Cholera surveillance in Bangladesh and how it informs the NCP

Dr. Ashraful Islam Khan
Scientist
icddr,b

Introduction

- Bangladesh is historically known as a cholera-endemic region where the first cholera case was reported in Jessore in 1817
- Bangladesh experiences biannual outbreaks with additional epidemics seen during times of floods, cyclones, or any natural disaster
- Any upsurge or an outbreak can be detected earlier than the anticipated time through a rapid diagnostic test
- This surveillance provides robust data for OCV prioritization
- The cholera sentinel surveillance system in Bangladesh is the only data source available to monitor progress towards national cholera control plan by 2030

Objectives of the nationwide surveillance

1. Conduct systematic clinical surveillance for cholera at sentinel sites serving the target population of areas targeted for interventions within the NCCP and areas with limited surveillance thought to be at high risk.

2. Work with DGHS to develop a national strategy for RDT use to expand routine cholera surveillance beyond sentinel sites, including for use in outbreak responses in Bangladesh

3. Use the information to inform GoB for prioritization of OCV use for prevention of cholera in sentinel sites as well as in outbreak areas

Study area map

The surveillance was started in 2014 with 10 sentinel sites

In 2016, the number of sites increased with 22

Due to funding constraints sites again reduced to 16 from 2022

During this current period, four out of 16 sites are considered as enhanced sites; and 12 standard sites

Bangladesh was arbitrarily divided into four geographical zone Four enhanced sites were selected from those four zones (one from each)

Nationwide cholera surveillance approaches

Standard surveillance: (20 samples/site/week)- Total 12 sites

- Everyday our assigned staff collect 1st 4 samples 5 days a week (Sat- Wednesday).
- All the samples undergone a rapid diagnostic test (Cholkit) on the site.
- All stool samples are spotted on Whatman filter paper for PCR.
- For microbiological culture, a systematic 20% (every 5th sample/site) of the specimens are tested.

Enhance surveillance: Total 4 sites

- All the possible samples are collected.
- All the samples undergone a rapid diagnostic test on the site.
- All RDT positive samples are blotted on Whatman filter paper for PCR
- Every 5th RDT positive and RDT negative stool sample are preserved in Cary-Blair transport media for culture

Integration of WASH in nationwide surveillance

- Using rapid test results, we're quickly providing WASH kits and health education materials to cholera-affected families to prevent the transmission

- The WASH kit included chlorine tablets (*Aquatabs-sodium dichloroisocyanurate*), detergent and soapy water container for a family for 30 days

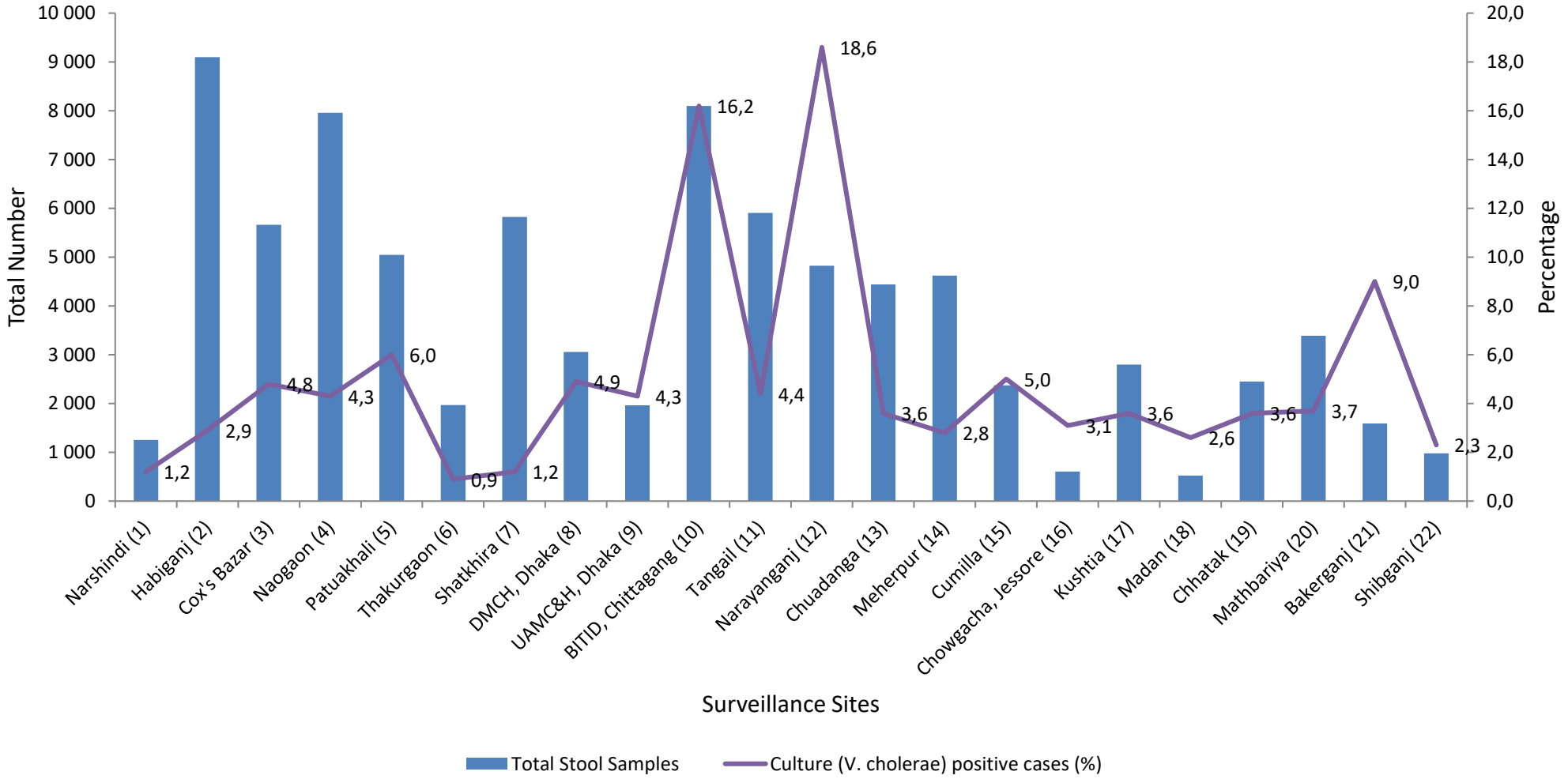
Results

- Overall isolation of *Vibrio cholerae* O1 was 6% among the suspected cases
- The rate of confirmed cases of cholera is higher in Chittagong, Barisal, and Dhaka
- The Rangpur region had the smallest percentage of the cholera cases

Division wise cholera positivity proportion

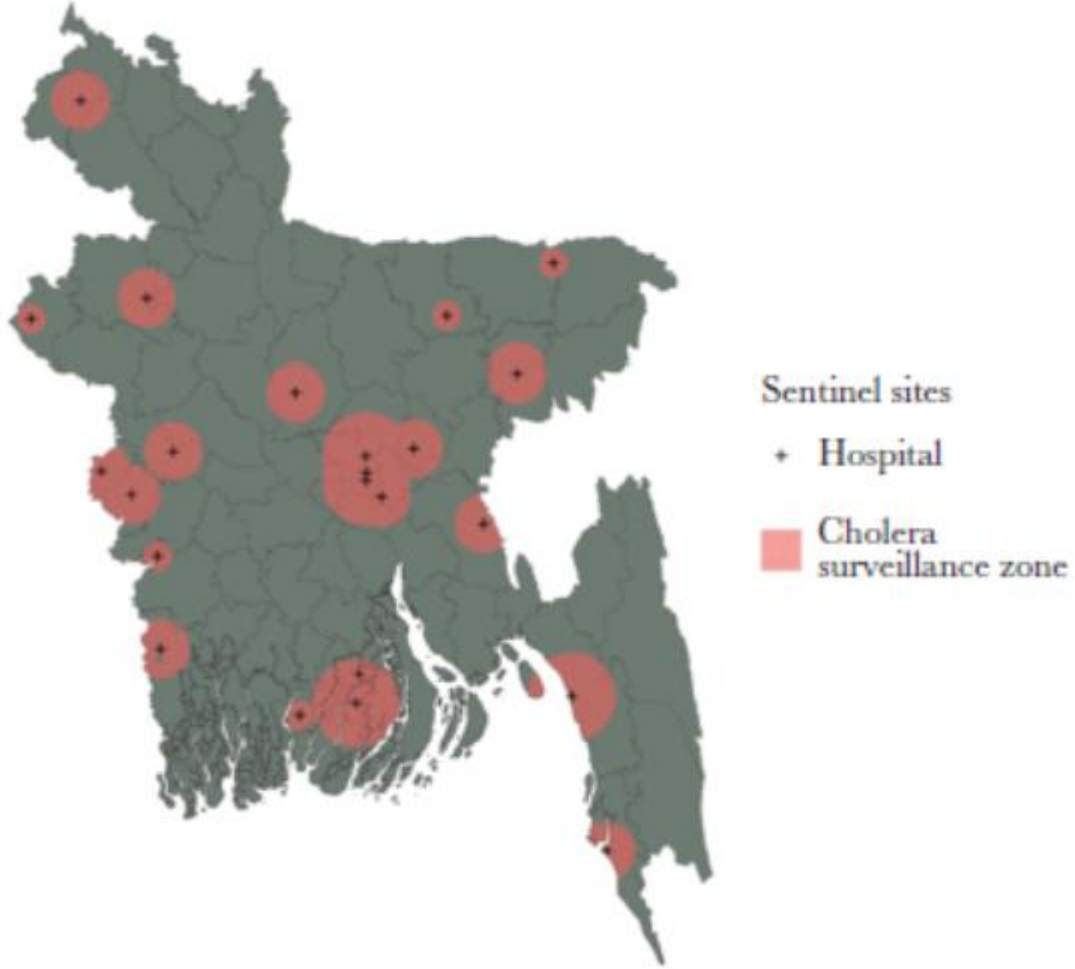
Division	Proportion of AWD that are cholera + (%)	Division average cholera positivity (%)
Chittagong	5.3	9.1
	16.7	
	5.4	
Barisal	5.5	6.9
	4.1	
	11.2	
Dhaka	2.3	5.5
	3.4	
	3.5	
	4.2	
	14	
Sylhet	3.7	3.7
	3.6	
Rajshahi	3.9	3.1
	2.3	
Khulna	1.3	2.9
	4.1	
	2.3	
	3.1	
	3.6	
Mymensingh	2.7	2.7
Rangpur	0.9	0.9

Site wise distribution of culture confirmed cholera cases in Bangladesh



A map of the cholera surveillance zone in Bangladesh.

- We estimated 69% people (111.7 million) in Bangladesh live in surveillance “greyspots”, the geographic area outside of the cholera surveillance zone
- Also in greyspots where 23% of these individuals (25.5 million people) live in areas with extremely high risk of cholera infection



Populations living in the coral pink areas are inside the cholera surveillance zone. The gray areas are places where we have little information on clinical cases of cholera because they are not captured by the national cholera surveillance system in Bangladesh.

Use the surveillance network in the outbreak investigation

- Through the surveillance network, any upsurge in AWD cases is notified from the sentinel sites
- A team is also working to review the news portals to notify of any increase in caseloads in the country
- Immediately after notification the IEDCR-DGHS team arrange an outbreak investigation
- The icddr,b team works in collaboration with IEDCR for the outbreak investigation
- In the recent past outbreak investigation was carried out in Chattogram, Jessore, Cumilla Patuakhali

Use of nationwide cholera surveillance data in national cholera control plan

Nationwide surveillance data are the backbone of effective cholera control planning

- Surveillance data inform evidence-based strategies for cholera prevention and control
- Trends, hotspots, and risk factors guide targeted interventions
- Surveillance identifies vulnerable populations for OCV deployment
- Surveillance detects outbreaks early
- Rapid response minimizes transmission and monitoring the effectiveness of preventive measures
- NCCP integrates efforts for holistic cholera control

National Cholera Control Plan (NCCP) 2019-2030

Goal

Reduction of cholera morbidity & mortality by 90% within 2030

Targets for cholera reduction

Short Term: 25% reduction by 2021

Mid Term: 50% reduction by 2025

Long Term: 90% reduction by 2030

Budget

		US$ billion
OCV		**0.43**
WaSH	Water: $0.68 bn Sanitation: $1.35 bn Hygiene promotion: $1.1 bn	**3.13**
Surveillance		**0.02**
	Total	**3.58**

Key Interventions

1. Strengthening surveillance
2. Treatment of cholera cases;
3. OCV campaigns;
4. WaSH promotion;
5. Coordination & leadership; &
6. Social mobilization.

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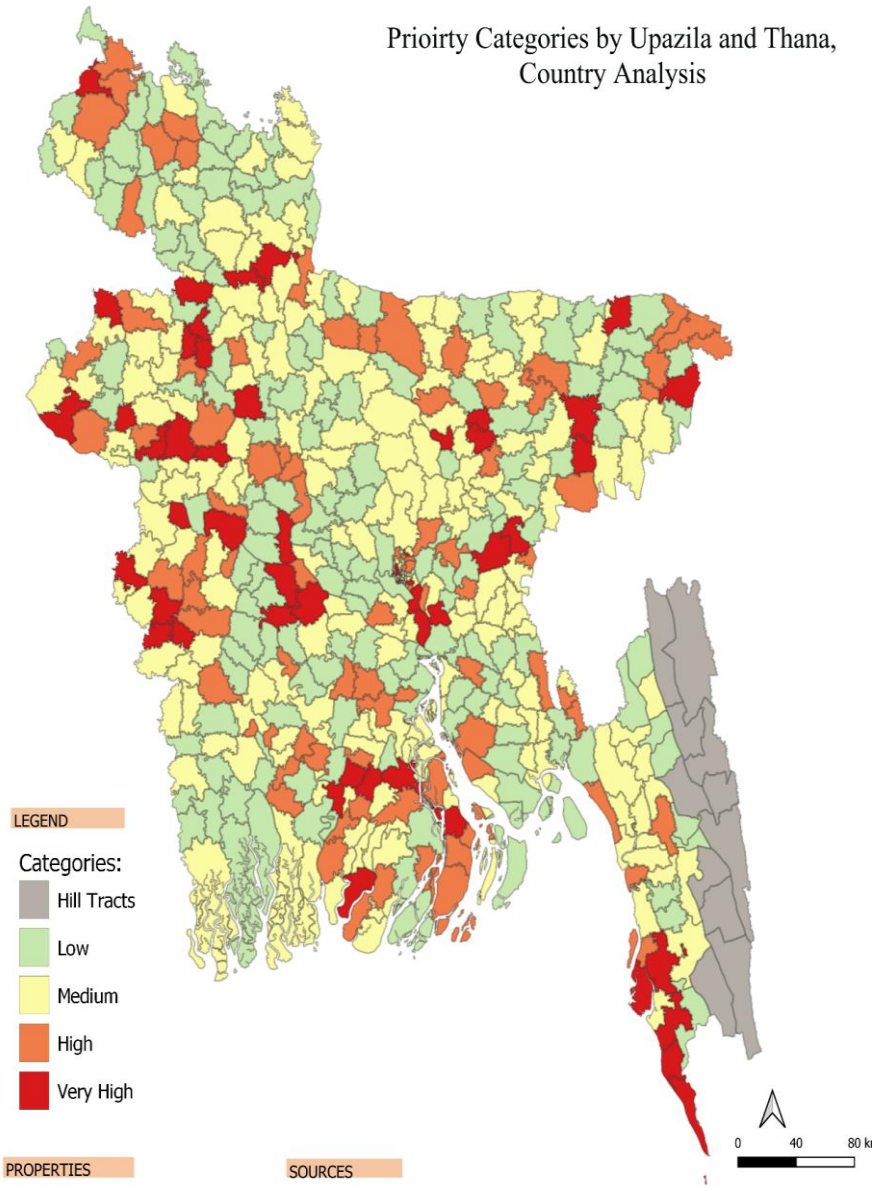
Use of nationwide cholera surveillance data to develop a multiyear plan of action

- For the multiyear plan of action, the initial step was to identify the priority areas for multisectoral intervention (PAMI)
- The nationwide surveillance data was the only source of culture-confirmed cholera that was used to prepare the PAMI
- Utilizing this data on a geographical map was prepared to categorize data at local levels
- This approach pinpoints high-risk zones, allowing precise prioritization of interventions by various partners and stakeholders

PAMI RESULTS (BANGLADESH)

The table of shows key parameters, stratified by priority category, Bangladesh

Categories	Units*	Rel. % of the units	Cumulative % of units	Est. Population	Rel. % of the population	Cumulative % of population	Diarrhea Cases**	Cumulative % of the cases
Very High	53	10.1	10.1	18,443,471	11.2	11.2	432,279	25.3
High	91	17.3	27.4	27,761,695	16.9	28.1	410,352	49.3
Hill Tracts	11	2.1	29.5	729,360	0.4	28.6	6,822	49.7
Medium	192	36.6	66.1	63,663,380	38.8	67.3	637,570	87.1
Low	178	33.9	100.0	53,642,452	32.7	100.0	220,974	100.0
Total	**525**	**100**		**164,240,358**	**100**		**1,707,997**	



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Conclusion and way forward

- Upsurge of diarrheal cases was observed in many new areas that are not under sentinel sites
- Limited sentinel sites, which may not fully reflect the diversity of cholera epidemiology.
- Additional sites ensure better geographical coverage, enhancing understanding of the diversity of cholera epidemiology within the country
- Bangladesh has developed RDT testing protocol to enhance use of RDTs and will apply for RDT kit to Gavi in the next window
- Increasing surveillance sites will help early detection of cholera cases, enabling prompt response and containment measures

A cholera surveillance system with widespread geographical coverage is necessary to target interventions to the highest burden areas and monitor progress from endemic transmission to elimination.

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