Cholera Surveillance in Bangladesh

Dr. Ashraful Islam Khan
Scientist, Infectious Diseases Division
icddr,b
Bangladesh Scenario

- Diarrhoeal diseases; number one among all hospitalized cases (14.63%)
- Cholera is highly under reported, due to –
  - Lack of surveillance and laboratory diagnostic capacity and also due to fear of travel and trade embargos
- icdrr,b has been carrying out systematic laboratory based cholera surveillance since 1979
- Cholera in Bangladesh-
  - Population at risk- 66,495,209
  - Incidence rate- 1.64/1,000 cases
  - Estimated Annual cases & deaths - 109,052 & 3,272
  - 2% systematic surveillance at icdrr,b hospital shows ~20% of all patients are culture confirmed cholera case
- Bangladesh is one of the 20 countries targeting for cholera elimination as per the “Ending Cholera- A Global Roadmap to 2030”
Nationwide cholera surveillance in Bangladesh

The hospital-based enteric disease surveillance was initiated from May, 2014 in 10 hospitals with the collaboration of Institute of Epidemiology, Disease Control and Research (IEDCR; GoB) and icddr,b.

The surveillance was further extended to 12 more health facilities to have representative data covering hotspots spanning different geographical areas in Bangladesh.

**Objective of cholera surveillance in Bangladesh:**

- Develop a laboratory based surveillance to report culture confirmed cholera cases
- Describe the co-morbidities and health service use among the people
- Identify disease burden in Bangladesh
- Develop and scaling up of a nationwide surveillance system for cholera at different levels of health facilities (from Upazilla to district and tertiary levels)
Surveillance sites in Bangladesh

The health facilities included 6 sub-district hospitals, 13 district hospitals, 2 tertiary level hospitals and one institute

<table>
<thead>
<tr>
<th>Sites: started on 2014</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DMCH, Dhaka</td>
<td>Patuakhali</td>
</tr>
<tr>
<td>Uttara Adhunik MCH, Dhaka</td>
<td>Satkhira</td>
</tr>
<tr>
<td>BITID, Chittagong</td>
<td>Naogaon</td>
</tr>
<tr>
<td>Narshingdi</td>
<td>Habiganj</td>
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<tr>
<td>Cox’s Bazar</td>
<td>Thakurgaon</td>
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</table>

<table>
<thead>
<tr>
<th>Sites started on 2016</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Madan, Netrokona</td>
<td>Narayanganj</td>
</tr>
<tr>
<td>Bakerganj, Barisal</td>
<td>Meherpur</td>
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<tr>
<td>Mathbaria, Pirojpur</td>
<td>Kushitia</td>
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<tr>
<td>Chaugacha, Jessore</td>
<td>Tangail</td>
</tr>
<tr>
<td>Shibganj, Chapai Nawabganj</td>
<td>Chuadanga</td>
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<tr>
<td>Chatok, Sunamganj</td>
<td>Comilla</td>
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</tbody>
</table>
Surveillance methodology

Case Definition: Any patient attending hospital with -

1. 3 or more loose or liquid stools within 24 hours or
2. less than 3 loose/liquid stools causing dehydration
3. Preferably rice watery stool

Age group: <5 years= 2 samples & > 5 years= 2 samples (4 samples per day)

Sample Collection: 4×5= 20 stool samples per week (Saturday- Wednesday)

Surveillance team at each site
- Surveillance Physician (SP)- GoB
- Surveillance Nurse (SN)-GoB
- Medical Technologist (Lab)- GoB
- Trained Field Attendant (TFA)- from study
Surveillance process

• Line list of all cases in the “Diarrhoea Case Register” at the indoor, outdoor, ORT corner and emergency areas
• Confirm 4 cases/day as per case definition
• Informed written consent for data & bio-sample (Stool sample/Rectal swab) collection
• Record in Case Report Form (CRF)
• Collection of stool sample and perform Rapid Diagnostic Test (RDT)
• Sample transportation twice a months to central lab (IEDCR & icddr,b labs in Dhaka)
Results of the surveillance

• We listed a total of 210,679 AWD cases within our surveillance network.
• A total of 26,221 AWD patients were enrolled in the study.

• We detected *V. cholerae* O1 in the stool of 6.2% (1604)
• Most of the *V. cholerae* samples isolated (70.4%) were of the Inaba serotype.

• Between 2014-2018, both Inaba and Ogawa serotypes were observed, but serotype Ogawa predominated from 2014-15. During 2016-2017, the serotype profile of *V. cholerae* O1 switched; Inaba almost replaced the Ogawa serotype.

• In 2018, the serotype shifted back from Inaba to Ogawa again, and 45.8% of the serotypes were identified as Ogawa.
Site wise burden of cholera

• The proportion of cholera positive diarrhea cases ranged widely each year by study site (1.1 to 18.3%)
  – The Cox’s Bazar (8.4%),
  – Narayanganj (13.9%)
  – BITID (18.3%) in Chittagong Division
• Divisions of Sylhet, Rajshahi, Khulna, and Rangpur ranged between 1.1 and 4.9% cholera positivity.
Demographic distribution of cholera cases

Sixteen percent of cholera cases were below five years of age, and 73% were ≥18 years of age. Fifty-three percent of cholera cases were male.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Overall</th>
<th>Dhaka</th>
<th>Chittagong</th>
<th>Barisal</th>
<th>Sylhet</th>
<th>Khulna</th>
<th>Rajshahi,</th>
<th>Rangpur</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n(%)</td>
<td>N=1604</td>
<td>n(%)</td>
<td>N=572</td>
<td>n(%)</td>
<td>n(%)</td>
<td>n(%)</td>
<td>n(%)</td>
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<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>&lt;5</td>
<td>253 (15.8)</td>
<td>48 (11.9)</td>
<td>63 (11.0)</td>
<td>40 (22.1)</td>
<td>37 (27.8)</td>
<td>35 (17.5)</td>
<td>15 (15.9)</td>
<td>15 (78.9)</td>
</tr>
<tr>
<td>5-17</td>
<td>181 (11.3)</td>
<td>48 (11.8)</td>
<td>70 (12.2)</td>
<td>19 (10.5)</td>
<td>20 (15.0)</td>
<td>17 (8.5)</td>
<td>7 (7.5)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>18-45</td>
<td>910 (56.7)</td>
<td>237 (58.5)</td>
<td>346 (60.5)</td>
<td>94 (51.9)</td>
<td>61 (45.9)</td>
<td>117 (58.5)</td>
<td>52 (55.3)</td>
<td>3 (15.8)</td>
</tr>
<tr>
<td>&gt;46</td>
<td>260 (16.3)</td>
<td>72 (17.8)</td>
<td>93 (16.3)</td>
<td>28 (15.5)</td>
<td>15 (11.3)</td>
<td>31 (15.5)</td>
<td>20 (21.3)</td>
<td>1 (5.3)</td>
</tr>
<tr>
<td>Sex (Male)</td>
<td>853 (53.2)</td>
<td>227 (55.9)</td>
<td>295 (51.6)</td>
<td>84 (46.4)</td>
<td>71 (53.4)</td>
<td>105 (52.5)</td>
<td>58 (61.7)</td>
<td>13 (68.4)</td>
</tr>
</tbody>
</table>

The overall age distribution of cholera cases (except under 5 age category) matched that of the Bangladesh population.
A biannual cholera peak was present across all sites in the pre-monsoon season (Apr–May–Jun) and post-monsoon season (Sep–Oct). In the NW and SW regions of Bangladesh, we see higher cholera positivity during the post-monsoon seasonal peak while in the NE and SE regions the pre-monsoon seasonal peak predominates.
Combining National AWD Data and Sentinel Surveillance Data to Estimate National Burden

National acute watery diarrhea surveillance from Bangladesh MOH

Predicted Pr(Cholera + | AWD) using national sentinel surveillance from 22 hospital sites

Implied annual cholera incidence

Note: Preliminary Estimates
Defining Geographic Risk Categories

Note: Preliminary Estimates
Summary and recommendation

- Nationwide hospital-based surveillance showed the presence of cholera in all geographical regions in Bangladesh.
- At least eight geographical areas where cholera burden was consistently higher over the reporting period.
- Dhaka remains as one of the high cholera burden area (icddr,b, 2% systematic surveillance).
- Surveillance may need to be extended to those areas.

- The best long-term public health control strategies: Comprehensive multi-sectoral approaches using both vaccination and appropriate water and sanitation interventions.

- National cholera control plan for Bangladesh has finalized and is moving forward.
This project has been funded

BMGF
Government of Bangladesh

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