CHOLERA SITUATIONAL ANALYSES IN INDIA

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Reviewing the epidemiology data

- **India has no National Cholera Control Program/Plan**

- Under IDSP outbreaks of acute watery diarrhea reported & investigated

- Cholera morbidity/mortality reported through CBHI, DGHS – evidence of massive under-reporting

- 559 outbreaks, affecting 27 States/UTs between 2009-2017

- Hotspots susceptible to cholera outbreaks identified in 16 S/UTs (in green in adjacent map)

- Clear seasonal trend in cholera outbreaks reported

- Very low CFRs; reported case loads reducing over the years

- No cholera specific objective at the national level; although improved water & sanitation facilities ensured through **Swachcha Bharat Abhiyan**
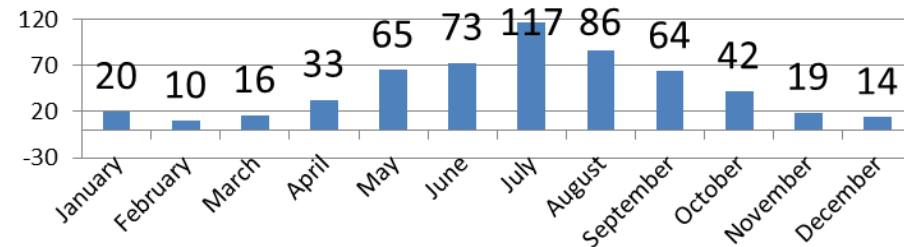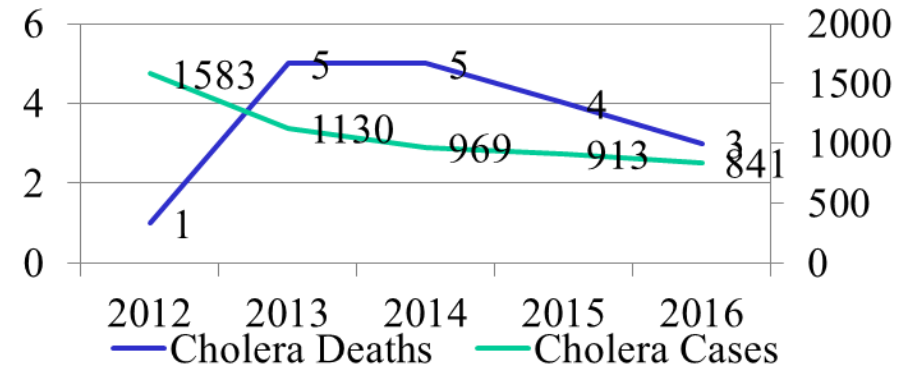
Seasonal trend of cholera outbreaks in India
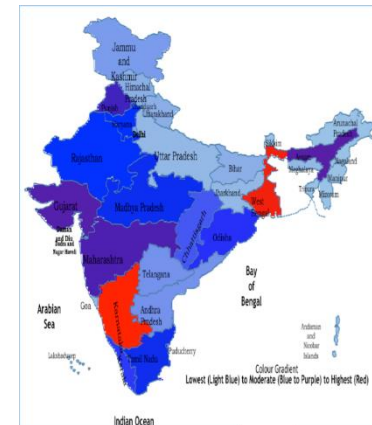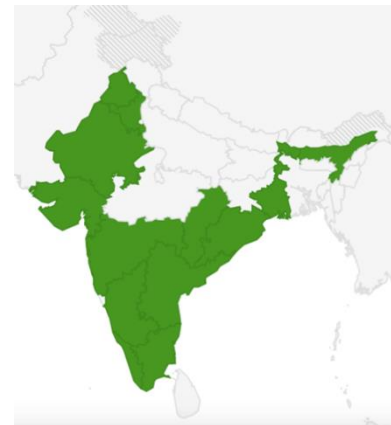
Cholera Outbreaks in India (2009-2017)

- **From the available IDSP data, we identified 559 outbreaks, affecting 27 states and union territories between 2009 and 2017.**

- **The following 9 states and union territories did not report a single outbreak of cholera in this period: Arunachal Pradesh, Manipur, Mizoram, Nagaland, Sikkim, Tripura, Andaman and Nicobar Islands, Daman and Diu, and Lakshwadweep.**

- **Six states accounted for 67% (379/559) of all outbreaks: Karnataka (101), West Bengal (97), Assam (48), Gujarat (47), Maharashtra (45), and Punjab (41).**

- **Of the six most populous states of India (according to the 2011 census), only one was represented in this list – West Bengal (7.55% of the national population);**

- **The other five, viz. Uttar Pradesh (16.49% of the national population), Maharashtra (9.28%), Bihar (8.58%), Madhya Pradesh (6%), and Tamil Nadu (5.96%), account for almost half of the nation's population (46.31%), but accounted for only about 18% of the reported outbreaks.**

Mapping the Cholera Vulnerable Districts of India: The Two Approaches

Modeling Approach (Ali et al)

- Cholera case reports from 2010-2015 from IDSP * Socioeconomic Status Data (2011 census) * WASH coverage (2011 census)

- Spatial analysis, Poisson regression model

- WASH indicators have since improved: Swachchh Bharat Abhiyan (Swachhta Reports available)

- Likely overestimates the burden hotspots

- Patchy reporting likely through IDSP

- Endemic hotspots, with sustained transmission, not raising outbreak triggers, may be missed in IDSP-based data

Ali M, Sen Gupta S, Arora N, et al. Identification of burden hotspots and risk factors for cholera in India: An observational study. *PLoS One*. 2017;12(8):e0183100. Published 2017 Aug 24. doi:10.1371/journal.pone.0183100
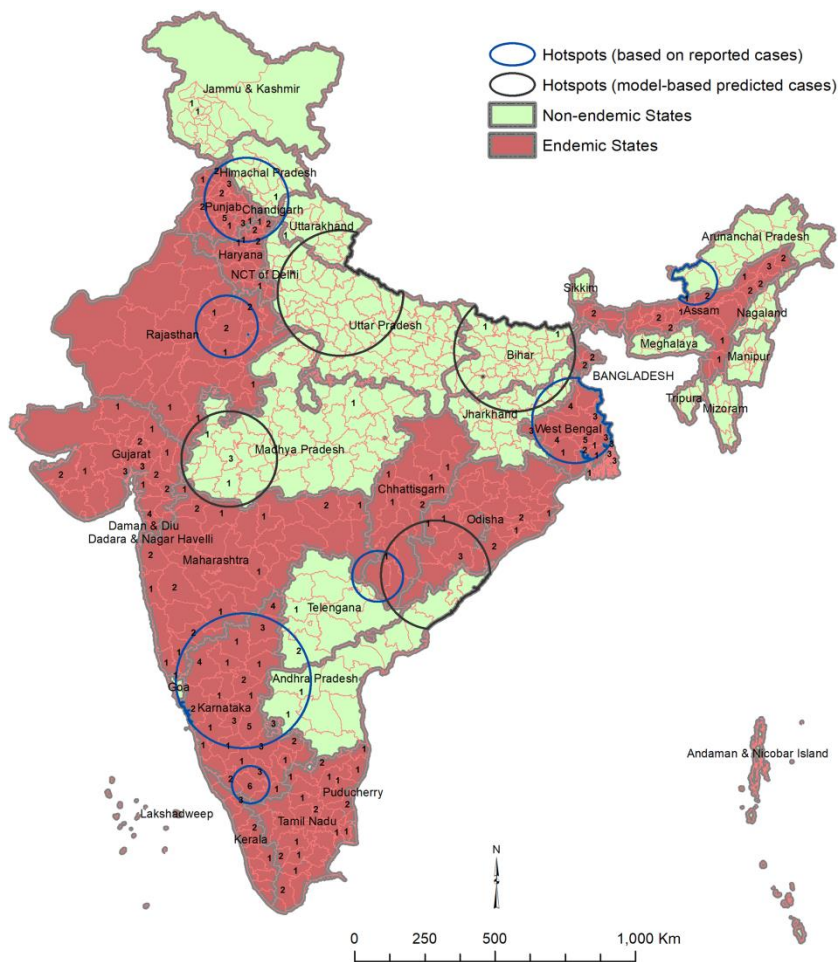
Multiple Sources of Reported Data

- IDSP, CBHI, DGHS, published cases/outbreaks, literature review: 2010-2016

- Unbalanced for SES data, WASH data

- Identifies endemic districts (experienced outbreaks in 3/5 years); priority districts (>2 outbreaks in a year reported by districts in last 5 years)

- Likely underestimates the burden hotspots

- Affected by patchy reporting for cholera

- Exploratory analyses comparing with acute diarrheal disease case counts can be considered; likely to overestimate the burden
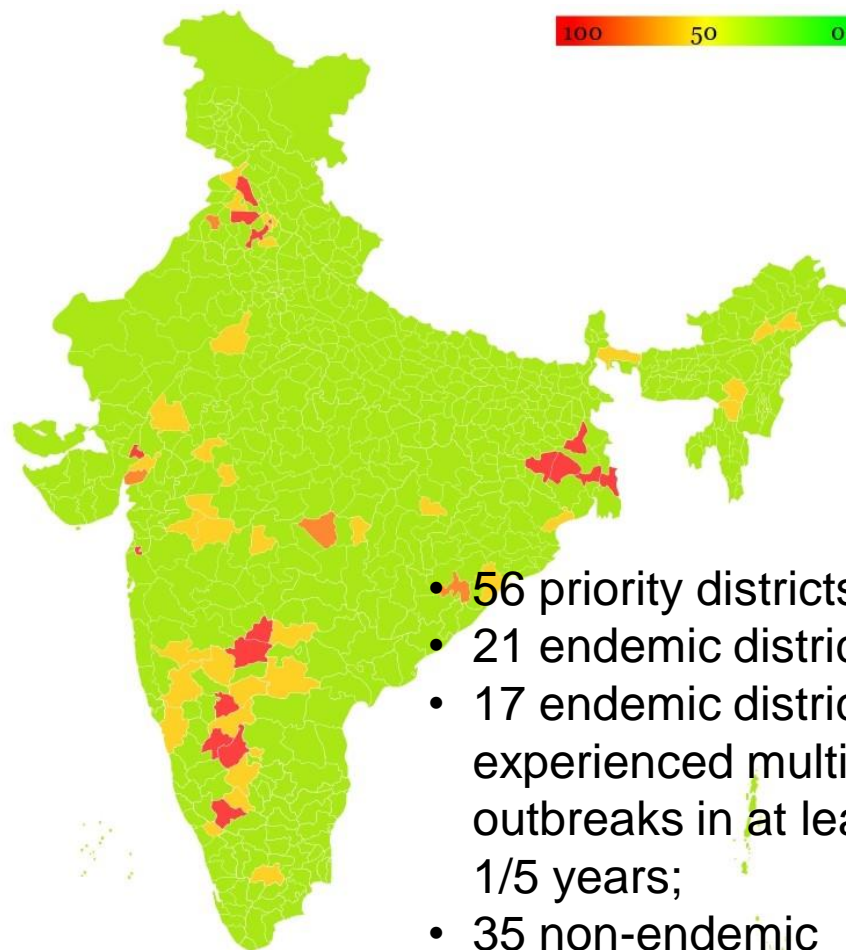
Cholera Hotspots in India

Modeling Approach (Ali et al)

Multiple Sources of Reported Data

- 56 priority districts;
- 21 endemic districts;
- 17 endemic districts experienced multiple outbreaks in at least 1/5 years;
- 35 non-endemic districts experienced multiple outbreaks 1/5 years

India WASH Update

Access to Basic WaSH Facilities in India (2015)				
	Access Overall	**Access Urban**	**Access Rural**	**No Access**
"At least basic water"	88%	96%	85%	150 million
"At least basic sanitation"	44%	65%	34%	708 million
Swachhta Status Report (2016)				
Parameters			**Urban**	**Rural**
Persons going for open defecation			7.5%	52.1%
Households practicing open defecation			8.9%	55.4%
Households with access to water in toilets			87.9%	42.5%
Households reporting to have sanitary toilets			88.8%	45.3%
Persons using sanitary toilets in households/communities having sanitary toilets			98.7%	95.6%

Diarrhoea admitted cases and Deaths at ID Hospital
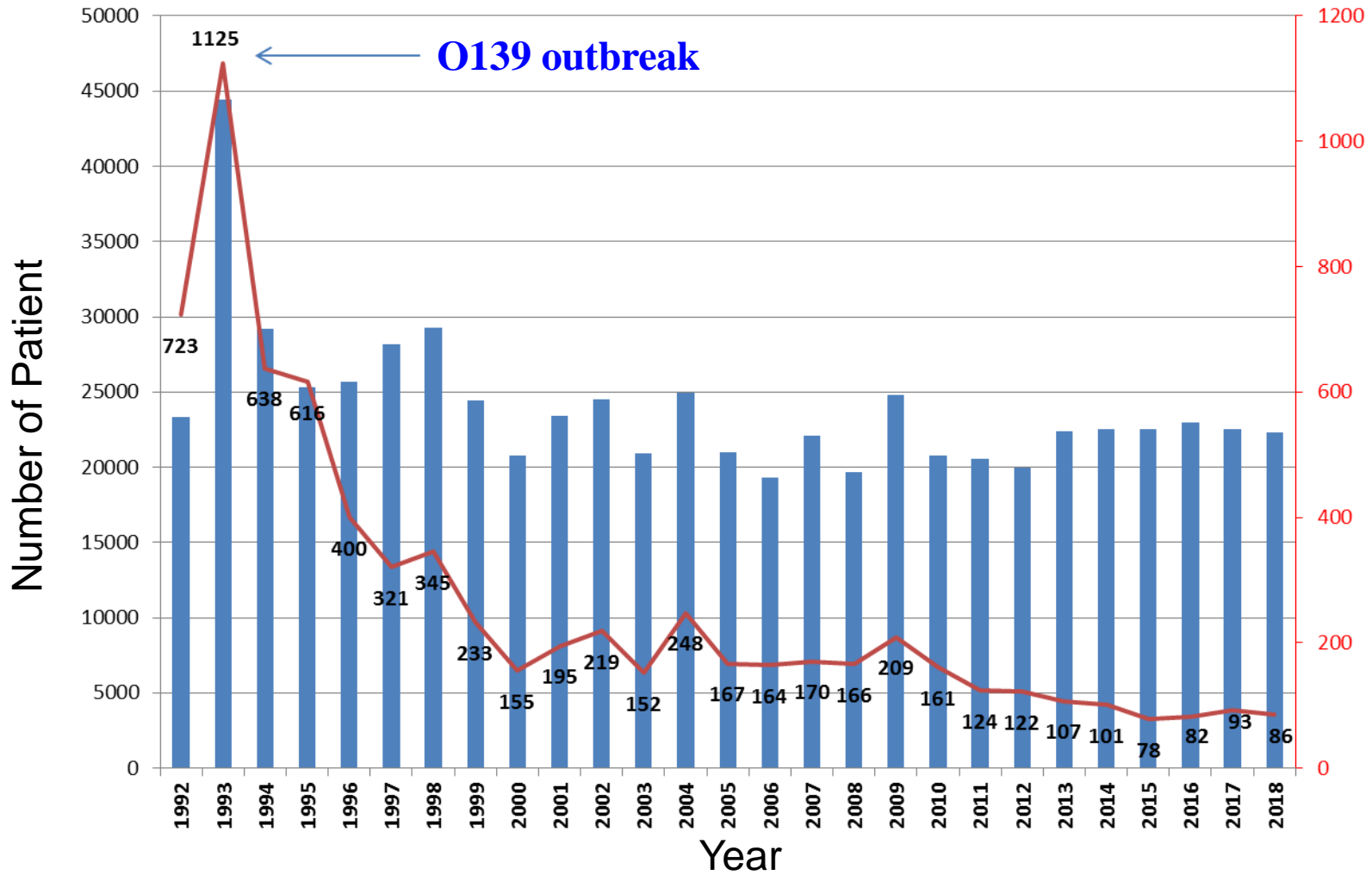
Estimated cholera cases at ID Hospital, Kolkata

Period	Total diarrhea admitted cases	Total enrollment cases under surveillance	Isolation(%) of Cholera from surveillance	Crude Estimated cholera cases
2008	19,679	1,122	250 (22.3)	4,388
2009	24,791	1,393	376 (27.0)	6,693
2010	20,761	681	130 (19.1)	3,965
2011	20,558	644	126 (19.6)	4,029
2012	19,957	975	109 (11.2)	2,235
2013	22,378	1,178	242 (20.5)	4,587
2014	22,566	1,135	120 (10.6)	2,392
2015	21,991	1,193	163 (13.6)	2,990
2016	22,963	1,267	182 (14.4)	3,298
2017	22,499	1,239	116 (9.4)	2,106
2018	20,828	1,018	125 (12.3)	2,557

Way Forward

- India can tilt the scales for making the case for cholera control

- Available data, modeling approaches unlikely to reflect the true reality of the situation

- Fragmentation of data: outbreaks (IDSP), isolated case counts (hospital surveillance, ICMR-NICED), reports (outbreaks, publications, reports) and case/death reports (CBHI, DGHS) available: all likely underestimates

- Approaches based on reported data likely to underestimate magnitude; approaches based on adjusted models likely to overestimate magnitude

- Case reporting for acute diarrheal diseases (same sources as above) as a proxy indicator to identify hotspots + Adjustments using non-cholera data

- Sentinel surveillance approaches to get more robust estimates (?funds)

- Absence of an NCCP hamstrings coordinated public health response; approaches need to be district-based to enable policy convergence

THANK YOU