# WASH Cholera “Research” Group (WS5)

Albert Reichert, Omar El Hattab,

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# Goal: What to do?

- **Prioritization:** Already lots
  - Wellcome CHNRI, Manuscript, Meetings, GTFCC
  - .. No need for more

- **Support:** Research completion/dissemination
  - Link: Roadmap, CHNRI(WASH), Wellcome Projects
    Projects to Donors
  - Update: Provide updates on research to WASH WG
  - Disseminate: Results
  - Share: Research and operational data

# How?

- If right way forward, work on details of:

Link, Update, Disseminate, Share

after March meeting.

# Ongoing Research We Know Of

- CDC — CATI (Tom), Assessments (Tom)
- JHU — CATI (Paul), DRC project (Christine Marie)
- LSHTM — CATI (Ruwan), Uvira (Lauren)
- Tufts — Ceramic (Daniele)
- UNICEF — DRC project (Justine)

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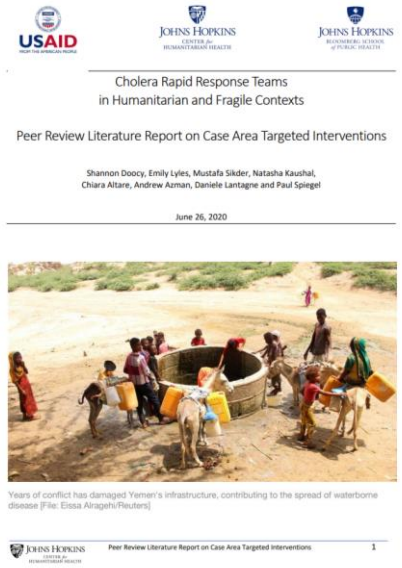
# Case Area Targeted Interventions (CATIs) in Cholera Outbreak Response in humanitarian settings: a multi site study collaboration

Johns Hopkins Center for Humanitarian Health
Gurpreet Kaur, MD, MPH
March 9, 2022

# Completed Project Components



Cholera Rapid Response Teams
in Humanitarian and Fragile Contexts

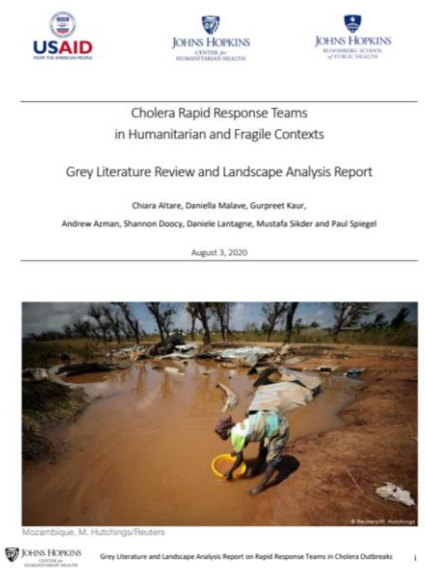
Peer Review Literature Report on Case Area Targeted Interventions

Shannon Doocy, Emily Lyles, Mustafa Sikder, Natasha Kaushal,
Chiara Altare, Andrew Azman, Daniele Lantagne and Paul Spiegel

June 26, 2020

Years of conflict has damaged Yemen's infrastructure, contributing to the spread of waterborne disease [File: Eissa Alragehi/Reuters]

Peer Review Literature Report on Case Area Targeted Interventions 1



Cholera Rapid Response Teams
in Humanitarian and Fragile Contexts

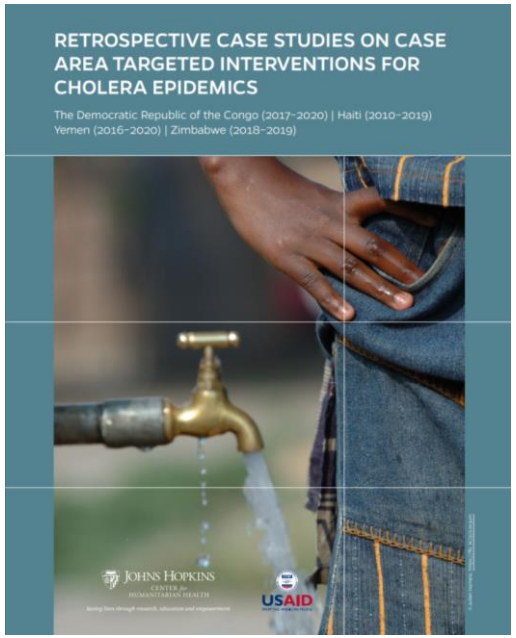
Grey Literature Review and Landscape Analysis Report

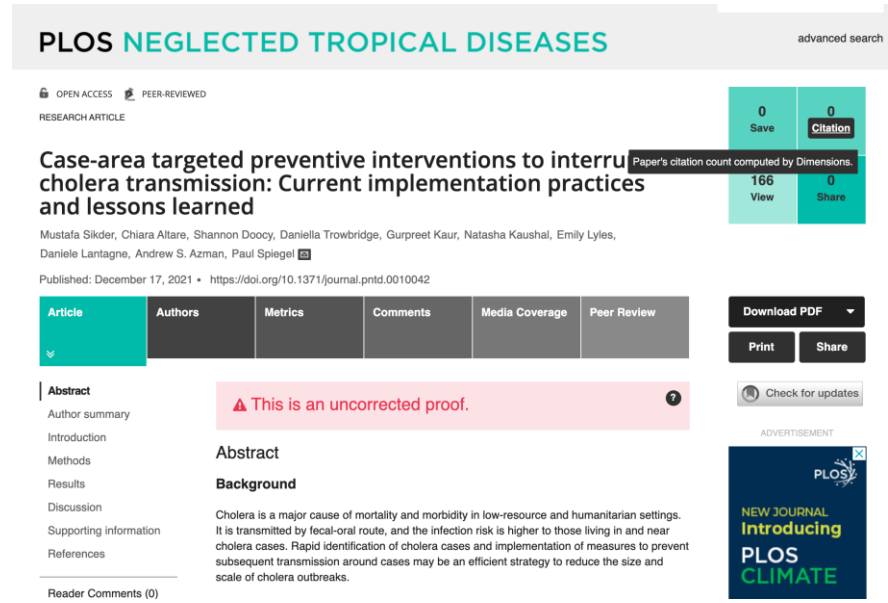
Chiara Altare, Daniella Malave, Gurpreet Kaur,
Andrew Azman, Shannon Doocy, Daniele Lantagne, Mustafa Sikder and Paul Spiegel

August 3, 2020

Mozambique, M. Hutchings/Reuters

Grey Literature and Landscape Analysis Report on Rapid Response Teams in Cholera Outbreaks



PLOS NEGLECTED TROPICAL DISEASES

advanced search

OPEN ACCESS PEER-REVIEWED
RESEARCH ARTICLE

Case-area targeted preventive interventions to interru cholera transmission: Current implementation practices and lessons learned

Paper's citation count computed by Dimensions.

Mustafa Sikder, Chiara Altare, Shannon Doocy, Daniella Trowbridge, Gurpreet Kaur, Natasha Kaushal, Emily Lyles, Daniele Lantagne, Andrew S. Azman, Paul Spiegel

Published: December 17, 2021 • https://doi.org/10.1371/journal.pntd.0010042

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Abstract

Background

Cholera is a major cause of mortality and morbidity in low-resource and humanitarian settings. It is transmitted by fecal-oral route, and the infection risk is higher to those living in and near cholera cases. Rapid identification of cholera cases and implementation of measures to prevent subsequent transmission around cases may be an efficient strategy to reduce the size and scale of cholera outbreaks.

PLOS NEW JOURNAL Introducing PLOS CLIMATE

# Prospective observational study

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**Research Team:**

Principal Investigator: Paul Spiegel MD, MPH

Co investigators: Chiara Altare PhD, Andrew Azman PhD, Shannon Doocy PhD, Gurpreet Kaur, MD, MPH, Daniele Lantagne PhD, PE, Mustafa Sikder PhD

**Country Partners:**

Nigeria: Action Contre la Faim (ACF), Solidarités International (SI)

*Mozambique: Instituto Nacional de Saúde (INS) and UNICEF + ??*

**Funder:** USAID Bureau for Humanitarian Assistance (BHA)

# Study aims

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**Primary Aim**:

Characterize the relationship between **CATI activation time** (time between case presentation at a cholera treatment facility and the start of the CATI intervention) and **cholera incidence** in the area covered by CATI interventions

**Secondary Aims:**

1. Document procedures of implementing CATIs (e.g. equip, staff, training, ideal radius, etc) and develop recommendations to maximize their impact in future cholera outbreaks
2. Describe integration of WASH and health delivered via CATI
3. Characterize the relationship between CATI completeness (in terms of **coverage** w/I the specified geographic area and activities implemented w/I households) and incidence of new cholera cases
4. Estimate CATI effectiveness using 2ndary parameters (**reported diarrheal incidence, FCR of drinking water,** knowledge and practices to prevent cholera)
5. Document coordination mechanisms between MoH, UN, Clusters, NGOs and develop recommendations for coordination in future responses

# Study design

**Main data collection:**

Phase 1: Observation CATI implementation at Households

Phase 2: Follow-up Households 7-14 days after CATI

**Household GPS*

**Key informant interviews:**

CATI team members

NGO leads/managers

# Cholera outbreak in Nigeria

## Adamawa SitRep: EpiWeek 46, Nov 16, 2021 (latest results online)

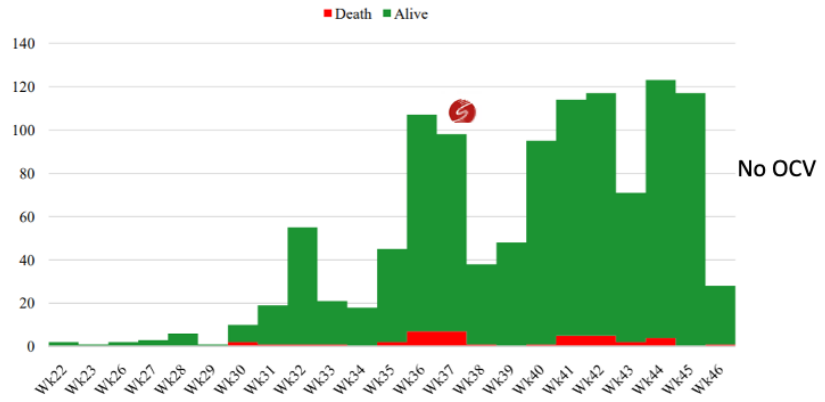


Figure 1: Epicurve of suspected cases of cholera and deaths in Adamawa state as at 16th **November, 2021**

- Total number of cases reported as of Nov 16, 2021 is 1139 suspected cases with 40 deaths (CFR=3.5%)
- No OC V

https://reliefweb.int/sites/reliefweb.int/files/resources/adamawa_state_2021_cholera_situation_report_no_20.pdf

## Borno SitRep Week No 16, Week 49 (Dec 12, 2021)

*Figure 1: Map of Borno state showing affected LGAs in Borno State.*

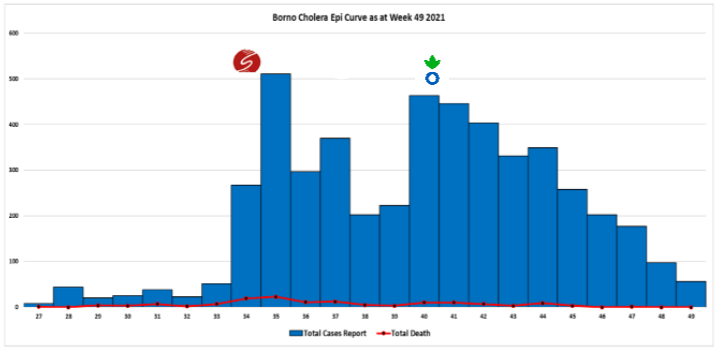


*Figure 2: Borno state weekly cholera outbreak Epi-curve as at week 49, 2021*

- Cumulative cases week 27-49 = 5,797; deaths 170; CFR 2.9%, 21 LGAs
- Epiweek 49: 56 suspected cases, 0 deaths, 3 LGAs
- No OCV

https://reliefweb.int/sites/reliefweb.int/files/resources/Borno%20State%20Ministry%20of%20Health%20%20Cholera%20outbreak%20Situation%20Report%20No.%2016%20as%20of%2012th%20December%202021.pdf

## Yobe SitRep: EpiWeek 48, Dec 5, 2021

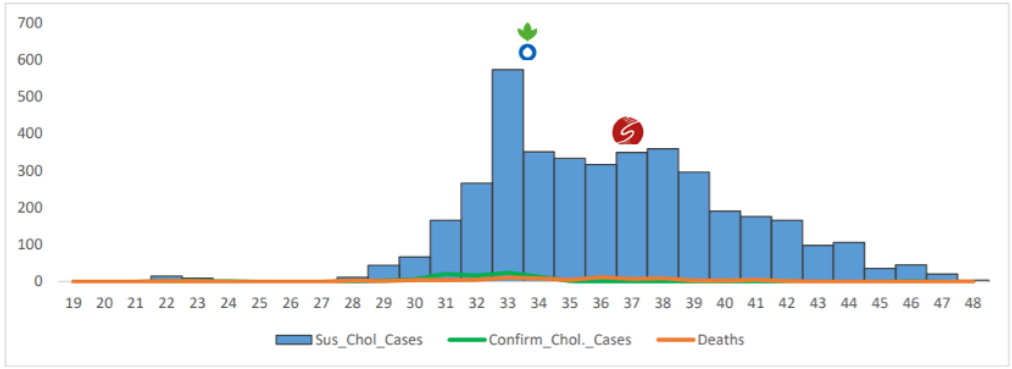


*Figure 1: Weekly Epi-curve of Suspected Cholera Cases in Yobe State @ week 48*

- Cumulative cases Week = 4003; deaths 91; CFR 2.3%, 15 LGAs (total 17 LGAs)
- Epiweek 48: 10 suspected cases, 0 deaths
- Reactive OCV – Damataru in October

https://reliefweb.int/sites/reliefweb.int/files/resources/yobe_state_cholera_outbreak_sitrep_no.8_5_december_2021.pdf

# CATI strategy in Nigeria BAY states by SI and ACF

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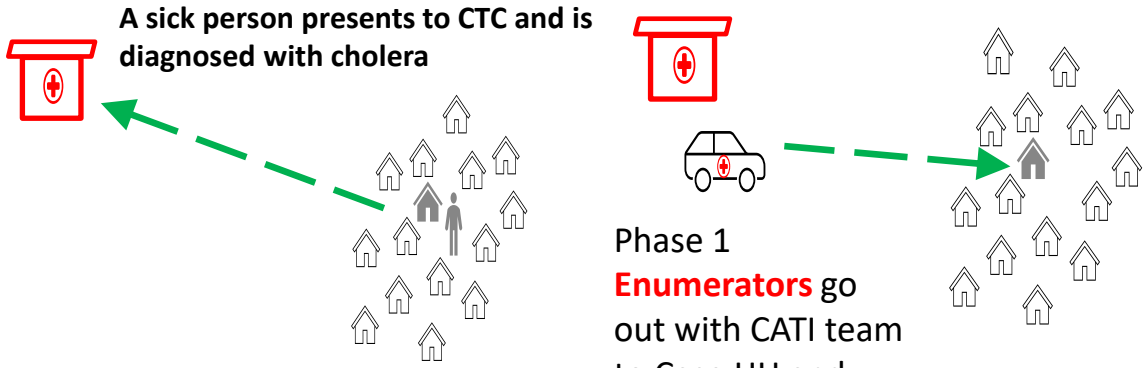
| | Solidarités (SI) | ACF |
|---|---|---|
| **Radius** | 150m | 150m |
| **Interventions** | Case HH: cholera kit, hygiene promotion, spraying (2 different concentrations), FCR<br><br>Neigh HH: soap, aquatabs, hygiene promotion, spraying, *FCR* | Case HH: cholera kit, hygiene promotion, spraying, FCR<br><br>Neigh HH: soap, aquatabs, hygiene promotion, spraying, *FCR* |
| **CATI Teams** | Borno: 5<br>Adamawa: 1<br>Yobe: 4 | Borno: 6<br>Yobe: 4 |
| **# CTCs** | Borno: 2 then 1 (MSF)<br>Adamawa: 1<br>Yobe: 2 | Borno: 1 (MdM)<br>Yobe: >2 |

# Phase 1: CATI response

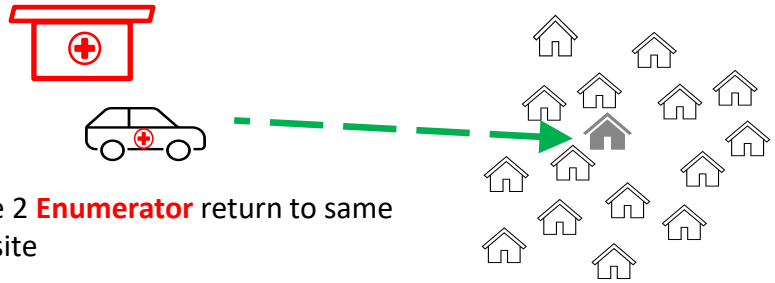



Phase 1
**Enumerators** go out with CATI team to Case HH and surrounding HH

**Data Collection: Case HH + Neighbor HH + Ring**

**GPS: Case + Neighbor HH**

# Phase 2: Follow-up 7-14 Days Later



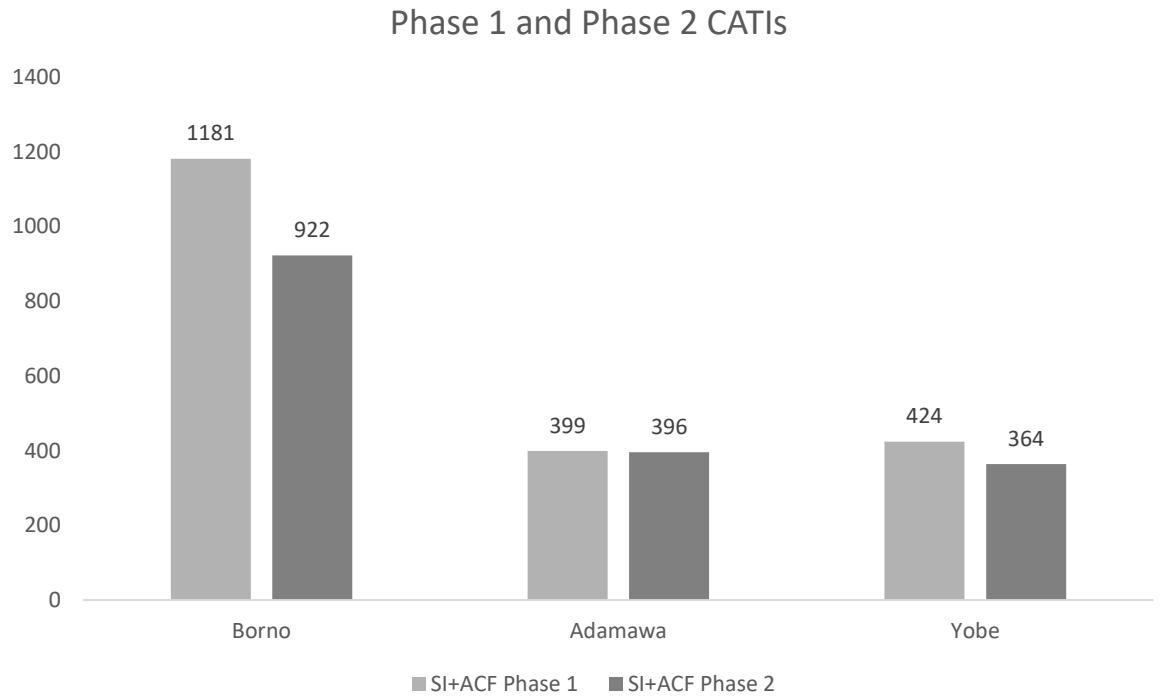
Phase 2 **Enumerator** return to same CATI site

**Data Collection: Case HH + Neighbor HH + Follow up Ring**

**GPS: Case + Neighbor HH**

# Initial Results – BAY States Nigeria

## Data cleaning and analysis in process




| | Borno | Adamawa | Yobe |
|---|---|---|---|
| **Cases** | 1188 | 460 | 539 |
| **Neighbors** | 25,430 | 11,647 | 15,861 |

# Implementation considerations – qualitative interviews

- Reasons for not following CTC Case to community
  - Security
  - Distance
  - Can't locate case household
  - Case load
- 150m radius measurement
  - Variable: # steps, # households, adaptation to household size, rural context
  - Difficult to cover all neighbors within 150m in dense context
  - Measuring around non-residential buildings
- Selection of Neighbor HH in a CATI
  - Don't accept intervention
  - No one home, male head of household not home, only minor at home
- On kits
  - Transportation
  - Stockouts

# Next steps

- Finalize data cleaning
- Conduct analyses

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Thank you

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Questions? Contact:

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Gurpreet Kaur gkaur5@jhu.edu

# Case Area Targeted Interventions with oral cholera vaccination

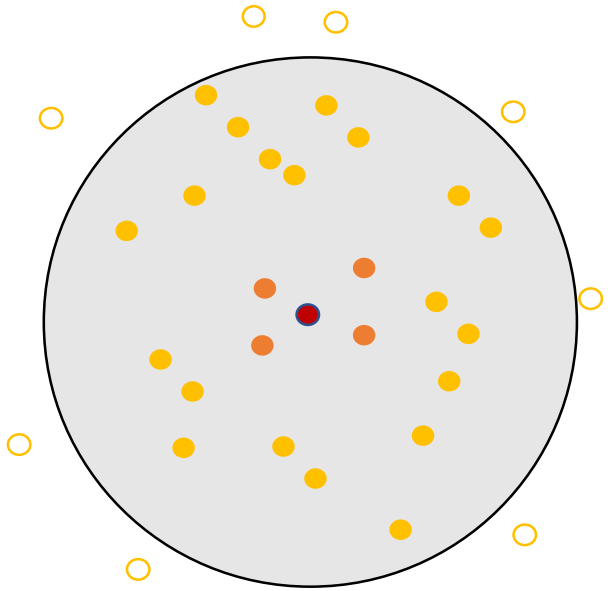
An update for the GTFCC WASH WG

9 March 2022

Ruwan Ratnayake – LSHTM
Flavio Finger – Epicentre
Nana Mimbu — Epicentre, MSF
Primitive Gakima – MSF
Placide Welo Okitayemba – PNECHOL
Francisco Luquero, Epicentre
Andrew Azman, JHU & MSF
Nicolas Peyraud, MSF
Iza Ciglenecki, MSF

# CATI – as used by MSF

**Aim**: ring of 100 to 500m around cholera cases with a positive enriched RDT
**Timing**: reactivity as primary objective (1-3 days, max 7)
**WASH component:** hygiene kit with soap, jerrycan, point of use water treatment, handwashing device (10 L bucket with tap)

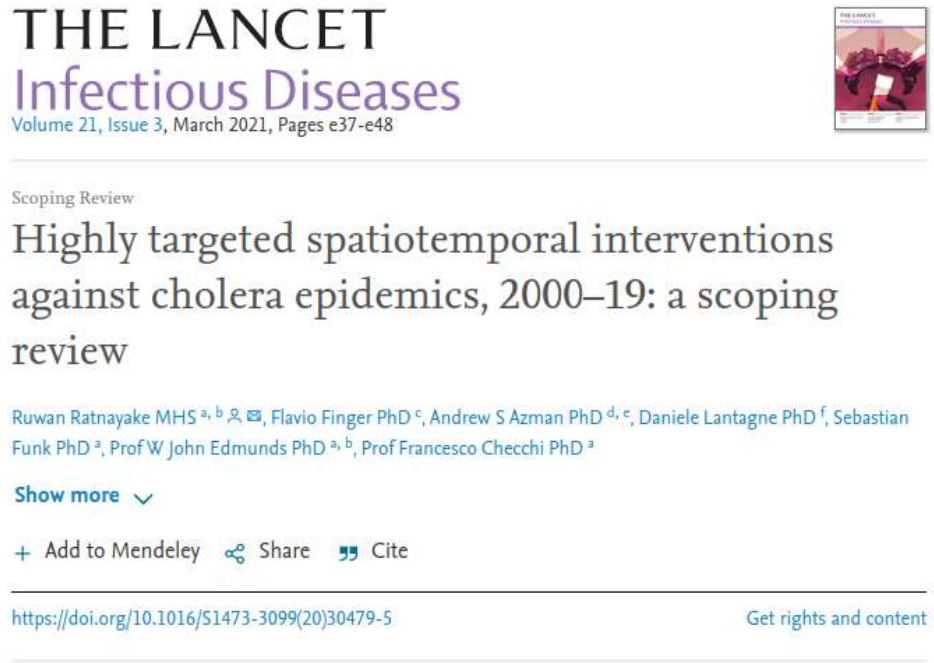


- Primary case-household
- Adjacent households (highest risk)
- Ring household (high risk)
- Household just outside ring (elevated risk)

| | Primary case household | Adjacent households | Ring households |
|---|---|---|---|
| Single-dose oral cholera vaccine (1-dose, oral) | | | |
| Water treatment, safe storage, soap | | | |
| Doxycycline or azithromycin (1-dose, oral) | | | |
| Intensive hygiene promotion | | | |
| Community hygiene promotion | | | |

# CATI – motivation of the project

- Several modalities of CATI and similar rapid response has been used in different contexts
  - Haiti, Bangladesh, Yemen, Nigeria, South Sudan, Cameroon, …
  - UNICEF (mostly WaSH), MSF pilots (with OCV)
- Adding vaccination to CATI is thought to provide better and more long-term protection to the people most at risk
- Scoping review of current evidence (Ratnayake et al, Lancet ID, 2020) found past evaluations indicating that CATI works



THE LANCET
Infectious Diseases
Volume 21, Issue 3, March 2021, Pages e37-e48

Scoping Review

Highly targeted spatiotemporal interventions against cholera epidemics, 2000–19: a scoping review

Ruwan Ratnayake MHS [a, b], Flavio Finger PhD [c], Andrew S Azman PhD [d, e], Daniele Lantagne PhD [f], Sebastian Funk PhD [a], Prof W John Edmunds PhD [a, b], Prof Francesco Checchi PhD [a]

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https://doi.org/10.1016/S1473-3099(20)30479-5  Get rights and content

# CATI – motivation of the project

- But knowledge gaps identified
  - No CATI evaluations including OCV
  - Based on suspected cholera
  - Most studies are retrospective with limited data
- Currently, CATI with vaccination is not part of WHO or national plans and recommendations
- Thus, the goals of the MSF/Epicentre/LSHTM CATI project are to:
  - Allow MSF to implement CATI with OCV in different countries
  - Generate evidence to influence policy (internal, national, international)

# Study Protocol

Aim: to evaluate the effectiveness of CATI in the rapid containment of case-clusters, at the start of the outbreak

Primary objective: to evaluate the effectiveness of CATI in the reduction of incidence of enriched RDT-positive cholera within targeted rings

Secondary objectives:

1. Population-based coverage
2. Spatiotemporal transmission patterns of the outbreak
3. Effectiveness in the reduction of household transmission
4. Antimicrobial resistance related to chemoprophylaxis (if used)
5. Resources and costs required

# Study Protocol

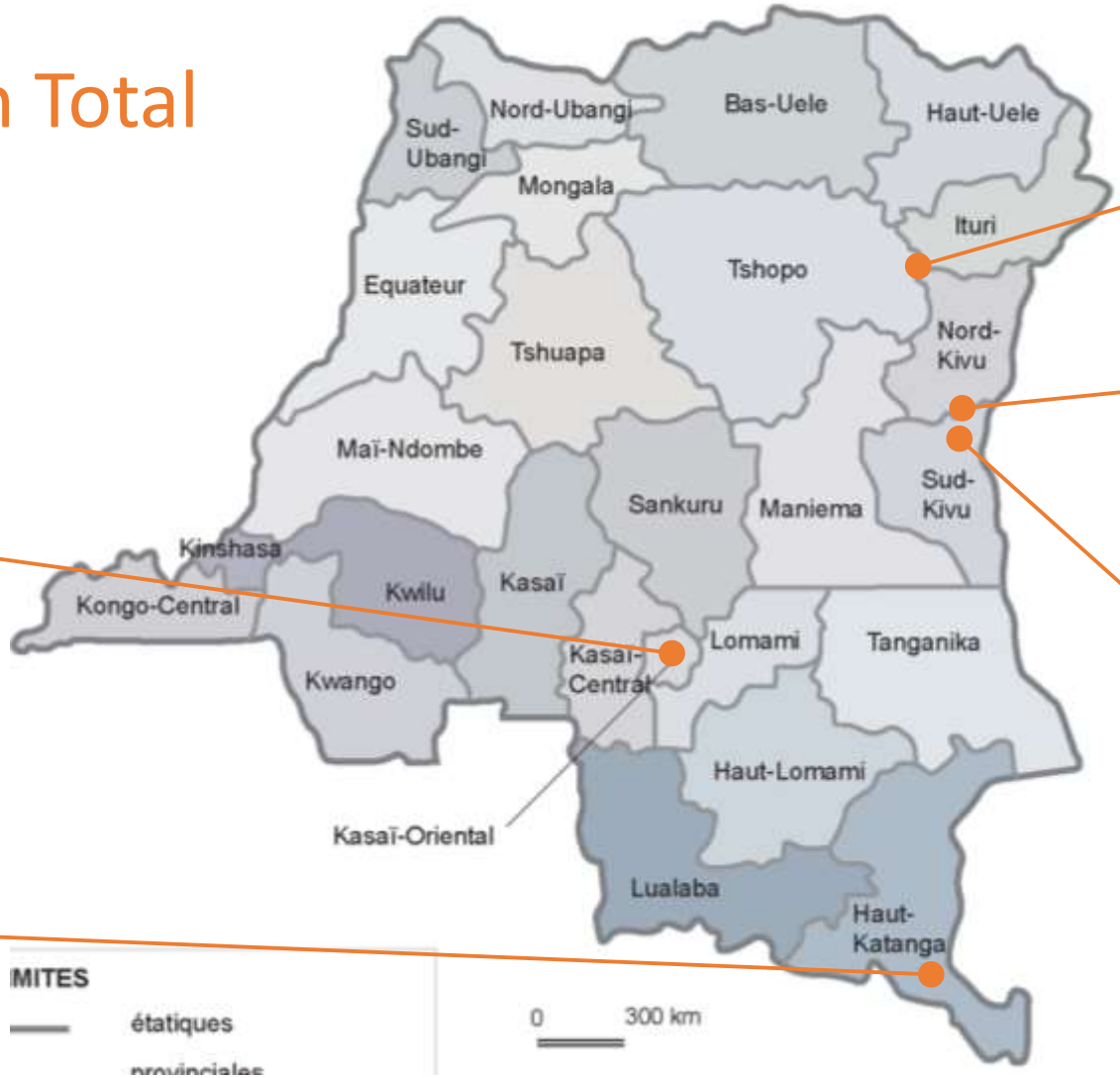
- Design: Prospective Observational Study of MSF's intervention
- Study sample size: 100 CATI rings
- Primary outcome: cholera incidence in each CATI ring
- Compare the incidence among rings as a function of delay to launching CATI in rings, (as a proxy for performance)
- Designed to adapt to variations in operational CATI strategies
- Approved by the MSF ERB, LSHTM IRB, and DRC IRB

# Countries

| | DRC | Niger | Cameroon | Zimbabwe |
|---|---|---|---|---|
| **Operational OC** | Various MSF sections | | | |
| **Protocol** | Approved | Approved | Submitted to IRB | In preparation |
| **Authorizations** | National authorizations obtained, currently discussing with provincial and local authorities | ongoing | ongoing | ongoing |
| **Operational plans** | Almost final | in preparation | in preparation | in preparation |
| **Vaccines** | In country | - | - | - |
| **Timeline** | Coming months | | | |

# MSF CATI in the DRC

## 30 Health Zones in Total




Tshopo & Ituri (17 Health Zones)

Masisi
Goma (2 HZ)

Sud Kivu
(2 Health Zones)

Kasai Oriental
(6 Health Zones)

Haut Katanga
(2 Health Zones)

# Where are we now? **Starting soon.**

**Operations**

- National agreements obtained
- Vaccines in country (50K doses)
- Provincial authorities informed
- Potential locations identified
- Operational procedures (SOP) defined and shared
- RDTs in country
- WASH list of materials prepared

**Study**

- Protocol approved
- Ethical approvals obtained
- Epicentre study coordinator in place
- Study tools: field procedures, data collection tools, trainings setup

# Challenges

- Surveillance is key to CATI, but resource intensive to set up, national surveillance system that need to be optimized for rapid case detection
- Prepositioning of materials (vaccines, RDTs, …)
- Communication with many parties involved

# Thank you!

**This is a large and interdisciplinary project with many contributions:**

- **MSF:** Nicolas Peyraud, Iza Ciglenecki, Catherine Bachy, Andrew Azman, Isabella Panunzi, Claire Dorion, Rob D'Hondt, Caroline Henry-Ostian
- **Epicentre:** María Lightowler, Etienne Gignoux, Francisco Luquero
- **LSHTM:** Francesco Checchi, John Edmunds
- **MoH of DRC:** Placide Welo Okitayemba, Elisabeth Mukamba Musenga, Berthe Miwanda
- **MoHs of Zimbabwe, Cameroon, Niger**
- **UNICEF DRC**

# Performance Evaluation of CATIs

## Nord-Kivu, DRC

US Centers for Disease Control and Prevention (CDC)
UNICEF

9 March 2022

# Case-Area Targeted Interventions (CATIs): Implementation in DRC

- Started in January 2020 in 4 priority health zones in North Kivu, DRC (Goma, Karisimbi, Kirotshe, and Nyiragongo)
- Multisectoral teams from DRC Red Cross and DPS (Provincial Health Department) and include driver, team lead, health promoter, and nurse
- WASH Package:
  - **Case Household**: Delivery of cholera kit which includes jerrycan, bucket, household water treatment products (Aquatabs or liquid chlorine), and soap
  - **Surrounding households**: receive household water treatment products and soap
  - **Both:** Household disinfection and hygiene promotion

# Objectives & Methods of the Performance Evaluation

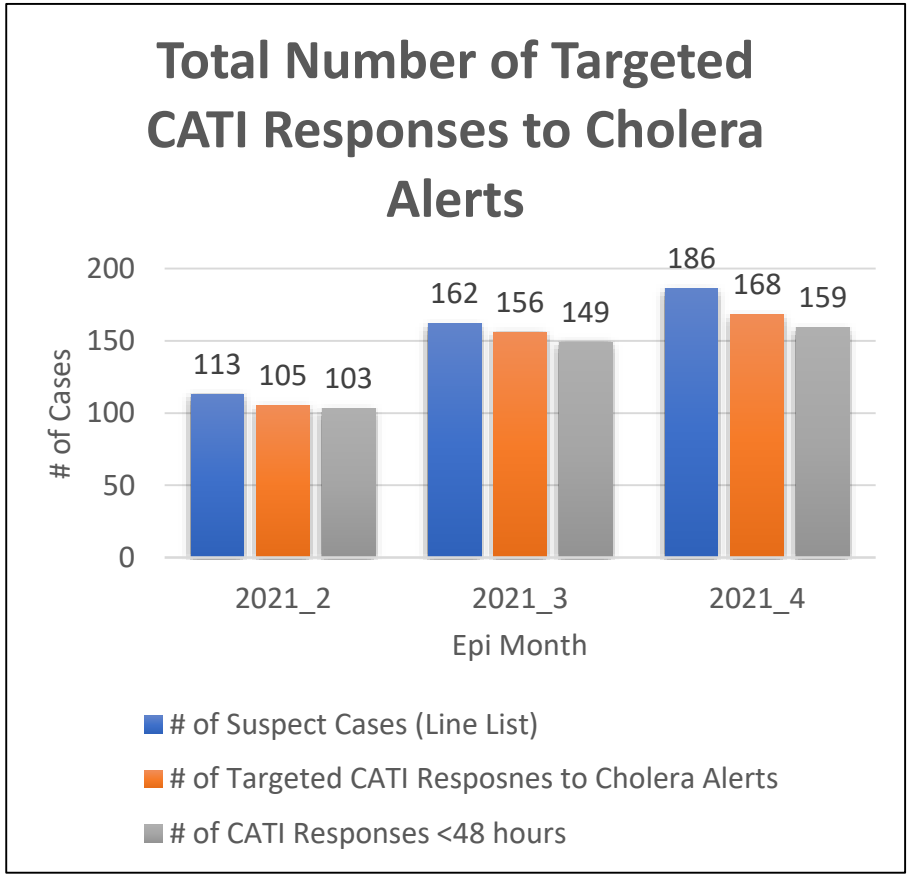
**Objectives**

- Document the performance of the evaluation (time to response, size of cordon sanitaire, WASH package delivered)
- Compare WASH knowledge and practices at households before and after CATIs

**Methods**

- Secondary Analysis of Red Cross DRC monitoring data
- External evaluation of CATI performance

# Secondary Analysis of Monitoring Data(Red Cross and DPS)

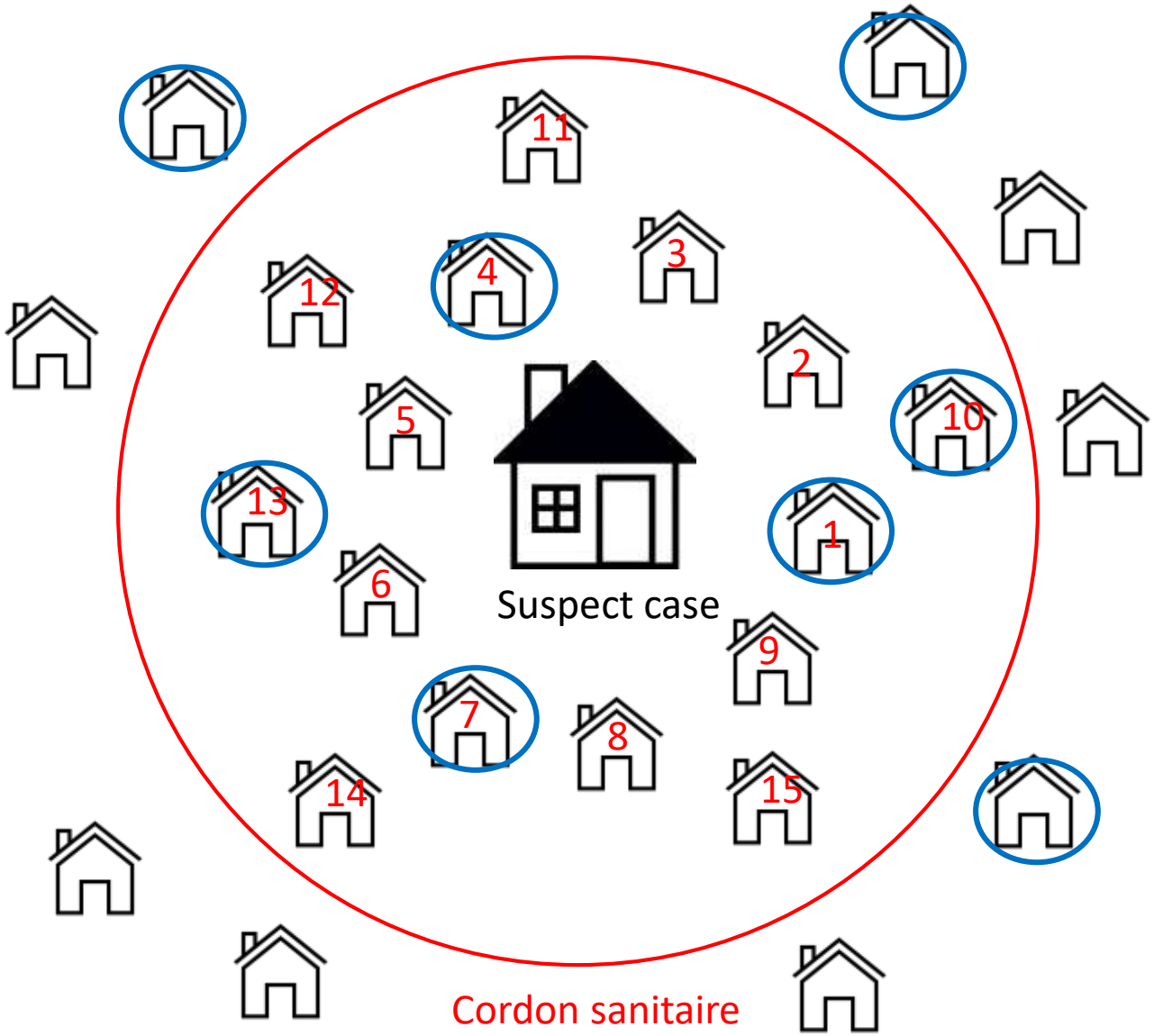



| | <24 hours | <48 hours | >48 hours |
|---|---|---|---|
| % of Targeted Responses by CATI teams, by time between alert and (N=311)* | 71% (221) | 95% (295) | 5% (16) |

| | Total Number | Average per cordon sanitaire |
|---|---|---|
| Number of houses reached by CATI | 5,881 | 18.9 |
| Number of persons sensitized | 44,882 | 144 |
| Number of households that received household water treatment products | 5,680 | 18.3 |
| Number of bars of soap distributed | 5,689 | 18.3 |
| Number of houses disinfected | 5,731 | 18.4 |

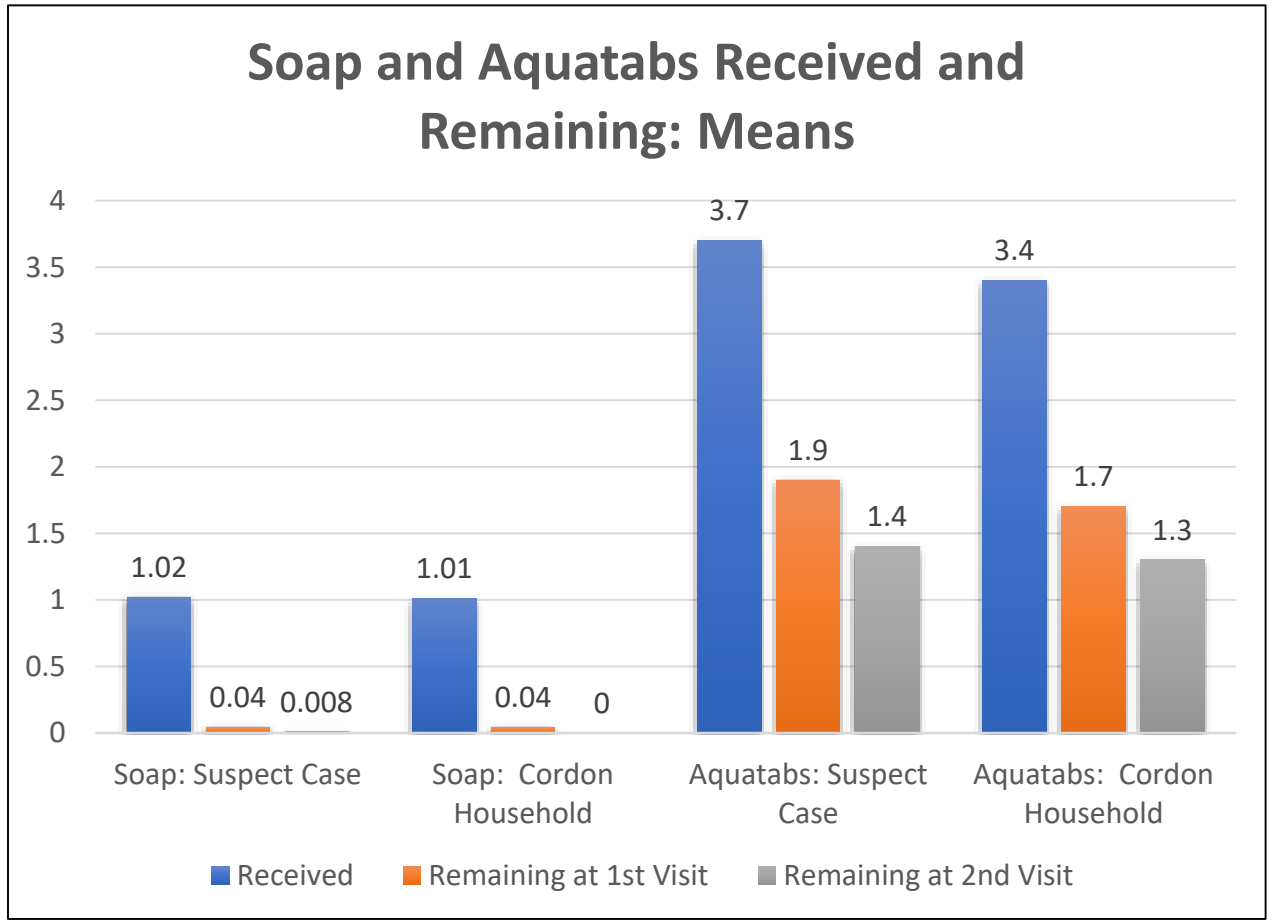
*For the period of external evaluation between 26 February 2021 and 26 April 2021

# Context of CATIs (Case-Area Targeted Interventions) and Sampling



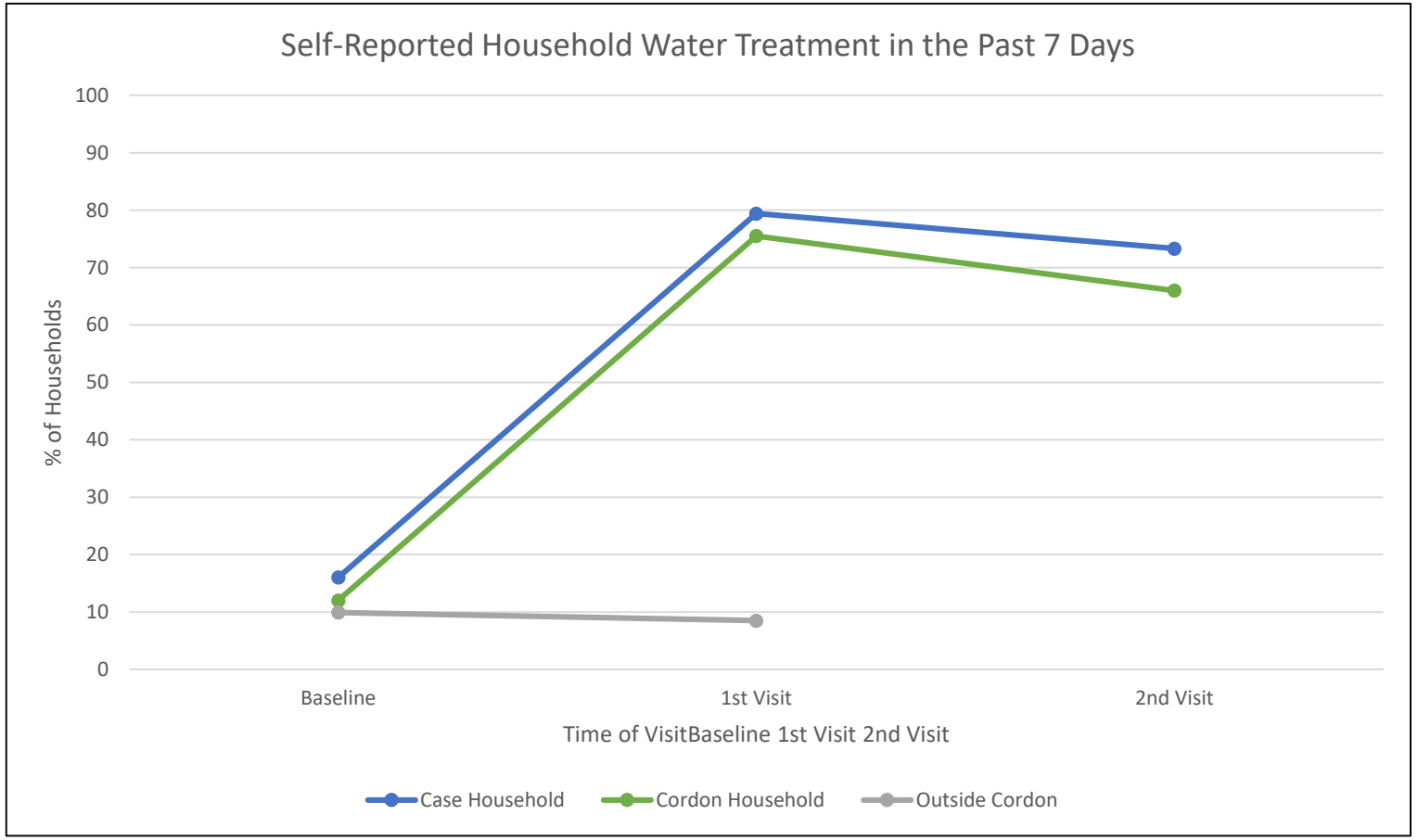

- Baseline survey just before the CATI response
  - At each **suspect case** purposively selected
  - 5 **surrounding households inside of the cordon sanitaire**
  - 3 households **outside of the cordon sanitaire**
- 1st PDM visit after 7-14 days, 2nd PDM visit after 14-28 days

# WASH Package Received and Remaining



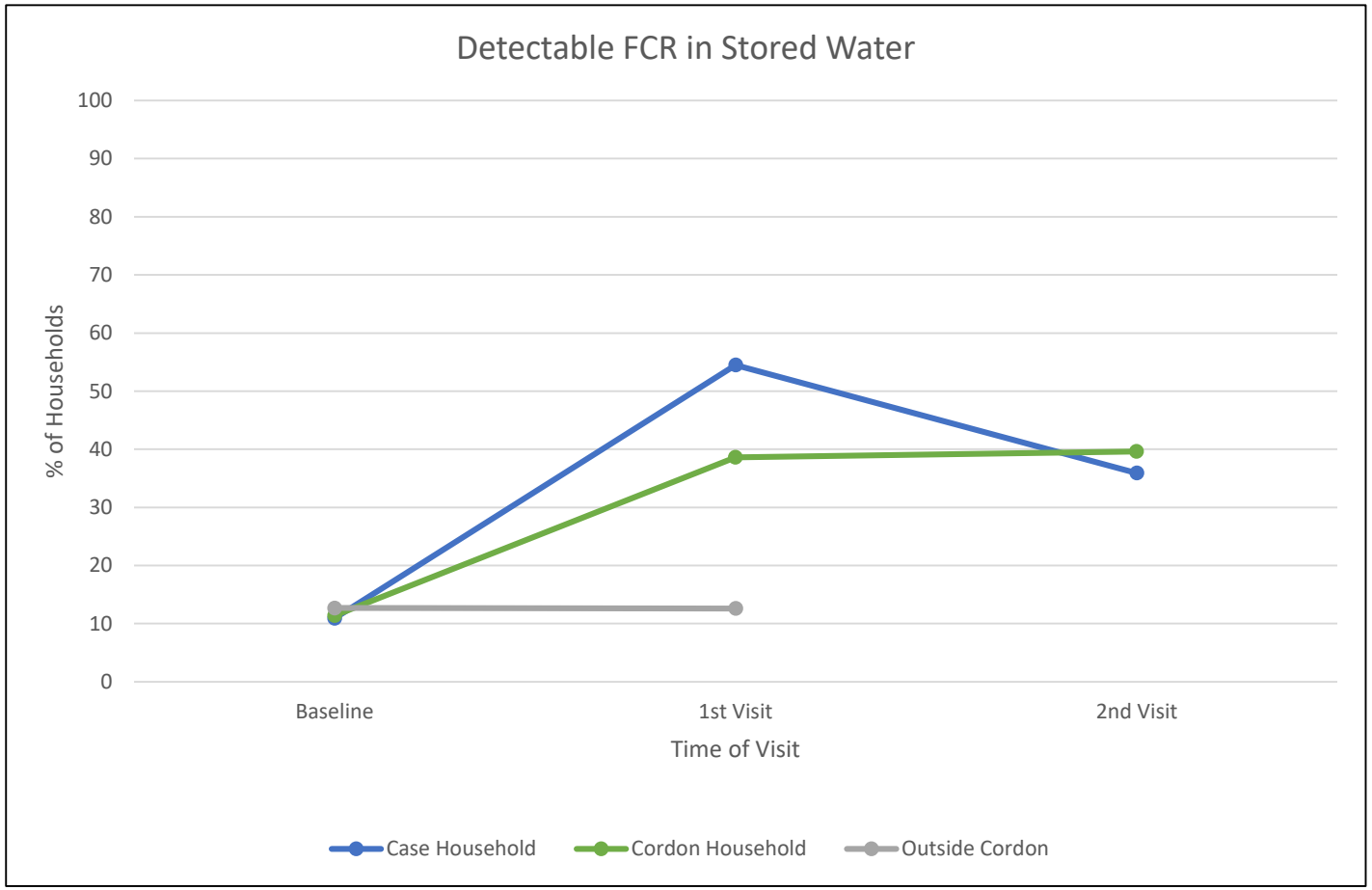

- At 1st visit, most households had used soap from CATI visit
- Sharp decrease in remaining Aquatabs between baseline and 1st visit but smaller decrease at 2nd visit

# Self-reported Household Water Treatment



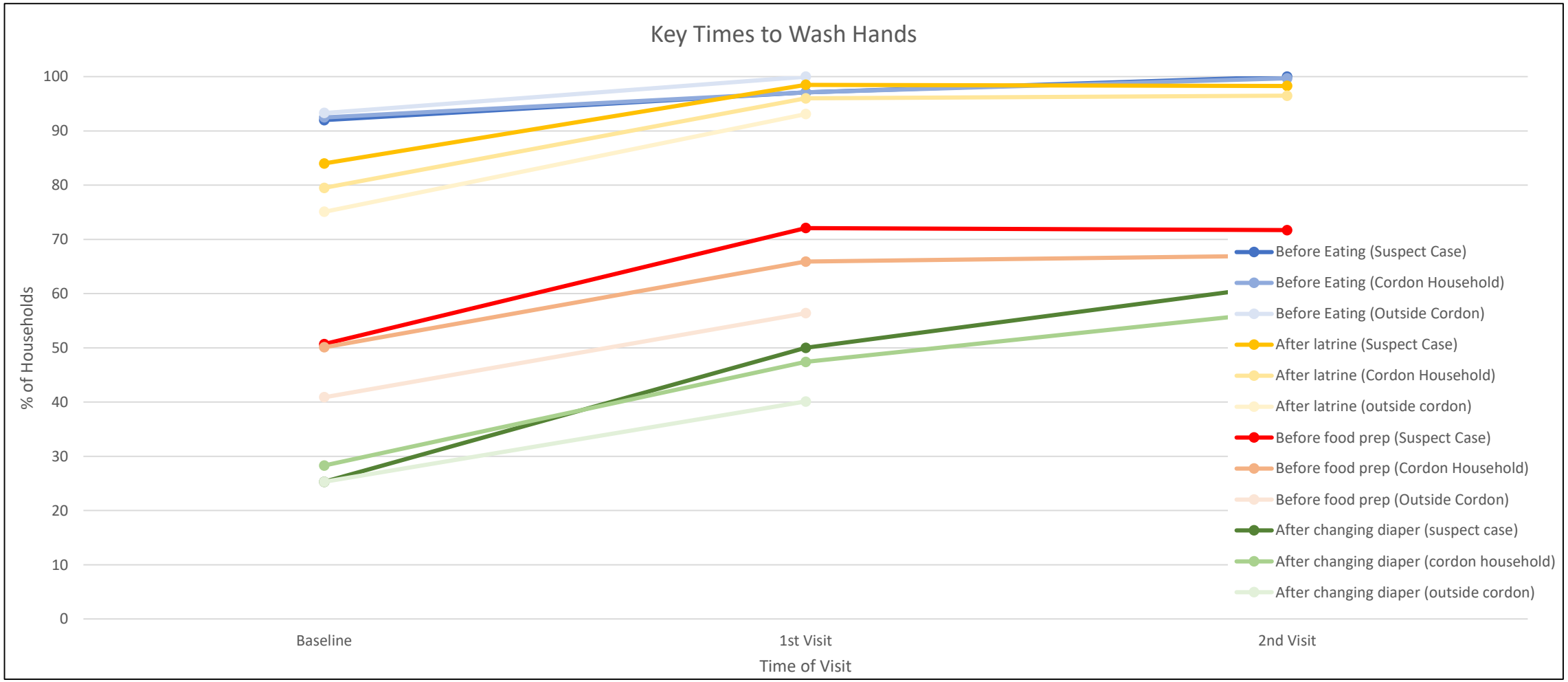

- In suspect case and surrounding households, the proportion who reported to treat their drinking water increased between baseline and 1st visit but decreased between 1st and 2nd visits.
- The proportion of households outside of cordon sanitaire remained less than 10% between baseline and 1st visit.

# Free Chlorine Residual




- Proportion of households with detectable FCR in stored drinking water was less than self-reported HHWT
- In suspect case and surrounding households, the proportion with detectable FCR in their drinking water increased between baseline and 1st visit
- Between 1st and 2nd visits, this decreased in suspect case households but not in surrounding households

# Knowledge of Key Times to Wash Hands



# Summary

- 93% of all suspect cases in North Kivu received CATI visit: 71% were responded to within 24 hours and 95% were responded to within 48 hours.

- Self-reported HHWT and detectable FCR in stored drinking water increased between baseline and 1st visit but decreased between 1st and 2nd visits.

- Most households had no remaining soap after 1st visit.  Sharp decrease in Aquatabs remaining after 1st visit but less of a decrease between 1st and 2nd visits.

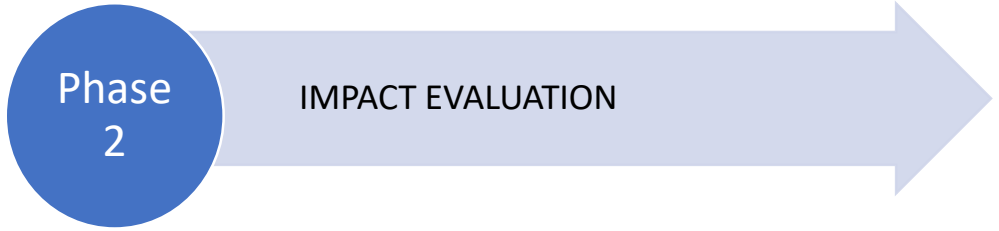
- Knowledge of WASH practices increased

# Next Steps

- Further analysis of performance evaluation data to estimate:
  - Proportion of cases that were confirmed positive
  - Cost of CATI implementation per case


- Conduct a repeat performance evaluation either in DRC or other country, with
  - Improved use of laboratory confirmation, including RDTs
  - Additional in-person field support

- Conduct health impact study of CATIs



# Thank you

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For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

# Self-reported Cholera in the past 7 days

| | Baseline | | | 1st Visit | | | 2nd Visit | | |
|---|---|---|---|---|---|---|---|---|---|
| | Suspect Case | Cordon Household | Outside Cordon | Suspect Case | Cordon Household | Outside Cordon | Suspect Case | Cordon Household | Outside Cordon |
| **Has someone in your household been sick with cholera in the past 7 days?** | | | | | | | | | |
| | 62 (82.7) | 49 (13.1) | 25 (11.1) | 9 (13.2) | 15 (4.3) | 13 (6.4) | 3 (5.0) | 30 (9.5) | -- |
| **Has someone in your household sought treatment for cholera in the past 7 days** | | | | | | | | | |
| | 62 (82.7) | 31 (8.3) | 11 (4.9) | 8 (11.8) | 9 (2.6) | 9 (4.5) | 3 (5.0) | 7 (2.2) | -- |