VILLAGE REACH

Closing the 9-Month Immunization Gap

Barriers to late-infancy immunization and practical solution to improve coverage at 9 months

DRC

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Executive Highlights

Why this matters now

In the Democratic Republic of Congo (DRC), the first dose of measles-containing vaccine (MCV1), yellow fever (YF) and the second dose of inactivated polio vaccine (IPV2) are administered at 9 months, so a single missed visit can delay multiple antigens and widen immunity gaps. Nationally, coverage drops from 65% for DTP3 (14 weeks) to 55% for MCV1 (9 months) in 2023, far below the 95% population immunity required to interrupt measles transmission. These gaps have fueled one of the world's largest and most persistent measles epidemics; after a temporary decline in 2020–2021, measles resurged with over 100,000 reported cases in 2024, underscoring that improving timely 9-month vaccination is essential for outbreak control.

Drivers of 9-month delay and dropout

Through participatory qualitative research with 105 caregivers, heads of household, health care workers, community influencers and EPI officials in Haut-Katanga and Kasaï Oriental provinces, we identified four primary drivers of delayed or missed vaccination that were either unique to or more pronounced at the 9-month touchpoint:

- **Long gaps between 14 weeks and 9 months weaken recall and follow-up**, as reminder systems and health system contact decline in later infancy
- **Reduced perceived urgency as children grow older**, lowering willingness to overcome transport, time and financial barriers despite positive attitudes toward vaccination
- **Informal fees, card-replacement costs and fear of reprimand**, which create financial, administrative and social barriers that accumulate over time
- **Stockouts and minimum-child threshold practices**, which lead to repeated visits, long waits and missed opportunities even when caregivers present on time

These drivers rarely occur in isolation. Instead, intent erodes along a pathway of compounding behavioral, financial and system-level pressures. Distance, transport costs, gendered household decision-making and livelihood demands

amplify these pressures. Ultimately, whether vaccination occurs often depends on service reliability at the moment caregivers attend.

Community-identified solutions to improve 9-month coverage

Through human-centered design, participants co-created and prioritized four complementary solutions to strengthen the 9-month immunization touchpoint:

- RECO (CHW) sensitization for both parents, expanding engagement beyond mothers to include heads of household in 9-month messaging
- Multi-person reminder systems, ensuring both caregivers and another household member receive reminders shortly before scheduled sessions
- Adjusted vaccination hours at fixed sites, aligning service delivery with caregiver work schedules and reducing opportunity costs
- Targeted outreach vaccination sites for 9-month antigens, focusing specifically on children who missed vaccination at 9 months

Together, these interventions address both behavioral erosion before the 9-month visit (weakened recall, declining urgency, knowledge gaps) and service availability barriers at the point of care (inconvenient hours, geographic distance, session reliability). Findings show that most caregivers remain positively oriented toward vaccination; when reminders are strengthened and services are accessible and reliable, families are able to access 9-month vaccination.

Priority policy actions

Findings also point to national-level policy and practice levers beyond community-level interventions:

1. Ensure enforcement of free vaccination policy and reduce card-replacement barriers

Although national policy mandates free vaccination, caregivers frequently report paying for cards or services. Even small, inconsistent or unpredictable fees deter return visits at 9 months, particularly among financially vulnerable households. Strengthened monitoring, clear communication to communities and consistent enforcement of free vaccination policy are critical to reducing this barrier.

2. Address restrictive vial-opening practices and supply uncertainty

Despite the transition from 10-dose to 5-dose MCV vials, informal minimum-child thresholds persist due to concerns about wastage and anticipated stockouts. Smaller vials alone are insufficient when yellow fever remains available only in 10-dose presentations and when supply reliability is uncertain. Aligning supervision, clear acceptable-wastage guidance and reliable resupply mechanisms could reduce missed opportunities at the 9-month visit.

3. Moving MCV1 to 6 months requires strong communication of evidence and system readiness

Stakeholders identified potential benefits of shifting MCV1 to 6 months, particularly improved recall and earlier protection. However, acceptance was conditional and there were concerns about infant readiness, reduced immunogenicity and workload burden and complexity. A schedule change would require robust clinical evidence, clear guidance for health care workers and proactive community sensitization. Respondents cautioned that without these safeguards, a poorly communicated shift could undermine trust and coverage rather than improve measles protection.

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Background

In the Democratic Republic of Congo (DRC), the first dose of measles-containing vaccine (MCV1), yellow fever and the second dose of inactivated polio vaccine (IPV2) is administered at 9 months of age through routine immunization. These vaccinations provide critical protection against highly transmissible diseases that remain endemic or outbreak-prone in DRC. A single missed or delayed visit at 9 months can therefore result in multiple antigens being delayed or missed altogether, compounding immunity gaps.

Nationally, coverage for the final dose of the early infancy series (the third dose of the diphtheria, tetanus and pertussis vaccine, or DTP3) is estimated at 65%, while coverage at the 9-month touchpoint (which includes MCV1) is lower, at 55%, representing a 10-point drop-off between DTP3 and MCV1, well below the 95% threshold needed to interrupt measles transmission. [1]

These sustained immunity gaps have contributed to one of the largest and most persistent measles epidemics globally in the DRC over the past decade, with hundreds of thousands of reported cases and thousands of deaths. After a temporary decline in 2020-21, measles resurged, with over 100,000 reported cases in 2024, underscoring ongoing vulnerabilities related to delayed or incomplete routine vaccination.

To better understand the factors behind low and delayed immunization coverage at 9 months, VillageReach, in partnership with the DRC Ministry of Health, conducted a qualitative, participatory study in Haut-Katanga and Kasaï Oriental provinces. Dropout between the DTP3 vaccine (given at 14 weeks) and MCV1 (at 9 months) is 10% in both provinces. The study aimed to **identify drivers and potential solutions for delay and dropout at the 9-month immunization touchpoint, as part of a broader four-country study.**

Data was collected between November 2024 and July 2025. Two male and two female peer researchers were recruited and trained to join the research team. Participants were recruited from 4 health facilities and their catchment areas in each district. The study included participatory interviews with 105 participants (Table 1). Participants represented both on-time vaccination experience (caregivers and heads of household whose children had completed at least one 9-month vaccine before the age of 12 months) and delayed or missed vaccination (those whose children had not received any 9-month vaccines before the age of 12 months). Additionally, eight health facility observations were also conducted. Solutions to identified drivers of non-vaccination at 9 months were developed through two ideation workshops, followed by two prototyping workshops to further refine the identified solutions.

[1] World Health Organization. WHO/UNICEF Estimates of National Immunization Coverage – Immunization data. Available at: https://immunizationdata.who.int/ Accessed: Jan 29, 2026.

Table 1: Study Sample

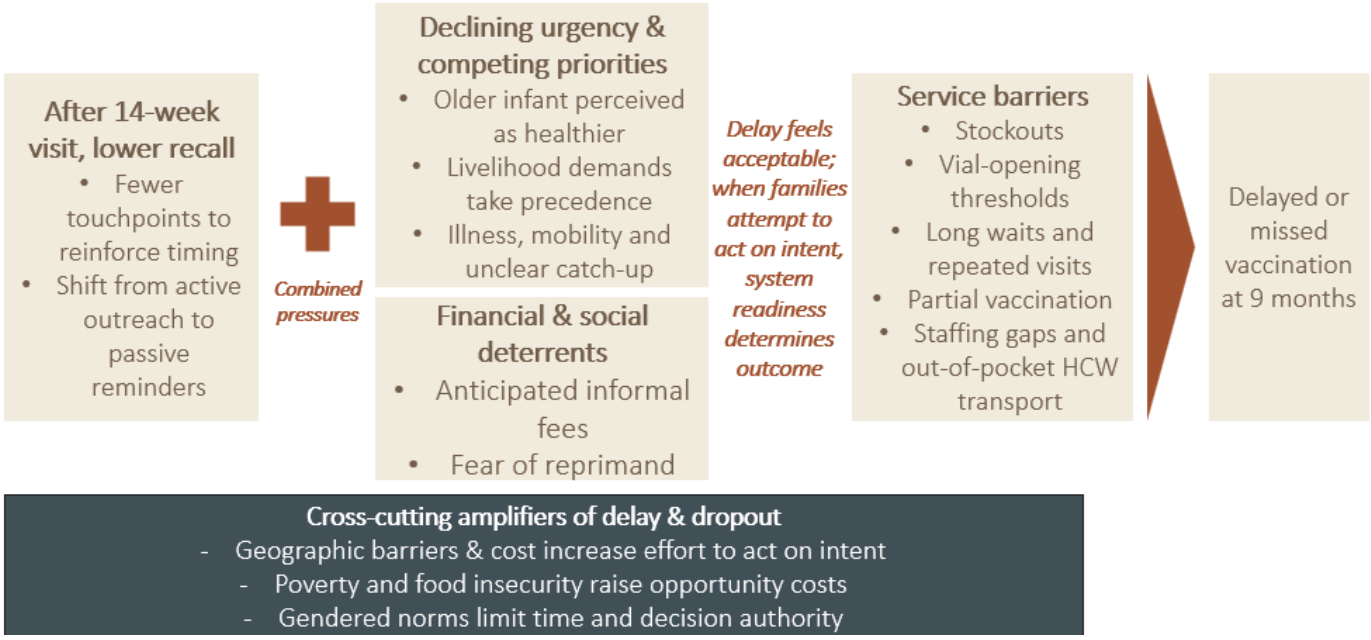
Participant Type	Sample (n)		
	Participatory Data Collection	Ideation Workshops	Prototyping Workshops
Caregivers	46	17	18
Heads of households	24	9	13
Health care workers	16	9	10
Community influencers	16	8	15
EPI officials	3	2	1
Total	105	45	57

Rapid analysis using participatory debriefing and affinity mapping was conducted alongside data collection and in-depth thematic analysis using Atlas.ti was conducted for all transcripts.

Drivers of MCV1, YF and IPV2 Delay and Dropout

Delay and dropout at 9 months rarely result from a single barrier, rather, intent erodes through a sequence of compounding behavioral, social, financial and system-level pressures, with service reliability and clarity ultimately determining whether intent translates into vaccination. Each step along the pathway represents an opportunity for targeted intervention. Considering these themes as a pathway, a single intervention will have limited effect unless they address both late infancy follow-up and facility reliability when caregivers attend.

Figure: Pathways to delay and dropout at the 9-month touchpoint



We identified four primary themes that represent drivers of vaccination dropout or delay that were either unique to or more pronounced at the 9-month point.

1. Long gap between 14 weeks and 9 months and weakened reminders in later infancy reduce recall despite intent to vaccinate

Between birth and 14 weeks, vaccination appointments are scheduled every 4 weeks, which creates a routine for the caregiver. This routine is reinforced by written dates on vaccination cards and frequent health care worker contact. The next required touchpoint occurs when children are 9 months old. This long gap weakens continuity of contact and reduces the salience of vaccination dates, increasing the likelihood of missed or delayed vaccination for MCV1, YF and IPV2.

> *"First of all, it's forgetfulness, forgetting the date of the appointment." – 28-year-old mother of a child who received no 9-month vaccines, Haut-Katanga*

> *"The mothers…had just given birth of course, so these activities of going to the hospital…it's still fresh in her head, so she can easily adapt to this rhythm; you see when there are many months…we can even forget that the child*

had to have the vaccine." – 36-year-old father of a child who received 9-month vaccines after one year, Haut-Katanga

Vaccination reminder systems that promoted adherence in early infancy included vaccination cards as prompts, active door-to-door outreach by community health workers (CHWs, called *relais communautaires/RECOs* in the DRC), recovery systems for missed children, and phone calls or SMS reminder initiated by health care workers. By 9 months, contact becomes passive, especially in Haut-Katanga, with caregivers expected to rely on appointment dates on vaccination cards or public announcements.

"The mobilizers come to our neighborhoods, they are mobilizing…pregnant women, those who have given birth, bringing children to vaccination." – 44-year-old father of a child who received 9-month vaccines after one year, Haut-Katanga

"[I knew to take my child for 9-month vaccination] when the RECOs raised awareness…They start raising awareness at 6 p.m. and they finish at 7 p.m." – Mother of a child who received 9-month vaccines on-time, Kasaï Oriental

As a result, missed or delayed 9-month vaccination is often driven by weakened recall rather than vaccination hesitancy, which can contribute to a decline in urgency and follow-through in later infancy.

2. Decreased urgency of 9-month vaccination as families perceive older infants to be at lower risk, reducing willingness to overcome persistent barriers

As infants grow older, many caregivers perceive them as stronger, healthier, and less vulnerable to illness. This shift in risk perception reduces the urgency of seeking out 9-month vaccinations compared to early infancy vaccines, when health risks feel more immediate.

" I always thought that since he has already received the other vaccines, it was no longer important, it won't do anything even if he doesn't receive that..." -26-year-old mother of a child who received no 9-month vaccinations, Haut-Katanga

"I started to neglect the 9-month vaccines, I said to myself ha, even at 11 months I will leave, even at 10 months I will leave until she has reached 12 months... I saw [CHILD] in good health, she ate well, she had no problems, that's why I was negligent about the 9-month vaccines." – 38-year-old mother of a child who received 9-month vaccines after one year, Haut-Katanga

Caregivers described a decline in urgency, which reduced their willingness to overcome barriers they had previously managed at earlier touchpoints. While attitudes towards vaccination remain positive, motivation weakened in the absence of reminders or reinforcing contact with the health system. This decline in urgency was often reinforced by household decision-making dynamics, in which mothers bear responsibility for taking the child to the health facility and fathers or heads of household control financial resources such as transport costs but are rarely present at vaccination visits.

"It is undoubtedly the head of the household who makes the final decision…I pay for the transportation…I was the guarantor who paid for it." 44-year-old father of child who received 9-month vaccines on-time, Haut-Katanga

"There are dads who control everything in their homes…the wife cannot have the last word…women prioritize work and neglect vaccination. – 43-year-old female community influencer, Haut-Katanga

As urgency declined, competing livelihood demands increasingly took precedence over preventive care. Mothers describe balancing market work, field labor, household chores and caring for other children, making travel and waiting at the health facility difficult to justify when the child appeared healthy. By 9 months, caregivers have typically moved beyond the postpartum period (when they are intensely focused on newborn care) and resumed their work, household and community obligations. Support available during postpartum has usually decreased.

"First of all I'm alone at home…If I had someone at home…maybe that wouldn't be the case…I was going to respect the vaccines there from 9 months." – 30-year-old mother of a child who received 9-month vaccines after one year, Haut-Katanga

When reminders weakened, geographic distance and transport costs further reduced the likelihood that caregivers would make a return visit.

"I was informed of the vaccination. The nurses came to tell me. But just finding the time was a problem. I start at 6 am until 7 pm…That's what prevented me from going with my child to the vaccination." – Mother of a child who received 9-month vaccines after one year, Kasaï Oriental

"I came back from the field late, the time has passed. Back in the field I told myself that I would first go and sell at the market and the time has passed again." -24-year-old mother of a child who received no 9-month vaccines, Kasaï Oriental

"The main cause is that the woman wakes up in the morning and goes off in search of food. How are we going to eat today if I take the child to the vaccination? How will the others survive, she wonders." 44-year-old female community influencer, Kasaï Oriental

Child illness and caregiver uncertainty about whether missed doses could be corrected further contributed to delay. Caregivers frequently reported postponing vaccination when a child had a fever or illness, often due to prior guidance discouraging vaccination during illness.

"It's because... they were getting sick…we had already been warned that if the child has a fever, do not come with them to the hospital." -30-year-old mother of a child who received 9-month vaccines after one year, Haut-Katanga

Without clear guidance on catch-up vaccination, temporary postponement due to illness often converts to dropout. Uncertainty about eligibility and fear of reprimand for missing appointments further increase the likelihood of dropout. Mobility related to mourning, travel or household relocation as well as weak reminder and defaulter tracking systems further reduce the likelihood of vaccination, particularly when misinformation or rumors were present.

In some cases, when a child becomes ill or shows signs of vulnerability in late infancy, families may be prompted to catch up once the child has recovered.

"When I noticed that there were already spots appearing on his body, that's when my conscience woke up that I have to bring the child to the vaccination." -38-year-old mother of a child who received 9-month vaccines after one year, Haut-Katanga

3. Informal fees, card-replacement costs and fear of reprimand deter caregivers from returning at 9 months

Over time, caregivers are more likely to lose their vaccination card, either due to misplacing it, moving, or damage. Although vaccination is officially provided through the DRC health system for free, some caregivers and heads of household who had not completed the 9-month vaccinations cited the anticipated cost of replacing the vaccination card or other unofficial fees as a key barrier. Informal vaccination fees were reported in both provinces, but they were more systematic and widespread in Haut-Katanga.

> *[If the caregiver didn't have the vaccination card, she] would have had to buy the vaccination card…[without the money,] they are not going to vaccinate the child, they are going to refuse, we absolutely need the money." -38-year-old father of a child who received 9-month vaccines on-time, Haut-Katanga*

Caregivers emphasized not only anticipation of fees, but unpredictability in amount and inconsistency of enforcement. This led to confusion that appeared to inhibit action for some caregivers. In addition, in at least one case, caregivers who needed to replace a vaccination card had to wait until the end of the session, increasing the time burden for women already balancing work and household responsibilities.

There is a disconnect between family and health care worker perspectives of informal fees related to vaccination. Health care workers do not describe fees associated with replacing a vaccination card. This mismatch between provider intent and caregiver experience creates uncertainty, fuels rumors and undermines trust, particularly when caregivers are turned away, asked to wait until the end of sessions, or given unclear explanations for service denial.

> *"If a mom comes for example and says that she has lost her card, if she has started the vaccines here with us, we will check in the registry and if there is her name, we fill out another card for her and we see the vaccines that were left. But if she started elsewhere and gave up and prefers to take from us, we ask her if the child has already taken how many vaccines and show us the places where he or she has been vaccinated? The response of the caregiver will allow us to vaccinate this child well." - Health care worker, Kasaï Oriental*

Even small fees or uncertainty deter caregivers, especially when household finances are already strained. Fear of reprimand from health care workers amplifies the financial and administrative cost of replacing a vaccination card. Caregivers who arrive late or without their vaccination card report being scolded or made to wait until the end of the session, creating a social cost.

> *"As it was my first time giving birth, I was just afraid that I would be chased away since the time had already passed." – Mother of a child who received no 9-month vaccines, Kasaï Oriental*

4. Stockouts and minimum-child threshold practices drive repeated visits, long waits, and missed opportunities

Both caregivers and health care workers reported that health care workers often wait for a minimum number of children before opening MCV and yellow fever vials, which must be discarded six hours after reconstitution. These practices are closely linked to central and provincial stockouts that create uncertainty about future supply and incentivize rationing to extend stock. These practices have a more significant impact in lower-volume facilities, such as those in remote areas. While both provinces struggled with stockouts and multi-dose vial management, caregivers in Haut-Katanga reported more strict enforcement of minimum child thresholds and resulting service denials.

"Every time we went to the health center we were unable to reach the required number (10), sometimes there were four of us, sometimes two, that's how we were told that there was no way to open the...the vaccine bottle because it would spoil." -36-year-old mother of a child who received no 9-month vaccines, Haut-Katanga

Although DRC has transitioned from 10-dose to 5-dose MCV vials, health care workers continue to apply informal minimum thresholds to avoid perceived wastage and preserve limited stock. Smaller MCV vials have limited impact because yellow fever vials are still only available in 10-dose vials and supply uncertainty persists. Health care workers must frequently reschedule appointments, deliver partial vaccinations when only some antigens are available, and assume additional follow-up workload.

“There is a break in yellow fever antigen at the level of the EPI antenna…the session was held well, the mothers were very satisfied and we gave them an appointment to come next Tuesday with their children to finally benefit from the missing vaccines…we will send the RECOs to their homes to recover the children who missed the vaccines.” – 34-year-old female health care worker, Haut-Katanga

Even when caregivers overcome other barriers and arrive on time with their child, they are often told to wait until more children come or to return on another day. Repeated rescheduling without clear assurance of service increases time costs, uncertainty and frustration. Over time, some families disengage.

“The child did not receive the 9-month vaccinations because of going back and forth without receiving the vaccinations that his mother had done, that's how she got tired, it has nothing to do with me, I... I’m often at work, when I came home and I asked his mother she told me about going back and forth without a solution, that's how she got tired.” -57-year-old father of a child who received no 9-month vaccines, Haut-Katanga

Health care workers also reported that availability of 9-month vaccines contributed to denied or delayed service. When stockouts and anti-wastage practices are not always explained, families may not know why they are being asked to return another day. Fear of reprimand for late vaccination may discourage some caregivers from returning after being turned away, transforming system-related rescheduling into missed opportunities and, over time, dropout.

"The last time she went there; there were no vaccines even though she went there for that, until they gave her another later date, and she went there again and there were still...Same thing, it was almost the same answer, that there are no vaccines" -36-year-old father of child who received 9-month vaccines after one year, Haut-Katanga

“The supply chain is in danger of blowing up.” – 35-year-old male health care worker, Kasaï Oriental

"When we arrive at the next appointment, we find that the vaccine is not available, or It has not been put in place in time. It's already a hurry, the person who was already keeping his appointment to come and take the vaccine will find an obstacle, maybe tomorrow he won't come." - EPI official, Haut-Katanga

Stockouts and restrictive vial-opening policies are amplified by broader immunization system constraints. Staffing shortages and competing demands limit session reliability. Health workers often pay out-of-pocket for transport and fuel to collect vaccines. RECOs play a critical role in mobilization and follow-up, but are unpaid, leading to variable effectiveness and support.

"We had been supplied with all the vaccines…the great difficulty we had was that, to leave the [health facility] and go to the [provincial warehouse] we travelled a long distance…we rent private motorcycles and we incur debts for them…we traveled 57 kilometers." – 35-year-old male health care worker, Kasaï Oriental

Facilitators of 9-month Vaccination and Catch-up

Factors that facilitate catch-up of the 9-month vaccines

Households that ultimately completed their 9-month vaccinations even after postponement were typically those in which temporary barriers such as child illness, travel or lack of caregiving support were resolved over time.

"It was just...when they were sick, and then lack of...of someone to help me uh...to take the children to go with them to the hospital, and after that when I made the decision to go with them uh...in the 16 months, it was because I found myself with someone at home to help me and then I made the decision to go..." -30-year-old mother of a child who received 9-month vaccines after one year, Haut-Katanga

For other families, visible child symptoms may prompt families to seek vaccination, as urgency is reactivated. Social support often enabled caregivers to return for vaccination. Personalized follow-up, particularly through community-based engagement, helped caregivers resume vaccination. RECOs who visit households, provide reminders, give tokens and personally accompany caregivers are core facilitators to catch-up vaccination.

"[The RECO] had come to confront me to go…if she hadn't come, I didn't know the program. It's the appointment that I didn't have in mind anymore." – 33-year-old mother of a child who received no 9-month vaccines, Haut-Katanga

Flexible catch-up strategies such as advanced or mobile vaccination sites and opening multi-dose vials at lower thresholds also facilitated catch-up.

"We start to open even if there are three children…even if the loss rate is high…that's why we have multiplied the number of advanced strategies to recover these children." – 36-year-old male health care worker, Haut-Katanga

The effectiveness of these facilitators varied by province. For example, RECO follow-up was more effective in Kasaï Oriental, where informal fees are less prevalent. Facilitators are most effective when system-level barriers are addressed simultaneously.

Table 2: Factors that facilitate catch up of missed 9-month vaccines

Catch-up facilitators	Related dropout drivers
Resolution of temporary barriers such as recovery from illness or return from travel, coupled with knowledge of how to correct missed doses	• Decreased urgency
Visible symptoms as a catalyst for action	• Decreased urgency
Personalized reminder and follow-up, most commonly RECO door-to-door visits	• Weak reminder systems
Flexible catch-up strategies that reduce the need for rescheduled appointments and long waits	• Stockouts & minimum thresholds

Factors that facilitate on-time vaccination at 9 months

Households that vaccinated on time were far more likely to value and retain their child's vaccination card, have consistent multi-channel reminder systems and services accessible in terms of cost and transport. Positive service quality and trust also played an important enabling role but trust alone was insufficient to ensure complete vaccination. Active financial support from fathers or heads of household contributed to on-time vaccination but not present in all on-time households, indicating that while this type of support is important, it complements other enablers.

> *"What made it easier for us was that the appointment date found us with a few means to take him to the vaccination." -38-year-old father of a child who received 9-month vaccines on-time, Haut-Katanga*

Table 3: Comparison of factors present for on-time vaccinated caregivers and heads of housed vs. delayed/non-vaccinated caregivers and heads of household

Factor	On-time vaccinated groups	9-month delay/dropout groups
Active financial support from fathers or household heads	Sometimes	Not present
Positive service quality and trust	Always	Sometimes
Timely, multi-channel reminder systems	Sometimes	Not present
Vaccination card as reminder	Always	Sometimes
Service accessibility (cost and transport)	Always	Rarely

CASE STUDY

Too Tired to Try Again

Pauline is a 36-year-old mother of two, whose 57-year-old husband, Joseph, is a wage laborer who is often away from home for long periods, up to two months at a time. Their younger child, Louis, completed his vaccines through 14 weeks but had not yet received his 9-month vaccines at the time of the interview, when he was 15 months old.

At 14 weeks, Louis received his scheduled vaccines on time. Pauline knew when to attend the clinic based on the date written on Louis's vaccination card and information provided by health workers at prior vaccination appointments. She walked to the health facility alone with Louis. Pauline described the earlier vaccination visits as straightforward and positive: the child was weighed, vaccinated the same day, and staff treated her well. Although Louis developed a fever later that night, Pauline managed the side effects with medication and reassurance from the health facility, reinforcing her confidence in routine vaccination.

When Louis was 9 months old, Pauline again took him to the health facility, but over three visits, she arrived and waited for hours, but health workers informed her each time that they could not open the vaccine vial unless enough children were present.

> *"I went there three times…we were always told that the number had not been reached…they told us that there was no way to open the vaccine bottle…They just said that there are not enough of us without specifying the number." - Pauline*

The repeated postponements became exhausting, and she became too discouraged to keep trying.

> *"Back from the vaccination, I got tired and sat down along the way, and then I drank water. That was just the third time I walked, and then I came back without the child being vaccinated." - Pauline*

Joseph and Pauline both expressed concern that Louis remains vulnerable to disease, even though Louis appears healthy.

> *"It doesn't make me feel good because the child must receive all vaccines according to the schedule. As long as he has not received the 9-month vaccines, I am not comfortable." – Joseph*

Health care workers at the facility Pauline visited confirmed that they wait for a minimum number of children before opening multi-dose vials because 6 hours after opening, these antigens expire, and replacement stock was not certain. Health care workers also shared that yellow fever vaccines were recently out of stock, creating another barrier for caregivers who repeatedly seek vaccination.

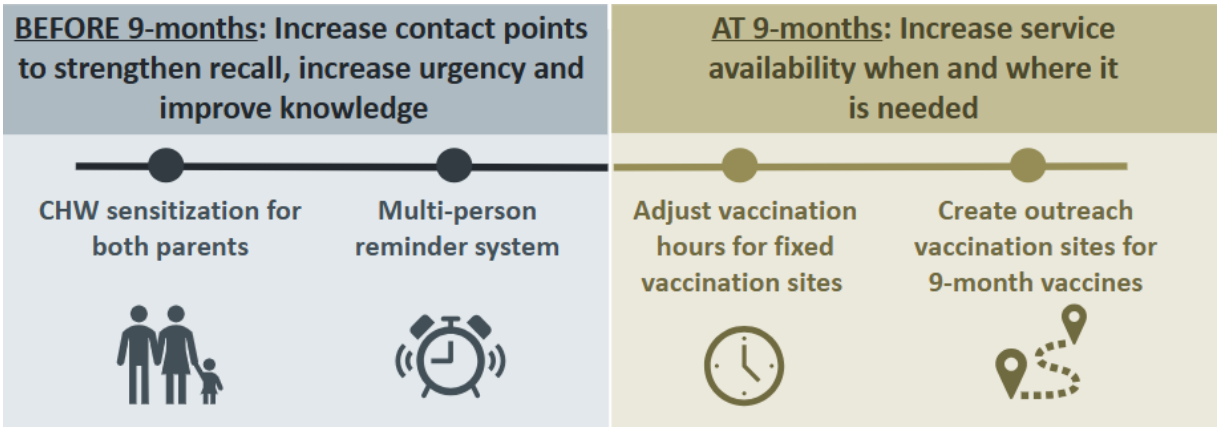
During an observed vaccination session, researchers observed that only a small proportion of children were seeking 9-month vaccinations, compared to early infancy vaccines. In an effort to consolidate children, vaccination sessions were scheduled on Tuesdays and Fridays, and caregivers who attended on other days were asked to return during scheduled sessions.

Community-Identified Solutions to Improve the 9-month Touchpoint

To improve coverage of MCV1, YF, and IPV2 at 9 months of age, participants identified and prioritized four solutions:

- **RECO Sensitization for both parents:** RECOs conduct joint sensitization with caregivers and heads of household together
- **Multi-person reminder system:** Conduct reminders with two members of the household shortly before upcoming sessions
- **Adjusted Vaccination Hours for Fixed Sites:** Adjust site opening times to align with local caregiver preferences and availability
- **Creation of outreach vaccination sites for 9-month antigens:** Deploy advanced vaccination sites in areas with low 9-month vaccination rates

Figure 2: Co-created community-identified solutions



Although each intervention is described separately, these solutions work best when combined, as they target different contributors to missed or delayed 9-month vaccinations (Figure 1). Notably, the first two interventions focus on intervening to address key drivers before the 9-month touchpoint by increasing contact points to strengthen recall, increase urgency and improve knowledge. These interventions reflect our findings that most caregivers are not resistant to vaccination but may lose visibility of the 9-month schedule due to limited messaging and follow-up from the health system, de-prioritize vaccination in the setting of other tasks that feel more urgent, or are unsure how to catch up when events like extended travel for mourning or a family illness cause the child to miss vaccination. The second two interventions focus on improving service availability when and where it is needed to increase convenient vaccination access at the 9-month touchpoint. These interventions respond to findings that service reliability is low. Adjusted vaccination hours and targeted outreach sites reduce these opportunity costs by aligning service delivery with caregiver schedule and locations.

1. RECO Sensitization for Both Parents [Before 9 months]

This solution builds off established approaches which leverage RECOs to support community mobilization and sensitization to drive increased childhood immunization rates. RECOs are known to serve as a key information channel, with 70% of caregivers reporting that RECOs informed them about vaccine preventable diseases.[2] The Accelerating Routine Childhood Immunization and COVID-19 Vaccination (ARCC) initiative is implementing a similar solution under Gavi's Equity Accelerator Fund (EAF) across 18 health zones in Haut-Katanga, and other CSOs have implemented comparable solutions in additional provinces. Community sensitization by RECOs is also a key part of the PIRIs implemented in six provinces with VillageReach's support in mobilizing communities by providing details on the day, time and location in which outreach teams will be providing vaccination. While some of these efforts include fathers, many focus specifically on the primary caregiver, usually the mother.

By expanding on successful RECO sensitization previously focused specifically on zero dose children, we can adapt these strategies to focus on 9-month vaccinations and to consistently include fathers. Families who completed 9-month vaccination often cited prompting from RECOs as a key facilitator. This approach would help to address specific barriers at the 9-month touchpoint such as losing motivation or forgetting the importance during the long gap before 9-month vaccinations, and caregivers not knowing how to catch up after missing vaccination due to family illness, extended travel for mourning, work or childcare obligations, or simply forgetting.

Table 4: Solution design components mapped to 9-month delay and dropout drivers (RECO sensitization)

Drivers	Design components to address identified drivers
Long gap between vaccines	• Conduct regular check-ins and follow-up on caregivers in their communities
Decreased urgency	• Provide information about the importance of completing 9-month vaccination • Sensitize heads of household to provide support in completing 9-month vaccination
Informal fees and fear of reprimand	• *Not directly addressed*
Stockouts and vial management	• *Not directly addressed*

By including fathers (or the head of household) in RECO sensitization, this approach will ensure that caregivers received needed support in paying for vaccine related costs, along with support from their partner in prioritizing vaccination in the setting of many conflicting caregiving, household and work obligations that may otherwise cause vaccination to be de-prioritized.

[2] Kinshasa School of Public Health (June 2024). DRC's Vaccine Coverage Survey Report for 2023. June 2024.

RECO SENSITIZATION: KEY COMPONENTS

PURPOSE: RECOs conduct joint sensitization with caregivers and heads of household ***together*** to promote shared understanding and responsibility for 9-month vaccination.

CORE FEATURES:

- Co-created key messages about the 9-month vaccines
- Practical guidance on barriers (e.g., travel, catch-up)
- Structured use of simple, themed message cards

Message Cards

- RECOs use four standardized cards:
    1. Benefits of 9-month Vaccination
    2. 9-month Vaccination Schedule
    3. Safety and side effects
    4. Accessing and logistics (where and how)

Household Participant Protocol

- Sessions with both caregiver and head of household.
- If the head of household is absent, another adult (preferably male) participates to ensure shared decision-making.

Example Content from Educational Cards:

Card 1 : Benefits of 9-month Vaccination

- Central Message: Vaccination at 9 months strengthens a child's immunity and protects against serious, preventable diseases:
- Key Points :
    - Protects against [specific targeted diseases defined by local programs]
    - Reduces the risk of hospitalization and complications
    - Contributes to the long-term health of the child and peace of mind for the family
- Call to Action: "Getting vaccinated on time means giving your child a safer life"
- Suggested Icons: shield, heart, calendar

2. Multi-Person Reminder System [Before 9 months]

This approach would explore the feasibility of different reminder approaches such as providing airtime to HCWs or RECOs, or in-person reminders via RECOs, along with the feasibility of phone calls to families that miss 9-month vaccinations. Conflicting obligations of caregiving, household and work lead many caregivers to feel overwhelmed and de-prioritize vaccination at the 9-month point.

By providing reminders shortly before upcoming vaccination sessions, the RECO or health worker can support motivation by reminding caregivers of the importance of completing 9-month vaccinations, and discuss and problem-solve common barriers seen at the 9-month touchpoint, such as how to handle a caregiver or child's illness, how to manage seeking vaccination while on extended travel for mourning, or how to anticipate fees for missing cards or vaccination services.

Table 5: Solution design components mapped to 9-month delay and dropout drivers (Multi-person reminder)

Drivers	Design components to address identified drivers
Long gap between vaccines	• Timely, structured messages provided to caregivers before scheduled vaccinations • Use multiple channels (RECO home visits, phone calls) to reinforce recall
Decreased urgency	• Reinforce the risk of measles and other diseases in late infancy • Provide reminders to the caregiver and a second family member to prompt family encouragement and support in completing 9-month vaccination
Informal fees and fear of reprimand	• Provide accurate information about when and where vaccination sessions will be held • If parents miss the appointment (illness, extended travel, lack of money for fees, etc.), offer guidance to help them make a plan to catch up
Stockouts and vial management	• *Not directly addressed*

Caregivers are often the only person responsible for tracking the vaccination schedule for their children. By including two family members in the vaccination reminders, this approach would support caregivers by ensuring a second person in the family is aware of upcoming vaccination or missed doses and can then provide reminders and prompting for 9-month vaccination. This approach also builds on evidence from immunization interventions in Mozambique and Malawi that by including messaging aimed at the whole family, programs can promote improved family involvement and increased motivation and support for immunization.[3,4]

[3] VillageReach. BatePapo Vacina Pilot: Endline Evaluation Report. June 24, 2024. Available at: https://www.villagereach.org/wp-content/uploads/2024/06/BatePapo-Vacina-Pilot_Endline-Evaluation-Report_Final.June-24-2024.pdf

[4] VillageReach. Malawi "Let's Talk About Vaccines": Endline Evaluation Report. March 2025. Available at: https://www.villagereach.org/wp-content/uploads/2025/03/Endline-Evaluation_Malawi-Lets-Talk-About-Vaccines_Final.pdf

MULTI-PERSON REMINDER SYSTEM: KEY COMPONENTS

CORE FEATURES:

Reminder Process:

- Two-call reminder system preferred over SMS due to reliability concerns
- Requires health care workers to have consistent phone access and airtime

Reminder Content:

- Brief, clear messages with date and location
- Includes guidance for missed doses or scheduling conflicts
- Designated time for questions

Phone Number Database Process:

- Collect 2-4 household contacts per child
- Link contact list to the child's medical record for follow-up

Example Script:

Beginning: Hello, may I speak with [Parent/Caregiver's First Name]? ***If Yes:*** Hello [First Name], I'm calling about your child's [Child's Last Name] vaccination appointment, scheduled for [date] at [time] at [Location].

Confirmation: Is everything ready for the vaccination? Do you have any questions about the procedure or the vaccine?

Logistical Details: The vaccine will be administered by [Doctor's or Nurse's Name]. Please remember to bring [required document: vaccination record, etc.].

Anticipating Potential Obstacles: Is there anything that might prevent you from attending? ***If so***, would you prefer to reschedule, or can I suggest an alternative time slot?

Offering Assistance: If you encounter any difficulties that might prevent you from attending, please let us know, and we can work together to find solutions.

Closing: Thank you, we look forward to seeing you on [date] at [time]. Have a good day and see you soon!

3. Adjusted Vaccination Hours for Fixed Sites [At 9 months]

This approach builds on efforts conducted under EAF to explore adapting health facility schedules to caregiver availability in 11 provinces in DRC. While not all sites were able to adjust hours, preliminary data from health facilities where hours were adjusted suggested the approach supported improved access for caregiver and has the potential to be more sustainable and cost-effective than campaigns. By implementing adjusted hours at more health facilities, there is an opportunity to generate evidence for the effectiveness of this intervention specifically at the 9-month touchpoint, which could in turn support advocacy to encourage scaling adjusted hours to more health facilities.

Caregivers in DRC often return to work by the time their child is 9 months old. Compared to seeking vaccination services at 14-weeks, vaccination at 9 months can have a higher opportunity and financial cost as clinic hours conflict with work hours, especially if the caregiver is obligated to return to sites multiple times due to stockouts or long wait times. Additionally, some caregivers may think the child is less vulnerable at 9 months making vaccination less of a priority, particularly given the need to balance increased household and work obligations. Adjusting the vaccination service hours to align with local caregiver preferences based on common work schedules will increase convenience. This will support vaccination session attendance by caregivers who may see 9-month vaccination as less of a priority and who would previously have needed to miss work to seek vaccination.

Table 6: Solution design components mapped to 9-month delay and dropout drivers (Additional Vaccination Hours)

Drivers	Design components to address identified drivers
Long gap between vaccines	• *Not directly addressed*
Decreased urgency	• Increase convenience, lowering the threshold for action among caregivers who view 9-month vaccination as less urgent
Informal fees and fear of reprimand	• Reduce indirect financial burden by minimizing missed work and unnecessary return visits
Stockouts and vial management	• *Not directly addressed*

ADJUSTED HOURS: KEY COMPONENTS

PURPOSE: Align vaccination session hours with local caregiver preferences and availability.

Ideal Times Identified: 10-12am identified as the most convenient for both caregivers and health care workers.

Scenarios Selected:

- Wednesdays: Middle of the week mornings are convenient for parents and caregivers at home
- Saturdays: Most people are off work but often have plans in the afternoons, mornings were seen as more convenient

PROPOSED ADJUSTED HOURS:

- ***Scenario A**: Extended Mornings (8h00–12h00) 2 days per week [selected by participants]*
- Scenario B: Extended afternoon hours (14h00–19h00) 3 days per week
- Scenario C: Alternating timeslots (8h30–13h30 et 15h00–19h00) 4 days per week
- Scenario D: Continuous timeslot 9h00–15h00) 5 days per week
- Scenario E: Targeted days and times of day (Saturday mornings, weekday evenings) to reach working people

4. Creation of Outreach Sites for 9-Month Antigens [At 9 months]

Under EAF, the DRC MoH has implemented a door-to-door vaccination strategy in 11 priority provinces which focused on identifying and vaccinating zero-dose children within a 5 km radius of health facilities, specifically in remote areas with high population density. Working closely with trusted RECOs to provide reminders in advance of planned sessions has proven effective in encouraging zero-dose caregivers to attend. Building on this work, along with similar initiatives implemented as part of special strategies and PIRIs in targeted health zones, this intervention would explicitly add a focus on identifying and reaching children who missed vaccination at 9 months.

Children at 9 months are larger and harder to manage, making travel to vaccination sites more difficult. Caregivers in DRC often return to work by the time their child is 9 months old. Compared to seeking vaccination services at 14-weeks, vaccination at 9 months can have a higher opportunity and financial cost as clinic hours conflict with work hours, especially if the caregiver is obligated to return to sites multiple times due to stockouts or long wait times. Additionally, some caregivers may think the child is less vulnerable at 9 months making vaccination less of a priority, particularly given the need to balance increased household and work obligations.

Table 7: Solution design components mapped to 9-month delay and dropout drivers (Outreach Sites)

Drivers	Design components to address identified drivers
Long gap between vaccines	• Provide reminders via RECOs in advance of planned sessions
Decreased urgency	• Increase the convenience of vaccination given the increased opportunity cost for busy caregivers balancing childcare and work
Informal fees and fear of reprimand	• *Not directly addressed*
Stockouts and vial management	• *Not directly addressed*

Outreach efforts typically focus on reaching zero-dose populations and therefore select geographic areas with high rates of zero-dose children. This intervention will build on these efforts by explicitly targeting areas with high rates of dropout at the 9-month touchpoint and ensuring that outreach teams are equipped with the necessary supplies for MCV, YF and IPV vaccination. During initial testing, participants highlighted schools and markets as potential priority sites for outreach sessions due to convenience as so many caregivers already frequent those areas and often bring their youngest child with them.

OUTREACH SITES: KEY COMPONENTS

PURPOSE: Increase convenience of 9-month vaccines for busy caregivers by deploying advanced vaccination sites in areas with low 9-month vaccination rates.

CORE COMPONENTS

- Establish agreed community locations and schedules in areas with lowest 9-month coverage
- Partner with RECOs to mobilize the community and raise awareness in advance.
- Prioritize children who missed 9-month vaccination

Preferred Location and Frequency of Outreach

- Locations:
  - Kasaï Oriental: Homes of Trusted Community Leaders (or other trusted community members)
  - Haut-Katanga: Markets, Schools
  - *Centrally located in the community to avoid having to travel too far*
- Frequency: Health Workers will do outreach 1-2 times per week with the location rotating on a weekly basis

Prioritization of Target Areas

- Priority factors: (1) low 9-month vaccination coverage and (2) distance from the health center
- Health care workers identify

Policy Considerations to Improve Coverage at 9 Months

While the community-identified solutions address key behavioral and follow-up gaps that weaken recall, urgency and motivation before the 9-month visit, the findings also point to system-level policy levers needed to ensure that when caregivers do present, children are vaccinated without delay.

Fees for lost vaccination card and vaccination services

Evidence from the Kinshasa School of Public Health (KSPH) underscores that informal and out-of-pocket payments remain widespread in routine immunization despite the legal requirement that vaccination be free. [5] The 2023 Vaccination Coverage Survey highlighted that one-third of households (38.8%) report having paid for a vaccination card, and three out of four caregivers (78.1%) reported paying for vaccination services at every session. The brief highlights that vaccination coverage among children from households who paid for services is lower, particularly in rural areas. KSPH recommends strengthening communication and monitoring to ensure EPI instructions for free vaccination are followed consistently and emphasizing to caregivers that vaccination should be free.

Our findings reinforce that both formal and informal fees remain a significant and persistent barrier. For financially vulnerable families, the inability to pay for a replacement card leads to delays or complete dropout from the immunization schedule, especially at the 9-month touchpoint. The cost and enforcement of payment for replacement vaccination cards reported by caregivers vary widely across health centers and communities, ranging from 1,000 to 12,000 CDF. Some health centers reportedly provide cards for free, while others require payment, leading to inconsistent experiences and confusion among caregivers. After multiple return visits or requests for payment, some families deprioritize vaccination in favor of immediate needs such as food or transport. These dynamics are especially consequential at 9 months, when motivation may already be lower due to the extended interval since the last visit and weakened reminder systems.

Health workers generally denied the existence of financial barriers, stating that cards and replacement cards are provided free of charge. This divergence between caregiver experience and provider accounts suggests that informal payment practices may be unevenly enforced, normalized in some settings, or perceived differently across actors. In at least one site, health care workers were reluctant to discuss card-related fees, reflecting the sensitivity of the issue. It is also possible that some facilities are responding to financial or administrative pressures from high levels of the system, such as expectations to cover operational costs or informal fees, though the specific mechanisms were not directly explored in this study.

While policy mandates free vaccination, inconsistent implementation and weak accountability mechanisms allow informal fees to persist. Addressing this barrier will require a combination of clearer communication to caregivers, strengthened supervision and monitoring of fee practices and explicit guidance to facilities on replacement card policies. Without greater transparency and accountability, financial barriers are likely to continue undermining timely vaccination, particularly at the 9-month visit.

[5] University of Kinshasa School of Public Health. Note d'information: Dépenses des ménages pour la vaccination des enfants en République Démocratique du Congo : analyse du lien avec la couverture vaccinale des enfants de 6 à 23 mois. 2023.

Implementation measures to minimize anti-wastage practices

Despite the transition from 10-dose to 5-dose MCV vials, informal minimum-child thresholds persist due to concerns about wastage and anticipated stockouts. Smaller vials alone are insufficient when yellow fever remains available only in 10-dose presentations and when supply reliability is uncertain. To realize the benefits of smaller vials, the following considerations will be important:

- **Align supervision and accountability with timely vaccination goals,** including clear, consistently reinforced expectations that vaccinating eligible children as they present is the priority, even if wastage increases.
- **Strengthen vaccine forecasting, stock reliability, and redistribution practices,** to reduce health care workers' reluctance to open vials for small numbers of children.
- **Consider that multiple antigens are administered at 9 months,** and poor vaccination outcomes may persist if yellow fever vaccines continue to require minimum thresholds or if session design remains inflexible.
- **Equip health care workers with practical guidance and messaging** to explain vial-opening constraints transparently to caregivers and reduce frustration and loss of trust when delays do occur.

Moving MCV1 from administration at 9-months to 6-months

The World Health Organization (WHO) sometimes recommends an earlier supplemental dose of MCV at 6 months during outbreaks or periods of elevated transmission. [6] Given the barriers to completion of 9-month vaccines and the high transmissibility of measles in particular, study respondents were asked for their perspectives on whether shifting MCV1 from 9 months to 6 months in routine immunization would help improve measles vaccination coverage.

The most consistently cited potential benefit was that moving MCV1 to 6 months could improve recall by shortening the long interval between early infancy vaccinations and the next required visit. This perspective aligned closely with broader findings from the study that weakened reminders in later infancy contribute to forgetting and delayed action at the 9-month touchpoint.

> *"I just want it [MCV1] to be [administered at] six months old so we can remember. When it's at nine months, we can forget because the child is already grown, he is already walking." – Caregiver of a MCV1 dropout child, DRC*

A second perceived advantage in DRC was that earlier vaccination could provide earlier protection in a context where measles infection before 9 months is observed. Some respondents felt that the current schedule leaves a window of vulnerability in high-transmission settings, and that vaccinating at 6 months could reduce this risk, even if additional doses would still be required later.

The strongest concern was that younger infants may not be physiologically ready or that they would experience greater discomfort. Some respondents also raised concerns about overlapping interventions at 6 months, particularly Vitamin A supplementation, and questioned whether adding measles vaccine at this age would increase the risk.

> *"It will be bad…the vaccination scheduled provides for this at 9 months…Not possible, at 6 months there are eye vaccines [sic]." – Caregiver of a MCV1 vaccinated child, DRC*

[6] World Health Organization. Weekly Epidemiological Record. 2017;92(17) (April 28, 2017). Geneva: WHO. Available at: https://iris.who.int/server/api/core/bitstreams/3eb838f7-724d-41d4-9a66-47ed008deb48/content

Technical stakeholders in DRC emphasized concerns about reduced immunogenicity at 6 months. EPI officials referenced prior campaign experience vaccinating at 6 months and noted that vaccine efficacy is lower when administered earlier, reinforcing resistance to routine schedule change without strong epidemiological justification.

> *"During campaigns, we vaccinated at 6 months… but its efficacy is lower at 6 months than when we give it at 9 months… [it] has an efficacy of 85% at 9 months, but 95% at 12 months." – EPI official, DRC*

Across respondent groups in DRC, acceptance of a potential shift was consistently conditional. On-time caregivers and some health care workers were open to the idea if strong evidence of safety and effectiveness were clearly communicated. In contrast, delay and dropout caregivers and EPI officials were more resistant, citing safety fears and technical concerns about immune response. Overall, respondents in DRC viewed moving MCV1 to 6 months as potentially helpful for recall and earlier protection, but only under strict conditions. Stakeholders emphasized that any schedule change would require robust clinical evidence, clear national guidance, intensive provider training, and proactive community sensitization. Without these safeguards, respondents cautioned that a poorly communicated shift could undermine trust and reduce coverage rather than strengthen measles protection.

Conclusion

The drop between DTP3 and MCV1 represents more than a coverage gap; it reflects a structural vulnerability at the 9-month touchpoint that widens immunity gaps across three antigens simultaneously. In the DRC, low coverage of MCV1, YF and IPV2 at 9 months is driven by behavioral, social and system-level barriers that become more pronounced in later infancy than earlier in the schedule. Families often begin the immunization schedule with strong intent, but the long gap between 14 weeks and 9 months weakens routines and reminders, while declining perceived urgency makes delay feel acceptable as children appear healthier and caregivers return to work and other responsibilities. When caregivers do attempt to vaccinate, outcomes are frequently shaped by service unreliability (e.g., stockouts, minimum child threshold practices and long waits) that can turn a missed opportunity into repeated return visits and, over time, disengagement. These barriers rarely occur in isolation; instead, they compound alongside transport costs, household decision-making dynamics and fear of reprimand, eroding follow-through and increasing the likelihood of dropout. Improving 9-month coverage requires interventions that both restore follow-up and urgency in later infancy and ensure that when families present, children are vaccinated without delay.

The four co-created solutions (RECO sensitization that engages both parents, multi-person reminders, adjusted facility hours and targeted outreach sites) work together to improve access for busy caregivers. Community-level strategies will have limited impact unless paired with policy and implementation measures that improve service reliability and reduce systems-level barriers. Priority reforms include enforcing free vaccination policies and clarifying replacement card procedures; aligning supervision and accountability to prioritize timely vaccination even when wastage increases; strengthening forecasting and resupply to reduce rationing behaviors; and equipping health workers with clear guidance and communication tools when vial-opening constraints or stock challenges occur.

FOR MORE INFORMATION, PLEASE CONTACT

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