Implementing a learning agenda on hepatitis B birth dose vaccine delivery in Africa

A case study from The Gambia

PATH

Acknowledgments

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437 N 34th Street
Seattle, WA 98103 USA

www.path.org

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On the cover: A nurse administers the Hepatitis B birth dose to a newborn. Photo: Unitaid

Contents

Abbreviations

ANC	antenatal care
BCG	bacillus Calmette-Guérin
CBCs	community birth companions
CHW	community health worker
COVID-19	coronavirus disease 2019
CSO	civil society organization
CTC	controlled temperature chain
EPI	Expanded Program on Immunization
HBsAG	hepatitis B surface antigen
HBV	hepatitis B virus
Hep B	hepatitis B
HMIS	health management information systems
HP	health provider
MAP	microarray patch
MeSH	medical subject headings
MOH	Ministry of Health
NS	national stakeholder
OPV	oral polio vaccine
OPV0	oral polio vaccine birth dose
PHO	public health officer
RHM	Regional Health Directorate
RMNCAH	reproductive, maternal, neonatal, child and adolescent health
UNICEF	United Nations Children's Fund
VVMs	vaccine vial monitors
WHO	World Health Organization

Background

The World Health Organization (WHO) estimates that approximately 254 million people worldwide live with chronic hepatitis B virus (HBV) infection, which can lead to serious health issues.[1] The burden is particularly high in low- and middle-income countries, including the African region, where an estimated 65 million people are infected.[1] Chronic HBV infection is commonly the result of vertical transmission of HBV. Babies who are infected before they are one year old have a 90% risk of developing chronic hepatitis.[2] The second most common cause of chronic HBV is transmission during early childhood, with a 30% risk among children who are infected between one to five years of age.[2]

Vaccination is one of the most critical measures to prevent HBV infection. When administered within 24 hours of birth, the hepatitis B (Hep B) birth dose can prevent 75–95% of vertical transmissions.[3] Since 2009, this vaccine has been endorsed by the WHO, which recommends that all infants receive the first dose as soon as possible after birth, follow ed by two or three subsequent doses to complete the infant HBV vaccine series.[4] However, administering the vaccine within 24 hours of birth is challenging, particularly in contexts where births take place outside of health facilities. In many African countries, more than 40% of births occur at home.[5] While 63% of new HBV infections are in the WHO African region, only 18% of newborns receive the Hep B birth dose with only 15 of 47 countries in the region offering it as part of their routine immunization programs.[6]

Project overview

With funding from Gavi, the Vaccine Alliance, PATH is implementing a learning agenda on Hep B birth dose vaccine delivery in Africa, including a focus on synthesizing lessons learned from countries with decades of experience implementing the Hep B birth dose, as well as countries newly introducing the birth dose into routine immunization schedules.[7,8] The learning agenda includes questions around operational feasibility, acceptability, cost, market access, and the impact of innovative strategies to improve the reach of timely Hep B birth dose for babies born both within in- and out-of-facility settings.

By exploring innovative delivery strategies, assessing the role of community health systems, and understanding stakeholder perspectives, the project's primary objective is to identify effective models for increasing Hep B birth dose coverage. Evidence and insights from this initiative will be applicable to countries planning for Hep B birth dose vaccine introduction as well as those seeking to deploy new strategies to increase coverage rates and timely administration within 24 hours of birth.

The project is being implemented in four countries—The Gambia, Nigeria, Ethiopia, and Uganda—which were selected based on several criteria including a high HBV burden, moderate or high rates of home births, moderate or high birth dose rates for oral polio virus (OPV) vaccine (demonstrating success with another type of birth dose), and an enabling environment for community health providers to administer vaccines. PATH also has a strong presence in these countries through long-standing collaborations with ministries of health.

This case study focuses on The Gambia, which was among the earliest adopters of the Hep B birth dose in Sub-Saharan Africa and has important lessons to document and synthesize, as well as considerations for reaching the last mile.

The Gambian context

The Gambia has an estimated HBV prevalence of 2.3%, 61 thousand people living with chronic HBV, and 400 deaths due to HBV in 2022. Among children aged 5 years old and under, an estimated 870 are HBsAg-positive (0.2% prevalence).[9] The Gambia introduced the Hep B birth dose vaccine nationally through its Expanded Program on Immunization (EPI) in 1990 to advance hepatitis elimination goals. However, despite its introduction, timely administration of the Hep B birth dose within 24 hours of birth remains challenging, especially in rural and health facility settings. Several challenges reportedly contribute to delayed vaccination, such as health worker shortages[10,11] and knowledge gaps among healthcare providers.[12] Some evidence suggests being born in a health facility was not significantly associated with an increase in the likelihood of timely birth dose vaccination, pointing to potential gaps in health worker knowledge or facility processes.[1] Additionally, issues such as the use of multi-dose vials have been identified as barriers to timely vaccination.

In terms of receipt of Hep B birth dose (regardless of timeliness) the difference between urban areas (99.1%) and rural areas (98.7%) are negligible, however only 37%-41% of newborns receive the Hep B birth dose within 24 hours of birth.[13,14] Given that certain rural areas benefit from stronger primary health care systems where village health workers raise community awareness about outreach services, there may be potential to see more timely Hep B birth dose uptake. Other potential factors that may support timely uptake of birth doses may include integrating Hep B birth dose with maternal and newborn services by village health workers, access to vaccine carriers ensuring cold chain maintenance, and using single-dose pre-filled injections for HBV.

Considering the government's ongoing commitment to improving timely Hep B birth dose coverage in the region, this study describes existing models of care for birth dose delivery in The Gambia, both in rural and urban settings and to assess strategies to support birth dose administration and improvements in vaccine uptake. Insights from current assessments and research will help strengthen strategies for birth dose delivery in both facility-based and community-based settings, with the aim of increasing timely Hep B birth dose coverage.

Project approach

Study design

The study used a multi-phase qualitative design, informed by secondary data from document review and routine immunization coverage data. First, we conducted a literature review to: (i) document existing delivery models for birth dose delivery within in-facility and out-of-facility settings in The Gambia, including their effectiveness, barriers, and facilitators; and (ii) understand the roles of community-based providers such as village health workers, community health workers (CHWs), midwives, and traditional birth attendants, now called community birth companions (CBCs), in birth dose delivery to date. These findings informed the design of interview guides and probes. This study was confirmed to be non-human subjects research by the Ministry of Health in The Gambia and approved for data collection. All respondents gave informed consent prior to participating in the interviews.

The literature review included 42 resources spanning peer-reviewed articles, policy documents, technical reports, and conference/webinar presentations. The initial search was conducted in PubMed using a combination of medical subject headings (MeSH) and text words related to immunization programs, neonatal vaccines, and specific vaccines (Hep B, Bacille Calmette-Guérin [BCG], and OPV0), limited to publications from the year 2000 onward. This search identified 23 documents, which were supplemented with additional gray literature and secondary resources to capture a broader range of evidence. These supplementary materials provided further insights into the health system context, including determinants of facility-based delivery, antenatal care (ANC) utilization, and service delivery strategies.

To better understand the context, particularly the timeliness of Hep B birth dose coverage and the capacity of the health system in The Gambia, we compiled indicators on the number of health facilities providing the vaccine, the number of trained health workers, and available vaccine stock.

Building on this foundation, the study proceeded with qualitative data collection at the national and subnational levels:

- National level (n=18) interviews included policymakers, EPI staff, Reproductive, Maternal, Neonatal, Child and Adolescent Health (RMNCAH) program staff, technical experts, civil society representatives, and supply chain specialists. These interviews explored past and current experiences and strategies relating to increasing Hep B birth dose uptake, as well as operational considerations such as vaccine presentation, cold chain options, wastage, and pricing.

FIGURE 1. **Subnational interviews were conducted in two regions of The Gambia.**

- Subnational level (n=19) interviews consisted of 9 interviews with regional government health officials, including RMNCAH and EPI staff, and 10 health providers from the public and private sector to assess how national strategies were implemented locally, identify contextual challenges, and explore opportunities for new strategies or adapting existing ones.

Study sites

In consultation with The Gambian Ministry of Health, the Western and Lower River regions were purposively selected to compare urban and rural contexts, respectively (Figure 1, Table 1). This comparison provided insights into the role of community providers, policy alignment, and factors influencing timely Hep B birth dose uptake (reported at 37% nationally)[14].

Analysis

The study applied the Journey to Health and Immunization Framework,[15] as seen in Figure 2, which maps six stages in the caregiver and provider journey, specifically, knowledge and awareness, intent, preparation, cost and effort, point of service, and after service, to examine barriers, facilitators, and implementation processes. This framework informed interview design and guided thematic analysis. All the literature review data were extracted to and collated in Smartsheet, and the interview data were collected in Kobo Toolbox, and synthesized into memos to identify enablers, barriers, and potential adaptations for strengthening Hep B birth dose delivery in The Gambia.

Our findings are presented in a modified Journey to Health and Immunization Framework. We adapted the framework into four stages by combining intent with preparation, cost and effort; and point of service is combined with experience of care, as these barriers and enablers identified were often interrelated and difficult to distinguish cleanly. Additionally, our stakeholders described the interactions with the health system as a single encounter, combining point of service and

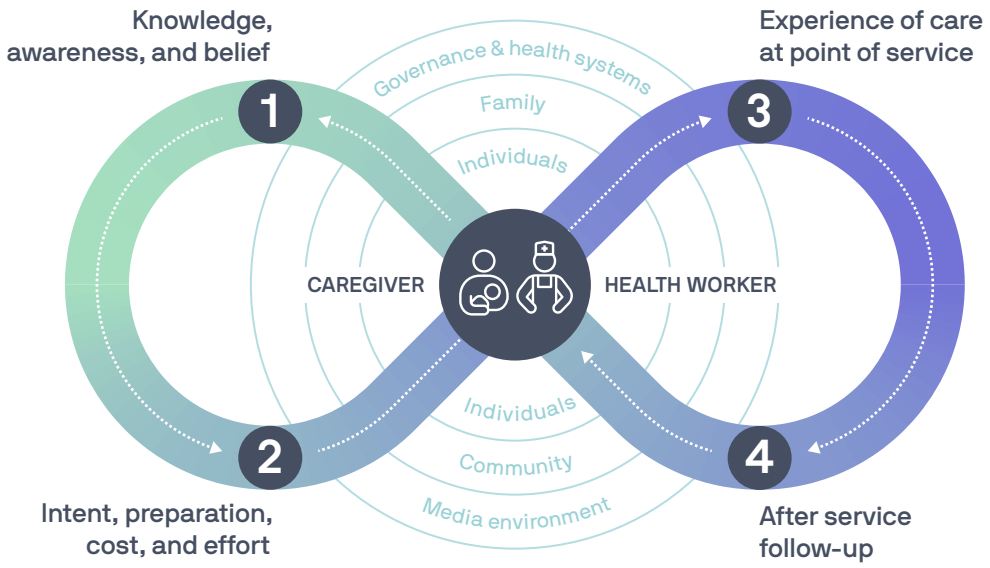
TABLE 1. **Health system structure, Hep B coverage rates, and deliveries nationally and in selected subnational regions.**

Geography	Total health facilities (n)*	PHC villages (n)[14]	Health facilities providing Hep B birth dose (n)[13]	Hep B birth dose coverage (2024) (%)[13]	Estimated annual deliveries (2025)[13]
National	222	939	116	89	93,663
Western 2	47	115	23	56	21,699
Lower River	23	102	10	92	3,258

*Including hospitals, health centers, and clinics (e.g., community, private sector, nongovernmental organization, and service clinics.)

Each PHC village is designated one village health worker (VHW) and one community birth companion (CBC)

FIGURE 2. **An adapted Journey to Health and Immunization Framework.**



Adapted from the Journey to Health and Immunization framework in the UNICEF Health Section/Innovation Office's report titled "Demand for Health Services: A Human-Centred Field Guide for Investigating and Responding to Challenges" (October 2018).

experience of care. By combining these stages, our analysis maintains fidelity to the framework while ensuring that findings reflect how respondents themselves experienced the journey to immunization.

Findings

Overview of the implementation of current strategies for Hep B birth dose in The Gambia

The Gambia Hepatitis Intervention Program, launched in 1990, was among the first national Hep B vaccination programs worldwide. Since then, Hep B birth dose delivery has been closely linked to the country's shift in maternal and primary health care strategy, moving from home deliveries assisted by traditional birth attendants to facility-based deliveries conducted by trained nurse midwives, particularly in the public sector where vaccines are available. In September 2022, a dedicated unit was established under the Director of Health Services to focus exclusively on hepatitis prevention and control. By policy, mothers should remain in facilities for at least 24 hours after delivery, however, in practice mothers are typically discharged within a few hours. This creates a narrow window in which vaccination must occur, typically by a public health officer (PHO), who is typically responsible for vaccination in public health facility or another designated vaccinator.[1,2,4,16]

Less emphasis has been placed on the private sector, and to our knowledge, no Hep B birth dose specific policy exists for it. While national strategies[17] recommend the MOH to engage with the private sector to facilitate timely Hep B birth dose delivery, in practice, private/non-government hospitals or clinics generally make their own decision about whether to offer vaccination. Some offer no immunization services, while others rely on PHOs or trained delivery ward nurses, to administer them. When private providers choose to participate, the government offers training, cold chain equipment and bundled vaccines. The private sector is also expected to report Hep B birth doses.

Survey data reflect high overall coverage but highlight persistent challenges with timeliness. The 2019–2020 Demographic Health Survey reported national Hep B birth dose coverage of 98.9%, irrespective of timing of that vaccination.[18] More recent data in 2024, however, show a decline with timely coverage within 24 hours of birth at only 37.2%.[14] Though the Gambia is one of the only countries to have a timeliness indicator in their routine monitoring systems for Hep B birth dose,[11,12,19] the government has reported challenges with monitoring and data quality, including data entry errors by both EPI and health management information systems (HMIS) teams, inconsistencies between reported and recounted data, and use of different denominators to calculate coverage rates, and other supervision challenges. Improvements

in vaccination registration and government monitoring systems to enable documentation of timeliness of Hep B birth dose in both EPI and labor and delivery wards is critical.[20]

Published studies in The Gambia indicate several maternal characteristics associated with birth dose awareness and uptake, including ethnicity, education, employment, and parity: the Fula and Wolof people are more likely to receive timely BCG than the Mandinka people[21]; mothers with formal education and employment is associated with timely BCG[22]; and mothers with one to three children are more likely to get timely Hep B birth dose than higher-parity mothers, possibly reflecting competing domestic responsibilities or limited financial means to access to health facilities in a timely manner.[22,23] In addition, family and gender dynamics can contribute to birth dose vaccination decisions, including mothers-in-law, who have a strong influence on decisions for location of birth (in-facility or home), which can delay health facility access.[24]

The literature from The Gambia and the Africa region point to several barriers to timely vaccination: PHOs work limited hours and are sometimes unavailable during nights and weekends when deliveries also occur; vaccines are not always stocked in labor wards; some health workers remain unaware of the policy to administer the vaccine within 24 hours of birth; delays in opening multi-dose vials when only a few infants are present to avoid wastage; and limited cold chain capacity constraints in certain rural and urban areas also reportedly affects vaccine availability (see Table 2 for details). The absence of a clear policy guiding Hep B birth dose in out-of-facility settings leaves service delivery in these contexts largely undefined.

In response, the Ministry of Health issued a directive in January 2025 instructing all public and private facilities to provide timely Hep B birth dose within 24 hours. The memo authorized any competent health worker to administer the vaccine in the absence of a PHO, marking a significant policy shift to address long-standing delays and close gaps in both coverage and timeliness.[25]

Barriers and facilitators to Hep B birth dose uptake within facility and out-of-facility settings

The literature review identified consistent enablers in community engagement and health promotion, supporting immunization awareness regardless of birth location. Challenges were more prominent in the later stages of the Journey to Health and Immunization framework, particularly from reaching a facility for delivery through subsequent immunization. Detailed findings for each stage of the modified framework are presented in Table 2.

Respondents at national and regional levels described barriers and facilitators to Hep B birth dose. Generally, national actors describe cultural and policy factors whereas regional actors focused more on their service delivery experiences. At the national level, respondents noted that cultural practices, such as postpartum restrictions requiring mothers to remain home could limit newborns' access to vaccination in the first week of life. They also noted that younger mothers' greater exposure to misinformation on social media may contribute to vaccine hesitancy and highlighted the need to strengthen community outreach and health education efforts to counter such misinformation.

On the service delivery side, national respondents also cited gaps in RMNCAH staff training and reliance on PHOs, which delayed vaccination and led to missed opportunities, prompting the policy memo to expand authorization to other health workers. In addition, some cited limited cold chain for outreach, transportation barriers and long distances between communities and health workers, corroborating findings in the National Immunization Strategy.[26] Despite these challenges, respondents described recent improvements in cold chain capacity, and the positive role of community birth companions in accompanying women to facilities as important facilitators, even if other health systems factors may delay vaccination.

Interviews with regional-level actors indicated limited or no awareness of the policy memo, and implementation of Hep B birth dose has largely continued as "business as usual" primarily through PHOs. This lack of policy awareness and implementation, together with the barriers, may help explain why timeliness of Hep B birth dose uptake in The Gambia has been stagnant and uneven across regions.

Regional respondents reported that Hep B birth dose coverage (irrespective of timing) in the Lower River region was 86% in 2023-24, which managers linked to population density and cross-border movement that increased demand. In contrast, coverage in the Western Region was lower, around 56% in around the same timeframe. Lower coverage was attributed to several barriers. These included unclear guidance or limited awareness around Hep B birth dose administration, insufficient assignment of responsibility and provision of tools for staff to carry out vaccinations, and possible competing priorities during postnatal care when multiple newborn programs are implemented. Additional challenges included high staff turnover, limited delivery services at some facilities, and staff shortages—particularly during nights and weekends when many deliveries occur.

Interviews with health providers in both regions offered additional insights into how these issues play out in practice. Overall, providers reported that caregivers generally accept the birth dose and view it as a routine

part of care. Earlier cultural practices restricting the movement of mothers and newborns in the first week of life were no longer considered significant barriers, contrasting with concerns about persisting social and cultural norms expressed by national level respondents. When concerns did arise, such as the baby's age or post-vaccination crying, providers felt these were usually resolved with explanation.

Differences between regions highlighted how cost and preparation shaped Hep B birth dose uptake, particularly in relation to where and how mothers delivered. In Mansa Konko, a town in Lower River Region which has a greater emphasis on outreach, uptake among out-of-facility births was constrained by weak cold chain, logistical challenges, and limited engagement of CHWs. Providers noted that these gaps reduced community awareness of the birth dose and weakened referral pathways for mothers delivering at home or in private facilities without vaccination services. In contrast, providers in Brikama, Western Region 2, an urban center, emphasized financial and time burdens: midwives in private hospitals described families' frustration at having to travel to a public facility for vaccination after already paying for delivery services. Neither region reported Hep B birth dose vaccine stockouts.

At the point of service, midwives and PHOs from both regions highlighted coordination and service delivery challenges. Weak coordination between the two cadres often led to delays and missed opportunities, further underscoring the limited operationalization of the policy memo authorizing any qualified cadre, including midwives, to vaccinate. Although some PHOs extended their hours into evenings and weekends, coverage gaps persisted as PHOs do not work in delivery wards and must be called to provide vaccination services. One promising example came from a private hospital in the Western Region, where midwives had been trained to vaccinate newborns immediately after delivery, helping to avoid delays. Nurses in public facilities in the Western Region similarly emphasized that authorizing them to vaccinate would improve the care experience by reducing reliance on PHOs, particularly during evenings and weekends, though this would require additional training. Although the national-level memo allows any qualified cadre, including nurses/midwives, to administer the Hep B birth dose vaccine, those we interviewed were unaware that they were authorized to do so.

TABLE 2. **Barriers and facilitators to birth-dose immunization uptake.**

Theme	Barriers and facilitators (literature)	Barriers and facilitators (key informant interviews)	Illustrative quotes
Knowledge, awareness, and belief			
Caregiver knowledge and perceptions of birth-dose vaccines.	(+) 94.5% of caregivers wanted their child vaccinated.[27] (+) 74% of caregivers believe vaccines are not harmful.[27] (+) Refusal was rarely cited as a reason for delays in vaccination.[22]	(+) Providers consistently reported high acceptance of the Hep B birth dose. Caregivers generally view it as a routine vaccine and rarely refuse. (+) Traditional cultural restrictions on newborn and mother movement during the first week are no longer perceived as significant barriers to uptake. (-) Mothers may know and trust vaccination services, but do not understand the importance of timely vaccination	"They always have a positive attitude... They are informed and mother and escorts do understand." "We have never had a case of refusal."—Public Health Provider, Western Region (HP-G-07) "If mother is aware, she will take the child to the health facility to get vaccinated. But some will wait until after the 7 days because of cultural belief."—National Stakeholder (NS-G-17) "After home birth it is unusual for the mother and baby to come out before 7 days. Home births would normally get birth dose after 7 days if there are no complications." –National Stakeholder (NS-G-16) "Mothers would wait for outreach clinic days to bring newborn for vaccination." –National Stakeholder (NS-G-16) "Most mothers do not know the importance of birth dose on time." –National Stakeholder (NS-G-18)
Health provider knowledge and engagement with caregivers.	(-) Only 56% of staff received training on Hep B birth dose.[28] (-) 71% of providers know Hep B birth dose should be given within 24 hours of birth; indicating a need for initial and refresher trainings for health providers on timeliness.[26] (+) 92% of providers know that HBV can be transmitted from mother to child.[26]	(-) Not all health providers feel confident in their ability to vaccinate newborns, despite training. This limits the acceptance of expanding the role of vaccine administration to community cadres. (-) Health providers are unaware of the importance and logistics of administering birth doses on time (-) Because the responsibility of vaccination falls only to EPI PHO staff, other health providers that support sensitization may not have enough training to promote the vaccines effectively	"Even me, I am not confident to vaccinate newborns. I do not think CHWs can administer the vaccine."—Private Health Provider, Western Region (HP-G-08) "There was an assessment before introduction. Many health workers still believe that the birth dose can be given at any time. Nurses may not be fully aware." –National Stakeholder (NS-G-16) "I don't have much idea about these vaccines, and we see it as PHO's responsibility. Thus, we don't have much knowledge about vaccines. If other health workers are trained, then when PHOs are unavailable, other health workers can give the vaccine... and deliver the vaccines. We totally rely on the Public Health Officer to deliver the vaccines, and that is also a constraint. It means that if the EPI staff is unavailable, the child will not be vaccinated." –Public Health Provider, Western (HP-G-05)

Theme	Barriers and facilitators (literature)	Barriers and facilitators (key informant interviews)	Illustrative quotes
Information sources and trust.	(-) During COVID-19, WhatsApp messages warned mothers not to visit clinics, resulting in lower trust and delays in care seeking.[29] (+) Pregnant women in the community reach out to CBCs as first point of contact for support and information (including on immunization), attending to pregnant women during pregnancy and postnatal.[22,30] (-) Not all CBCs have been trained,[22] potentially limiting accuracy of information. (-) CBCs are not paid and do not have dedicated spaces in the community to consult with families, limiting privacy and reach.[22,31] (+) Traditional communicators (*kanyeleng*) provide musical entertainment with health messages on vaccination in the community, increasing trust between health professionals and the community, and facilitating information and public debate on sensitive health topics.[32,33] (+) Village health workers support education in the community, particularly on preventive health measures, though have also recently been engaged in disease-specific activities.[28]	(+) Concerns can be addressed by providers, e.g., the young age of the baby, crying at night post-vaccination.	"They [caregivers] raise concern about age of the baby but accept [the Hep B birth dose] with explanation."—Public Health Provider, Lower River Region (HP-G-01)
Intent, preparation, cost, and effort			
Health facility infrastructure	(+) As of 2019-2020, 79.3% of women are attending at least 4 ANC appointments, and only 0.3% are not attending ANC at all.[18] (-) Lack of point-of-care testing and lab capacity limits timely HBV screening, despite policy for screening of every woman during ANC visits.[17,37,38]	(-) Out of facility vaccine delivery is hindered by weak cold chain, limited CHW mobilization, and logistical challenges. CHWs are seen as important for referral and follow-up but underutilized for health promotion. (-) Rural areas face higher burden of health facility infrastructure failures, including access to consistent electricity, limiting availability of vaccines.	"In facility we do not have any issues but outreach we tend not to have enough ice packs sometimes due to cold chain space."—Public Health Provider, Lower River Region (HP-G-02) "Most villages do not have a cold chain."—Public Health Provider, Western Region (HP-G-06) "Some children are not vaccinated due to the absence of a cold chain system."—Regional Health Directorate, Lower River (RHM-G-01) "Electricity is an issue in many rural areas."—Regional Health Directorate, Lower River (RHM-G-08)

Theme	Barriers and facilitators (literature)	Barriers and facilitators (key informant interviews)	Illustrative quotes
Distance, transportation costs and human resources constraints	(-) Staff shortages at health facilities and heavy workload limit time for HBV counseling.[34] (-) Travel and household duties reduce ANC visits.[35] (-) High costs for transport to health facilities for delivery; Self-arranged transport is slow (donkey/horse carts, bicycles) and unsafe for women in labor.[24] (-) Poor road conditions: flooding, inaccessibility, or extremely rough surfaces, worsen maternal risk during transport to facility for delivery.[24] (+) National government invested in ambulatory services with CBCs for pregnant women to address transportation problems.[36] (-) Ambulances are often delayed and experience access issues including long waits, ferries with frequent breakdowns, and limited availability.[24]	(-) Transportation is challenging for caregivers to bring newborns to the facility for vaccination and birth due to cost and road conditions	"Transportation is expensive for movement to the health center. Most home deliveries are due to the distance to the health facility and poor road network." —Public Health Provider, Lower River (HP-G-02)
Lack of vaccination in private facilities adds to caregivers' logistical barriers		(-) Private hospitals refer new mothers to vaccinate their child in a public health facility rather than vaccination providing services on-site. (-) Caregivers in private facilities express frustration for paying for delivery but having to still travel to government facilities post-delivery for the Hep B birth dose.	"They [caregivers] don't react well as they feel reluctant [to go to the nearest health facility for birth doses.] They pay money and still have to go to government facility for vaccination."—Private Health Provider, Western Region (HP-G-08) "If the delivery occurs at the private health facility, they mostly missed out [on birth dose vaccination]."—Public Health Provider, Lower River Region (HP-G-02) "Private facilities have a dedicated day for vaccination, and these leaves out those not born on those days."—National Stakeholder (NS-G-10) "Private clinics conduct deliveries but do not have access to vaccine."—National Stakeholder (NS-G-01)

Theme	Barriers and facilitators (literature)	Barriers and facilitators (key informant interviews)	Illustrative quotes
Experience of care at point of service			
Availability and reliability of immunization services	(-) Facilities do not offer Hep B birth dose every day of the week, notably not on weekends.[28,39]	(-) Some midwives signaled challenges with providing birth dose vaccines due to after-hours/weekend coverage since PHOs are not always available, others discussed how extended hours of PHOs in evenings and during weekends is helping to close the gap but not enough. (-) Vaccination services are not available through all hours of the night, so vaccination is done in shifts for any children born at night (-) Only PHOs are trained to administer vaccines, which limits vaccination according to their availability	"Nurse delivering babies and PHO vaccinating. There are so many missed opportunities. Allowing nurses to give vaccines or allowing PHOs to be available."—National Stakeholder (NS-G-13) "During weekends it is challenging because PHOs don't work during weekends. PHOs have to be on duty when deliveries happen which is outside their working period."—Public Health Provider, Lower River Region (HP-G-02) "Reliance on EPI staff to deliver vaccine doses [is a challenge]. Occasionally, we have scenarios when PHOs are stretched and not available to provide vaccination at the labor [ward]." –Public Health Provider, Lower River (HP-G-01) "Deliveries can happen at any time. Vaccines are kept at the facility level with PHO responsible for the vaccine. Deliveries done out of working hours have to wait for another day to get vaccinated. PHO should come on shift duty to provide full coverage. Nurse midwives could be trained to administer Hep B birth dose [if] necessary." –Regional Health Directorate, Lower River (RHD-G-08) "As a policy, there needs to be a new strategy to achieve high timeliness. There are challenges of vaccine availability after working hours." –Regional Health Directorate, Western (RHD-G-09)
Coordination between EPI and maternity wards		(-) Division of roles between PHOs (vaccination) and nurses/midwives (delivery) and weak coordination leads to delays or no vaccinations. (+) Nurses/midwives are willing to vaccinate if trained; a notable exception was a private hospital where midwives both delivered and vaccinated.	"During weekends and holidays, those responsible for immunization [PHOs] are not available to give immunization."—National Stakeholder (NS-G-10) "In facility need more coordination between PHOs and midwives that are doing the delivery."—National Stakeholder (NS-G-04) "PHO has control over the vaccines, and they bring along the vaccines to the labor ward to administer birth doses to the babies." –Health Provider, Western (HP-G-05) "Every morning a team will go to the labor ward to vaccinate any children newborn overnight...Midwives alert PHOs if there are newborns during the day." –Public Health Provider, Lower River (HP-G-01)

Theme	Barriers and facilitators (literature)	Barriers and facilitators (key informant interviews)	Illustrative quotes
Place of delivery associated with birth dose uptake	(+) Being born in an in-facility setting, rather than a home setting, increased likelihood of timely (within 24 hours) Hep B birth dose coverage.[39] (-) Those who opt for home births typically wait at least 7 days before bringing the newborn to a health facility for immunizations due to cultural practices of naming ceremonies.[28] (-) Reliance on unorganized, rushed counseling and little information sharing reduces mothers' ability to make informed decisions about vaccination.[40]	(-) Home vaccination is not perceived as feasible due to lack of adequate staffing and resources for health providers (+) Incentive-based programs have historically worked to encourage facility delivery and vaccination attendance (+/-) Gambia's strategy for promoting facility deliveries provides a consistent and clear message about where to receive newborn vaccination, but may leave missed opportunities for home births (-) Division of roles between PHOs (vaccination) and nurses/midwives (delivery) and weak coordination leads to delays or no vaccinations. (+) Nurses/midwives are willing to vaccinate if trained; a notable exception was a private hospital where midwives both delivered and vaccinated.	"Resources are not always available for health workers to the community. Bringing them to the facility would make it easier. Incentives will motivate them. There was resource-based financing project that successfully did it." –National Stakeholder (NS-G-16) "We are not encouraging home delivery and prefer PHO and nurse to administer the vaccines." –Regional Health Directorate, Western (RHD-G-06) "We advocate for all deliveries to be conducted at facility level, so vaccinating at home may not be very useful." — Regional Health Directorate, Lower River (RHD-G-08) "In facility need more coordination between PHOs and midwives that are doing the delivery."—National Stakeholder (NS-G-04) "PHO has control over the vaccines, and they bring along the vaccines to the labor ward to administer birth doses to the babies." –Public Health Provider, Western (HP-G-05) "Every morning a team will go to the labor ward to vaccinate any children newborn overnight...Midwives alert PHOs if there are newborns during the day." –Public Health Provider, Lower River (HP-G-01)
Early discharge prior to vaccination services	(+) A policy was established to keep women and newborns in health facilities for postnatal care for at least 24 hours post-delivery.[41] (-) Some mothers are discharged or discharge themselves before vaccination to return to household duties, or due to lack of food and space at facilities.[41]	(+) Providers stressed the importance of ensuring babies are vaccinated before contact with escorts or movement to postnatal wards. (-) Due to constraints on when the facility is open, some women and their newborns are discharged early without vaccination services if PHOs are unavailable	"Even if we move the baby to the postnatal ward before the baby receives the Hep B vaccine, we make sure no escort touches the baby before the Hep B vaccines."—Private Health Provider, Western Region (HP-G-07) "When women deliver after working hours – like on Friday evening, we cannot keep the mother til Monday. So we release the mother and advise her to come back on Monday for the child to receive the birth doses." –Public Health Provider, Western (HP-G-06)

Theme	Barriers and facilitators (literature)	Barriers and facilitators (key informant interviews)	Illustrative quotes
After service follow-up			
Reminders and follow up systems	(-) No formal system to notify health facilities of home birth outcomes or conduct follow-up and reminders of vaccination.[39] (+) Mobile phone follow-up was tested to address issues with tracking birth outcomes and offers potential for immunization follow-up.[42] (+) Monthly text alerts to caregivers and visual dashboard charts in facilities show timeliness of Hep B birth dose administration and showed improvements in timely administration among facilities that were previously underperforming.[43] (+) Digitized registries (birth, ANC, vaccine) have been piloted and in some cases implemented. These offer opportunities for alleviating challenges with co-locating registration and immunization/ANC services.[44,45]	(+/-) CHWs are underutilized in supporting timeliness of Hep B birth dose though were seen as central in supporting vaccination referrals and creating awareness.	"They [CHWs] are playing a great role. These are the entry points to the communities. We use them to get communities to buy into our programs. To increase Hep B birth dose, it has to be through them."—Regional Health Directorate (RHD-G-01).

Abbreviations: ANC: antenatal care, BCG: Bacille Calmette-Guérin, CBC: community birth companion, CHW: community health worker, HBV: hepatitis B virus, Hep B: hepatitis B, HP: Health Provider, NS: National Stakeholder, PHO: public health official, RHD: Regional Health Directorate, TBA: traditional birth attendant.

Operational feasibility considerations: Controlled temperature chain and product presentation

Interviews with a diverse group of respondents at the national and subnational levels explored perceptions of whether adjustments to vaccine handling and product formats could improve timely Hep B birth dose uptake, particularly in settings where current delivery approaches fall short. Respondents highlighted opportunities and challenges across three main areas: supply chain operations, controlled temperature chain (CTC), and product presentation.

Supply chain

Delivery relies on a combination of push and pull systems supported by cold chain equipment and mobile outreach strategies, ensuring vaccines reach remote communities. At the national level, vaccines are distributed using a push model from national to regional stores and a pull model from regions to facilities, with outreach managed through cold boxes and vaccine carriers on a one-day basis. Respondents largely expected this system to remain unchanged for Hep B birth dose, though pilot innovations such as the use of tricycles for last-mile delivery have been introduced in some areas. Regional-level respondents described their current practices in detail, including conditioning ice packs, monitoring with vaccine vial monitors (VVMs) and freeze tags, and protecting vials from direct sunlight. However, they also identified persistent challenges- heat exposure during hot seasons, difficulties maintaining temperatures during long outreach sessions, limited fuel availability, equipment maintenance needs, and high staff attrition that requires repeated retraining. Respondents mentioned that collaboration with partners such as UNICEF and WHO generally ensures vaccine security but delays in co-financing and procurements sometimes lead to stock-outs.

CTC

All respondents (n=22) believed that it will be beneficial if the Hepatitis B birth dose vaccine was qualified for CTC, particularly for reaching newborns delivered outside of facility settings (although this strategy is not currently being deployed for the Hep B birth dose in The Gambia). They emphasized that CTC could improve timely administration within 24 hours. Respondents noted that adoption would require policy reform, staff training, and integration into procurement and monitoring systems. Most respondents (11 out of 19) indicated that to achieve the maximum benefit of CTC, the vaccine should remain stable for at least 8 days. However, a few respondents (4 out of 19) also indicated a preference for the vaccine not to be outside of cold chain for more than 14 days due to concerns of the vaccine being compromised and therefore needing to be discarded. For this reason, an 8–14-day stability window was considered most practical, as it aligns with weekly outreach planning.

The private sector providers noted that since they do not conduct outreach to out-of-facility births, expanded cold chain parameters would have minimal benefit to their services.

Although there is no evidence to suggest that a WHO prequalification for CTC would increase the price of a hepatitis B birth dose vaccine, respondents were asked whether they would be willing to pay more for a CTC-qualified product. More than half of national respondents (5 of 9) indicated they would be willing to pay a slightly higher price per dose for a CTC-qualified product, while the remaining respondents said they would not.

Product presentation

Most respondents (19 out of 27) felt it would be feasible to manage both one-dose and ten-dose vials (multiple presentations) for out-of-facility births, noting the value of having different options for different settings to help reduce wastage. When asked about preferences, most respondents favored single-dose presentations for out-of-facility administration, linking them to reduced wastage, simplified handling, and fewer preparation errors. Single dose formats were generally viewed as more suitable for lower-volume facilities and outreach contexts.

When ranking product options, including products not yet commercially available (e.g., MAPs), 37% selected ten-dose vials, 30% each selected one-dose vials and MAPs, and 3% selected prefilled syringes as the first choice for vaccinating in-facility births (n=27). For vaccinating babies born out of facility settings, 56% selected MAPs, 16% each selected one-dose vials and ten-dose vials, and 12% selected prefilled syringes as the first choice (n=25). If reducing wastage was the only factor considered, all respondents preferred single-dose formats, with MAPs ranked highest (50%), followed by one-dose vials (40%) and pre-filled syringes (10%).

Across all discussions, respondents recognized the value of having both ten-dose and single-dose formats available, with feasibility largely dependent on delivery context. Multi-dose vials were generally seen as efficient and easier to manage in facilities with higher birth rates. However, concerns were consistently raised about the suitability of ten-dose vials for out-of-facility use, where low birth volumes could lead to significant wastage and limit practicality.

Opportunities for new strategies/adapting strategies

National-level respondents highlighted opportunities to strengthen Hep B birth dose delivery by drawing on

experiences from other health programs. Examples included results-based financing projects that provided incentives to CBCs and mothers[10,46] as well as initiatives that addressed transport barriers by investing in land and water ambulances, as well as other modes of transportation including motorcycles and 4-wheelers through Riders for Health.[36,47]

To increase the uptake of Hep B birth dose strategies, national-level stakeholders felt that the most effective strategies were vaccinating newborns before discharge and tracking home births, supported by efforts to bring newborns to facilities for timely vaccination, underscoring the importance of ensuring that vaccination occurs at the facility level.

Building on these points, providers and community actors described more specific opportunities to strengthen processes at both the community and service delivery levels, particularly within health facilities, as summarized in Table 3. Among the most immediate steps aligned with the perspectives of national-level stakeholders, was raising awareness of the policy memo at subnational levels, which would formally authorize nurses to provide vaccination and to equip them with refresher courses on Hep B birth dose and updating/implementing a newborn vaccination protocol within in-facility settings.

In addition, respondents proposed developing a system to track births and notify CHWs for timely community

TABLE 3. **Opportunities for strengthening existing or developing new strategies to improve Hep B birth dose delivery.**

Level	Opportunities for strengthening existing strategies or developing new strategies
Policy and systems	• Disseminate the new policy memo widely and reinforce it through regular training, refresher courses, and supportive supervision for health workers. • Support private hospitals to obtain cold chain equipment (CCE) to ensure procurement and consistent availability of Hep B birth dose vaccines in labor wards and potentially other routine immunizations. • Improve mechanisms for collaboration and coordination between RMNCAH and EPI teams at national and regional levels to ensure alignment of priorities on timely Hep B birth dose.
Knowledge and awareness	• Educate mothers about specific vaccines and the importance of birth doses to strengthen understanding of the Hep B birth dose, using CSO volunteers and CHWs. • Leverage CHWs and CSOs to track out-of-facility births and refer and accompany caregivers to vaccination services. • Engage *Alkalolu* (traditional village leaders) and religious leaders in community sensitization and awareness campaigns. • Develop and distribute posters, pictorial job aids, and other communication materials to reinforce messages at both facility and community levels.
Service delivery	• Provide refresher courses on Hep B birth dose administration to build nurses' and midwives' confidence and ensure consistency in administration of the birth dose in the labor and delivery ward. • Raise awareness and reiterate the formal authorization of nurses in public facilities to vaccinate, reducing dependence on PHOs. • Allocate resources for transportation and outreach activities to enable CHWs and other health workers to support community-based awareness activities about the Hep B birth dose vaccine available in health facilities. • Conduct supportive supervision and consider non-financial incentives, such as awards, or appreciation from leadership.

Abbreviations: CCE: cold chain equipment, Hep B: hepatitis B, RMNCAH: reproductive, maternal, neonatal, child and adolescent health, EPI: Expanded Program on Immunization, CSO: civil society organization, CHWs: community health workers, PHOs: public health officials.

vaccination after home deliveries as well as more regular refresher training on vaccine management, and more fuel support.

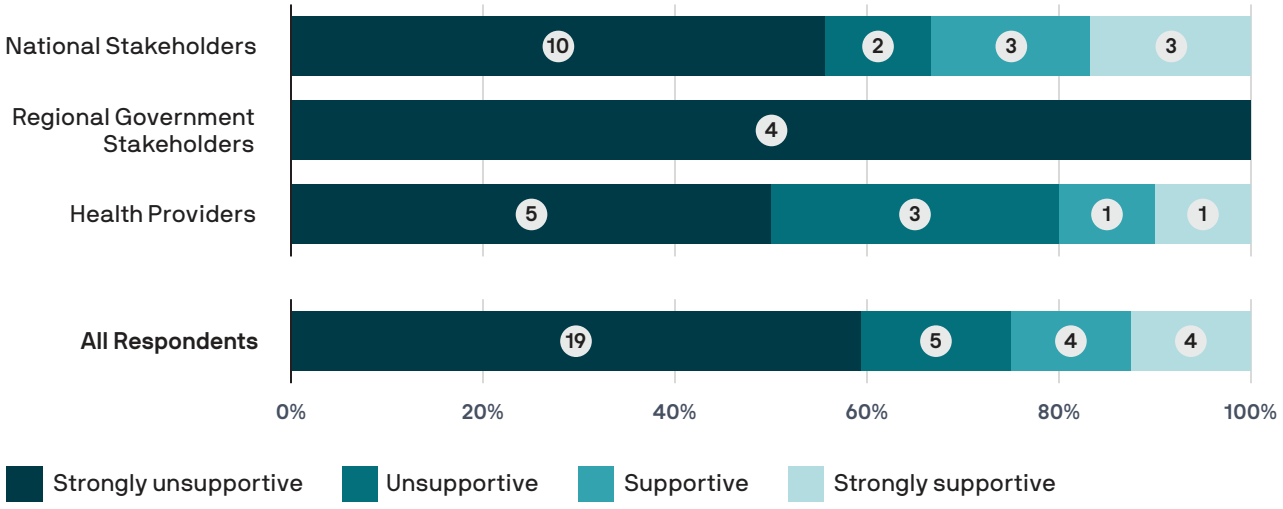
Role of CHWs

Specifically, with respect to the role of CHWs in immunization delivery, there was broad recognition among stakeholders about their importance in mobilizing communities but also significant concern about expanding their role to include providing direct vaccination. National stakeholders highlighted issues of training, literacy, and technical competency, and emphasized that injections require a higher skill level than most CHWs are trained for. As respondents explained, "Vaccination is a procedure and CHWs' level of formal education and training is low" (National Stakeholder, NS-G-07) and "We are not there yet because most of the caliber of CHW we have are untrained." (National Stakeholder, NS-G-02). Managers at the subnational level echoed these concerns, with one noting, "Unless we start paying them and recruit more educated people [CHWs should not vaccinate]. The current CHWs are volunteers and uneducated. But if trained in vaccination, they could move to other jobs." (Regional Health Directorate, RHD-G-01).

Despite this, respondents consistently emphasized that CHWs play a vital role in sensitization, awareness, and community engagement. They were viewed as trusted entry points into communities and are essential for building demand for Hep B birth dose. As one region health manager added, "These are trusted and critical people and they are the entry points... They are trained, engage and help to sensitize caregivers to the importance of Hep B birth dose. We have a platform to regularly engage them." (Regional Health Directorate, RHD-G-02). Figure 2 describes the level of support among respondents for expanding CHWs' roles to include the administration of the Hep B birth dose vaccine.

Though CHWs are unlikely to take on the responsibility of vaccinating newborns in the near term, engaging them

FIGURE 3. **Level of support among respondents for expanding CHWs role to administer the Hep B birth dose vaccine.**



through training, supportive supervision, and referrals would offer practical opportunities to increase timely Hep B birth dose uptake.

Conclusions

The Gambia's experience with Hep B birth dose delivery highlights a persistent gap between high overall coverage and low timely administration within 24 hours of birth. Although steps, such as the policy memo expanding the pool of providers authorized to deliver the vaccine represent progress, awareness of the memo at subnational levels remains low. In addition, health system barriers including limited after-hours staffing of PHOs, weak coordination between delivery and vaccination services, logistical challenges, and gaps in follow-up for out-of-facility births, contribute to delays in timely vaccination.

Opportunities to improve timeliness include fully implementing the policy memo authorizing additional qualified providers to vaccinate newborns and leveraging caregivers' acceptance of Hep B birth dose.[25] Engaging community health actors, particularly CBCs, can raise awareness, connect families to health facilities, and ensure no newborns are missed. Additional strategies include using CTC approaches, offering flexible vaccine presentations (e.g., single-dose vials, pre-filled syringes), and providing refresher training for all providers, especially those newly authorized to vaccinate under the policy memo. Strengthening the role of community actors, such as CBCs and VHWs remains critical for referral, follow-up, and outreach to out-of-facility births.

These findings offer practical insights for countries both introducing the Hep B birth dose and seeking to improve coverage. While this study involved a relatively small sample and had limited engagement with private providers and caregivers, further research exploring their perspectives will be essential to design targeted strategies and adapt interventions to local contexts.

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