# Effectiveness of case-area targeted interventions (CATI) including vaccination on the control of cholera in the DRC

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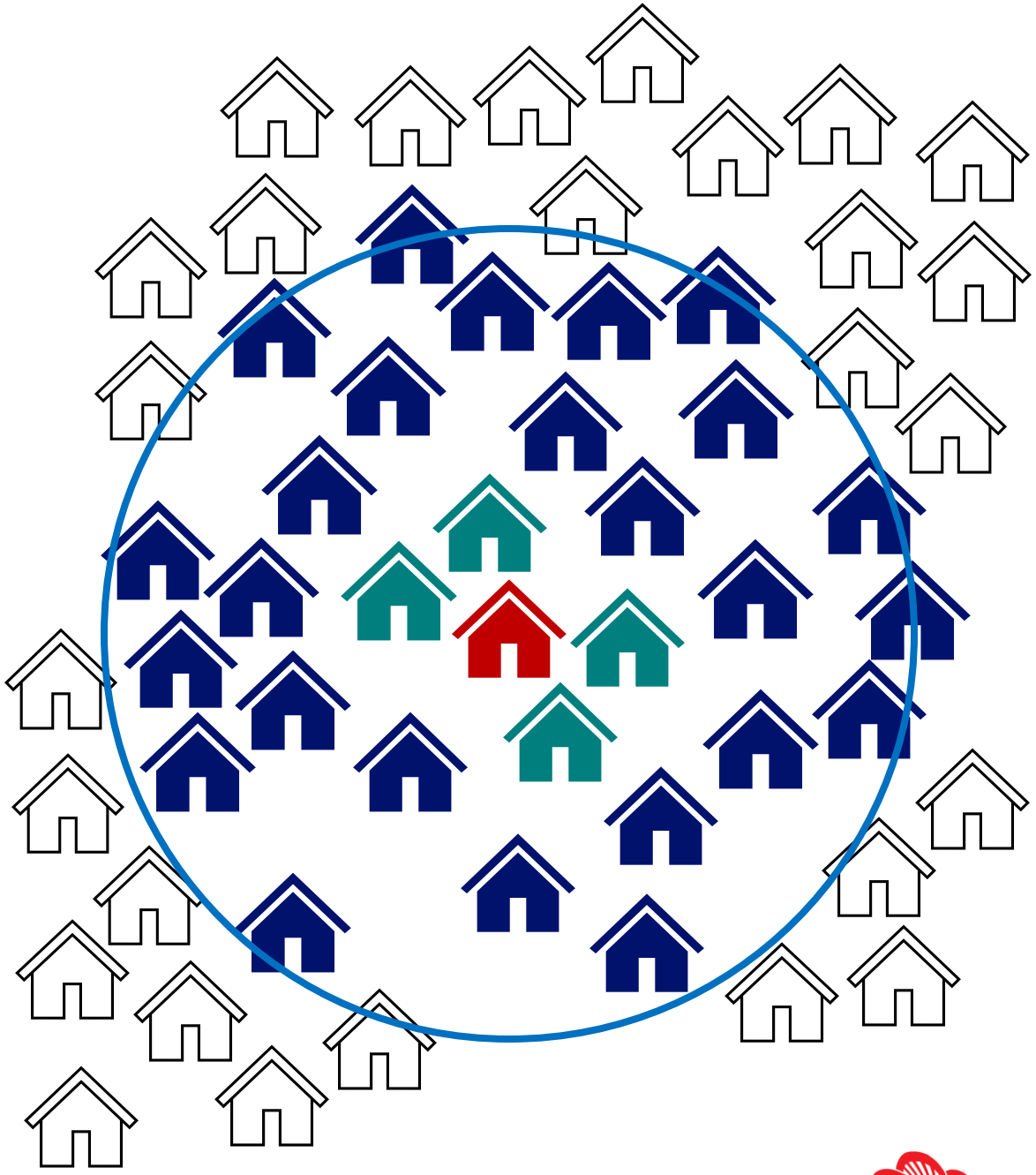
**16 May 2024**

**Conflict of Interest**: The author has declared no conflict of interest.

Photo: Lisa Véran, MSF

# CATI: Case-area targeted intervention

- **Highest risk** of **cholera infection**: **100 to 500m** around **household of cases** during **5 first days** after case presentation
- **CATI = Multi-pillar reactive intervention**
- Within a **fixed radius around** the household of cholera cases
- Package for **all ring households** with additional items for **primary household** and **direct neighbours**
- **Reactivity** is the main objective
- CATI used by UNICEF, MSF and others in Haiti, Bangladesh, Yemen, Zimbabwe, Nigeria, South Sudan, Cameroon, …
- CATI **with vaccination** is recent and never evaluated



# CATI project in the Democratic Republic of the Congo (DRC)

- **CATI package**
  - Single-dose oral cholera vaccine (OCV)
  - Hygiene kit (soap, Aquatabs/chlorine, water storage container, handwashing station)
  - Hygiene promotion
  - Antibiotic chemoprophylaxis (single-dose oral doxycycline) to primary household and direct neighbours
- **Case-ascertainment** with enriched RDTs (Rapid Diagnostic Tests)
- **Ring-radius** between 100 and 500m depending on population density

Photo: Lisa Véran, MSF

MEDECINS SANS FRONTIERES

# Epicentre prospective observational study - Endpoints

- **Reactivity**: Timing of each intervention after primary case presentation
- **Coverage & Adherence**: Survey in 30 households in every ring, around 3 weeks after CATI
- **Effectiveness**: Number of cholera cases reported within rings after CATI
- **(Resources)**

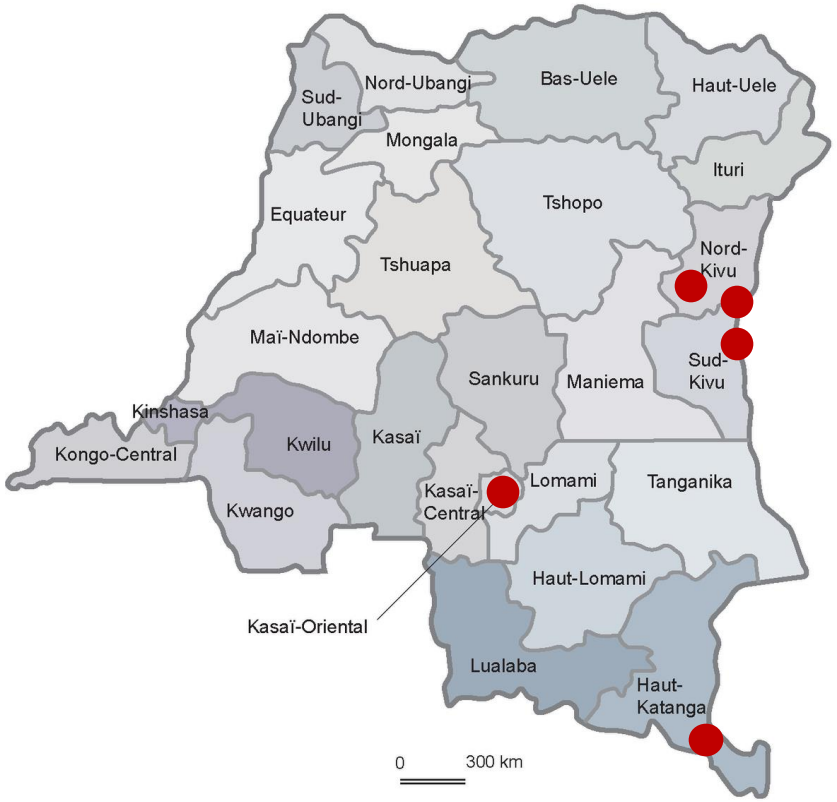
Study protocol approved by the MSF ERB & the CNES of the DRC

Photo: Flavio Finger, Epicentre

# CATI implementation

- April 2022 to April 2023
- 5 sites in 4 provinces of the DRC
- 118 CATI rings completed
- 104 rings included in effectiveness analysis
  - Main exclusion criterion: surveillance not maintained during 30 days after CATI

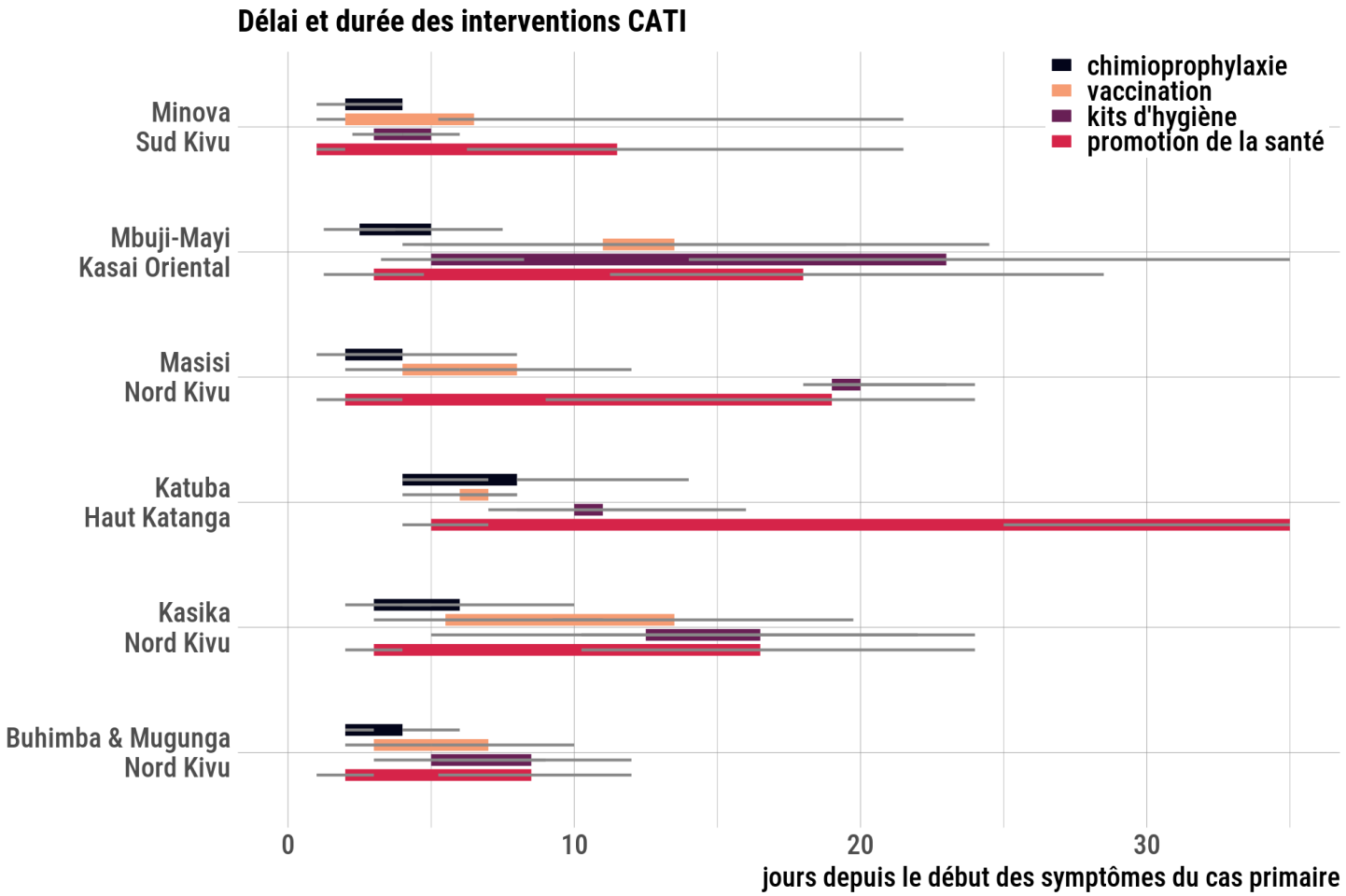
| Ring radius | |
|---|---|
| 100m | 84 (71%) |
| 50m | 34 (29%) |
| Households | 70 (IQR 35, 124) |
| Population | 331 (IQR 151, 566) |



# Reactivity

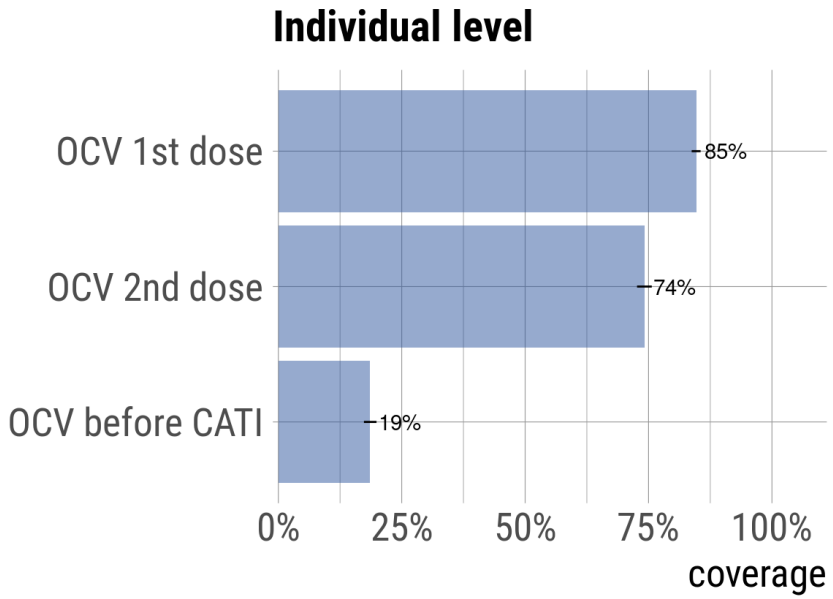
| Characteristic | N = 118[1] |
|---|---|
| Symptoms onset to reporting | 0.00 (0.00, 1.00) |
| Reporting to start of CATI | 2.00 (1.00, 3.00) |
| Reporting to start of Vaccination | 3.0 (2.0, 6.0) |
| Duration of Vaccination | 4.0 (2.0, 6.0) |

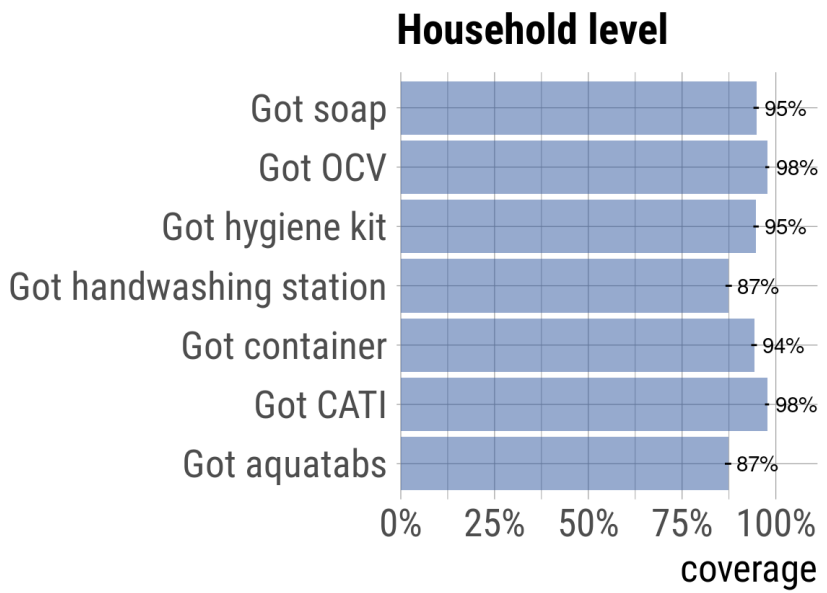
[1] Median (IQR)



# Coverage

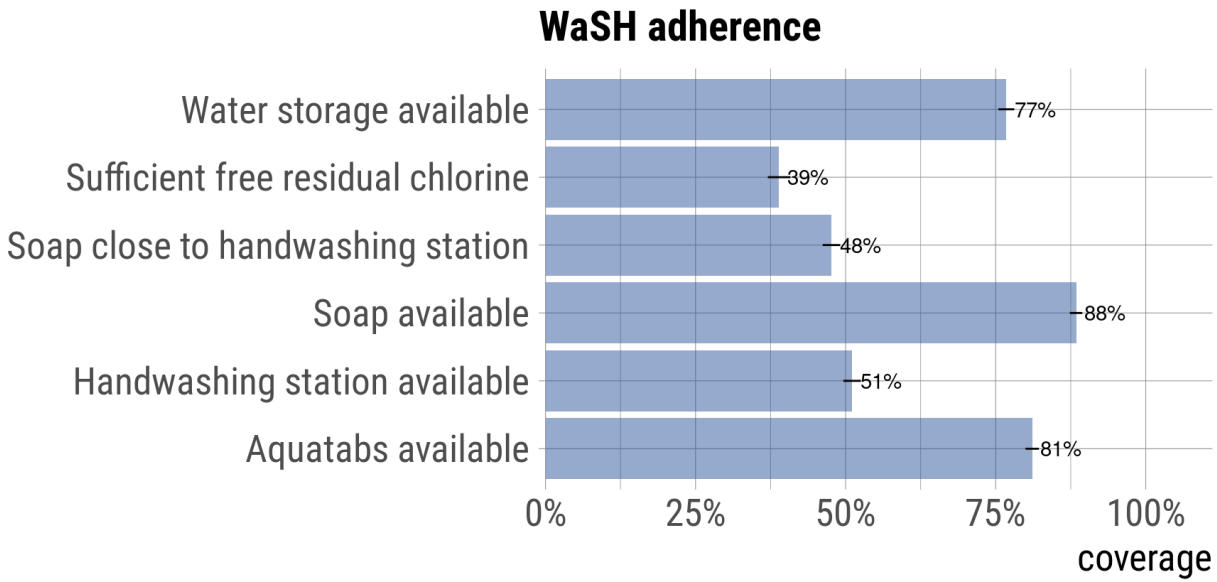
Household survey in 30 randomly selected households in every ring, about 3 weeks after CATI.



# Adherence

Household  survey in 30 randomly selected households in every ring, about 3 weeks after CATI.



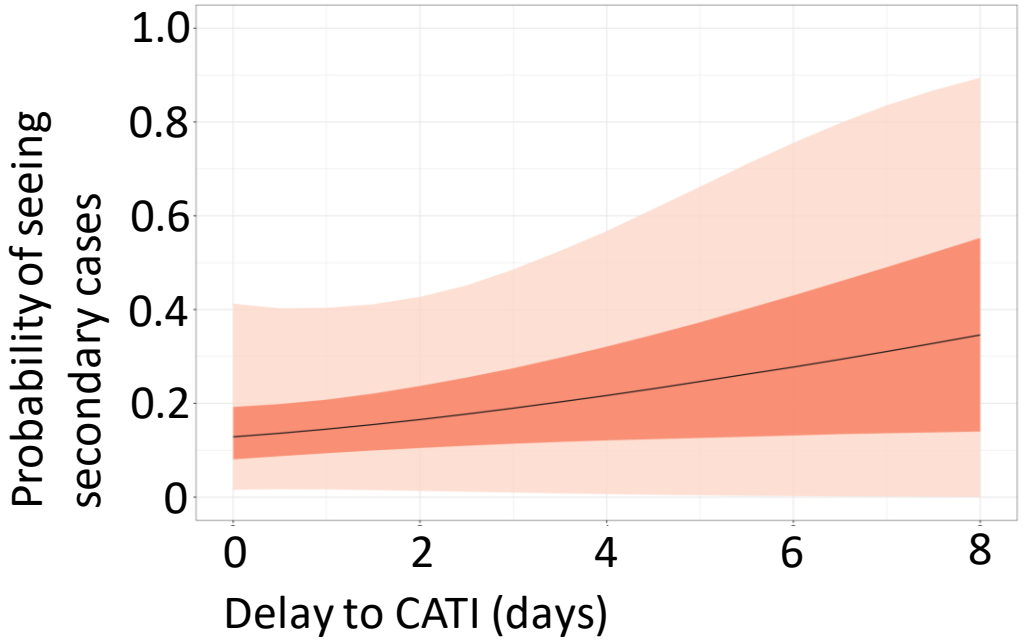
# How we measure effectiveness

- **Hypothesis:** The **shorter the delay** to CATI the **fewer secondary** cases observed in the rings
- **Comparison** between **rings where we were fast** and ones where we were **slow**
- Exposure: **Delay** between **primary case presentation and start of CATI**
- Outcome: **Secondary cases** that are
  - in a CATI ring
  - Reported within 1 to 30 days after primary case presentation
  - Positive to **enriched RDTs**
- Bayesian **multivariate Poisson regression** adjusting for population density, population <5, water and sanitation, receipt of CATI components, adherence (FRC), random effect for study site

# Effectiveness

- **No secondary case** within 30 days in 81 of 104 rings (78%)
- Total of **51** secondary cases, **less than expected**
- Low statistical power

| Delay to CATI | 2 days | 5 days |
|---|---|---|
| Probability of seeing at least one secondary case in a ring | 17.9 % (1.3 - 42.7%) | 26.4 % (0.4 - 66.2%) |
| Number of secondary cases expected per ring | 0.53 (0.027 - 2.01) | 1.33 (0.01 - 4.85) |




**Trend**: the earlier the CATI, the less secondary cases we see

# Study conclusions

- CATI shown to be **feasible**
- **Reactivity:** rapid implementation of CATI possible
  - CATI initiation within 2 days (median)
  - vaccination started within 3 days (median)
  - Heterogeneity between sites
- **Good coverage:** >85% coverage of full package
- **Adherence** is variable and requires more in-depth analysis
- **Less secondary cases than expected**
- **Effectiveness:**
  - Results show that with a delay to CATI between **0 and 5 days** the **number of secondary cases expected is low**
  - Within this range, we show a **trend towards less secondary cases** with a **quicker implementation** of CATI
  - Main limitation is the little variation in delay that we observed

Photo: Lisa Véran, MSF

# Operational learnings

- **When and where** is CATI the most appropriate strategy?
  - Containment at **start or end of outbreaks**
  - May prevent expansion in **highly endemic areas** (year-round cholera transmission), but also consider **preventive mass interventions**
- **Reliant on preparedness:**
  - Requires **operating procedures ready, teams trained** and all necessary **approvals** before outbreak starts
  - Clearly defined **trigger criteria**
  - Functioning **surveillance** is key to reactivity, case definitions and/or RDT
- **Resource** and **labour intensive**
  - Possible **collaborations** with other actors, community health workers
  - **Ring size** is a trade-off between resource need and area covered
  - **Water and sanitation technician on site** can adapt hygiene kit to local conditions
- **Vaccination** is a useful addition to CATI
  - Requires **stock of OCV** in country
  - **Small number of doses** needed (<40K first doses for 118 rings in this study)
  - CATI is a multi-pillar package, **not about vaccination alone**
- **Overall, CATI is an excellent way of quickly providing protection to people most at risk to get infected with cholera**

# Merci!

- Équipe d'étude CATI en RDC, en particulier Nana et Innocent
- Les équipes opérationnelles de MSF en RDC
- Le PNECHOL-MD & et le PEV de la RDC et les autorités provinciaux et locaux
- Les relais communautaires
- Primitive Gakima et Louis-Albert Massing du BALI
- Ruwan Ratnayake, LSHTM
- L'équipe de l'étude Wellcome
- Sophie Meakin d'Epicentre
- Les co-investigateurs d'Epicentre MSF, LSHTM et du MSP