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## Innovative vaccine delivery strategies in response to a cholera outbreak in the challenging context of Lake Chilwa. A rapid qualitative assessment

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### ARTICLE INFO

Article history:  
Available online xxx

Keywords:  
Cholera vaccines  
Self administration  
Fishermen  
Vulnerable population  
Attitude to health  
Anthropology

### ABSTRACT

A reactive campaign using two doses of Shanchol Oral Cholera Vaccine (OCV) was implemented in 2016 in the Lake Chilwa Region (Malawi) targeting fish dependent communities. Three strategies for the second vaccine dose delivery (including delivery by a community leader and self-administration) were used to facilitate vaccine access.

This assessment collected vaccine perceptions and opinions about the OCV campaign of 313 study participants, including: fishermen, fish traders, farmers, community leaders, and one health and one NGO officer. Socio-demographic surveys were conducted, In Depth Interviews and Focus Group Discussions were conducted before and during the campaign.

Some fishermen perceived the traditional delivery strategy as reliable but less practical. Delivery by traditional leaders was acceptable for some participants while others worried about traditional leaders not being trained to deliver vaccines or beneficiaries taking doses on their own. A slight majority of beneficiaries considered the self-administration strategy practical while some beneficiaries worried about storing vials outside of the cold chain or losing vials. During the campaign, a majority of participants preferred receiving oral vaccines instead of injections given ease of intake and lack of pain. OCV was perceived as efficacious and safe. However, a lack of information on how sero-protection may be delayed and the degree of sero-protection led to loss of trust in vaccine potency among some participants who witnessed cholera cases among vaccinated individuals.

OCV campaign implementation requires accompanying communication on protective levels, less than 100% vaccine efficacy, delays in onset of sero-protection, and out of cold chain storage.

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### 1. Introduction

Lake Chilwa is located in the southeast region of Malawi, with 32% of its water catchment area in Mozambique. The main activities in and around the lake include fishing, farming, and small-scale business, the Lake Chilwa ecosystem is critical to food security in the region, with an estimated 1.5 million people depending on the lake for their livelihood [1]. In 2015, like other Malawians, Lake Chilwa residents suffered from a “Maize crisis” due to drought

and flooding that resulted in maize flour shortages and doubling of selling prices as compared to 2014 [2].

Lake Chilwa has experienced recurrent cholera outbreaks since the 1980s [3], which has a high impact on the fishing communities [4]. The most recent outbreak was reported in December 2015; the index case was a fisherman residing in *zimboweras* (floating homes on the lake). Based on the positive results of a recent OCV campaign organized in Nsanje District, Southern Malawi in March and April 2015 [5], the Ministry of Health (MoH) decided to organize a reactive oral cholera vaccine (OCV) campaign with support from the World Health Organisation (WHO), Médecins Sans Frontières (MSF), and Agence de Médecine Préventive (AMP), collaborating as an interagency OCV group. The OCV campaign was

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implemented in the Lake Chilwa area between February and March 2016 and targeted fishermen on the lake and the population living within a 2 km radius (lake shore). Innovative strategies were implemented to reach the populations that were at high risk and difficult to access.

From January to March 2016 we organized and conducted a rapid qualitative assessment prior to and during the campaign to investigate anticipated and observed acceptability of OCV and innovative delivery strategies among the fishing-dependent communities targeted by the reactive campaign.

## 2. Methods

### 2.1. OCV campaign and vaccine delivery

The cholera vaccine is usually delivered through two vaccination rounds at least two weeks apart, under medical supervision and requiring a cold chain [6]. The OCV campaign in Malawi used a two-dose delivery strategy. The first round of the campaign was held between 16 and 22 February 2016 and begun the same day in the three settings (shore, islands and *zimboweras*). The second round of the campaign begun on March 8, 2016 on the islands and March 9, 2016 on the shore.

For the first round of the campaign, OCV doses were administered by health workers as per standard. The second dose was administered using three delivery strategies: (1) For residents living on the shores of the lake, the second dose was administered by health workers as per standard. (2) For those residing in *zimboweras* on the lake, the second dose was given to the individual in a Ziplock bag at the time of the first dose for subsequent unsupervised self-administration. (3) For residents on the islands, community leaders and Health Surveillance Assistants (HSAs) delivered and observed intake of the second dose, but beneficiaries were also able to take doses home for their household members provided they had the appropriate vaccination cards from the first round (a strategy termed “Community-led self-administrated”).

### 2.2. Study site and population

The rapid assessment was carried out before and during the campaign, with four data collection rounds between January and March 2016. The sample was divided between the geographical areas that were to receive the three different OCV delivery strategies, namely Lake Chilwa Shore (Machinga district), *zimboweras* (in Machinga and Zomba districts), and Chisi and Chinguma island (Zomba district).

The sampling strategy was purposive, based on the respondent’s experience with cholera and the profiles and roles sought in the assessment. Participants were recruited using the snowball technique [7]. In total, 313 participants were included (see Fig. 1 and Table 1).

### 2.3. Characteristics of respondents

Laypersons included fishermen, fishermen’s wives, fish traders, and farmers. Community leaders included village chiefs, religious chiefs, and heads of village committees. Community health agents included volunteers and HSAs. At the regional response level, a local resident working for an international organization was included (see Table 2).

### 2.4. Data collection tools and analysis

A short questionnaire, aimed at collecting social characteristics and key elements regarding perceptions of cholera and vaccines,

was administered via in-depth interviews (IDI) and focus group discussions (FGD) with participants. IDIs based on a semi-structured guide were carried out with 67 participants. All IDIs were conducted with participants who gave written, informed consent. All interviewees were individuals who were judged to have relevant knowledge about cholera in the community or vaccination programmes in Malawi.

Overall, 35 FGDs were held with community members (laypersons) in the targeted area. FGDs were facilitated by two trained research assistants. One led the discussion, while the other took notes. The FGDs were tape-recorded, fully transcribed, translated, and imported into Nvivo©. All sources were coded using predetermined categories, leaving the possibility for code creation to allow for unexpected, emergent themes.

Data entry and analyses were performed using Epi Info 7. Descriptive analyses were conducted to provide frequency distributions and test the associations as necessary.

### 2.5. Ethical approval

The study protocol was approved by the Malawi National Health Sciences Research Committee (reference number NHSRC # 15/5/1599). All interviewees provided written, informed consent after reading or having been read the participant information sheet.

## 3. Results

### 3.1. Living condition

According to laypersons, communities around Lake Chilwa engage mostly in subsistence farming and small-scale fishing on foot and by dugout canoe.

Lake Chilwa is officially open for fishing from March 1 to December 1, although some fishing is still carried out during the period when the lake is officially closed. A few participants have suggested that the food shortages and high prices meant that the population were not getting enough to eat, so the lake was more crowded in late 2015 and early 2016 than in previous years.

Lake Chilwa includes several islands with an estimated but fluctuating population of 14,000. The lake also includes floating homes, the *zimboweras*. Used as temporary shelters, made of phragmites (tall grass), they are built by fishermen on the shallow parts of the lake. Most residents are men, with a few female traders and sex workers. Fishermen on the islands or on the shore tend to live with their families; some, but not all, use the *zimboweras*. Movement occurs between the family residence, the *zimboweras*, the islands, and the markets, with residency on the lake ranging from one day to three months, rarely even more. Some fishermen operating on Lake Chilwa also operate on other lakes at other times of the year, but this is rare and most mobility is limited to Lake Chilwa.

On the *zimboweras*, fishermen communities have no access to safe water and sanitation or electricity (except for limited solar panels). There are no formal health structures such as village health committees on the lake. Visits from health personnel or NGOs, dependent on boats and large amounts of gasoline, reportedly only occurred during outbreaks. Clusters of *zimboweras* usually include a so-called “tea room”, which is larger than the other *zimboweras* and acts as a central point where daily goods are sold and food can be bought and cooked. The tea room owner is described as influential. During the OCV intervention, tea rooms were used as a delivery point for vaccines and Water, Sanitation and Hygiene (WASH) items, and the owners acted as local focal points.

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