



## Using photovoice methodology to uncover individual-level, health systems, and contextual barriers to uptake of second dose of measles containing vaccine in Western Area Urban, Sierra Leone, 2020

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### ABSTRACT

**Background:** Vaccination coverage for the second dose of the measles-containing vaccine (MCV2) among children has remained stagnant in Sierra Leone at nearly 67% since its introduction in 2015. Identifying community-specific barriers faced by caregivers in accessing MCV2 services for their children and by health workers in delivering MCV2 is key to informing strategies to improve vaccination coverage.

**Methods:** We used Photovoice, a participatory method using photographs and narratives to understand community barriers to MCV2 uptake from March–September 2020. Six female and five male caregivers of MCV2-eligible children (15–24 months of age), and six health care workers (HCWs) in Freetown, Sierra Leone participated. After having an orientation to photovoice, they photographed barriers related to general immunization and MCV2 uptake in their community. This was followed by facilitated discussions where participants elaborated on the barriers captured in the photos. Transcripts from the six immunization-related discussions were analyzed to deduce themes through open-ended coding. A photo exhibition was held for participants to discuss the barriers and suggested solutions with decision-makers, such as the ministry of health.

**Results:** We identified and categorized nine themes into three groups: 1) individual or caregiver level barriers (e.g., caregivers' lack of knowledge on MCV2, concerns about vaccine side effects, and gender-related barriers); 2) health system barriers, such as HCWs' focus on children below one year and usage of old child health cards; and 3) contextual barriers, such as poverty, poor infrastructure, and the COVID-19 pandemic. Participants suggested the decision-makers to enhance community engagement with caregivers and HCW capacity including, increasing accountability of their work using performance-based approaches, among different strategies to improve MCV2 uptake.

**Conclusion:** Photovoice can provide nuanced understanding of community issues affecting MCV2. As a methodology, it should be integrated in broader intervention planning activities to facilitate the translation of community-suggested strategies into action.

### Introduction

In 2009, the World Health Organization (WHO) released a position paper stating that introducing a second dose of the measles-containing

vaccine (MCV2) into the routine childhood immunization schedule is necessary, globally [1]. MCV2 offers lasting immunity to prevent measles and its serious health complications in children [2]. In Sierra Leone, MCV2 was introduced into the national immunization schedule in 2015

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to be administered at 15 months of age; however, coverage for this second dose has been low. In children under 36 months, MCV2 coverage in 2015 was 60% and has remained stagnant with the most recent estimate from 2021 at 67%, despite the approximately 90–95% coverage required to achieve herd immunity and prevent outbreaks [2].

The introduction of new vaccines in the second year of life, such as the MCV2, has met with success but also challenges at the health system and caregiver levels. Issues such as tracking defaulters from the first dose to the second dose, inaccurate practices on recording the MCV2 in immunization registers and child health cards, and the lack of reminders to caregivers about the upcoming second dose are commonly noted [3]. The dropout rate in Sierra Leone between the first dose of the measles-containing vaccine (MCV1) and MCV2 in 2016 was 21% [4]. Another cross-sectional survey in Sierra Leone in 2019 found MCV1 coverage at 75%, but MCV2 coverage was only 33% [5]. There is also a documented need to address caregiver barriers related to low knowledge and awareness of the need and timing of the second dose [3,6].

Urban settings, especially in slums and poor communities can face additional challenges negatively impacting immunization delivery and uptake [7]. Some of these issues are poor availability and uptake of health services by migrant groups, lower social cohesion and community organization, and over-burdened health facilities serving a large proportion of the population [6,8]. Identifying and understanding these barriers in urban settings is critical to addressing low MCV2 uptake in Sierra Leone.

Photovoice methodology is a participatory approach that enables community members to photographically capture, represent, and reflect on the barriers, and collectively contribute to identifying potential solutions [9,10]. Photovoice can empower the community to directly represent and raise awareness of the issues with the decision-makers; hence influencing programs and policy [11]. We employed Photovoice to understand barriers to MCV2 uptake in an urban, slum setting in Freetown, Sierra Leone. The aims of this assessment were to 1) identify and understand the barriers to general immunization and MCV2 uptake from caregiver and healthcare worker perspectives, 2) identify community-generated suggestions for improving MCV2 uptake, and 3) describe the photo exhibition where community members shared their photos and insights with immunization decision-makers and stakeholders.

## Methods

### Setting

The photovoice activity was conducted in an urban slum area of Western Area Urban (WAU) district in Freetown, Sierra Leone to understand the barriers related to MCV2 uptake in the context of overall low-coverage of the vaccine and we specifically aimed to understand the unique challenges related to urban settings, such as health services challenges, overcrowding in health facilities, and issues with community cohesion among others [8,12]. ICAP Sierra Leone was the implementing partner conducting the field activities for this project.

### Sampling and recruitment

Parents of MCV2-eligible children aged 15–24 months, and healthcare workers (HCWs) providing immunization services in health facilities located in urban slum communities participated in this activity. Participant recruitment was initiated by purposively selecting communities. A total of five communities were considered, of which two communities were chosen based on health facilities serving slum communities and the feasibility of conducting the photovoice-related activities (e.g., the availability of a convenient and easily accessible central location for photovoice discussions).

Caregivers were recruited through consultative meetings facilitated by community leaders, during which the scope of the project and

eligibility criteria for participation were explained, in the two locations selected. Community leaders helped the facilitators identify male and female caregivers of children within the two communities based on the eligibility. A total of 17 mothers and 27 fathers were identified. Of those, 17 mothers and 21 fathers were screened for eligibility based on their child's age appropriateness for receiving MCV2. The screening tool also included questions on demographic information, the child's vaccination status, and the identification of any immunization defaulters. Based on the screening, six mothers and six fathers were identified as the main participants, while four fathers and eight mothers were considered for backup in case caregivers dropped off the project. Mothers and fathers were recruited from different families (i.e., only one spouse within a given household was recruited). All selected participants consented to participation. To get a comprehensive understanding of facilitators and barriers to MCV2 uptake from a variety of caregiver experiences, the selected caregivers included a combination of those whose children were up to date on recommended vaccinations and those whose children had delayed vaccination.

For HCW recruitment, first, we randomly selected three health facilities that served the two project areas from an existing health facility database. Then, we approached, facility in-charges to introduce the project and help identify HCWs providing immunization services who could participate in this project. Six of the nine HCWs identified through this process consented and were recruited to participate in the photovoice activity.

### Photovoice training for facilitators

ICAP Sierra Leone recruited and trained six facilitators to conduct photovoice activities. First, we introduced to the facilitators the aims and objectives of this project, how photovoice can help achieve these, and their roles and responsibilities to convey the details and steps of photovoice to the participants. Core methodological training included the overview of prompts/questions for taking photos, effectively captioning photos to convey meaning, using questions to facilitate discussion with participants, generating themes from discussions, and managing the photovoice exhibition at the end of the project. Facilitators were also trained on the basics of photography, (i.e., operating and troubleshooting the cameras), and ethical considerations, (i.e., consent and privacy for taking photos in communities). Lastly, the facilitators had an overview of qualitative analysis coding for high-level analysis of the captions. The training was interactive with hands-on activities, active discussions, and role plays. To ensure accuracy when conveying information to participants and mitigate miscommunication, the team conducted appropriate translation to English and back translation to Krio of key phrases and questions during the training.

### Implementation of activities

#### 1. Introductory training session for participants

Trained facilitators conducted introductory training/orientation sessions for the selected participants in separate groups for mothers, fathers, and HCWs. The facilitators taught participants about the details of the project, its objectives, photography techniques, ethical considerations, photography copyright release forms, and the first prompt/question for taking photos. They also received digital cameras to take pictures.

#### 2. Photovoice prompts

The participants were provided with three prompts over the course of the activity that progressively narrowed down to focus on barriers related to MCV2 uptake (Table 1). The first prompt was "Why do children under five in this community get sick?" Participants were asked to take and caption five photographs that could help address this prompt

**Table 1**

Photovoice activity implementation plan, Sierra Leone 2020.

Introductory Session for participants	1st Photovoice session	2nd Photovoice session	3rd Photovoice session	Photo exhibition
March 2020	June 2020	July 2020	August 2020	September 2020
-Background and introduction of the project -Ethical considerations in Photovoice process -Photography and caption-writing instructions - Gave each participant a digital camera  - 1st Photography prompt for next meeting: <u>Why do children under 5 years in this community get sick?</u>	-Each participant presented selected photos and captions  -Group discussion of the 1st photograph prompt: (Why do children under 5 years in this community get sick?)  - 2nd Photography prompt for next meeting: <u>What challenges do you face when immunizing children at the health facility?</u>	- Each participant presented selected photos and captions  -Group discussion of the 2nd photography prompt: (What challenges do you face when immunizing children at the health facility?) 8. - 3rd Photography prompt for next meeting: <u>What are the challenges you face when vaccinating children with MCV2 at the health facility? What are the solutions to overcome those barriers?</u>	- Each participant presented selected photos and captions  -Group discussion of the 3rd photography prompt: (What are the barriers you face when vaccinating children with MCV2 at the health facility? What are the solutions to overcome those barriers?)	-Gallery Photo Exhibit: moderated by participants; stakeholders from relevant organizations and community invited to attend followed by a joint discussion

\*Separate sessions were held for mothers, fathers, and HCWs.

over the course of a month. The interval between the orientation session in March 2020 and the first discussion was prolonged to three months due to the COVID-19 lockdown. The participants regrouped after the lockdown to discuss the photos taken. Each participant selected two of the five photos taken for the discussion that was held in May 2020. This photo selection method was used for all subsequent discussions. After the first group discussion, the second prompt (“What challenges do you face when immunizing children at the health facility?”) was provided, and participants were asked to take photos reflecting these challenges. The second group discussion to discuss these photos was scheduled for July 2020. The third and final prompt (“What are the challenges you face when vaccinating children with MCV2 at the health facility, and what are the solutions to overcome those barriers?”) was provided to the participants at the end of the second group discussion. The final discussion session on the barriers to MCV2 uptake took place in August 2020.

### 3. Capturing and captioning photos

Facilitators worked to ensure that each participant took five photos for each prompt and assisted participants with queries about captioning the photos over the course of the month before the group discussions. The captions were drafted by the participants, but facilitators assisted in any translation from the local language (Krio) to English. They also helped with back translation to Krio to ensure the intended meaning of the captions was preserved. When needed, the facilitators also helped to select two photos that participants thought as the most important to discuss as a group to highlight the diverse factors affecting immunization uptake.

### 4. Group discussions using SHOWeD methodology

Separate group discussions were held for the mothers, fathers, and HCWs. These discussions facilitated in-depth dialogue around six questions that aimed to gradually understand the deeper meaning of the photos. Each photo was discussed, using the following questions: What do we **see** in the photo? What is **happening** in it? How do these issue(s) relate to **our** (participant’s) life? **Why** are they happening? How can we become **empowered** with this new understanding? What can we **do** about it with our shared understanding of these issues? The technique is commonly referred to by the acronym- SHOWeD method (as indicated by bold and italics above) [9,10]. Following the discussion, the facilitators and participants identified the key themes that came out of the discussion and noted them on a flip chart while grouping the photos

according to these themes. The discussions lasted between three and four hours. All discussions were audio-recorded, transcribed, translated, and complemented with detailed notes.

### 5. Debriefing

After each discussion, the facilitators held a debriefing session amongst themselves for reviewing and documenting the key themes, any logistical challenges encountered during the session and how they were resolved, and how the session went, overall. These notes were shared with all project members.

### 6. Photo exhibition

A photo exhibition was held where key immunization stakeholders (Sierra Leone Ministry of Health and Sanitation (MoHS), Essential Program on Immunization (EPI), the World Health Organization (WHO) country office, UNICEF, local non-governmental organizations, community leaders, and participants) came together after the three group discussions were completed. Photos and related captions were displayed on poster boards where participants highlighted the issues represented in their photos and discussed them with the decision-makers. Because immunization was the focus, only photos and captions from the second and third questions were displayed. Following the exhibition, the stakeholders, photovoice participants, and the community had a more in-depth structured group discussion. This provided a forum where the participants could directly communicate with the stakeholders to discuss potential strategies to address barriers to MCV2 uptake.

### 7. Evaluation of Photovoice experience

At the conclusion of all project activities, the participants completed a self-administered short, open-ended questionnaire about their experience with in the Photovoice process.

### Data analysis

We analyzed six audio-recorded transcripts of the group discussions on immunization. Three transcripts were related to the question “What challenges do you face when immunizing children at the health facility?” one for each of the three groups of participants (mothers, fathers, and HCWs), and three transcripts were for the question specific on challenges to MCV2 for the same three groups of participants. The facilitators analyzed all photo captions to code and identify major themes

highlighted in the content. Two analysts open-coded the entire text of transcripts from the discussions in NVivo (version 12) software to identify emerging concepts from the data. The coding process was iterative, where codes were revised and refined as new content was encountered. Inter-coder reliability was assessed by double coding one of the six transcripts and found to be over 90% indicating high coding consistency between the coders. After the coding was finalized and all transcripts were consistently coded, the codes were grouped into categories/sub-themes, which provided a higher-order structure, and these categories were then grouped into broader themes to capture the barriers to immunization. The themes from this in-depth analysis were compared to rapidly developed themes identified during the photovoice discussion sessions to understand and validate the findings.

*Ethical clearance*

This activity received ethical approval from the Sierra Leone Ministry of Health and Sanitation and Columbia University Medical Center. The U.S. Centers for Disease Control and Preventions Center for Global Health Human Subjects Office approved this as a public health activity. All participants provided written consent.

**Results**

We identified nine themes through our analysis. Drawing from the socioecological model [13,14], we further grouped these themes into three types of barriers: 1) individual or caregiver barriers; 2) health systems barriers; and 3) contextual barriers, which are described below (Table 2). The photos and captions provided below are from the participants.

*Individual or caregiver barriers*

*Theme 1: Lack of knowledge on the benefits and concerns about MCV2 side effects affected MCV2 demand and acceptance*

Caregiver discussions highlighted limited knowledge on the importance of immunizations in general, but this was especially pronounced for MCV2. The common misperception that vaccinations were not needed beyond the first year of life suggested a lack of awareness of MCV2. Further, although some caregivers were aware of MCV2, they did not always see the need for their children to take it due to its relative unfamiliarity. As one mother noted, “[The mother in the picture] is fully aware of [MCV2] but has refused to go with her child for the measles two. She said her parents didn’t give her that when she was young and therefore would not give her child, too.” (Mother, prompt 3 discussion).

Concerns about MCV2 side effects were also common among caregivers. Caregivers’ photos showed stories of vaccinated children who suffered from various health issues (e.g., deformities and rashes) and they were attributed to MCV2. Some associated these perceived side effects with vaccine ingredients or administration malpractices. Such perceived side effects sometimes led to decreased confidence in the safety of the vaccine at the community level (Fig. 1).

**Theme 2: Caregiver’s immunization-seeking behavior often resulted in delayed or missed immunization**

Health care workers informed that some caregivers only sought health services when their children were ill (Fig. 2). HCWs also noted caregivers did not always seek vaccination as scheduled on the child’s health card. Lost or damaged vaccination cards were a challenge for some caregivers, especially among those who had migrated to urban areas. In such cases, caregivers often lost their cards during transit, which ultimately resulted in not seeking immunization services as scheduled. Migration also resulted in re-registering at a different health facility, which created additional hindrances for caregivers. One father informed “Some of the mothers move from one place to another. For

**Table 2**  
Themes related to individual, health systems, and contextual barriers to general immunization and MCV2-specific uptake, and suggested strategies to address the issues in urban Sierra Leone, 2020.

Theme	Sub-theme	Suggested strategies for improvement
<b>Individual or Caregiver Barriers</b>		
1	Lack of knowledge about benefits and concerns about MCV2 side effects affected MCV2 demand and acceptance	<ul style="list-style-type: none"> <li>Caregivers fears about post-immunization events</li> <li>Caregivers’ limited knowledge/ misperceptions about vaccines</li> <li>Caregivers’ general low knowledge about child health</li> </ul>
2	Caregiver’s immunization-seeking behavior often resulted in delayed or missed immunization	<ul style="list-style-type: none"> <li>Delayed visit or not visiting the health facility for immunization by the caregiver due to migration, lost card, or only visiting when child is ill</li> <li>Caregivers’ reluctance to visit health facility due to fear of negative treatment by HCWs</li> </ul>
3	Caregivers often had negative perceptions of HCWs’ skills and work ethic; therefore, lacked confidence in them for providing immunization	<ul style="list-style-type: none"> <li>Caregivers had a negative perception of HCW work ethic and behavior</li> <li>Caregivers lacked confidence in HCW ability or clinical practices to deliver health service</li> </ul>
4	Gender-specific barriers, such as women’s heavy workload and less time to take child to health facility, and the lack of family planning affected MCV2 uptake	<ul style="list-style-type: none"> <li>Heavy workload for women without support from family members</li> <li>Gender-specific poverty issues where women are primary breadwinners</li> <li>The lack of family planning resulted caring for many young children in the first two years and therefore affected timely seeking of immunization services</li> <li>The lack of family support</li> </ul>
<b>Health Systems Barriers</b>		

(continued on next page)

Table 2 (continued)

Theme	Sub-theme	Suggested strategies for improvement
5	The immunization delivery system usually prioritized first-year-of-life vaccines more over MCV2	<ul style="list-style-type: none"> <li>• Provide new immunization cards or upgrade them</li> <li>• Keep immunization records at health facility</li> </ul>
6	Long waiting times and vaccine stock outs at the health facility negatively affected immunization uptake	<ul style="list-style-type: none"> <li>• HCWs should provide vaccinations to children when needed</li> <li>• Vaccination days should be scheduled in a way that accommodates caregivers' schedules</li> <li>• Improve waiting room conditions at the health facility</li> <li>• Improve the supply of vaccines and other drugs and/or non-medical equipment</li> </ul>
7	Issues of the free healthcare program and the lack of financial incentives demoralized health workers for providing immunization services	<ul style="list-style-type: none"> <li>• Reintroduce performance-based incentives and salaries for HCWs</li> <li>• Provide more financial support for HCW activities such as outreach</li> </ul>
<b>CONTEXTUAL FACTORS</b>		
8	Contextual factors, such as poverty, cultural and infrastructure issues affected immunization uptake	<ul style="list-style-type: none"> <li>• Improve infrastructure including access to clean water and minimize effect of natural disasters</li> <li>• Sensitization on traditional medicine                             <ul style="list-style-type: none"> <li>• Provide job opportunities and vocational training to alleviate poverty</li> </ul> </li> <li>• Government should support women and children better to improve their health</li> </ul>
9	COVID-19 affected service delivery and caregivers' demand for immunization services	<ul style="list-style-type: none"> <li>• Caregivers should follow COVID-19 precautions</li> <li>• Health facilities should implement COVID-19 precautions</li> <li>• Sensitization related to COVID-19</li> </ul>



**Fig. 1.** A man holding a dead child. “As you can see from the photo, you will notice that the man is standing [holding] a dead child... This child is said to have died as a result of the uptake of the MCV2. Just after when they came from the hospital for the MCV2 vaccine, the child started vomiting and her mother called some [of] her neighbors to help know what to do. As they were trying to rush with child to the hospital, she died on the way going. During the burial process, other women were in full attendance and [were] made to understand that the child died as a result of the uptake of the MCV2. So, it was a lesson learnt from the community people that, the MCV2 is a killer vaccine and that they should not go for it when the time comes.” (Father, prompt 3, photo caption).



**Fig. 2.** Lack of proper parental care. “This picture shows a mother who is not too responsible when it comes to childcare. She was supposed to take her baby to the hospital for MCV 2 but didn't; she decided to come with her baby when the baby fall ill. We decided to follow up, on the immunization record of the baby as that is what we do since we are not going out on outreach. We realized that the baby defaulted in the uptake of the MCV2 and even the under-five card was missing.” (HCW, prompt 3, photo caption).

example, let's say the woman gave birth in Bo and move to Freetown, if she goes to any health center in Freetown, they will tell her she is not registered with them, and the child will not receive MCV2” (Father, prompt 3 discussion).

**Theme 3: Caregivers often had negative perceptions of HCWs' skills and work ethic and therefore lacked confidence in them for providing immunization services**

Caregivers discussed their negative perceptions of HCWs' attitudes at work. Words, such as “arrogant”, “aggressive”, and “hostile” were used to describe how HCWs' interacted with them. Caregivers sometimes lacked confidence in HCWs' clinical skills, especially those concerning vaccine administration. For example, one mother noted “I am a parent. Some of the nurses are not fit to inject our children. Because when they do sometimes, the dose [negatively] reacts on our children.” (Mother, prompt 3 discussion). This suggested that HCWs' practices and caregiver concerns about the side effects of the vaccines were sometimes interrelated.

Caregivers also expressed their frustration with HCWs' practices, such as asking for money for services, stealing supplies from health facilities, or when HCWs spend time on their phones instead of attending to patients (Fig. 3).

#### Theme 4: Gender-specific barriers such as women's heavy workload, paucity of time to take the child to the health facility, and the lack of family planning affected MCV2 uptake

Mothers, fathers, and HCWs acknowledged that the heavy workload for mothers was a barrier to MCV2 uptake. Female caregivers often had to balance domestic chores with daily work responsibilities. As one mother noted, *"The husband is working in up country. He comes only once after some months. She is alone at the house, and she does all the house chores. She is faced with a lot of constraints that prevent her from going out"* (Mother, prompt 3 discussion). Competing home and work priorities resulted in heavy workload and less time for childcare, especially for those who were single mothers and expected to be the primary breadwinner of the household—a situation that participants noted was common in their community (Fig. 4).

Furthermore, even if married, female caregivers did not always receive sufficient social support because men in the household reportedly did not assist with domestic chores or childcare.

*"They [mothers] do not space their children and that is why they find it very difficult to take their children to the hospital as you can't move with two children at the same [time]. They are also afraid of being mock[ed] at by their colleagues and the health workers. I have also learnt that the wellbeing of children is very important especially if you space your children through the use of family planning.* (HCW, prompt 3, discussion).

Having multiple, closely spaced children due to lack of family planning knowledge and awareness was also highlighted in group discussions as contributing to time paucity to seek immunization services. While mothers acknowledged the heavy burden of household work and income generation activities, some HCWs and caregivers characterized the inability to get the child to a health facility as the caregiver's carelessness. This was discussed in the context of competing priorities, where home needs were sometimes placed above child health.

Some discussions, however, focused on the low male involvement in childhood immunization to support women. The fathers' group noted that they needed to be more proactively involved in childhood



Fig. 3. Lack of attention.

*"This is a nurse who is in charge of triaging patients. Instead of her doing her duty she is busy playing with her phone delaying patients and this is very annoying. It weighs some parents down and aids them in escaping from subsequent vaccines".* (Mother, prompt 2, photo caption).



Fig. 4. Hawker.

*"This is a mother who sells things by hawking and as you can see from the picture, she is always having her baby on her back. She is always too busy finding money to take care of the family which she takes so important that there is little or no time in taking her baby to the hospital for vaccines."* (Mother, prompt 2, photo caption).

immunization.

*"We need to work hand in gloves with our wives to ensure that our children are immunized. We as fathers need to monitor our children's vaccine cards to know the date, they are supposed to be going for immunization so that they cannot miss the date. If the woman is busy with other domestic chores, you as a dad need to take the child to the hospital for immunization."* (Father, prompt 2, discussion)

#### Health systems barriers

##### Theme 5: Immunization delivery practices usually prioritized first-year-of-life vaccines over MCV2

While MCV2 has been on the routine immunization schedule since 2015, the immunization delivery practices seemed to be largely focused on vaccines in the first year of life. HCWs themselves noted that they inadvertently paid more attention to mothers of younger children than to those with older children. Furthermore, caregivers were oftentimes given outdated immunization cards that did not have designated space to remind caregivers to return for MCV2 or for HCWs to document administration (Fig. 5).



Fig. 5. Under-five card.

*"Some hospital still gives out the old card which shows that measles [vaccine] should be given at nine month[s] so because of this most mothers with this card are not [offered] measles 2 dose."* (Mother, prompt 3, photo caption).

### Theme 6: Long waiting times and vaccine stock-outs at the health facility negatively affected immunization uptake

Participants acknowledged that long waiting time at the health facility was a barrier. This was often a result of needing a minimum number of children for vaccination at the health facility or because the HCWs were distracted with other activities. Unsatisfactory physical conditions of the waiting rooms (e.g., lack of ventilation) made waiting uncomfortable. Moreover, even after waiting for a long time, caregivers were sometimes turned away by the HCWs due to the unavailability of vaccines, which added to their frustrations (Fig. 6).

### Theme 7: Issues of the free healthcare program and the lack of financial incentives demoralized healthcare workers which negatively affected immunization delivery.

HCWs suggested that unpaid health volunteers may have reduced motivation to work; hence, less likely to be retained within the health system due to the lack of monetary support. The unavailability of financial resources also meant that they were unable to perform some activities such as outreach. Furthermore, some unsalaried health volunteers reportedly demanded money from caregivers for health services that were supposed to be free, which frustrated caregivers. These factors led to negative perceptions of the free healthcare system among both HCWs and caregivers (Fig. 7).

#### Contextual barriers

#### Theme 8: Contextual factors, such as poverty, cultural, and infrastructure issues affected immunization uptake

Poverty was discussed as an underlying factor for low awareness and poor uptake of immunization services. Participants also noted that poverty contributed to other social problems, such as illiteracy and lack of awareness, or competing work priorities, which in turn impacted caregivers' ability to correctly use immunization cards or seek immunizations on time. General lack of transportation and seasonal issues, such as flooding affected caregivers' and HCWs' access to the health facilities. These infrastructure issues also resulted in structural damages to buildings and loss of immunization cards that ultimately affected overall immunization uptake (Fig. 8).

Cultural issues, such as the Fullah community that believed vaccinations, in general, were prohibited by their faith, resulted in many under-immunized children in their community. Other caregivers preferred traditional medicine, which prevented them from seeking health services.

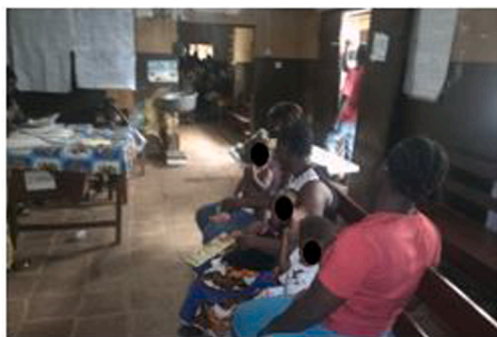


Fig. 6. Queue to take immunization.

“This is a picture showing a long line filled with mothers and their children that have been on queue for some hours waiting for vaccines. This is time-consuming, and it creates a bad impact to mothers of not going to the hospital.” (Mother, prompt 2, photo caption).

### Theme 9: COVID-19 affected service delivery and caregivers' demand for immunization services

Fear of contracting COVID-19 from others or HCWs decreased caregiver visits to health facilities. Reportedly, some caregivers were also unwilling to adhere to COVID-19 precautions (e.g., handwashing, masking) that were in place at the health facility. They felt that these precautions were time-consuming or physically uncomfortable, making them hesitant to seek health services (Fig. 9). Furthermore, outreach activities were affected during the early period of the pandemic.

The themes discussed above were congruent with the rapidly developed themes by the facilitators and participants after each discussion session. For barriers related to MCV2, issues, such as the lack of family planning, poverty, religious/traditional beliefs, COVID-19 issues, and negative attitudes and perceptions towards HCWs were commonly identified themes by the participants.

#### Strategies for addressing barriers

The photo exhibition and joint discussion provided a venue for participants to discuss barriers and solutions with the decision-makers; then strategies for improving MCV2 uptake were proposed. These strategies and recommendations (Table 2) included the following.

#### Demand-related strategies

To reduce knowledge gaps on the importance and scheduling of MCV2 and address negative perceptions about the side effects of vaccines, the participants and stakeholders recommended a more intensified peer-to-peer and door-to-door approach for MCV2 campaigns. In addition to HCWs, it was suggested that the EPI consider mobilizing and supporting caregivers, traditional and religious leaders to pass on immunization-related information in local languages based on their target audience's preferences. Radio and television programs were brought up as important tools for sensitization because these platforms have the trust of community members and allow for broader coverage and listenership.

Previously, hand bands were given to children and parents as incentives for MCV2 completion. This incentive package was reportedly useful in motivating parents to seek immunization services for their children. With support from development partners, it was proposed that the EPI reintroduce similar incentives.

#### Health systems strategies

To enhance caregiver-provider experiences, participants and stakeholders recommended HCWs training for demand promotion and better interpersonal communication. The training could cover topics, such as communication with caregivers about immunizations, listening skills, and responding to caregiver needs and concerns regarding vaccines.

As a strategy for improving HCWs' motivation for immunization service delivery, the reintroduction of performance-based financing (PBF) was discussed. PBF was previously implemented to reduce negative attitudes and behaviors of HCWs and incentivized HCWs based on agreed-upon, measurable performance targets. The incentives included financial payments, bonuses, and public recognition, which could potentially enhance morale and motivation, particularly for health volunteers not on formal payroll.

Lastly, participants and stakeholders agreed that means for ensuring accountability among HCWs should be explored. It was recommended that clear indicators for HCWs' performances and a shared understanding of service delivery objectives are established. Regular performance assessments and feedback were also mentioned as part of this process.

Decision-makers appreciated participants' efforts to shed light on new barriers to MCV2 uptake, which several stakeholders were unaware



**Fig. 7.** Free health care.

“Free health care was designed to help parents who are poor in caring for their children until they reach the age of five years, and it is a very good idea. But its design has nothing to do with the health workers providing the services to the children. Most of the health care workers who are providing services to these children are not on payroll and hence some will come to work when... they feel [like it]. Sometimes a lot of patients will come for immunization and only few staff will turn out on that day. This will discourage the mothers or caregivers and has given a fixed notion that health workers especially the nurses are [not] working which is not the case. Some of us are really committed to our jobs.” (HCW, prompt 3, photo caption).



**Fig. 8.** Flooding in the community.

“Flooding in our community is one of the barriers in the uptake of MCV2. We usually have flooding every year that cause destruction on the live[s] and property of the community people. The woman is busy relocating her children and properties. It is during this process that they lost their immunization cards. After the whole flooding, she was afraid to take her child to the hospital for MCV2 because of the lost immunization card and also the demand the nurses will make as a result of not having her child[s] immunization card” (father, prompt 3, photo caption).

of previously. Report from the Photovoice exhibition indicated that strategies suggested by participants were well-received by the decision-makers.

#### Participant evaluation of the overall project

The short, self-reported questionnaire after the project revealed that most participants thought they were now more knowledgeable about childhood immunization and more cognizant of the different barriers in the community. Participants reported that showcasing issues through photos was a simple way of conveying immunization-related issues and thought that similar photovoice activity can also be conducted in other communities in Sierra Leone.

#### Discussion

This novel photovoice activity for immunization revealed complex individual, health-system, and contextual factors affecting MCV2 uptake in urban Sierra Leone. Factors such as infrastructure, seasonality, cultural influences, general health system challenges related to vaccine availability, long waiting times, and HCW-caregiver interactions were common barriers to immunizations. Gender-related barriers (e.g., heavy workload, need for family planning services), low caregiver knowledge of MCV2, and high HCW emphasis on vaccines in the first year were



**Fig. 9.** Times of COVID-19.

“During the outbreak of any epidemic or pandemic as the one we are currently experiencing, majority of the mothers especially those with children under the age of five will stop visiting the hospital for their health care needs and not just immunization. Because of the rigorous procedure they will have to go through at the facility, majority will prefer to stay at home as they think visiting the health [care facility] will make them infected. [People think that] health workers are those responsible for [COVID-19’s] spread, and some even think they come with illnesses just for them to make money” (HCW, prompt 2, photo caption).

more pronounced for MCV2 uptake than general immunization. Participant-suggested strategies to overcome these barriers were community-level and policy approaches, involving multiple stakeholders (i.e., the community itself and HCWs), health systems strengthening, and addressing the underlying, deep-rooted contextual issues.

Issues regarding low caregiver knowledge of the need for MCV2 and concerns about the potential severe side effects of MCV2 have been reported in other settings in sub-Saharan Africa [15,16]. For example, caregiver survey in Malawi revealed 53% thought that only one dose of MCV is needed for the child [15]. Similarly, in a qualitative study from Sudan, factors such as the experience of prior vaccine side effects coupled with low knowledge and timing of the second dose contributed to low acceptance of MCV2 [16]. As noted by the participants, targeted community sensitization in local languages, especially for specific populations (e.g., migrant groups in urban settings), may be crucial to increase awareness and clear misperceptions.

Overall health systems strengthening and policy recommendations for workforce development are also important [17]. Results from this activity, highlighting HCWs’ greater focus on the first year-of-life vaccines for immunization delivery may suggest the need for additional



training and mentoring for HCWs to emphasize second-year-of-life vaccines, including MCV2. Literature shows that HCWs' knowledge about the delivery, recording, and registering of MCV2 is important [4]. Our photovoice activity also indicates that teaching HCWs how to effectively communicate the importance of MCV2 and any related vaccine safety information with caregivers should also be a component of trainings for HCWs to improve their skills and knowledge. Prior research in Ghana suggests some improvements in communication with caregivers for the second year of life vaccines through capacity building activities [17].

Gender-related barriers to immunization are increasingly recognized as important issues to address in increasing immunization uptake [18,19]. While quantitative studies have shown that the lower birth order of a child and the limited decision-making power of female caregivers are associated with lower vaccine uptake [20,21], our study provides a more nuanced view of how gender-related issues are critical in an urban setting. Issues specific to female caregivers (e.g., low support from male partners, heavy workload, time unavailability, and unmet family planning needs) underscored in this study have also been noted in other contexts. For example, a Photovoice study from Mozambique showed limited support from husbands for seeking vaccination services and related gender and family dynamics negatively influenced childhood immunization [22]. The participant discussions suggested links between unmet family planning needs, increased caregiver responsibilities, and decreased immunization uptake pointing to gender-related barriers that affect overall maternal and child health. Overall, our findings highlight that gender issues may operate at multiple socioecological levels (individual, household, community, and health system) [18] and the necessity of having integrated approaches to improving maternal and child health across the life course to reduce immunization-related disparities [23].

While participants discussed less support from male caregivers, some fathers acknowledged being more proactive and supportive of childhood immunization. This suggests that family-based approaches to involve other family members (e.g. fathers, grandparents) may also play an important role to support immunization [24,25] and is increasingly being employed in several Gavi-supported countries for improving childhood immunization [19].

Participants discussed COVID-19 pandemic influencing immunization. The risk perception of getting infected by others in the health facility when seeking immunization services was high among participants. A study in Mozambique also found that caregivers hesitated to visit health facilities for vaccination services during the COVID-19 pandemic due to concerns of getting the infection [22].

Connecting the community with decision-makers is an essential component of the photovoice approach. It allows the community to highlight the issues they face and discuss solutions with the decision-makers directly. Participatory methods with community-led action have been shown to create localized solutions while improving trust in systems to ultimately improve immunization uptake [26,27]. The photovoice exhibition allowed participants to have an open forum with decision-makers, including MoHS, EPI, WHO, community leaders, and other community-based organizations. Participants self-reported a general sense of empowerment because of their shared and unique perspectives. They understood the problem and collectively identified issues in the community, which brought about new insights for solutions. Literature also suggests that participants have greater control and confidence in their ability to affect change through their actions, using participatory methods, such as photovoice [11].

### Limitations

We used a novel approach to identify barriers to low MCV2 uptake; however, our study had some limitations. First, this was a resource-intensive activity with constant, ongoing engagement between the facilitators and participants. Therefore, it may be hard to replicate in other

resource-constrained settings. Second, the discussions were in-depth and required considerable time beyond what is usually done for interviews or focus group discussions. This can be an obstacle to participation. Third, due to the ongoing pandemic and the conclusion of the project, further follow-up was not possible with the MoHS to assess whether and how solutions from the community were given further consideration. Additionally, we could not directly measure empowerment for informing or developing interventions or strategies among photovoice participants as the scope of this activity was limited to assessment. However, future photovoice activities in low- and middle-income countries should consider including a specific empowerment evaluation component.

### Conclusion

Photovoice can provide a nuanced understanding of issues on immunization uptake, which are often unique to different communities. Owing to the community-driven process, an added strength of photovoice lies in identifying, reflecting, sharing, and clarifying community health priorities through photos of their choosing that echo their shared experiences. Unlike traditional assessments that are disseminated to decision-makers through program implementers, photovoice offers an opportunity for the community to directly connect with decision-makers to discuss potential solutions in depth. Photovoice may serve as a tool to embed within larger intervention project planning to ensure that there is sufficient community buy-in, time, resources availability, and stakeholder participation to not only understand the issues but to also develop and implement targeted interventions.

### Contributions

NA lead the conceptual design of this assignment along with SK (CDC) and PP. SK (CDC) and AL analyzed the data. SK (CDC) led the writing of the manuscript with substantial inputs from AI and NA. SK (CDC) and PP led facilitator training on photovoice methodology. AI and PP conducted earlier data analysis. EO led the overall project implementation in-country with support from HS in training, data collection, dissemination, and reporting. MT supervised the project, overall. MF, SK (ICAP), JB, UJ, MK, and ZB led the data collection and facilitation of photovoice discussion sessions, and initial coding analysis of photo captions. RNF provided technical leadership on the project design and implementation, analysis, and dissemination of findings. TS provided overall leadership and guidance for identifying country-specific needs and ensuring the findings are used to inform improvements in the EPI program, and assisted in site selection, supervision of project activities, and interpretation of findings. TUI supported coordination with the Ministry of Health and Sanitation and other stakeholders and conducted monitoring of project activities to ensure the scientific integrity of the project and the rights and protection of participants. All authors critically reviewed the manuscripts, provided inputs, and approved the manuscript.

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### Disclaimer

The findings and conclusions in this paper are those of the authors and do not necessarily represent the official position of the U.S. Centers for Disease Control and Prevention.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data availability

Data will be made available on request.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jvaxc.2023.100338>.

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