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

Summary report: Human-centered design findings comparing implementation strategies developed in Ethiopia and Uganda.

PATH

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Contents

Abbreviations

ANC	antenatal care
BCG	bacillus Calmette-Guérin
CHEW	community health extension worker
CHW	community health worker
DHIS2	District Health Information System 2
DHS	Demographic and Health Survey
eCHIS	electronic Community Health Information System
EPI	Expanded Programme on Immunization
HBV	Hepatitis B virus
HCD	human-centered design
Hep B	Hepatitis B
HEW	health extension workers
HMW	"How Might We"
N/A	not applicable
OPV0	oral polio vaccine birth dose
PNC	postnatal care
TBA	traditional birth attendant
VHL	village health leader
VHT	village health team
WDG	women's development groups
WHO	World Health Organization

Background

Hepatitis B and the importance of the birth dose

The World Health Organization (WHO) estimates that approximately 254 million people worldwide live with chronic hepatitis B (Hep B) infection.[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] Babies infected with the Hepatitis B virus (HBV) before they are one year old have a 90% chance of developing chronic Hep B infection.[2] Preventing early-life infection, particularly in the newborn phase, is central to achieving the global elimination goals of hepatitis.[3] And administering the Hep B birth dose vaccine within 24 hours of birth is one of the most effective interventions, preventing 75% to 95% of vertical transmissions.[4]

Despite the availability of a highly effective birth dose vaccine—endorsed by WHO since 2009,[5] which recommends that all infants receive the first dose as soon as possible after birth followed by two or three subsequent doses—timely Hep B birth dose coverage remains low. Though 63% of new Hep B infections are in the WHO African region, only 18% of newborns receive the Hep B birth dose. Additionally, fewer than one-third of countries in the region (only 15 out of 47) offer the Hep B birth dose vaccine as part of their routine immunization programs.[6]

Barriers to timely Hep B birth dose vaccination

Administering the vaccine within 24 hours of birth has been challenging for a number of reasons. Structural and social barriers, including high rates of home births (in many African countries, more than 40% of births occur at home[7]), limited access to health facilities,[8] supply and cold chain constraints,[9] and myths and misconceptions about the birth dose vaccine, among other factors, have all contributed to delayed uptake.

These challenges are compounded by gaps in training and knowledge for health care providers on timely administration,[10] as well as unclear roles and responsibilities for neonatal care,[11] including who is accountable for delivering newborn vaccines in the immediate postpartum period. All of this makes it difficult to consistently vaccinate newborns within the 24-hour window that ensures the high level of vaccine effectiveness.

Country contexts

Against this backdrop, Uganda and Ethiopia are at key junctures in introducing Hep B birth dose vaccinations into their routine immunization programs.

Uganda

Uganda recently launched a national rollout of the Hep B birth dose vaccine, following a 2022 recommendation by the National Immunization Technical Advisory Group to include it in the national immunization program. To achieve the global Hep B elimination goals,[3] Uganda has set ambitious goals for the rollout as laid out in *The National Viral Hepatitis Prevention and Control Strategic Plan 2023–2028*: (i) to achieve 75% birth dose coverage by the end of the first year; (ii) to ensure that over 90% of health facility births receive each birth dose vaccine, Hep B,BCG and OPV0 by 2030; and (iii) to reduce Hep B virus prevalence among children under five to below 0.5% by 2030.[12]

Yet challenges persist. In Uganda, roughly 13–19% of births occur at home,[13] with some districts reporting rates as high as 60%. There are limited systems in Uganda for

tracking home births, as well as challenges in linking to facilities for birth dose immunization given cultural norms that keep mothers and newborns indoors for days or weeks.[14,15] Furthermore, Uganda lacks a clear strategy for reaching newborns delivered outside facilities; its primary approach focuses on co-delivering the Hep B birth dose with BCG and OPV0 within maternity wards and immunization units, with the goal of integrating newborn vaccination into maternal and child health services to promote facility-based births and early vaccination.[16] However, gaps in coordination between maternity and Expanded Program on Immunization (EPI) staff within facilities continue to hinder timely uptake.[9,10]

Ethiopia

Ethiopia introduced the Hep B birth dose nationally in November 2025, following a 2021–2022 pilot that assessed the feasibility of integrating the birth dose into routine immunization through both facility- and community-based delivery strategies. In facilities, midwives and nurses administered the vaccine in maternity wards, taking advantage of vaccines stored in on-site refrigerators, when available, or vaccine carriers when necessary, and were able to integrate birth dose delivery into their existing facility-level workflows with minimal disruption.[9] For newborns delivered outside health facilities, the pilot assessed the logistical and technical feasibility of introducing the Hep B birth dose vaccine. In practice, the pilot evaluation report noted that vaccination for some out-of-facility births occurred either when newborns were brought to health facilities or, in some cases, through home-based administration by health extension workers during postnatal care.

Despite these early implementation lessons, Ethiopia faces persistent challenges in reaching newborns born at home, who represent nearly half of all births nationally and an even higher proportion in pastoralist regions, such as Afar, where up to four in five births occur outside of facilities. Births are often reported too late, and health extension workers (HEWs), who are based in communities, face constraints in traveling to households, while families live far apart, which limits timely access to newborns within the recommended window. Additional facility-level barriers further delay timely vaccination. Although national policy requires mothers and newborns to remain at facilities for at least 24 hours postpartum,[11] this standard is inconsistently applied,[12] and early discharge reduces opportunities to administer the vaccine within the recommended time window.

Implications for improving timely birth dose delivery

In both Uganda and Ethiopia, early implementation experiences have shown that timely Hep B birth dose vaccination relies not only on service availability but also on families' knowledge and social norms, the quality of interactions between caregivers and health workers, well-designed facility workflows, clear staff roles, and coordination and communication between community health workers (CHWs) and health facilities.

Addressing these interconnected, context-specific behavioral, social, and operational factors requires more than technical or policy fixes alone. Human-centered design (HCD) helps make sense of these complexities and supports the co-creation of solutions that fit user needs, service delivery realities, and system constraints.

Purpose of this report

This report synthesizes insights from HCD co-creation workshops conducted in Uganda and Ethiopia under Gavi, the Vaccine Alliance's Hep B birth dose learning agenda in partnership with PATH. It presents: (i) the barriers affecting timely birth dose vaccination; (ii) the "How Might We" questions that guided co-creation workshops; (iii) the strategies that were collectively developed to address these questions; and (iv) the implications and recommendations for strengthening the implementation of strategies developed going forward.

Study setting

The study was conducted in Uganda and Ethiopia, which represent different contexts for Hep B birth dose introduction (**Table 1**).

Uganda

Uganda has an estimated HBV prevalence of 2.4% and introduced the Hep B birth dose in 2022, primarily using a facility-only delivery strategy. However, routine DHIS2 data indicated roughly 30% of births occur outside health facilities, including rates up to 60% in some districts.19 Co-creation workshops were conducted in Lira and Butaleja districts to capture diverse geographic and health system contexts relevant to birth dose uptake.

- Lira District is peri-urban, with 26 health centers and 1 general hospital in the government public sector, 1,382 village health teams (VHTs), and 166 community health extension workers (CHEWs). In this district, 67.9% of births take place in a facility, while 53% are home births, and an HBV prevalence of 4.3%.[15,19]
- Butaleja District is predominantly rural, with 24 health centers and 1 general hospital in the government public sector, 502 VHTs, and 150 CHEWs. About 32% of births occur at home, with an HBV prevalence of 2.8%.[15,19]

TABLE 1. **Context for Hep B birth dose delivery in Uganda and Ethiopia.**

Characteristic	Uganda	Ethiopia
HBV prevalence	2.4%[17]	6.2%[17]
Hep B birth dose coverage	36%[18]	N/A
Timely birth dose coverage	N/A	N/A
Births outside health facilities	13%,[13] 32%[19]	46.1%[20]
Year birth dose introduced	2022	2025
Government strategies	Facility-only Hep B birth dose vaccine delivery	Facility-level Hep B birth dose administration (though pilot documented some out-of-facility vaccine administration by HEWs)
Community health worker roles in birth dose delivery	• CHEWs administer vaccines during outreach • VHTs identify defaulters and mobilize community	• HEWs vary in ability to administer injections • WDGs and VHLs identify home births and mobilize community

Abbreviations: CHEW,community health extension worker; HEW, health extension worker; VHL, village health leader; VHT, village health team; WDG, women's development groups

Recent health system reforms have implications for how birth-dose vaccinations are provided. Uganda's electronic Community Health Information System (eCHIS) is a new national digital platform that replaces paper-based methods with digital tools. Its aim is to strengthen community-level reporting, monitor CHW performance, and improve follow-up. The system is expected to influence how newborns are tracked and how birth-dose vaccinations are delivered. Specifically, CHWs are expected to use eCHIS to document home visits, referrals, and track immunizations.[21]

Ethiopia

Ethiopia has an estimated HBV prevalence of 6.2% and introduced the birth dose in November 2025.[17] Nearly half of all births (51.4%) occur outside of health facilities, with even higher proportions in pastoralist regions.[20] Co-creation workshops were conducted in Afar and Sidama to compare pastoralist and agrarian contexts, both regions have a high HBV burden and low institutional birth rates.

- In Afar, two pastoralist woredas (Chifra and Haruka) were selected due to the region's high HBV prevalence (estimated at about 25% in rural areas). Institutional delivery rates are low (16% in Chifra; 20% in Haruka), and each woreda has limited HEW staffing (12 HEWs each).
- In Sidama, Loka Abaya was selected as an agrarian woreda with an estimated 9% HBV prevalence and substantially higher institutional delivery rates (62%). The woreda has 1 primary hospital, 5 health centers, 17 health posts, and 74 HEWs.

Contextual differences between woredas include the rollout of Ethiopia's community engagement strategy involving village health leaders (VHLs) in Loka Abaya and Chifra, but not yet in Haruka. The new eCHIS has been implemented in Loka Abaya but not yet in Chifra or Haruka.

Methods

Across both Uganda and Ethiopia, we followed a structured, iterative approach to the HCD process that moved from generating qualitative insights to working together to define the problems, brainstorm ideas, create prototypes, and validate our solutions. In each country, following initial qualitative interviews (n=55 in Uganda; n=20 in Ethiopia) across national, regional/state, and district/woreda levels and focus group discussions (n=8 in Uganda; n=15 in Ethiopia) at the community level, we conducted subnational HCD workshops, including data collection and synthesis involving 69 workshop participants in Uganda

and 88 workshop participants in Ethiopia. This sequencing allowed participants to ground their strategy development in real, context-specific barriers people face in getting timely Hep B birth dose vaccinations.

All the qualitative data were analyzed according to an adapted Journey to Health and Immunization framework,[22] focusing on the four domains: (i) knowledge, awareness, and intent; (ii) preparation, cost, and effort; (iii) experience at the point of service; and (iv) follow-up after service.

In both countries, HCD workshops were conducted over four days and brought together caregivers, including mothers, fathers, and grandparents, as well as community representatives (e.g., women's groups), CHWs, facility-based health workers, and district-level managers.

Workshops began with a validation phase in which participants reviewed and refined the key barriers to administering the Hep B birth dose to create a shared understanding of the contextual challenges related to the Hep B birth dose context in the region.

Facilitators then introduced "How Might We" (HMW) questions to reframe these challenges as opportunities for innovation (presented in **Annex 1**) followed by participants brainstorming a wide range of potential solutions. Participants subsequently took part in a prioritization exercise to identify the most feasible and potentially impactful solutions. During this process, they considered factors such as acceptability, ease of implementation, alignment with existing health system structures, and the strategy's ability to address barriers affecting both in-facility and out-of-facility births.

The co-creation workshops in Uganda and Ethiopia were structured as follows, with some instances of activities extending into the subsequent day:

- **Day 1:** Caregivers, community leaders, and community health workers (VHTs/CHEWs in Uganda and /WDGs/VHLs in Ethiopia) participated in validating community-level barriers to the Hep B birth dose and brainstorming solutions for the "How Might We" questions.
- **Day 2:** District-level managers, EPI focal persons, and facility-based health workers, including HEWs in Ethiopia similarly contributed to validating provider-side barriers and brainstorming solutions for the "How Might We" questions.
- **Days 3 and 4:** Mixed groups of community members, providers, and district decision-makers engaged in collaborative prototyping, and refinement of strategies based on user needs, system constraints, and contextual realities.

Once priority ideas were selected, workshop participants collaborated to develop detailed strategies for Uganda and Ethiopia. These strategies included describing the proposed approaches and key features, which laid out implementation activities, anticipated challenges, and mechanisms to address those challenges.

Ethiopia conducted three workshops which took four days each, two in Afar and one in Sidama, with 88 participants, including HEWs, facility-based health workers, village leaders, caregivers, and woreda health teams. Uganda held two workshops, one in Lira and one in Butaleja, with 69 participants, including VHTs, CHEWs, traditional birth attendants (TBAs), caregivers, and district health managers. In both countries, strategies were presented to national-level bodies (the EPI Task Force in Ethiopia and the Viral Hepatitis Technical Working Committee in Uganda) for feedback and to ensure policy alignment. Additional district-level feedback was sought in Uganda to ensure the strategies reflected local realities and to create ownership.

Findings

Key findings are presented in three sections including the current delivery strategies for the Hep B birth dose in each country, the barriers and facilitators related to the Hep B birth dose, and strategies developed through the HCD workshop for both home and facility births, along with the crosscutting strategies needed to support their implementation.

Government strategies to delivering the Hep B birth dose vaccine

Facility-level strategies

Across both Uganda and Ethiopia, governments have prioritized the integration of the Hep B birth dose vaccine into facility-based postnatal care (PNC) to ensure timely vaccination immediately after delivery. In Ethiopia, national policy requires mothers to remain in the facility for 24 hours postpartum[23] to increase access to postnatal care and ensure the birth dose is administered on time by trained EPI nurses or delivery staff along with other essential newborn care packages. In Uganda, the Hep B birth dose is similarly being incorporated into existing newborn vaccination services and is expected to be co-delivered with BCG and OPV0 in maternity wards and immunization units. **Table 2** provides a summary of the similarities and differences of the facility-level Hep B birth dose delivery strategies in each country.

Out-of-facility strategies

With respect to out-of-facility strategies, government policies in Ethiopia and Uganda diverge significantly.

TABLE 2. **Comparison of facility-level Hep B birth dose delivery strategies in Ethiopia and Uganda.**

Topic	Description of approach in Ethiopia and Uganda
Description of facility-level strategy	Both countries are integrating the Hep B birth dose into facility-based newborn services. • **Ethiopia:** Emphasizes facility delivery and a recommended 24-hour postnatal stay to ensure timely PNC and vaccination. • **Uganda:** Co-delivers Hep B with BCG and OPV0 before discharge
Who administers the birth dose	In both countries, the birth dose is administered by trained facility-based staff. • **Ethiopia:** Delivered by EPI or maternity ward staff. • **Uganda:** Delivered by staff within maternity wards or nurses in immunization units.
Systems strengthening	Each country is strengthening training, guidance, and coordination mechanisms to improve facility readiness for birth dose delivery. • **Ethiopia:** A newly published training manual[24] clarifies roles and coordination across health system levels to support timely birth dose delivery. • **Uganda:** Health workers are being trained using the Immunization in Practice guidelines, which have been updated with Hep B birth dose specific protocols.[25]

Abbreviations: BCG, Bacillus Calmette-Guérin polio vaccine; EPI, Expanded Program on Immunization; OPV0, Oral Polio Vaccine birth dose; PNC, postnatal care

TABLE 3. **Comparison of out-of-facility Hep B birth dose delivery strategies in Ethiopia and Uganda.**

Activity	Description of approach in Ethiopia and Uganda
Community engagement, awareness, and pregnancy tracking	CHWs in both countries conduct education, identify pregnant women, and prepare families for timely newborn vaccination. • **Ethiopia:** HEWs provide ANC counseling, household visits, and maintain pregnancy tracking registers. VHLs and WDGs support HEWs in pregnancy and birth tracking, and in community mobilization. • **Uganda:** VHTs lead community mobilization, identify pregnant women, and notify facilities.
Referral, early linkage, and defaulter follow-up	Both systems rely on CHWs to link families to services and follow up on missed vaccinations. • **Ethiopia:** HEWs encourage facility delivery, follow up after home births, and manage defaulter lists with support from VHLs and WDGs. • **Uganda:** VHTs mobilize for facility/outreach services and track unimmunized or partially immunized infants.
Home-based vaccine administration	Used selectively to reach newborns delivered outside facilities. • **Ethiopia:** HEWs administer the Hep B birth dose at health facility following home deliveries. Although the evaluation report of the 2021/22 pilot noted that HEWs delivered the vaccine at home, the Ministry of Health has not yet accepted home-based vaccine delivery as a service delivery model. • **Uganda:** Home-based administration is not routine; VHTs focus on referral to facilities or outreach sites.

Abbreviations: ANC, antenatal care; CHW, community health worker; HEW, health extension worker; VHL, village health leader; VHT, village health team; WDG, women's development group

Ethiopia has an established community pathway for reaching newborns born at home by leveraging women's development group (WDG) volunteers and HEWs to identify pregnancies, promote antenatal care (ANC) and facility delivery, accompany women to health facilities, notify HEWs when labor begins, and support ambulance transport for postnatal care. During the Hep B birth dose pilot, HEWs were also authorized to administer the birth dose during home PNC visits, although timely tracking of newborns within 24 hours remained a persistent challenge.[26]

In contrast, Uganda does not yet have an articulated policy for vaccinating newborns with the Hep B birth dose in the community. While community health workers (CHEWs and VHTs) play important roles in routine immunization, neither cadre is currently mandated or trained to deliver the Hep B birth dose to newborns born at home. CHEWs, who are salaried, focus on health education and support immunization outreach. Some are trained to administer injectable contraception and may assist with vaccine administration during outreach, as well as manage and report vaccination records. CHEWs also supervise VHTs during community activities.

VHTs, who are volunteers, focus on community mobilization and follow-up, including mobilizing households for immunization sessions, referring unimmunized children, providing vaccine education, and tracking defaulters. **Table 3** provides a summary of the similarities and differences of out-of-facility Hep B birth dose delivery strategies in each country.

Barriers and facilitators to timely Hep B birth dose administration in Ethiopia and Uganda

Within this policy context, as Ethiopia and Uganda work to integrate the Hep B birth dose into newborn care, we identified crosscutting and context-specific factors that influence the timeliness and completeness of birth dose administration.

Using the Journey to Health and Immunization framework, we examined where along the caregiver and provider journey these bottlenecks emerge, how they differ across home and facility births, and which enablers create opportunities for improved service delivery.

The analysis below summarizes these findings by the four key domains adapted from the framework.

Knowledge, awareness, and intent of receiving the Hep B birth dose among caregivers and providers

Across Ethiopia and Uganda, limited early awareness among community members of the need for birth dose vaccines including a Hep B birth dose within 24 hours, is a major barrier. While caregivers are familiar with routine childhood vaccines, awareness of the Hep B birth dose is low and often overshadowed by concerns about newborn pain, fear of adverse effects, and cultural norms that discourage taking a newborn outside soon after delivery.

In Uganda, misinformation, including fears of infertility or religious narratives in some districts, further suppresses awareness and trust. On the provider side, limited or inconsistent training contributes to uneven readiness, with some health workers unsure about the correct timing for administering the birth dose.

Antenatal care serves as a critical platform in both countries, where counseling and visual education tools could be used to strengthen early understanding and build demand for timely newborn vaccination.

Preparation, cost, and effort access to services (care-seeking and service delivery readiness)

Community and home birth pathway: For families preparing for home births, access challenges are especially acute in both Ethiopia and Uganda. Long distances, difficult terrain, poor road conditions, and high transport costs create substantial barriers to reaching a facility within 24 hours. Fear of night travel, cultural norms that reinforce postpartum isolation and limit the movement of newborns outside the home, and low awareness of the birth dose further reduce the likelihood of seeking vaccination services outside the home. In Ethiopia, geographic remoteness and dispersed populations place greater reliance on HEWs for follow-up after home births.

Facility-based pathway: For caregivers who deliver in facilities, timely vaccine administration of the Hep B birth dose depends more on health system performance. Both facilities in Ethiopia and Uganda face cold chain gaps, frequent stockouts, and limited vaccine availability outside routine immunization days. These system-level limitations reduce the likelihood that facilities can administer the birth dose on time, even when mothers deliver in the facility.

Ethiopia has made progress toward improving readiness by decentralizing refrigerators to maternity wards and developing national training materials to clarify newborn vaccination workflows in facilities postpartum.[24]

In Uganda, challenges such as the placement of vaccine refrigerators, limited access to the refrigerators, and the availability of EPI or nursing staff to administer the vaccine, especially when midwives are overstretched, continue to undermine timely service delivery.

Experience of care at the point of service (when caregivers and providers interact)

Community and home birth experience: For families who deliver at home, the experience of seeking vaccination is strongly influenced by community norms and perceptions. In both countries, caregivers described how postpartum isolation practices limited the movement of mothers and newborns, which made seeking health services at the facility difficult.

Even when families are willing to seek vaccination at a facility, many feared being judged or scolded by facility-level health providers for having delivered at home. These experiences and expectations reduce caregivers' willingness to seek care quickly.

Ethiopia's service model provides an important learning: HEWs can administer the Hep B birth dose at home in some settings, which reduces the need for immediate travel and can contribute to improved timeliness of birth dose administration in remote areas. However, this model is constrained by high workloads, weak tracking systems, and difficult terrain.

In Uganda, VHTs are expected to support mobilization and referral of un- and under-vaccinated newborns but cannot administer the vaccine, meaning families must navigate transport and facility processes even when rapid referral occurs.

Facility-based experience: Within facilities, timely administration of the birth dose depends on the integration of newborn vaccination into routine delivery workflows. In both countries, missed opportunities arose when vaccines were not stored in maternity wards, refrigeration capacity was limited, or vaccine supply disruptions occurred.

Health worker hesitancy to open multidose vials due to wastage concerns also contributed to delayed vaccination. Ethiopia's decentralization of refrigerators has improved access in some facilities, but staff workloads remain a bottleneck. In Uganda, staffing shortages, especially in Butaleja, and cold chain instability, particularly in Lira, have reinforced perceptions that facility visits may not reliably result in successful vaccination.

Follow-up after birth and reducing missed opportunities

Follow-up systems determine whether infants not vaccinated at birth are eventually reached. In Ethiopia, HEWs conduct home visits and can directly administer the birth dose after non-facility deliveries, an important strategy in remote settings. However, this approach is challenged by strained HEW–TBA relationships in some areas, uneven collaboration, and the difficulty of reaching geographically distant households.

In Uganda, VHTs play a critical role in defaulter tracking, mobilization, and referral, but they do not administer vaccines. Even when referrals are made, follow-through is often hindered by cultural norms around postpartum isolation, long distances and access barriers to health facilities, and caregivers' fear of being judged by health workers for not delivering in a facility.

The insights were then translated into the "How Might We" questions presented in **Annex 1**. These questions guided the ideation and co-creation of prototypes and strategies aimed at addressing the most critical bottlenecks facing caregivers and providers across both home and facility pathways.

Strategies co-created during workshops to increase the uptake of the Hep B birth dose at in-facility and out-of-facility settings

An overview

Given the similarities in key barriers across the two countries, the co-creation workshops in Ethiopia and Uganda generated strategies that address many of the same challenges along the caregiver and provider journeys in vaccine administration for both home and facility births.

For home birth and community settings, the strategies in both countries focus on:

- Increasing community-wide awareness about birth dose vaccines and their place within the broader newborn care and prevention of mother-to-child transmission package (see **Box 1** for insights from Uganda, and **Box 3** and **Box 4** for related strategies in Ethiopia).
- Using CHW platforms (VHTs and CHEWs in Uganda and HEWs, VHLs, and WDGs in Ethiopia) to link families to facilities for birth and vaccination, bring services closer to households, and, where feasible, administer vaccines directly (see **Box 2** for Uganda and **Box 3** and **Box 4** for Ethiopia).

For facility settings, both countries' strategies emphasize that:

- The maternity/labor ward is the critical point for ensuring timely birth dose vaccination after facility births (see **Box 5** for Uganda and **Box 6** for Ethiopia).
- Improving timely birth dose administration requires better integration between maternity and immunization services, including clearer roles, shared responsibilities, and reliable access to vaccine stocks in or near maternity wards.

Finally, both countries' strategies highlight the need to strengthen existing health system functions to deliver birth doses effectively across community and facility levels:

- This includes recognizing and supporting the performance of VHTs and CHEWs (see **Box 7** for Uganda). It means ensuring that vaccines are reliably available (see **Box 8** for Uganda) and implementing Ethiopia's crosscutting, supportive strategies, like using technology for birth tracking, improving last-mile supply chains, and creating stronger connections between health posts and health centers (see crosscutting/supportive strategies in **Boxes 3, 4, and 6** for Ethiopia).

Together, these approaches reflect core functions for strengthening health systems. They underscore that community engagement and facility readiness require strong systems that support the workforce and can manage performance, logistics, and data effectively.

Strategies to improve timely birth dose vaccines after home births

Across Uganda and Ethiopia, the strategies collectively emphasize that timely Hep B birth dose vaccination after home births requires strengthening both community engagement and system coordination.

Uganda's strategies focus on improving community-wide awareness (**Box 1**), as well as building trust and tightening communication loops among VHTs, CHEWs, TBAs, and facilities to ensure home-born newborns are identified early and referred promptly (**Box 2**).

Ethiopia's strategies, shaped by the Health Extension Program and the high rate of home births, provide two vaccine delivery pathways: home-based vaccination by HEWs (**Box 3**), and facility-based vaccination supported by transport and coordinated follow-up (**Box 4**).

The approaches underscore the importance of early birth notification, trusted community actors, consistent messaging, and responsive community and facility systems that can reduce missed opportunities for vaccination.

BOX 1

Uganda's community-level strategy #1

Strengthening community-wide awareness for timely birth dose vaccination context strategy

Context: Many pregnant women in Uganda do not attend ANC or miss critical information about birth dose vaccines, labor signs, and facility delivery. Barriers include limited awareness, distance, provider attitudes, and low risk perception. Without clear, widespread community education, newborns delivered at home face delays in receiving the birth dose.

Strategy overview: This strategy strengthens community sensitization paired with respectful, consistent ANC counseling. The goal is to ensure that pregnant women, families, and community decision-makers have accurate information, a plan for delivery and transport, and understand the importance of timely birth dose vaccination, especially after home births.

Key features:

- Whole-of-community sensitization on birth dose vaccines, prevention of mother-to-child transmission, labor signs, facility delivery, and advance preparation for transport and costs.
- Consistent, clear messages delivered via VHTs, CHEWs, influencers (male champions, religious/cultural leaders), radio, community gatherings, and local-language channels.
- Engagement of men and families to support decision-making and transport readiness.
- Strengthened ANC counseling, ensuring respectful communication on birth dose vaccines, labor recognition, and transport planning.
- Reinforcement that no newborn should be turned away after the initial 24-hour window, as the vaccine remains valid for up to six weeks, according to national guidelines.

Contextual adaptations: Districts emphasized the need to retrain VHTs and CHEWs on birth dose vaccination before implementation, given long gaps since their last immunization trainings.

BOX 2

Uganda's community-level strategy #2

Closing the coordination and communication loop for timely birth dose administration in the community

Context: Weak linkages between communities, VHTs/CHEWs, TBAs, and health facilities make it difficult to identify newborns born at home and refer them for timely vaccination. Mothers who give birth at home, especially with TBAs, may fear being judged at health facilities, delaying vaccination beyond 24 hours.

Strategy overview: This strategy strengthens trust, communication, and coordinated referrals for VHTs/CHEWs and facilities. It creates a continuous cycle of identifying, notifying, referring, following up, and verifying to ensure that no home-born newborn is missed.

Key features:

- **Community engagement with VHT/CHEWs:** Strengthening VHT presence in their own communities, building trust, and reinforcing respectful communication about vaccine safety and value.
- **VHT/CHEWs engagement with facilities:** VHTs/CHEWs receive timely notification from TBAs about home births, alert facilities when home births occur, and assist with referrals of newborns.
- **Facility engagement with VHT/CHEWs:** Facilities record VHT/CHEW contact information on ANC and immunization cards to help women contact VHTs when labor begins and allow real-time follow-up.
- **Coordinated messaging among CHEWs, VHTs, and facilities** to ensure consistent guidance and supportive care for mothers.
- **Community cross-checking** by VHTs/CHEWs to verify that newborns delivered at home have received the birth dose and appropriate newborn care.
- **Stronger system coordination** through regular review meetings among CHEWs, VHTs, and facilities, along with the use of eCHIS for tracking births and follow-ups.

Contextual adaptations: Depending on district, they may include the contact information of the Local Council 1, as in Lira. Beyond CHWs, mentor mothers may also be used to build trust, and facilities can be asked to generate pregnancy lists to support tracking, as in Butaleja.

BOX 3

Ethiopia's community-level strategy #1

Home-based vaccine administration within 24 hours of birth

Context: Given the high rates of home births and the central role of the Health Extension Program, communities in Ethiopia have identified home-based vaccine administration as a feasible and trusted option, although home vaccination is not yet formally included in the national EPI service delivery strategy.

Strategy overview: This strategy enables HEWs to administer the Hep B birth dose at home as part of immediate postpartum care, supported by community birth tracking systems, integrated home-based PNC, and improved HEW mobility.

Key features:

- Community-based birth tracking using multi-stakeholder platforms, like WDGs, VHLs, clan leaders, TBAs, and religious leaders, tailored to agrarian and pastoralist settings.
- Integration with home-based PNC, pairing vaccination with postpartum health checks for mothers and newborns.
- Expanded transport support, particularly motorbikes, to reduce HEW travel time and allow quicker access to remote households.
- Crosscutting strategies, such as debunking traditional beliefs, engaging men, strengthening CHW skills, and ensuring a consistent supply chain, are supported by mechanisms like birth notification tools, referral slips, incentives for volunteer CHWs, and stronger linkages between health posts and health centers.

BOX 4

Ethiopia's community-level strategy #2

Facility-based birth dose administration after home birth

Context: Ethiopia's national guidance for 24-hour postnatal care recognizes that caregivers may bring newborns to a facility shortly after home birth. Although this option imposes transport-related costs on families, it provides a structured opportunity for timely vaccination.

Strategy overview: This strategy focuses on ensuring that newborns delivered at home are transported to facilities within 24 hours for birth dose administration and essential newborn services.

Key features:

- Ambulance availability for rapid transport of newborns and caregivers following home births.
- HEW coordination and follow-up, including notifying facilities of home deliveries and helping arrange transport.
- Key functions like birth tracking, community demand generation, male engagement, and addressing traditional beliefs (as addressed in Box 3) must continue, regardless of where vaccination occurs.

Contextual adaptations: In pastoralist areas, strategies must rely more on traditional community structures and place greater emphasis on engaging men, while in agrarian areas, efforts should focus on using formal community platforms and involving religious leaders.

Strategies to improve Hep B birth dose following in-facility births

Uganda emphasizes team-based integration of vaccine administration (**Box 5**), while Ethiopia emphasizes strengthening the overall capacity and readiness of the health facility to deliver the birth dose vaccine (**Box 6**).

Uganda's approach (**Box 5**) strengthens teamwork between maternity and EPI units, expands who can vaccinate newborns, ensures vaccines are accessible in maternity wards, and improves mentorship, data systems, and shared accountability to support 24/7 vaccination.

Ethiopia's strategy (**Box 6**) focuses on overall facility readiness by ensuring vaccine availability in maternity wards, building midwives' immunization skills, addressing misunderstandings about wastage and open-vial policy, and improving data sharing between delivery and EPI teams.

Crosscutting strategies to create an enabling environment for birth dose delivery across all settings

In Uganda, the strategy presented in **Box 7** aims to strengthen the performance and motivation of VHTs and CHEWs, who are essential for tracking pregnancies, identifying home births, and referring newborns for vaccination. The strategy shown in Box 8 focuses on improving the vaccine supply chain, so facilities always have doses available by strengthening stock tracking, forecasting, communication, and redistribution among national, district, and facility levels.

Ethiopia's crosscutting strategies, detailed in **Boxes 3, 4, and 6**, emphasize better birth tracking, addressing harmful beliefs, and improving the skills and motivations of HEWs and volunteer groups (WDGs and VHLs). They also work to ensure a reliable last-mile supply chain and increase male engagement—not just to encourage newborn vaccination but also to support transport to health facilities. Ethiopia also highlights the use of technology and referral tools for birth notification, incentives for volunteer cadres, and stronger links between health posts and health centers to improve monitoring and vaccine flow.

BOX 5

Uganda's facility-level strategy

Integrated, team-based delivery of the Hep B birth dose in facilities

Context: Timely birth dose vaccination is hindered by limited vaccine access in maternity wards, long queues at outpatient clinics, low vaccination skills among midwives, weak collaboration between maternity and EPI units, and reliance on a single EPI staff member to access the vaccine fridge, which is not feasible especially during nights and weekends.

Strategy overview: This strategy positions birth dose vaccination as a shared responsibility across maternity and EPI teams, supported by cross-training, improved vaccine access, and coordinated workflows across all facility staff to ensure the birth dose is delivered within 24 hours, regardless of staffing or facility layout.

Key features:

- **Shared responsibility:** Midwives, nurses, and EPI staff jointly ensure vaccination within 24 hours; birth dose delivery is integrated into routine newborn care.
- **24/7 vaccine access:** Vaccines are stored in or near maternity wards; maternity staff can vaccinate during off-hours or when busy.
- **Capacity-building:** Midwives receive training and mentorship to confidently vaccinate and document newborn vaccinations; all staff are informed that the vaccine remains valid for up to six weeks, according to national guidelines.
- **No discharge without vaccination:** Hep B birth dose included in discharge checklists and routine newborn services.
- **Clear workflow and monitoring:** Protocols ensure timely vaccination, with time-of-vaccination recorded to monitor timeliness.
- **Streamlined data systems:** Maternity and EPI registers aligned; routine review meetings are held to track missed opportunities.

BOX 6

Ethiopia's facility-level strategy

Immediate post-delivery administration of the Hep B birth dose in facilities

Context: Although newborn vaccines (BCG, OPV0) are meant to be given at birth, they are often delayed due to fear of wastage, limited understanding of the open-vial policy, gaps in midwives' immunization skills, and inconsistent vaccine availability in maternity wards resulting in missed opportunities for timely birth dose vaccination.

Strategy overview: This strategy strengthens facility readiness to vaccinate immediately after delivery by improving vaccine availability in maternity wards, expanding midwives' immunization competencies, and enhancing coordination between delivery units and EPI teams.

Key features:

- **Consistent vaccine availability:** Maternity wards receive regular resupply via carriers or dedicated refrigerators to ensure vaccines are accessible at the point of birth.
- **Expanded midwife capacity:** Midwives receive targeted training on birth dose administration, documentation, and safe vaccine handling.
- **Improved coordination and data flow:** Delivery and EPI teams share data routinely to support follow-up and monitor timely administration.

Supporting actions:

- Strengthen counseling during ANC and pregnant women's forums to build demand for timely newborn vaccination.
- Promote facility delivery through maternity waiting homes and improved quality of care.

BOX 7

Uganda's crosscutting strategy #1

Supporting VHT/CHEW performance through tools, supervision, and accountability

Context: VHTs and CHEWs are essential for identifying pregnant women, tracking home births, and referring newborns for timely vaccination. However, inadequate incentives, delayed payments, poor accountability, and limited logistical support undermine their performance, leading to delays in referrals and reduced engagement.

Strategy overview: This strategy strengthens the motivation and effectiveness of VHTs and CHEWs by providing tools, transparent verification processes, and routine supervision. With improved support, frontline workers can more reliably track pregnancies and births, mobilize caregivers, and ensure newborns receive timely Hep B birth dose vaccination.

Key features:

- **Practical tools for fieldwork:** Rain gear, gumboots, bicycles, torches, and phone airtime are provided to support mobility and communication.
- **Transparent performance verification:** Referral slips, facility-linked verification, and supervisor checks to validate VHT/CHEW contributions.
- **Routine accountability forums:** Facility review meetings where VHTs/CHEWs report progress on pregnant women reached, home births followed up, and newborns referred.
- **Recognition of high performers:** Public acknowledgment during supervision meetings to reinforce motivation and reduce favoritism.
- **Financial support:** Monthly allocation of 10,000 Ugandan shillings per VHT to cover work-related costs, addressing gaps in primary health care fund implementation.

Contextual adaptations: Districts emphasized creating formal guidance for performance management, linking incentives to verified outputs, and integrating VHT remuneration into district budgets. Implementing partners may temporarily fill financing gaps to cover work-related activities while systems strengthen.

BOX 8

Uganda's crosscutting strategy #2

Ensuring reliable vaccine availability through stock tracking and buffer management

Context: Timely birth dose vaccination depends on consistent vaccine availability at delivery points. However, districts often receive fewer doses than requested, deliveries from the National Medical Stores arrive late, and facilities have limited visibility into district-level stock. Weak stock tracking, inadequate forecasting, and poor buffer stock management lead to preventable stockouts and missed opportunities.

Strategy overview: This strategy strengthens vaccine availability by improving stock visibility, enhancing ordering and forecasting practices, ensuring adequate buffer stocks, and enabling redistribution across facilities. The goal is to prevent unexpected shortages and support uninterrupted birth dose delivery, including during weekends and off-hours.

Key features:

- **Improved visibility and communication:** Earlier notifications from National Medical Stores; districts relay stock updates to facilities; facilities verify deliveries and adjust plans accordingly.
- **Accurate ordering using real consumption data:** Staff trained to track temperatures, ledgers, and registers; forecasts updated using VHT/CHEW-generated population data.
- **Clear ordering cycles and buffer stock:** Monthly ordering schedules; two-week buffer stock at facility and district levels; staff are taught or are aware of replenishment timelines.
- **Redistribution mechanisms:** District cold chain technicians track excess or expiring doses and redistribute them to facilities running low on vaccine supplies.
- **Accountability systems:** Monthly review meetings across facility and district teams to compare stock ordered vs. received, track wastage, and review stock status.

Contextual adaptations: Districts highlighted the need for a digital stock-monitoring system (currently missing) linking national, district, and facility levels. Respondents recommended ODK based facility tools and targeted training for cold chain staff to enable timely redistribution.

Key implications and recommendations for strengthening timely Hep B birth dose delivery

Strengthen and tailor CHW platforms to support timely birth dose delivery.

Community health workers, including VHTs and CHEWs in Uganda and HEWs, WDGs, and VHLs in Ethiopia, are the backbone of the community health system and play a central role in enabling timely Hep B birth dose delivery. Their functions include identifying pregnancies, tracking home births, facilitating birth notifications, referring families to facilities, and, where permitted, directly vaccinating newborns born at home.

These roles position CHWs as a critical bridge between households and the formal health system, particularly for home births, where delays in care-seeking are most pronounced. To strengthen CHW platforms, it will require clear role definitions, manageable workloads, supportive supervision, and adequate compensation and resources.

In Uganda, this translates into consistent funding to enable outreach activities such as transport, provision of basic tools to operate in challenging terrain, and performance management mechanisms that recognize and reward high-performing VHTs and CHEWs. In Ethiopia, system strengthening similarly hinges on transport support for HEWs, appropriate incentives for volunteer cadres, and reliable birth notification mechanisms. Without these enabling conditions, the ability of CHWs to support timely birth dose delivery remains constrained, despite their central role in the service delivery pathway.

Alternative vaccine presentations, including one-dose vials, can reduce concerns about wastage, and make it more feasible to vaccinate newborns following home births or early postnatal visits where CHWs are permitted to vaccinate. Product innovations, such as microarray patches, may further expand the feasibility of community-based vaccination by simplifying administration for CHWs, particularly in communities far from health facilities.

Improve facility readiness and implement integrated, team-based workflows in facilities to ensure timely administration of the birth dose vaccine for every delivery.

Both countries identify similar facility-level bottlenecks, including limited vaccine availability within maternity wards, gaps in readiness to deliver the birth dose vaccine at all hours, and low confidence among midwives and delivery staff in administering the birth dose.

The strategies developed in each setting point to practical solutions that redistribute responsibility for birth dose delivery across maternity and EPI teams. These solutions include locating vaccines in birthing areas, authorizing trained maternity staff to administer the vaccine, integrating birth dose vaccination into routine newborn care checklists, and strengthening data sharing and accountability mechanisms across maternity and EPI teams.

These findings suggest that prioritizing low-effort, high-impact workflow changes, such as ensuring no newborn is discharged without vaccination, updating maternity registers to include information on birth does vaccination, and enabling real-time communication between wards, can reduce missed opportunities and institutionalize birth dose delivery as a routine component of newborn care rather than a standalone immunization activity.

Build structured processes for district- and community-level adaptation.

National guidance on administering the Hep B birth dose vaccine, including the strategies developed through this process, must be translated into context-specific implementation plans. Mechanisms, such as co-design workshops, can be used to adapt the strategies and develop implementation plans. Additionally, implementation research to assess acceptability, feasibility, cost-effectiveness, and impact and can clarify what is effective, why it may succeed or fail, and for whom—and critically which implementation strategies should be considered for scale up. Implementation research can also help identify context–mechanism–outcome relationships and support timely course correction as strategies are implemented across diverse social and geographic settings.

Strengthen health systems functions to reduce missed opportunities.

Strengthening core health system functions is critical to reducing missed opportunities for timely birth dose vaccination. These functions include managing vaccine stocks, monitoring personnel performance, tracking pregnancies and births (by integrating tools and data repositories, where possible), ensuring consistent vaccine availability, paying salaries and operational funds on time, and providing supportive supervision.

Addressing gaps in these areas requires targeted investments in practical system improvements, such as better stock visibility through digital or paper-based tools, clearer and more consistent supervision structures, updated registers and indicators, and stronger links between community- and facility-level data systems. Without these systems in place, even well-designed strategies are unlikely to consistently reach newborns in a timely fashion.

Annex 1. "How Might We" (HMW) questions presented to community and provider/district-level participants in Uganda and Ethiopia

Theme	Uganda HMW questions	Ethiopia HMW questions
Knowledge, awareness, and belief		
Caregiver perceptions and knowledge of birth dose vaccines	**Community:** • HMW ensure all mothers are aware of labor signs and respond to them appropriately so that they avoid spontaneous births at home? • HMW increase awareness among mothers on vaccines, their schedule, and possible side effects, in a simple way that eliminates fear and motivates uptake? • HMW strengthen coordination between health workers and leaders to ensure accurate messaging of newborn vaccination that reaches everyone in the community? **CHW, TBA, and providers:** • HMW facilitate CHEWs and VHTs to ensure every mother receives information about birth dose vaccines, regardless of how far they live from the facility?	**Community:** • HMW improve birth dose vaccination awareness so that mothers and fathers have accurate vaccine schedule knowledge? (Loka Abaya) • HMW address community concerns that lead to vaccine hesitancy so that we improve birth dose uptake? (Chifra) • HMW raise caregiver knowledge on birth dose vaccines so that they are more confident to seek services? (Chifra) • HMW ensure every parent knows where, when, and how to access birth dose vaccines for their newborn? (Chifra) • HMW build community knowledge, address hesitancy, foster confidence, create demand, and ensure every parent knows where, when, and how to access birth dose vaccines for their newborns? (Haruka)
Cultural practices	N/A	**Community:** • HMW respectfully align birth dose vaccination with existing cultural norms to ensure early health facility visits are perceived as safe, appropriate, and beneficial for newborns? (Chifra and Haruka) **Community:** • HMW reassure caregivers who fear the "evil eye," or use "ameessa" (plant used by traditional healers) instead of vaccines so that they can prioritize seeking the birth dose vaccine within the initial 24-hour window? (Loka Abaya)
Preparation, cost, and effort		
Tracking and notification of home births	**CHWs and TBAs:** • HMW improve the existing identification and tracking system for home births?	**Community:** • HMW ensure village health leaders are present in all areas so they can support home birth tracking? (Loka Abaya) **Providers:** • HMW design a system keeps pregnant women informed about relevant health services and links them to health facilities to receive birth dose vaccines? (Chifra)

Theme	Uganda HMW questions	Ethiopia HMW questions
Family and gender dynamics in health decisions	**Community:** • HMW encourage male partner involvement in ANC and immunization processes to improve support for their female partners/ caregivers?	**Community:** • HMW significantly strengthen male involvement to empower both parents in vaccinating their newborns with birth dose vaccines? (Chifra & Haruka)
Transportation	N/A	**Community:** • HMW make it easier for caregivers who live far from facilities to access delivery services and in turn birth dose vaccination on time? (Loka Abaya) **Providers:** • HMW address distance, cost, and transport as barriers to accessing birth dose vaccination for all newborns? (Haruka)
Experience of care at point of service		
Relationship between caregivers and health providers	**Providers:** • HMW encourage providers to receive caregivers in a friendly manner so as to encourage them to seek the birth dose, even if they delivered at home or their card was not well kept?	**Community:** • HMW rebuild and strengthen trust between communities and HEWs to demonstrate their value when it comes to newborn health, including birth dose vaccination? (Chifra and Haruka) **Providers:** • HMW improve the gaps related to compassionate care, providing counseling services, and availing female midwives to enhance quality of services, thereby improving birth dose vaccine uptake? (Haruka)
Inadequate staffing and overburdened workload	**CHWs, TBAs, and providers:** • HMW support health workers to manage the high workload so that birth dose vaccinations within the initial 24-hour window is achievable?	**Providers:** • HMW enable birth dose administration for caregivers, even when there's just one or no health care workers available? (Loka Abaya) • HMW support health care workers with coordination and logistics so that they manage to vaccinate within 24 hours of birth? (Loka Abaya) **Providers:** • HMW ensure that health centers are supported to provide quality services? (Loka Abaya) • HMW avail female midwives to enhance quality of services, thereby increase the uptake of birth dose vaccines? (Chifra)

Theme	Uganda HMW questions	Ethiopia HMW questions
Quality of services	N/A	**Providers:** • HMW ensure that health centers are supported to provide quality services? (Loka Abaya) • HMW avail female midwives to enhance quality of services, thereby increase the uptake of birth dose vaccines? (Chifra)
Availability of services	**Providers:** • HMW enhances coordination and collaboration among all maternal and child health staff so that newborns receive birth doses even when EPI staff are not available? **Providers, CHWs, TBAs, and community:** • HMW ensure vaccination services are provided everyday so that mothers do not miss the birth dose within the initial 24-hour window?	**Providers:** • HMW strengthen the link between health centers and health posts so that service provision is enabled at lower levels? (Loka Abaya) • HMW ensure birth dose vaccination services are consistently available 24/7 and administered to every eligible newborn who accesses a health facility? (Chifra and Haruka)
Vaccine delivery	N/A	**Providers:** • HMW innovate outreach and house-to-house vaccination strategies to effectively reach all home births within the critical 24-hour window for birth dose vaccination? (Chifra and Haruka)
Vaccine availability	**Providers** • HMW ensure vaccines are distributed up to the last mile to minimize stockouts and hence reduce missed opportunities?	N/A
Follow-up after service		
Reporting and monitoring	N/A	**Providers:** • HMW implement a real-time monitoring system to track birth dose vaccine uptake, identify gaps, and enable timely interventions? (Haruka)

Abbreviations: CHEW, community health extension worker; CHW, community health workder; HMW: "How Might We"; TBA, traditional birth attendants; VHT: village health team

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