Mass vaccination with oral cholera vaccines in response to an outbreak in Guinea

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Cholera prevention and control

• Provision of safe water and proper sanitation are the long-term solution for cholera control

• Burden of cholera increasing with large-scale outbreaks in the past years (Haiti and Zimbabwe)

• Two safe and effective oral cholera vaccines (OCV) are currently prequalified by the WHO

• WHO has discouraged the used of OCV as reactive tools, but changed this recommendation in 2010
Background

• First time a reactive campaign with an OCV is conducted in Africa

• First time that Shanchol® is used in Africa
Cholera in Guinea

Regularly big epidemics (2003-2008), high CFR, no cases since 2009

AR highest in Maritime districts

Epidemics start off from the islands in Forecariah / Boffa prefectures

Seasonal pattern - peak follows rainy season peak (start in June/July)
Cholera in Guinea: 2012

RAINY SEASON
Decision making process

- Early in the season
- No major outbreak since 2007
- Large epidemic on-going in Sierra Leone (over 2000 cases in March)
- MSF intervention in both affected areas: standard package cholera intervention (case mng + prevention)
Looking at:

• Feasibility

• Vaccine coverage and acceptability

• Vaccine effectiveness
Getting started: target population

• All persons > 1 year presenting at vaccination sites

• Boffa: 163’086

• (Forecariah: 46’008)
Getting started: vaccines
Getting started: water
Getting started: documentation

Vaccination cards

Tally sheets

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Getting started: strategy – village by village

Boffa: 31 teams x 9 members
5-6 days per round
3 bases

Forecariah: 12 teams x 5 members
6 days per round
1 base
Getting started: sensitization

- Information via authorities 1 week before
- Communities: 2 days before vaccination day via crieur public & chefs de villages
- Health education – big number of messages!
- Addition of other preventive tools to vaccination (soap, sur’eau)
Campaign summary

- 316,250 vaccines delivered
- Side effects: 46 minor side effects (mainly diarrhoea and vomiting)
- Utilisation rate: 99%
- Average nb of people vaccinated per team per day: 728 (102-1830)
- Cost per dose delivered: 2.85 USD (excluding fixed costs)
Vaccine coverage and acceptability

• Household survey using cluster based sampling in Boffa and Forecariah

• Sample size:
  – 776 households (60 clusters of 13 households) in Boffa
  – 180 households (30 clusters of 6 households) in Forecariah

• Starting points: PPS with enumeration of households and GPS
Vaccine coverage by site*

<table>
<thead>
<tr>
<th></th>
<th>Boffa</th>
<th>Forecariah</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least one dose</td>
<td>93.3% [91.1-95.0%]</td>
<td>94.9% [91.8-96.9%]</td>
</tr>
<tr>
<td>Fully vaccinated</td>
<td>75.8% [71.2-79.9%]</td>
<td>75.9% [69.8-80.9%]</td>
</tr>
<tr>
<td>Dropout rate</td>
<td>15.2% [12.2-18.7%]</td>
<td>13.6% [9.7-18.7%]</td>
</tr>
</tbody>
</table>

* Card (~75%) and oral reporting
Acceptability

- 4% considered that the vaccine made them feel sick

- Most participants reported that the taste of the vaccine was bad (78%)

- 99% reported that they would be vaccinated again in a future cholera vaccination campaign
Vaccine effectiveness

• Density case-control study

• Main exposure: vaccination status

• Case definition: acute watery diarrhea + positive result to RDT (sub-analysis including only culture or PCR confirmed cases)

• Low number of cases in vaccinated areas: probably due to herd protection (40 cases recruited, mainly in Koba)
Crude vaccine effectiveness estimates per protocol

<table>
<thead>
<tr>
<th>Vaccination status</th>
<th>control</th>
<th>case</th>
<th>VE*</th>
<th>95%CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>N</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unvaccinated</td>
<td>24</td>
<td>15</td>
<td>Ref</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incomple dose**</td>
<td>39</td>
<td>14</td>
<td>38.9%</td>
<td>(-55.2% 76.0%)</td>
<td>0.300</td>
</tr>
<tr>
<td>Full course (two doses)</td>
<td>104</td>
<td>11</td>
<td>84.0%</td>
<td>(59.7% 93.6%)</td>
<td>0.000</td>
</tr>
<tr>
<td>Total</td>
<td>167</td>
<td>40</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

* VE: crude vaccine effectiveness estimates, calculated as 1-odds ratio.
** Incomple course: this category represents those individuals taking only one dose or and incomplete dose in the two doses regimen

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Adjusted estimates & restricted analysis

• Estimate remain stable in the adjusted analysis:
  – 86.0% (IC95% 95.7-54.1)*

• The vaccine effectiveness in the restricted analysis to culture or PRC confirmed cases was:
  – 91.6% (IC95%: 98.3-58.6)

* Adjusted by: number of individuals living in the household, treatment of water before consumption, sharing the latrine with a cholera case and having a mobile phone
Epidemic evolution

A. Reported cholera cases, Boffa and Forecariah districts, Guinea, 2012.

- Forecariah: 344 cases / 29 deaths (CFR 8.4%)
- Boffa: 281 cases / 11 deaths (CFR 3.9%)

B. Reported cholera cases, Guinea, 2012.

- Guinea: 7223 cases / 128 deaths (CFR 1.8%)

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Conclusion

- Reactive vaccination campaigns are feasible and high coverage can be reached even in rural areas with mobile populations.

- The vaccine was very well accepted by the population in an epidemic setting.

- The vaccine was efficacious to protect the population.

- Vaccination can complement the standard outbreak response, a stockpile is being created.
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