Case-area targeted interventions (CATI) to rapidly contain the spread of cholera: updates from the study in the Democratic Republic of the Congo

GTFCC Research Session

Ruwan Ratnayake², Nana Mimbu¹, Flavio Finger¹
CATI: Case-Area Targeted Interventions

• Highest risk of cholera found within a radius of 50—250m during the first few days after a case presents for care
• Multi-pillar interventions close to cholera cases
• Reactivity as the primary objective of the strategy
• Already done in Haiti, Bangladesh, Yemen, Nigeria, South Sudan, Cameroon (rarely with vaccination)
• Literature indicates that CATIs are feasible and work well
• Particularly interesting strategy at the beginning and end of epidemics to target flare-ups
The MSF & Epicentre CATI project

- MSF CATI strategy was developed by experts in vaccination, WaSH, antibiotic prophylaxis, health promotion and epidemiology
- CATI MSF package:
  - Oral cholera vaccine (OCV): single dose
  - Hygiene kit
  - Health promotion
  - Chemoprophylaxis (primary and adjacent households only)
- Little evidence regarding CATI with vaccination
- Prospective observational study to accompany operations and assess the feasibility and effectiveness of the strategy
- Designed to adapt to the variation in implementation
- Epicentre supported operational teams to collect the data required for the study
  - Number of secondary cases in each ring
  - Coverage within the ring
  - Documentation of resources required
Preliminary Results
Preliminary Results

- Implementation of CATI with vaccination from April 2022 to April 2023
- 118 rings (around primary cases) were covered and included in the study
- **5 sites** in 4 provinces implemented by 4 MSF sections
- To come: consolidation of the final databases and data analysis

<table>
<thead>
<tr>
<th>Number of rings</th>
<th>Country</th>
<th>Province</th>
<th>Rings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buhimba &amp; Mugunga, Nord Kivu</td>
<td></td>
<td></td>
<td>42</td>
</tr>
<tr>
<td>Kasika, Nord Kivu</td>
<td></td>
<td></td>
<td>34</td>
</tr>
<tr>
<td>Katuba, Haut Katanga</td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Masisi, Nord Kivu</td>
<td></td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>Muji-Mayi, Kasai Oriental</td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Minova, Sud Kivu</td>
<td></td>
<td></td>
<td>14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>118</strong></td>
</tr>
</tbody>
</table>
Number of households per ring:

Overall median: 69 households

Administrative vaccination coverage (single dose):

Overall median: 89%
Delay and duration of CATI implementation

- Minova
- Sud Kivu
- Mbuji-Mayi
- Kasai Oriental
- Masisi
- Nord Kivu
- Katuba
- Haut Katanga
- Kasika
- Nord Kivu
- Buhimba & Mugunga
- Nord Kivu

Days since the date of symptom onset of primary care

- Chemoprophylaxis
- Vaccination
- Hygiene kits
- Health promotion
## Secondary cases

<table>
<thead>
<tr>
<th></th>
<th>Mean number of secondary cases</th>
<th>75&lt;sup&gt;th&lt;/sup&gt; percentile of number of secondary cases</th>
<th>Maximum number of secondary cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buhimba &amp; Mugunga Nord Kivu</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Kasika Nord Kivu</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Katuba Haut Katanga</td>
<td>0</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Masisi Nord Kivu</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Muji-Mayi Kasai Oriental</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Minova Sud Kivu</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
</tbody>
</table>

**Secondary case**: RDT positive cholera case enriched within the CATI ring

**Secondary case taken into account for the study**: secondary case with an onset of symptoms between 2 and 30 days after the onset of symptoms in the primary case.
Initial conclusions from preliminary results

• Rapid implementation of CATI possible
  • CATI initiated in 2 days (median)
  • vaccination initiated in 3.5 days (median)
• Administrative coverage of first dose of vaccine 89% (median)
• Wide variation in turnaround times between different sites and rings
• Reflects the diversity of contexts and the different approaches taken by teams
• Overall, more than 75% of rings had no secondary cases
• Analysis of effectiveness and coverage in progress
Operational limits for CATI

- Outbreak of cholera in the Bulengo camp for displaced people in February, in the immediate vicinity of the health areas where MSF was carrying out CATI.
- The number of cases coming to the Buhimba CTU rapidly increased from less than 10 to 140 cases per week.
- Impossible to identify the origin of each patient and to carry out CATI systematically.
- Change to a lighter response.
- What are the criteria for changing strategy?

Figure: projet OCV Impact Wellcome
The continuation of CATI in the DRC

• How will the CATI strategy with vaccination be implemented in the DRC in the future?
  • Which approach? Who will be involved?
  • DRC cholera preparedness and response plan

• Internationally, there is a trend towards the use of CATI in epidemics.
  • For the moment, no recommendations or guidance from GTFCC on the strategy

• Will there be a stockpile of vaccines dedicated to the strategy? Consider:
  • CATI uses few vaccines per population
  • CATI can rapidly reach populations most at risk
  • Way to address current cholera vaccine shortage
Merci!

- CATI study team in the DRC
- The DRC's PNECHOL-MD & EPI and provincial and local authorities
- MSF operational teams in the DRC
- Community health volunteers
- Primitive Gakima and Louis-Albert Massing from BALI
- The Wellcome study team
- EpicentreMSF, LSHTM and MSP co-investigators
More information

The Effectiveness of case-area targeted interventions with vaccination on controlling epidemic cholera: protocol for a prospective observational study.
BMJ Open, 2022

Inference is bliss: Simulation for power estimation for an observational study of a cholera outbreak intervention.
PLOS Neglected Tropical Diseases. 2022

Highly targeted spatiotemporal interventions against cholera epidemics, 2000-19: a scoping review.
THE LANCET Infectious Diseases, 2021