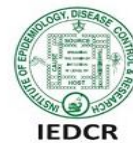




Cholera Surveillance in Bangladesh



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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
- icddr,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 icddr,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

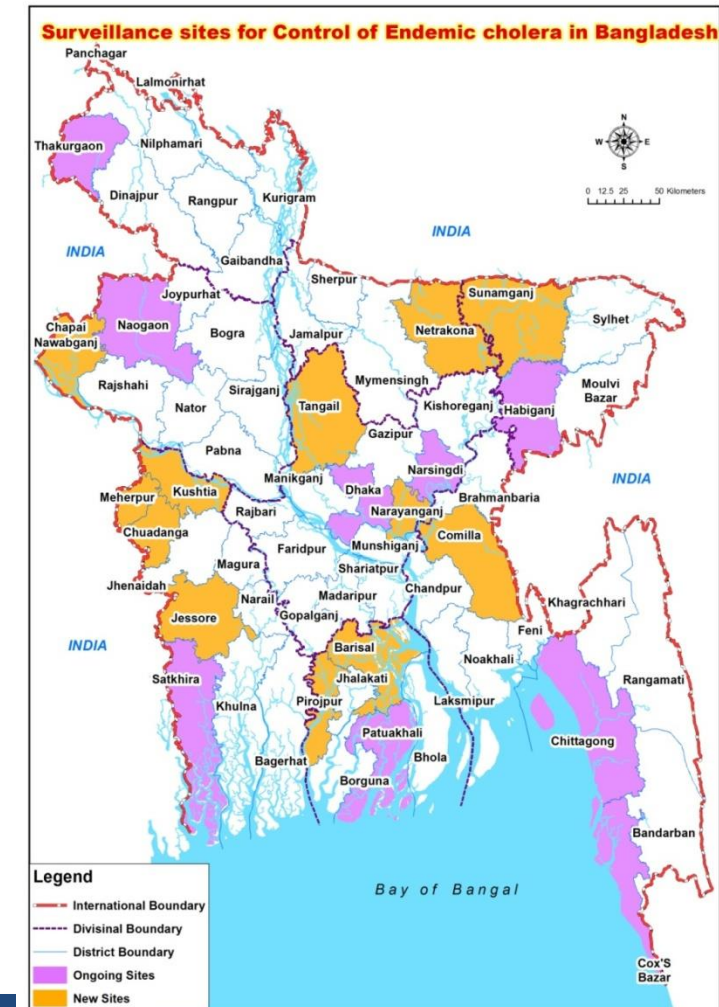
Develop and scaling up of a nationwide surveillance system for cholera at different levels of health facilities (from Upazilla to district and tertiary levels)

Surveillance sites in Bangladesh

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

Sites: started on 2014	
DMCH, Dhaka	Patuakhali
Uttara Adhunik MCH, Dhaka	Satkhira
BITID, Chittagong	Naogaon
Narshingdi	Habiganj
Cox's Bazar	Thakurgaon

Sites started on 2016	
Upazila	District
Madan, Netrokona	Narayanganj
Bakerganj, Barisal	Meherpur
Mathbaria, Pirojpur	Kushtia
Chaugacha, Jessore	Tangail
Shibganj, Chapai Nawabganj	Chuadanga
Chatok, Sunamganj	Comilla



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

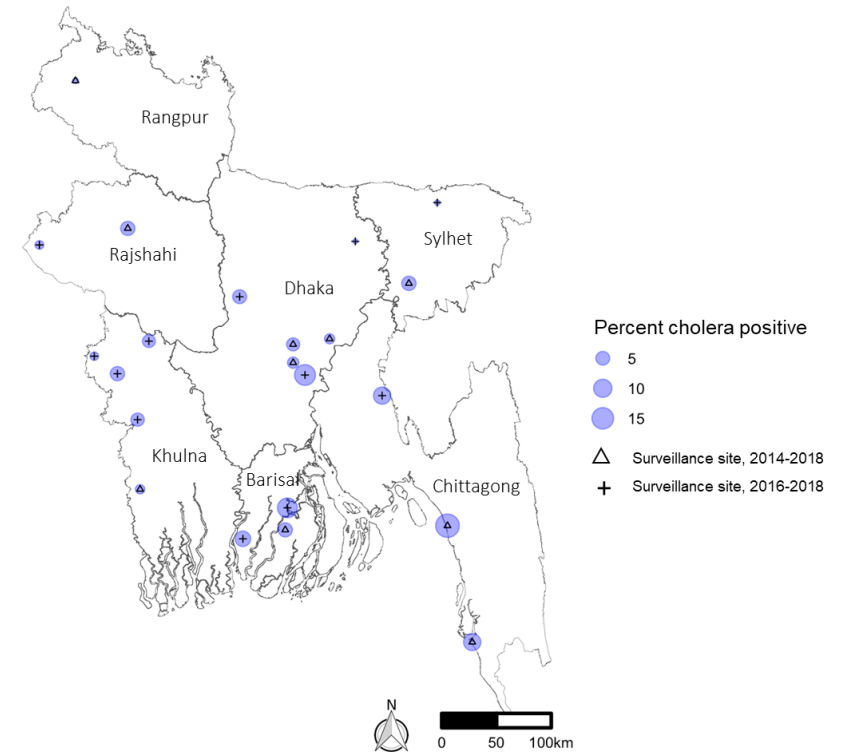
- Line list of all cases in the “ Diarrhoea Case Register” at the indoor, outdoor, ORT corner and emergency areas
- Confirm 4 cases/day as per case definition
- Informed written consent for data & bio-sample (Stool sample/ Rectal swab) collection
- Record in Case Report Form (CRF)
- Collection of stool 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

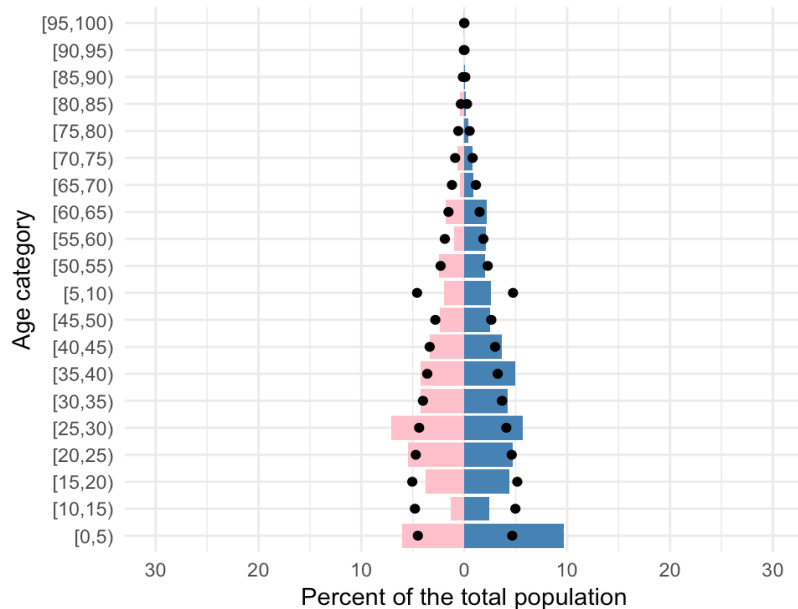
- The proportion of cholera positive diarrhea cases ranged widely each year by study site (1.1 to 18.3%)
 - The Cox's Bazar (8.4%),
 - Narayanganj (13.9%)
 - BITID (18.3%) in Chittagong Division
- Divisions of Sylhet, Rajshahi, Khulna, and Rangpur ranged between 1.1 and 4.9% cholera positivity.



Demographic distribution of cholera cases

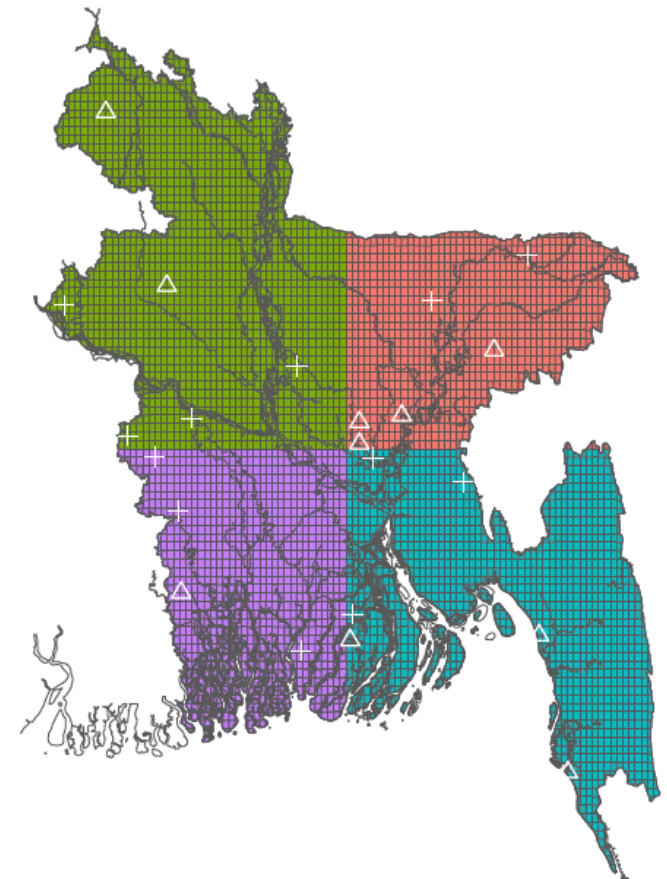
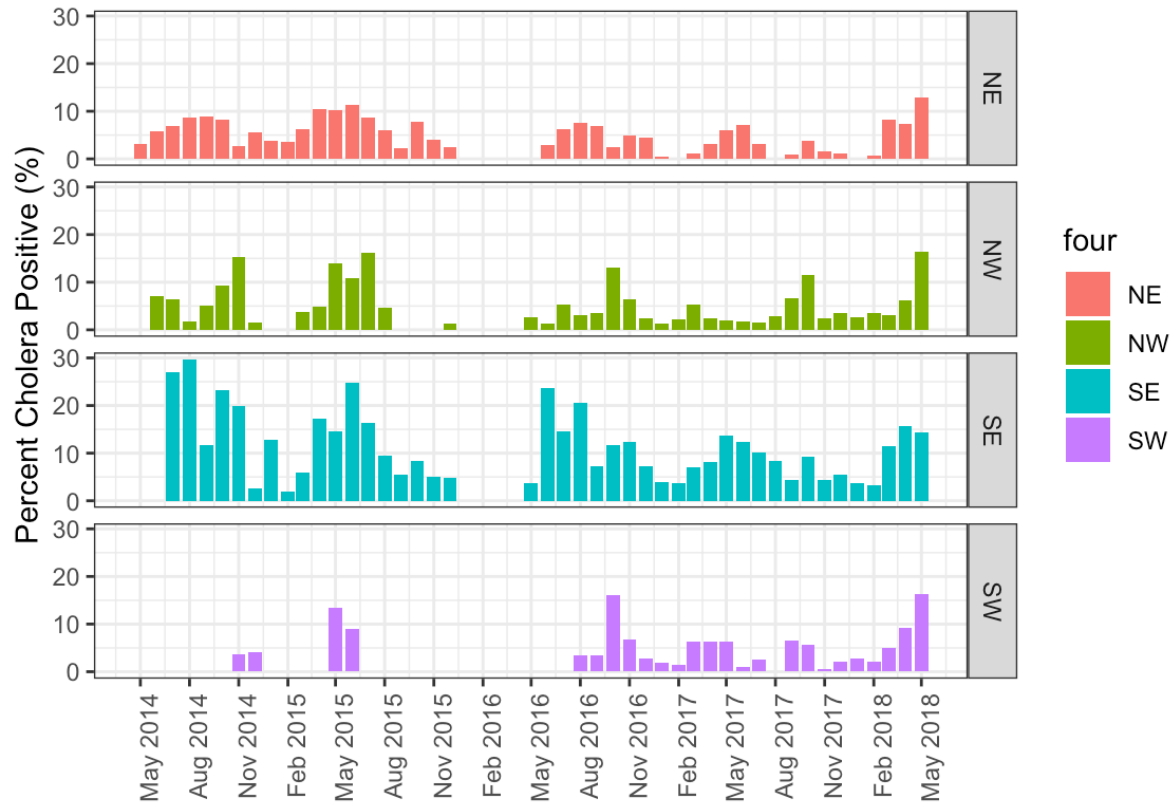
Sixteen percent of cholera cases were below five years of age, and 73% were ≥ 18 years of age. Fifty-three percent of cholera cases were male

Characteristics	Divisions							
	Overall n(%), N=1604	Dhaka n(%), N=405	Chittagong n(%), N=572	Barisal n(%), N=181	Sylhet n(%), N=133	Khulna n(%), N=200	Rajshahi, n(%), N=94	Rangpur n(%), N=19
Age (years)								
<5	253 (15.8)	48 (11.9)	63 (11.0)	40 (22.1)	37 (27.8)	35 (17.5)	15 (15.9)	15 (78.9)
5-17	181 (11.3)	48 (11.8)	70 (12.2)	19 (10.5)	20 (15.0)	17 (8.5)	7 (7.5)	0 (0.0)
18-45	910 (56.7)	237 (58.5)	346 (60.5)	94 (51.9)	61 (45.9)	117 (58.5)	52 (55.3)	3 (15.8)
>46	260 (16.3)	72 (17.8)	93 (16.3)	28 (15.5)	15 (11.3)	31 (15.5)	20 (21.3)	1 (5.3)
Sex (Male)	853 (53.2)	227 (55.9)	295 (51.6)	84 (46.4)	71 (53.4)	105 (52.5)	58 (61.7)	13 (68.4)



The overall age distribution of cholera cases (except under 5 age category) matched that of the Bangladesh population

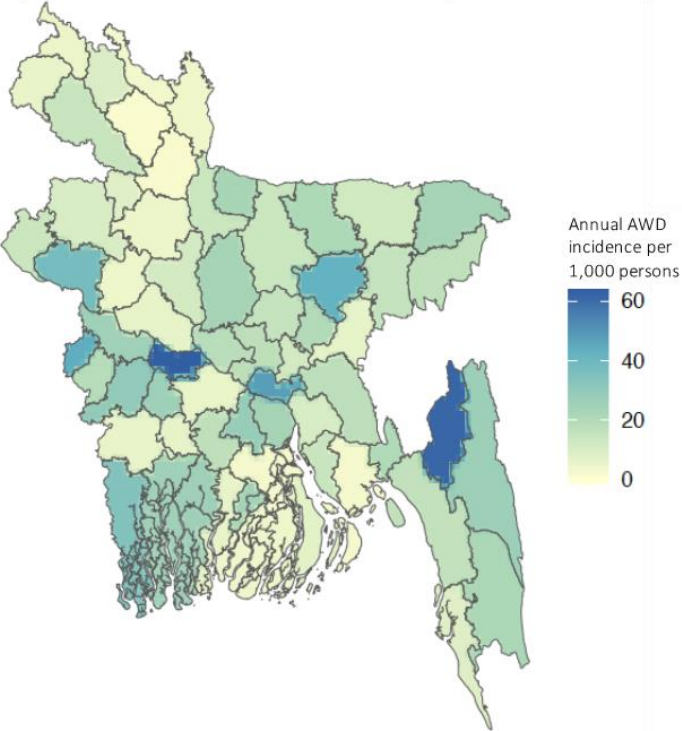
Seasonality of cholera in Bangladesh



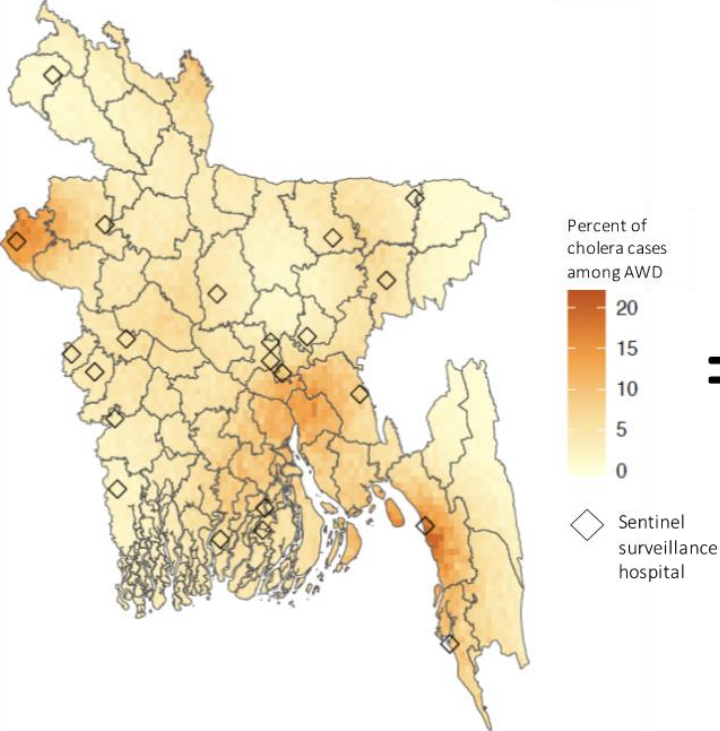
A biannual cholera peak was present across all sites in the pre-monsoon season (Apr–May–Jun) and post-monsoon season (Sep–Oct). In the NW and SW regions of Bangladesh, we see higher cholera positivity during the post-monsoon seasonal peak while in the NE and SE regions the pre-monsoon seasonal peak predominates

Combining National AWD Data and Sentinel Surveillance Data to Estimate National Burden

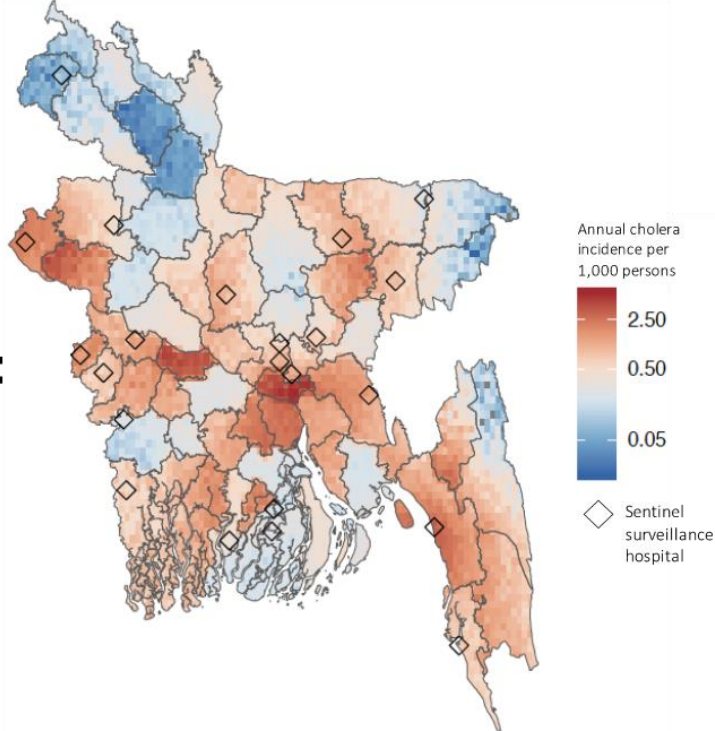
National acute watery diarrhea surveillance from Bangladesh MOH



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

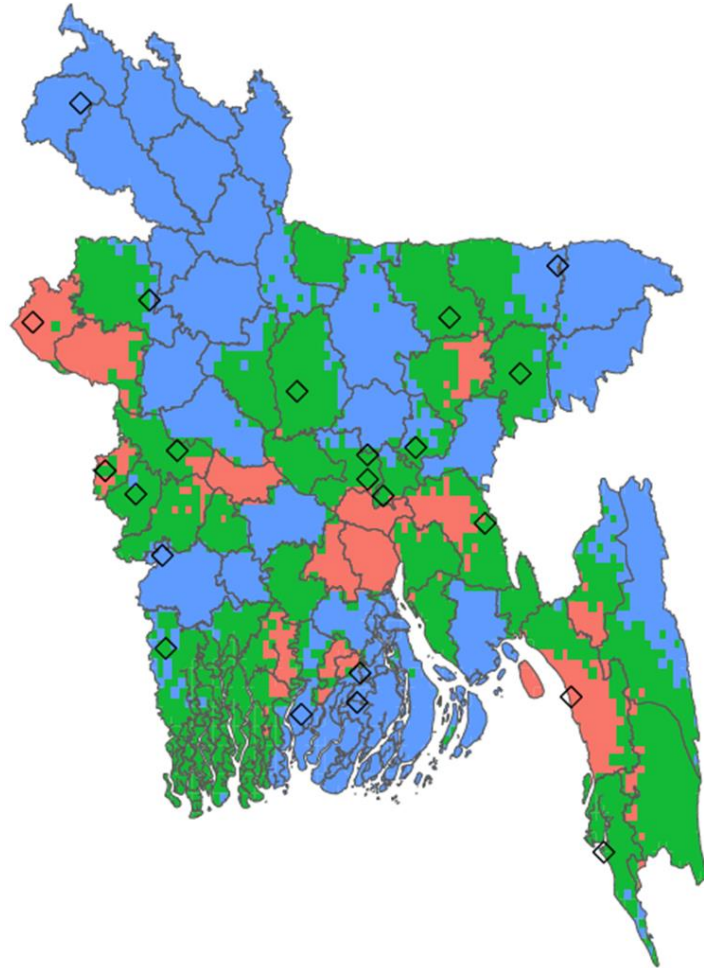


Implied annual cholera incidence



Note: Preliminary Estimates

Defining Geographic Risk Categories



Risk category

- High
- Moderate
- Low

◇ Sentinel surveillance hospital

Risk category	Incidence per 1,000 people	Number of people in these areas	Percentage of Bangladesh population
Low	< 0.5	68,391,222	42.4%
Moderate	0.5 to 1.5	69,734,816	43.3%
High	≥ 1.5	23,071,790	14.3%

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).
- DGHS report show diarrheal outbreaks all over the country.
(<http://www.iedcr.gov.bd/index.php/outbreak/27-outbreak>)
- 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

icddr,b thanks its core donors for their on-going support



Government of the People's
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Canada 

