Challenges of use of cholera vaccines in Haiti and the Americas

Dr. Cuauhtémoc Ruiz Matus
Comprehensive Family Immunization Program
Topics

• Background
• Consultations at PAHO
• Challenges
  – Decision-making steps on vaccination in epidemic settings
  – Vaccine availability
  – Cost-opportunity of cholera vaccines versus other new vaccines
• Conclusions
Coverage with measles-containing vaccines
The Americas and Haiti, 1980–2009

Source: Country reports
Epidemic curve of cholera outbreak
Haiti, October 2010–March 2011 *

* As of 22 March 2011

Reported cholera cases

N = 228,786

11 weeks

Epidemiologic week starting on

17-Oct
24-Oct
31-Oct
7-Nov
14-Nov
21-Nov
28-Nov
5-Dec
12-Dec
19-Dec
26-Dec
2-Jan
9-Jan
16-Jan
23-Jan
30-Jan
6-Feb
13-Feb
20-Feb
27-Feb
6-Mar
13-Mar
PAHO position on cholera vaccination in Haiti, 27 October 2010

• Based on 2010 WHO position statement and related references
• Main conclusions
  – Vaccination preventive measure additional to sanitation
  – Not recommended in Haiti as emergency response
  – Not recommended either for health care workers, responders and travelers
• Vaccine availability not considered since contrasting information existed
PAHO consultation on cholera vaccination in the Hispaniola Island, 17 December 2010

• Two dozens of experts on cholera, immunization and/or epidemiology

• Three main conclusions
  – Cholera in Haiti is a potential risk for whole Region
  – Demonstration project would be best use of 250,000 available doses
  – Global increase in vaccine availability necessary
Meeting of partners interested in improving immunization services in Haiti, 8–9 March 2012

- Partners included Haiti’s MOH, PAHO, UNICEF, governmental agencies and non-governmental/ funding organizations
- Reviewed strategies to strengthen the routine EPI nationwide and to maintain Haiti free of polio, measles and rubella
- Commented on multi-year plan
  - To be submitted for GAVI funding
  - Provides for staggered introduction of pentavalent, PCV and rotavirus vaccines
- Cholera vaccination mentioned but not discussed
Main challenges

1. Apparent decrease in strength of vaccination recommendation from endemic to epidemic scenarios; unclear steps for decision-making

2. Available vaccine only sufficient for <120,000 people, thus possible cause for inequities

3. Perception that greater priorities exist, whether for routine vaccination or in new vaccine introduction
Global availability of oral cholera vaccine
March 2011–March 2012 *

Total: 3,850,000 doses

* As per information communicated to PAHO by end of January 2011
How large should a oral cholera vaccine stockpile be?

a) 3 million doses
b) 10 million doses
c) 30 million doses

**Hint:** Haiti and the Dominican Republic have each over 10 million inhabitants

**Reminder:** “Pre-emptive or reactive vaccination should cover as many people as possible who are eligible to receive the vaccine and should be conducted as quickly as possible” (2010 WHO position statement)

**Cave:** current maximal global production capacity capped at 5 million doses per year

Pan American Health Organization

Comprehensive Family Immunization Project
### Estimated burden of selected vaccine-preventable diseases, Haiti

<table>
<thead>
<tr>
<th>Cause</th>
<th>Severe illness</th>
<th>Deaths</th>
<th>Source; observations</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Haemophilus influenzae</em> type b</td>
<td>14,826</td>
<td>1,226</td>
<td>WHO/IVB, 2007; children aged 1–59 months</td>
</tr>
<tr>
<td><em>Streptococcus pneumoniae</em></td>
<td>26,516</td>
<td>2,444</td>
<td>Ditto</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>67,904</td>
<td>679</td>
<td>PAHO ProVac model; children aged ≤24 months, 13,330 severe illnesses per 100.000 children, lethality 1.0%</td>
</tr>
<tr>
<td><em>Vibrio cholerae</em></td>
<td>10,082</td>
<td>181</td>
<td>Preliminary data for illustrative purpose; children aged 2–5 years, 10 illnesses per 100.000 children, lethality 1.8%</td>
</tr>
</tbody>
</table>
Conclusions

• Weak recommendation for pre-emptive and even more so for reactive vaccination possibly reflecting greater doubts in feasibility

• Very limited vaccine available on short term
  – From offset, limited impact even in presence of “herd protection”
  – Yet, call for vaccine stockpile ought to consider stockpile required size and related cost-opportunity implications

• In lesser developed countries, other new vaccines may offer greater cost-effectiveness
  – Need to contextualize and set long-term priorities
Thank you
### Estimated impact of vaccines new

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Deaths averted</th>
<th>per averted death (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(DPT-Hib-HepB)</td>
<td>3,271</td>
<td>2,106</td>
</tr>
<tr>
<td>PCV13</td>
<td>7,338</td>
<td>2,661</td>
</tr>
<tr>
<td>Rotavirus vaccine</td>
<td>2,397</td>
<td>2,388</td>
</tr>
<tr>
<td>Oral cholera vaccine</td>
<td>769</td>
<td>11,677</td>
</tr>
</tbody>
</table>

Trivac model; preliminary results for OCV on Dukoral (85% vaccine effectiveness, 3 doses, 10% wastage, US$ 2.7 per dose)