccine.2020.05.057](https://doi.org/10.1016/j.vaccine.2020.05.057)

IMPACT FACTOR: 3.143

CITED HALF-LIFE: 7.3

START COMMENTARY

In this study, mathematical models were used to assess factors influencing subnational heterogeneity in rotavirus vaccine impact in Ghana. Results suggest that there are intra-country variations in rotavirus transmission; Accra had year-round transmission with a biannual seasonal pattern, Kumasi had a shorter peak transmission period occurring primarily during the dry season, and Navrongo had strongly seasonal transmission. Model parameters that showed the greatest variation across the three locations were the rotavirus transmission rate, duration of maternal immunity, waning of vaccine-induced immunity, and proportion who responded to the vaccine. The estimated rotavirus transmission rate was lowest in Navrongo ($R_0 = 30.91\text{--}31.53$) and highest in Accra ($R_0 = 35.69\text{--}38.82$). Mean maternal immunity duration was longer (~5 months) in Accra and Kumasi compared to Navrongo (~3 months). The proportion who responded to each vaccine dose varied between settings. Furthermore, the estimated duration of vaccine-induced immunity was longer in Accra (>20 months), compared Kumasi and Navrongo (4–6 months). One of the key limitations is that there is missing data from Navrongo between June 2011 and December 2012, which may have impacted the model for Navrongo. Understanding how these different drivers of rotavirus transmission influence vaccine efficacy could help to identify optimal implementation strategies to improve vaccine performance across different regions within Ghana.

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5. Factors Associated With Mobile Phone Ownership and Potential Use for Rabies Vaccination Campaigns in Southern Malawi.

Marron O, Thomas G, Burdon Bailey JL, et al.

Infect Dis Poverty. 2020;9(1):62.

PubMed ID: 32503667

ABSTRACT

BACKGROUND: Rabies is a fatal but preventable viral disease, which causes an estimated 59 000 human deaths globally every year. The vast majority of human rabies cases are attributable to bites from infected domestic dogs and consequently control of rabies in the dog population through mass vaccination campaigns is considered the most effective method of eliminating the disease. Achieving the WHO target of 70% vaccination coverage has proven challenging in low-resource settings such as Sub Saharan Africa, and lack of public awareness about rabies vaccination campaigns is a major barrier to their success. In this study we surveyed communities in three districts in Southern Malawi to assess the extent of and socio-economic factors associated with mobile phone ownership and explore the attitudes of communities towards the use of short message service (SMS) to inform them of upcoming rabies vaccination clinics.

METHODS: This study was carried out between 1 October-3 December 2018 during the post-vaccination assessment of the annual dog rabies campaign in Blantyre, Zomba and Chiradzulu districts, Malawi. 1882 questionnaires were administered to households in 90 vaccination zones. The surveys gathered data on mobile phone ownership and use, and barriers to mobile phone access. A multivariable regression model was used to understand factors related to mobile phone ownership.

RESULTS: Most survey respondents owned or had use of a mobile phone, however there was evidence of an inequality of access, with higher education level, living in Blantyre district and being male positively associated with mobile phone ownership. The principal barrier to mobile phone ownership was the cost of the phone itself. Basic feature phones were most common and few owned smartphones. SMS was commonly used and the main reason for not using SMS was illiteracy. Attitudes to receiving SMS reminders about future rabies vaccination campaigns were positive.

CONCLUSIONS: The study showed a majority of those surveyed have the use of a mobile phone and most mobile phone owners indicated they would like to receive SMS messages about future rabies vaccination campaigns. This study provides insight into the feasibility of distributing information about rabies vaccination campaigns using mobile phones in Malawi.

WEB: [10.1186/s40249-020-00677-4](https://doi.org/10.1186/s40249-020-00677-4)

IMPACT FACTOR: 3.067

CITED HALF-LIFE: 3.0

START COMMENTARY

Marron et al. explored socio-economic factors associated with mobile phone ownership and explore the attitudes of communities towards the use of short message service (SMS) to inform them of upcoming rabies vaccination clinics. This study is relevant for improving vaccine coverage given that public awareness about the rabies vaccination campaigns is critical for success, but traditional means of public awareness are challenging in a setting where communication infrastructure is underdeveloped. The study found high levels of phone ownership (59% of participants owning a phone and 7% with access to a mobile phone), and that the odds of owning a mobile phone increased with higher education levels compared to no education, for males compared to females, and living in Blantyre district compared to Zomba or Chiradzulu. Nearly all (99.6%) participants reported wanting to receive SMS reminders about rabies vaccination campaigns, highlighting the potential acceptability and feasibility of providing information about campaigns using mobile phones in Malawi. However, further research needs to be done to understand how such an awareness program could be successfully implemented and if an awareness campaign would improve coverage in this setting.

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6. Prevalence and Predictors of Taking Tetanus Toxoid Vaccine in Pregnancy: A Cross-Sectional Study of 8,722 Women in Sierra Leone.

Yaya S, Kota K, Buh A, Bishwajit G.

BMC Public Health. 2020;20(1):855.

PubMed ID: 32503478

ABSTRACT

BACKGROUND: Immunization of women during pregnancy to protect them and their infants against tetanus, pertussis and influenza is recommended by the World health Organization (WHO). However, there is limited information about the coverage rate and associated factors in low-income countries. The aim of this study was to measure the prevalence and predictors of taking tetanus toxoid among pregnant women in Sierra Leone.

METHODS: This study was based on the fifth round of Multiple Indicator Cluster Survey (MICS 5) conducted in Sierra Leone in 2017. In total 8722 women aged between 15 and 49 years were included in this study. Outcome variable was taking of Tetanus Toxoid vaccination during the last pregnancy. Data were analyzed using cross-tabulation and logistic regression methods.

RESULTS: The overall prevalence of receiving TT immunization during women's last pregnancy was 96.3% and that of taking at least two doses was 82.12%. In the regression analysis, women from Mende ethnicity had a 0.48 fold lower chance of being immunized (OR = 0.480, 95% CI = 0.385,0.59768) than those from the other ethnicity. In addition, women who attended at least four ANC visits had higher odds of receiving TT vaccine (OR = 1.919, 95% CI = 1.639,2.245) compared to those who attended less ANC visits. Stratified by areas, this association was observed in both urban (OR = 2.661, 95% CI = 1.924,3.679) and rural areas (OR = 1.716, 95% CI = 1.430,2.059). Attending at least four ANC visits showed a positive association with receiving at least two doses TT (OR = 2.434, 95% CI = 1.711,3.464) in both urban (OR = 2.815, 95% CI = 1.413,5.610) and rural areas (OR = 2.216, 95% CI = 1.463,3.356) as well.

CONCLUSION: Higher number of ANC visits, mass media exposure and higher wealth quintile increased the odds of receiving TT immunization. In addition, minimum two doses which were identified to reduce neonatal mortality. Therefore, immunization campaigns targeting improved utilization of healthcare and immunization services by women of childbearing age in Sierra Leone are strongly recommended.

WEB: [10.1186/s12889-020-08985-y](https://doi.org/10.1186/s12889-020-08985-y)

IMPACT FACTOR: 2.521

CITED HALF-LIFE: 6.0

START COMMENTARY

The aim of this cross-sectional study was to measure the prevalence and predictors of taking tetanus toxoid (TT) among pregnant women in Sierra Leone, a country with high levels of neonatal and maternal tetanus and mortality. About 96.3% of participants reported receiving TT immunization and 65.2% reported receiving adequate doses (at least two) of TT immunization during their most recent pregnancy indicating high prevalence. Positive predictors of receiving TT immunization included those with advancing age, who lived in the north and south region of Sierra Leone, women from the Temba ethnicity, women with the highest household wealth quintile, women with higher parity, those who exposed to mass media, and those who attended at least four antenatal care visits. This study is impactful as it provides a greater understanding of factors that are related to receiving TT immunization to inform campaigns in Sierra Leone and beyond.

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7. The Reactive Vaccination Campaign Against Cholera Emergency in Camps for Internally Displaced Persons, Borno, Nigeria, 2017: A Two-Stage Cluster Survey.

Ngwa MC, Alemu W, Okudo I, et al.

BMJ Glob Health. 2020;5(6):e002431.

PubMed ID: 32601092

ABSTRACT

INTRODUCTION: In 2017, amidst insecurity and displacements posed by Boko Haram armed insurgency, cholera outbreak started in the Muna Garage camp for Internally Displaced Persons (IDPs) in Borno State, Nigeria. In response, the Borno Ministry of Health and partners determined to provide oral cholera vaccine (OCV) to about 1 million people in IDP camps and surrounding communities in six Local Government Areas (LGAs) including Maiduguri, Jere, Konduga, Mafa, Dikwa, and Monguno. As part of Monitoring and Evaluation, we described the coverage achieved, adverse events following immunisation (AEFI), non-vaccination reasons, vaccination decisions as well as campaign information sources.

METHODS: We conducted two-stage probability cluster surveys with clusters selected without replacement according to probability-proportionate-to-population-size in the six LGAs targeted by the campaign. Individuals aged ≥ 1 years were the eligible study population. Data sources were household interviews with vaccine card verification and memory recall, if no card, as well as multiple choice questions with an open-ended option.

RESULTS: Overall, 12 931 respondents participated in the survey. Overall, 90% (95% CI: 88 to 92) of the target population received at least one dose of OCV, range 87% (95% CI: 75 to 94) in Maiduguri to 94% (95% CI: 88 to 97) in Monguno. The weighted two-dose coverage was 73% (95% CI: 68 to 77) with a low of 68% (95% CI: 46 to 86) in Maiduguri to a high of 87% (95% CI: 74 to 95) in Dikwa. The coverage was lower during first round (76%, 95% CI: 71 to 80) than second round (87%, 95% CI: 84 to 89) and ranged from 72% (95% CI: 42 to 89) and 82% (95% CI: 82 to 91) in Maiduguri to 87% (95% CI: 75 to 95) and 94% (95% CI: 88 to 97) in Dikwa for the respective first and second rounds. Also, coverage was higher among females of age 5 to 14 and ≥ 15 years than males of same age groups. There were mild AEFI with the most common symptoms being fever, headache and diarrhoea occurring up to 48 hours after ingesting the vaccine. The most common actions taken after AEFI symptoms included 'did nothing' and 'self-medicated at home'. The top reason for taking vaccine was to protect from cholera while top reason for non-vaccination was

travel/work. The main source of campaign information was a neighbour. An overwhelming majority (96%, 95% CI: 95% to 98%) felt the campaign team treated them with respect. While 43% (95% CI: 36% to 50%) asked no questions, 37% (95% CI: 31% to 44%) felt the team addressed all their concerns.

CONCLUSION: The campaign achieved high coverage using door-to-door and fixed sites strategies amidst insecurity posed by Boko Haram. Additional studies are needed to improve how to reduce non-vaccination, especially for the first round. While OCV provides protection for a few years, additional actions will be needed to make investments in water, sanitation and hygiene infrastructure.

WEB: [10.1136/bmjgh-2020-002431](https://doi.org/10.1136/bmjgh-2020-002431)

IMPACT FACTOR: 4.280

CITED HALF-LIFE: 1.9

START COMMENTARY

In this mixed-methods study, the authors describe vaccination coverage, adverse events following immunization (AEFI), non-vaccination reasons, vaccination decisions, and campaign information sources which are critical to develop an understanding of how to improve oral cholera vaccination campaigns (OCV) amidst insecure conditions. In this study, it was found that the house-to-house and fixed site strategy campaign was successfully implemented reaching 90% of those targeted by the campaign, and with improvements of 11% between the first and second round. However, there were some differences in coverage among populations, with males of working age having the lowest two dose coverage. Table 3 provides important insights on factors that guide the decision to take or not take the vaccine. Namely, absence during campaigns (which may be particularly common among mobile working age men) seems to play a critical role. One key limitation of this study is a large amount of missing data; vaccination cards were not confirmed during the first round of vaccinations and vaccination could not be confirmed for 12.98% of participants due to missing cards.

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8. [Impact of Routine Vaccination Against Haemophilus influenzae Type B in The Gambia: 20 Years After Its Introduction.](#)

Zaman SM, Howie SR, Ochoge M, et al.

J Glob Health. 2020;10(1):010416.

PubMed ID: 32509291

ABSTRACT

BACKGROUND: In 1997, The Gambia introduced three primary doses of Haemophilus influenzae type b (Hib) conjugate vaccine without a booster in its infant immunisation programme along with establishment of a population-based surveillance on Hib meningitis in the West Coast Region (WCR). This surveillance was stopped in 2002 with reported elimination of Hib disease. This was re-established in 2008 but stopped again in 2010. We aimed to re-establish the surveillance in WCR and to continue surveillance in Basse Health and Demographic Surveillance System (BHDSS) in the east of the country to assess any shifts in the epidemiology of Hib disease in The Gambia.

METHODS: In WCR, population-based surveillance for Hib meningitis was re-established in children aged under-10 years from 24 December 2014 to 31 March 2017, using conventional microbiology and Real Time Polymerase Chain Reaction (RT-PCR). In BHDSS, population-based surveillance for Hib disease was conducted in children aged 2-59 months from 12 May 2008 to 31 December 2017 using conventional microbiology only. Hib carriage survey was carried out in pre-school and school children from July 2015 to November 2016.

RESULTS: In WCR, five Hib meningitis cases were detected using conventional microbiology while another 14 were detected by RT-PCR. Of the 19 cases, two (11%) were too young to be protected by vaccination while seven (37%) were unvaccinated. Using conventional microbiology, the incidence of Hib meningitis per 100 000-child-year (CY) in children aged 1-59 months was 0.7 in 2015 (95% confidence interval (CI) = 0.0-3.7) and 2.7 (95% CI = 0.7-7.0) in 2016. In BHDSS, 25 Hib cases were reported. Nine (36%) were too young to be protected by vaccination and five (20%) were under-vaccinated for age. Disease incidence peaked in 2012-2013 at 15 per 100 000 CY and fell to 5-8 per 100 000 CY over the subsequent four years. The prevalence of Hib carriage was 0.12% in WCR and 0.38% in BHDSS.

CONCLUSIONS: After 20 years of using three primary doses of Hib vaccine without a booster Hib transmission continues in The Gambia, albeit at low rates. Improved coverage and timeliness of vaccination are of high priority for Hib disease in settings like Gambia, and there are currently no clear indications of a need for a booster dose.

WEB: [10.7189/jogh.10.010416](https://doi.org/10.7189/jogh.10.010416)

IMPACT FACTOR: 2.899

CITED HALF-LIFE: 3.7

START COMMENTARY

Zaman et al. present epidemiological surveillance of Hib transmission in The Gambia, the first African country to introduce Haemophilus influenzae type b (Hib) conjugate vaccine (HCV) in 1997. The Gambia is a good candidate to address questions related to needed changes in Hib vaccination policy due to shifts in epidemiology, as it has both a HCV immunization program, consists of three primary doses without a booster, and a standardized population-based surveillance system for Hib. The authors found that Hib meningitis in children under-5 was very low at 0.7 and 2.7 per 100,000 CY for 2015 and 2016 respectively, showing that three primary doses without a booster have resulted in sustained declines in disease incidence over 20 years. However, it has not eliminated Hib transmission completely, with 25 cases of Hib meningitis detected from 2008 to 2017. Of these cases, many children were not vaccinated yet due to age (n=9), were under vaccinated (n=5), or had experienced vaccine failure after three doses (n=4) or five doses (n=5), highlighting issues of vaccination coverage and timeliness of doses. This study suggests that even though there is sustained low incidence, three doses of vaccines without a booster is effective in controlling Hib meningitis in The Gambia and a booster is not necessary.

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9. Cost-effective Analysis of Childhood Malaria Vaccination in Endemic Hotspots of Bangladesh.

Sarker AR, Sultana M.

PLoS One. 2020;15(5):e0233902.

PubMed ID: 32470101

ABSTRACT

INTRODUCTION: Bangladesh has a history of endemic malaria transmission, with 17.5 million people at risk. The objective of this study was to assess the cost-effectiveness of universal childhood malaria vaccination in Chittagong Hill Tracts (CHT) of Bangladesh with newly developed RTS,S/AS01 malaria vaccines.

METHODS: A decision model was been developed using Microsoft® Excel to examine the potential impact of future vaccination in Bangladesh. We estimated the economic and health burden due to malaria and the cost-effectiveness of malaria vaccination from the health system and societal perspective. The primary outcomes include the incremental cost per Disability-Adjusted Life Year (DALY) averted, incremental cost per case averted, and the incremental cost per death averted.

RESULTS: Introducing childhood malaria vaccination in CHT in Bangladesh for a single birth cohort could prevent approximately 500 malaria cases and at least 30 deaths from malaria during the first year of vaccination. The cost per DALY averted of introducing the malaria vaccine compared to status quo is US\$ 2,629 and US\$ 2,583 from the health system and societal perspective, respectively.

CONCLUSIONS: Introduction of malaria vaccination in CHT region is estimated to be a cost-effective preventive intervention and would offer substantial future benefits particularly for young children vaccinated today. Policies should, thus, consider the operational advantages of targeting these populations, particularly in the CHT area, with the vaccine along with other malaria control initiatives.

WEB: [10.1371/journal.pone.0233902](https://doi.org/10.1371/journal.pone.0233902)

IMPACT FACTOR: 2.740

CITED HALF-LIFE: 5.6

START COMMENTARY

In an effort to inform policy makers whether or not there is a need for malaria vaccination as a part of the malaria control initiatives in Bangladesh, Sarker et al. present the economic and health burden due to malaria and the potential cost-effectiveness of the RTS,S/AS01 vaccine in high risk areas. Key input parameters, outlined in detail in Table 1, include vaccine coverage, vaccine effectiveness and duration, disease information (incidence, case fatality ratio, duration), treatment costs, and other parameters. Key cost input parameters included are that the malaria vaccine prices would be approximately US\$ 0.16 and will vary from US\$ 0.1 up to US\$ 5.0, and vaccine delivery cost is about an additional US\$ 0.5 to US\$ 1 per person for delivery-related activities. Relatedly, based on prior studies, it was assumed the average outpatient cost per treating malaria was US\$ 5.84 from health system perspective, and US\$ 22.48 from a societal perspective. For inpatient treatment, costs were assumed to be US\$ 30.26 from the perspective of health system while the societal average cost was estimated at US\$ 64.50. One key strength of this study is the inclusion of the sensitivity ranges for each of these input parameters (e.g. the overall protective effectiveness is estimated to be 39% with a sensitivity range of 34.3% to 43.3%) (Table 1).

Based on these costs and other input parameters, it was estimated that 206.64 DALYs could be averted (Table 2). The results also demonstrated that approximately US\$ 5,697 could be saved in the short term whereas US\$ 3,620 could be saved by avoiding the inpatient treatment from the health system perspective. The cost-effectiveness estimates show that even with a vaccine with low protective effectiveness, universal childhood malaria vaccination is a cost-effective investment both for health system and societal perspective in high risk areas in Bangladesh.

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10. Prosocial Polio Vaccination in Israel.

Wells CR, Huppert A, Fitzpatrick MC, et al.

Proc Natl Acad Sci U S A. 2020;117(23):13138-13144.

PubMed ID: 32457142

ABSTRACT

Regions with insufficient vaccination have hindered worldwide poliomyelitis eradication, as they are vulnerable to sporadic outbreaks through reintroduction of the disease. Despite Israel's having been declared polio-free in 1988, a routine sewage surveillance program detected polio in 2013. To curtail transmission, the Israel Ministry of Health launched a vaccine campaign to vaccinate children-who had only received the inactivated polio vaccine-with the oral polio vaccine (OPV). Determining the degree of prosocial motivation in vaccination behavior is challenging because vaccination typically provides direct benefits to the individual as well as indirect benefits to the community by curtailing transmission. However, the Israel OPV campaign provides a unique and excellent opportunity to quantify and model prosocial vaccination as its primary objective was to avert transmission. Using primary survey data and a game-theoretical model, we examine and quantify prosocial behavior during the OPV campaign. We found that the observed vaccination behavior in the Israeli OPV campaign is attributable to prosocial behavior and heterogeneous perceived risk of paralysis based on the individual's comprehension of the prosocial nature of the campaign. We also found that the benefit of increasing comprehension of the prosocial nature of the campaign would be limited if even 24% of the population acts primarily from self-interest, as greater vaccination coverage provides no personal utility to them. Our results suggest that to improve coverage, communication efforts should also focus on alleviating perceived fears surrounding the vaccine.

WEB: [10.1073/pnas.1922746117](https://doi.org/10.1073/pnas.1922746117)

IMPACT FACTOR: 9.412

CITED HALF-LIFE: 10.0

START COMMENTARY

Using survey and epidemiological data, Wells et al. constructed two alternative game theoretical models (a classical individualistic model in which people act in self-interest and a prosocial model in which people can also be motivated to vaccinate in order to protect others) to explore vaccination behavior during the 2013 Israeli polio outbreak. It was found that the prosocial model was 17.4 times more likely than the individualistic model to achieve the 79% coverage reported by the Ministry of Health and 17.1 times more likely to achieve the 72% vaccination coverage reported by the study survey. The study survey also indicated that self-interested and prosocial motives were high,

indicating that both are key factors for decision-making. The study also found that the coverage is dependent on not only the prosocial nature of the campaign, but also the perception of side effects and risks, the magnitude of risk difference in perceptions between aware and unaware individuals, and how those perceptions shift when an unaware individual becomes aware. This study provides a deeper understanding to guide future OPV campaigns, and further, other disease control measures beyond vaccination that rely on prosocial behavior.

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Appendix

The literature search for the July 2020 Vaccine Delivery Research Digest was conducted on July 5, 2020. We searched English language articles indexed by the US National Library of Medicine and published between May 15, 2020 and June 14, 2020. The search resulted in 317 items.

SEARCH TERMS

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(((((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]) ("2020/05/15"[PDAT] : "2020/06/14"[PDAT]))
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