

# **Epidemiology update on cholera: Indian Perspective**

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# Presentation outline:

1. Cholera epidemiology update
2. Progress in the prevention and control of cholera
3. Mapping country capacities

# **Cholera epidemiology update**

# Cholera outbreak review –India

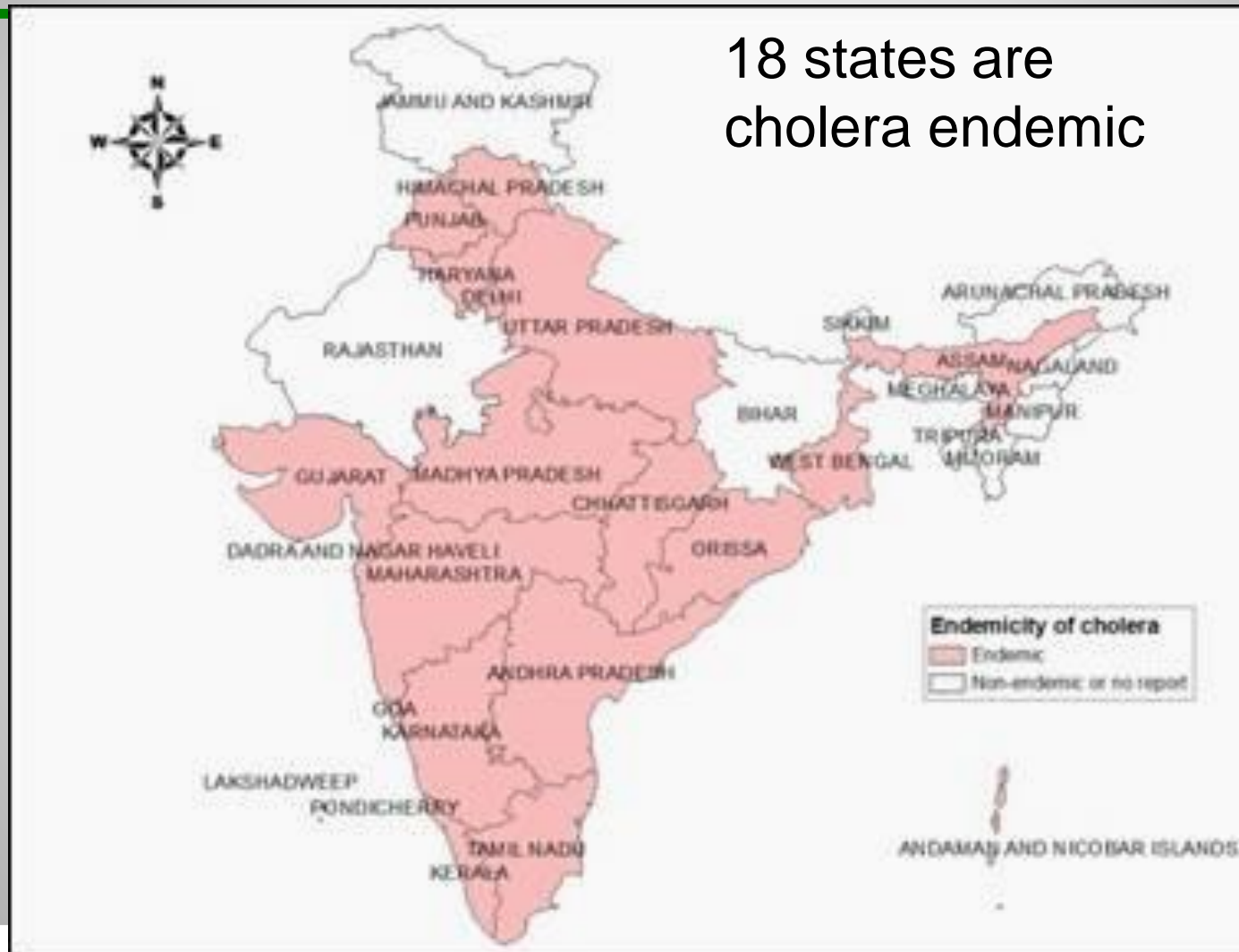
- A literature review identified 68 cholera outbreaks in India from 1997-2006
- About 222,000 cases and 823 deaths
- **Maximum 16 outbreaks from West Bengal followed by 13 from Odisha**
- Largest outbreak with 103,000 cases from Odisha

# Estimated cholera cases-India

- Disease burden study has estimated 834,00 cholera cases in India every year
- Estimated 25,000 deaths every year
- Total **18 states** are considered as cholera endemic
- Several states do not report any cholera cases  
**potentially due to limited surveillance system**

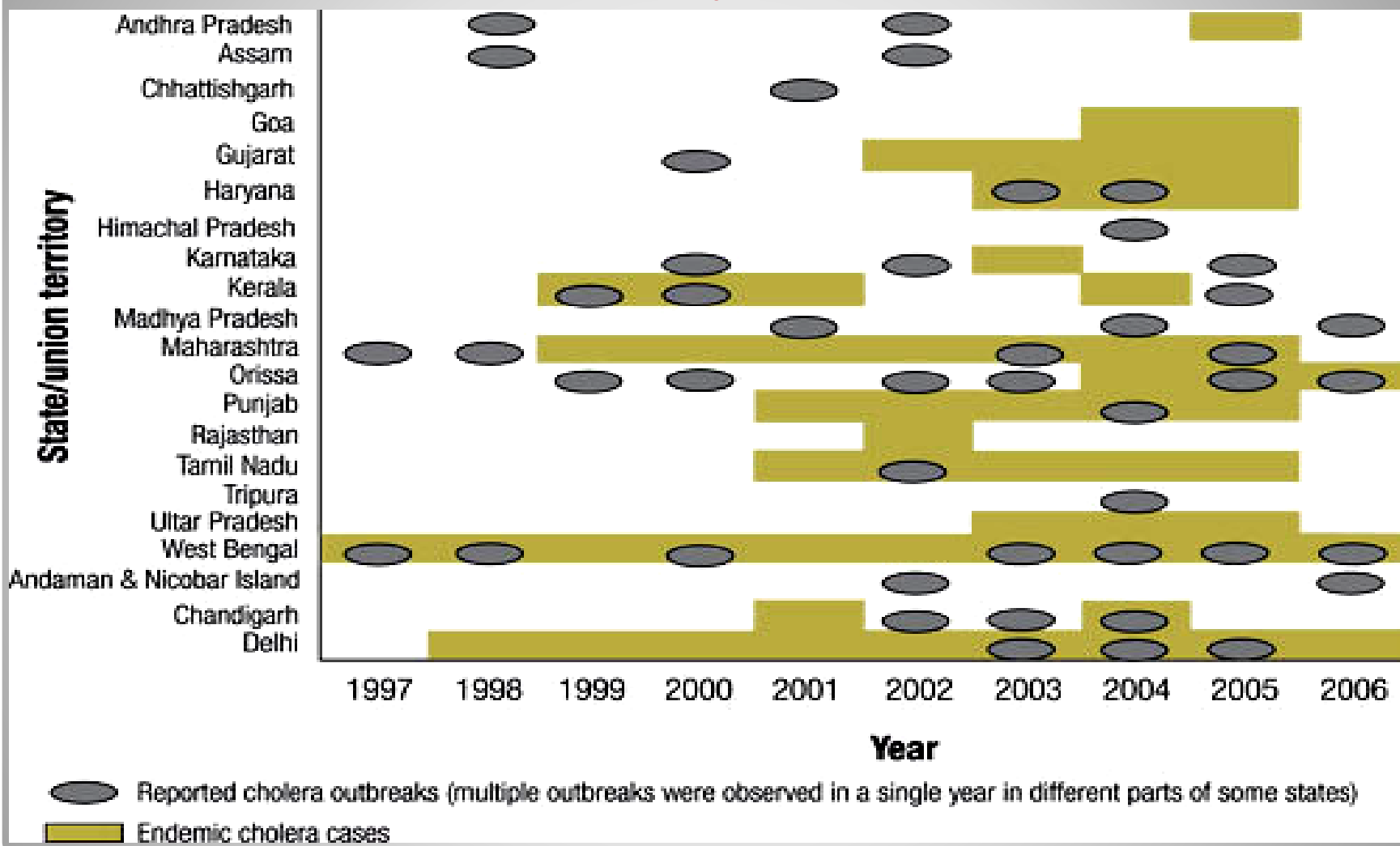
Ali M, Lopez AL et al The global burden of cholera. Bull World Health Organ. 2012 March 1; 90(3): 209–218A

# Cholera endemic states-India



An investment case for accelerated introduction of oral cholera vaccines, International Vaccine Institute, South Korea 2012

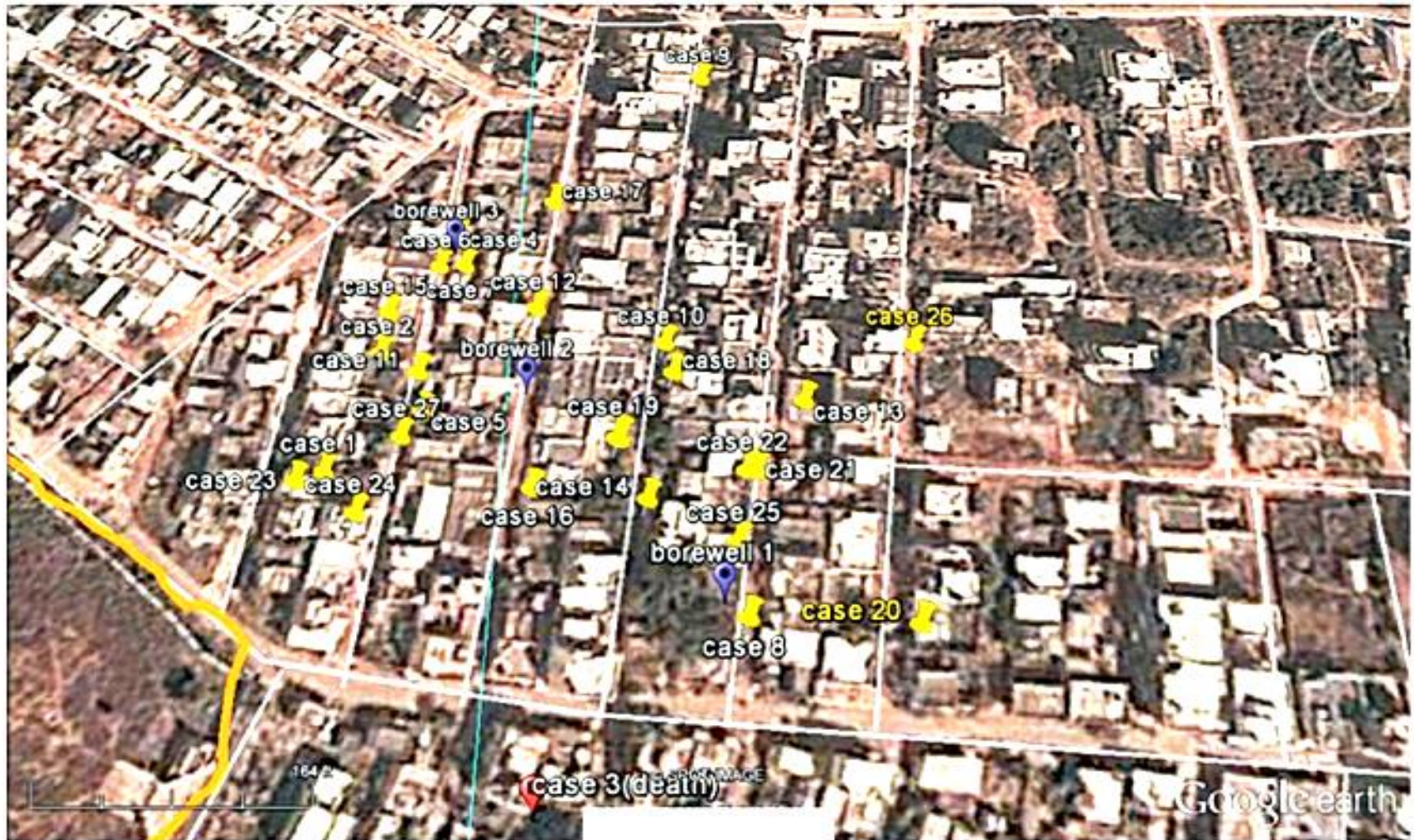
# Cholera endemicity and outbreak (97-06)





## Global positioning system & Google Earth in the investigation cholera outbreak

Spot map showing spatial distribution of the cholera cases in Karnataka



Reference: Masthi et al., 2015. Indian J Med Res. 2015 Nov;142(5):533-7.



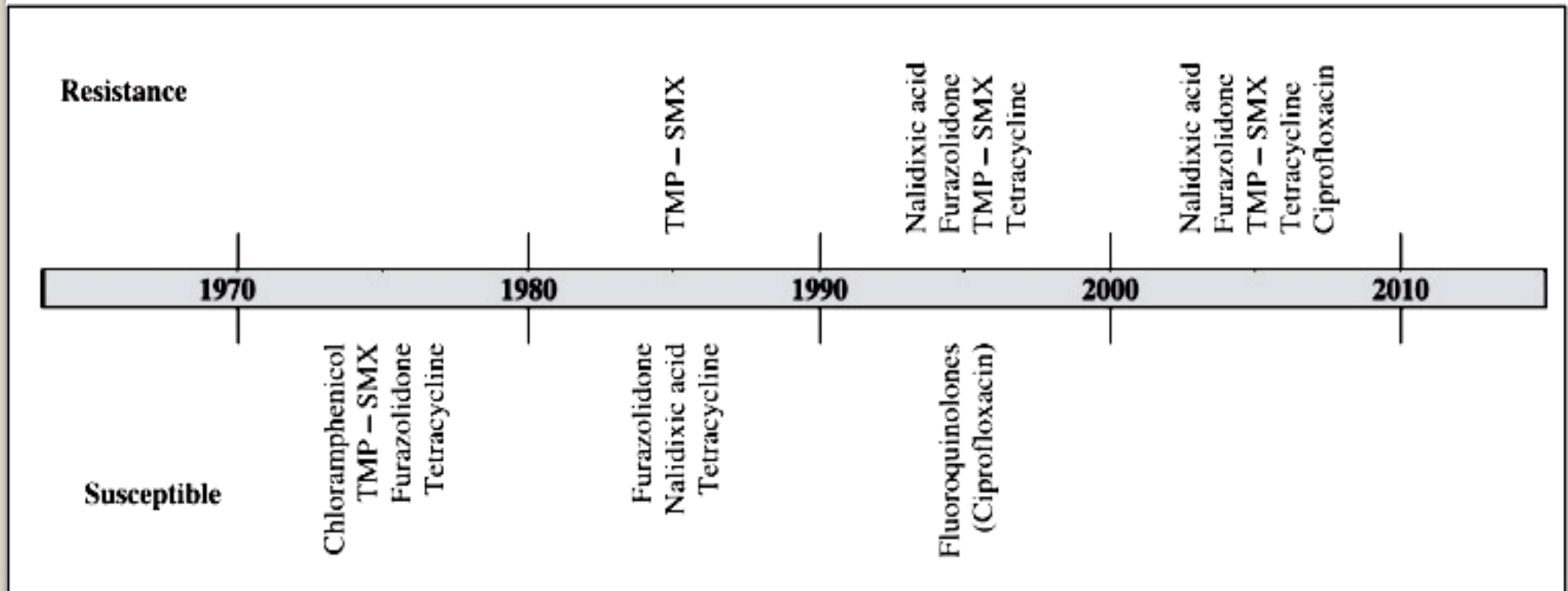
## Rugose *Vibrio cholerae* O1 in a cholera outbreak in Andhra Pradesh during 2009

a large cholera outbreak, Bholakpur (AP)



Most of the *V. cholerae* strains showed extended antimicrobial resistance to ampicillin, trimethoprim-sulfamethoxazole, furazolidone, nalidixic acid, streptomycin, ciprofloxacin, erythromycin and tetracycline (Chowdhury et al., 2016)

# Trends in antimicrobial resistance of *V. cholerae* in Kolkata, India extending a span of 40 years from 1970. Ref: Ramamurthy and Ghosh, 2011.



**2016: O1 Eltor variant (ctxb7)**

**Sensitive to Doxy Az, Cibro, Ofloxacin, norfloxacin, tetra**

# Guidelines for Treatment of Cholera with Antibiotics

- Antibiotic treatment for severely dehydrating cholera patients only
  - **First-line drug choice:** Doxycycline
  - **Alternate drug choices:** Tetracycline
  - Erythromycin is recommended drug for children
  - Norfloxacin/ciprofloxacin or azithromycin is being used in some regions
- Trimethoprim-sulfamethoxazole, chloramphenicol, furazolidone are less effective due to the emergence of resistant *Vibrio cholera* O1 strains
- Antibiotics are not given to cholera patients who have only mild or no diarrhea and dehydration

## Composition of electrolytes in diarrhea/cholera stools and rehydration fluids

Stool	Sodium (mmol/L)	Chloride (mmol/L)	Potassium (mmol/L)	Bicarbonate (mmol/L)
Adult	130	100	20	44
Children	100	90	33	30

Fluid	Sodium (mmol/L)	Chloride (mmol/L)	Potassium (mmol/L)	Others (mmol/L)
<b>ORS</b>				Trisodium citrate
Glucose (WHO)	75	65	20	10
Intravenous				Lactate
Ringer's lactate	130	109	4	28
Normal saline	154	154	0	0

## **Sanitation and Hygiene-Specific Risk Factors for Moderate-to-Severe Diarrhea**

- Open defecation with limited availability of safe drinking water supply mainly in rural area
- Sharing sanitation facilities with other households was a significant risk factor for severe diarrhea.
- Designated hand washing area, soap or ash were observed to be significantly protective against MSD.

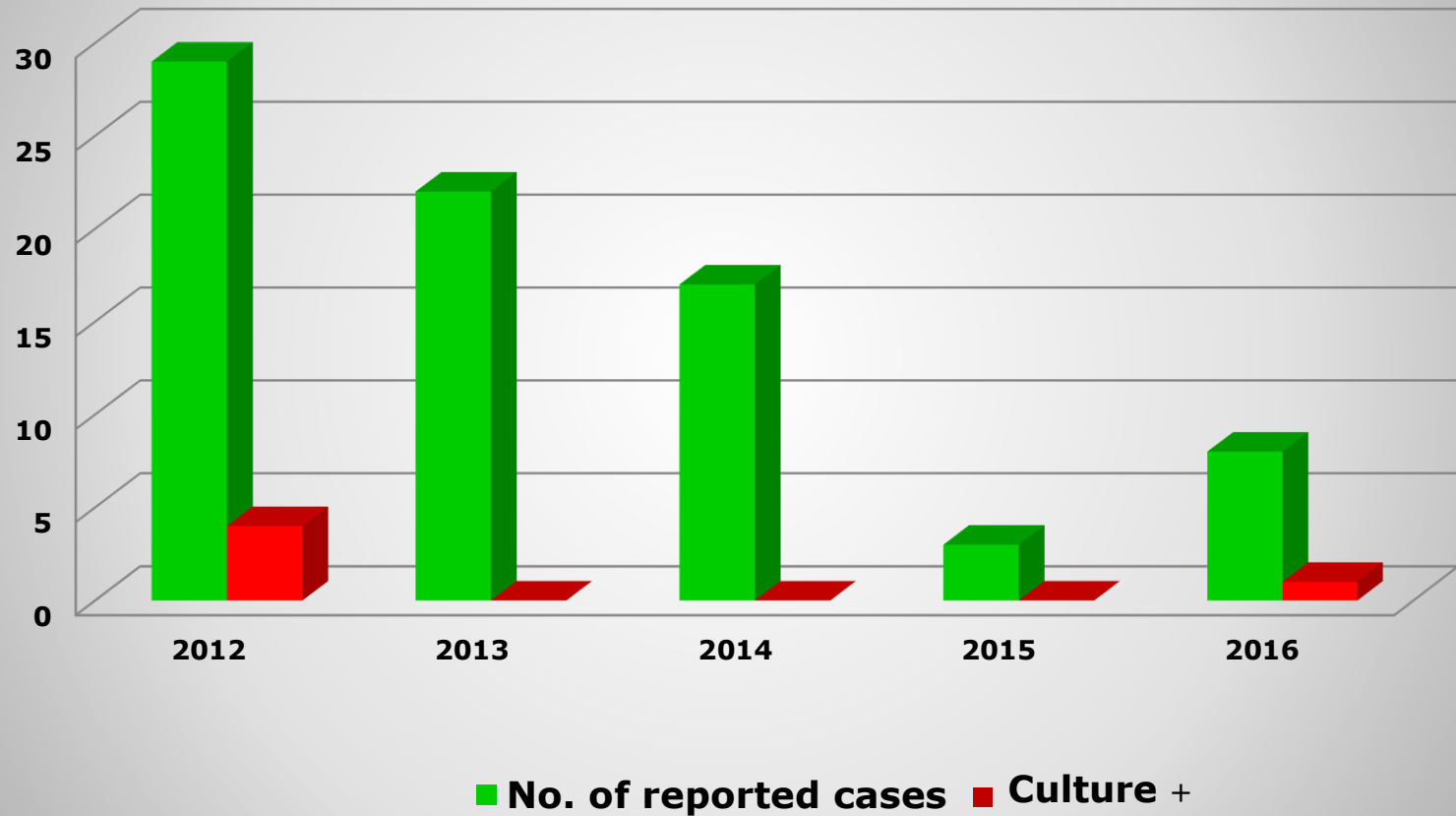
Ref: Baker et al., 2016. PLoS Med. 13(5):e1002010.



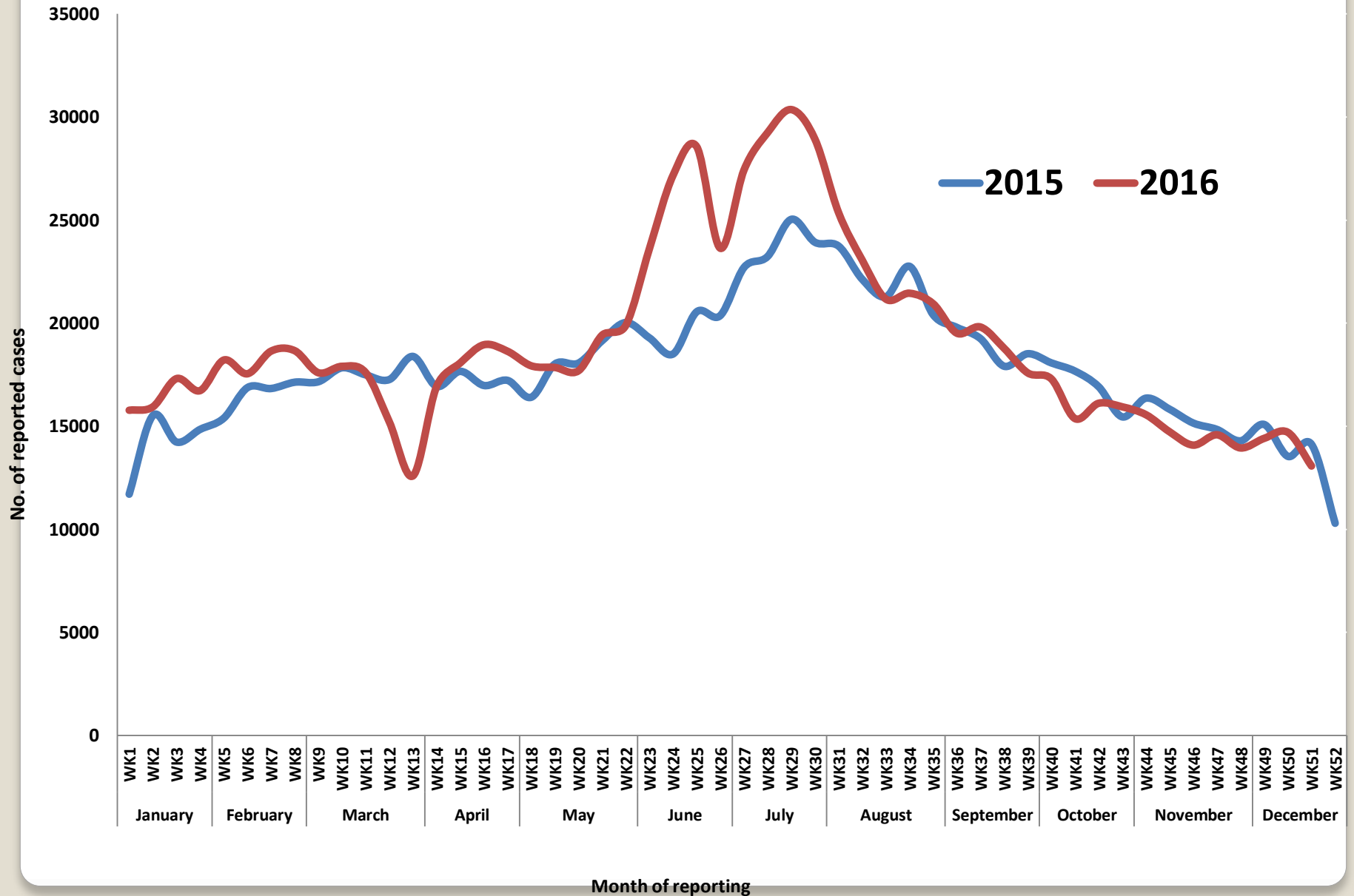
# Challenges

- Marginalized rural and tribal populations
- Health is not a priority in poverty-ridden communities
- Poor availability of safe drinking water supply
- Inadequate ownership of programs
- Poor local health infrastructure
- Inadequate priority setting mechanisms
- Long incubation periods for research programs

## Year wise ADD cases and cholera positive (Culture) 2012-16

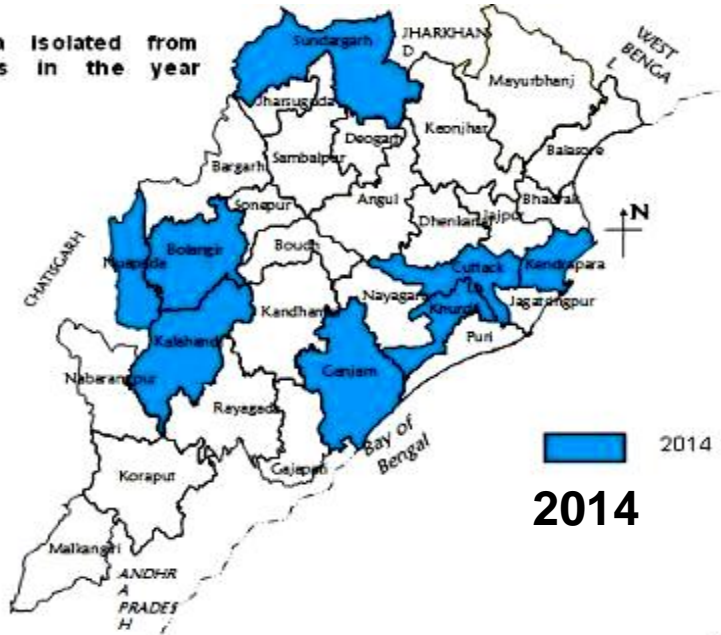


# Trend of ADD cases month wise: 2015-2016

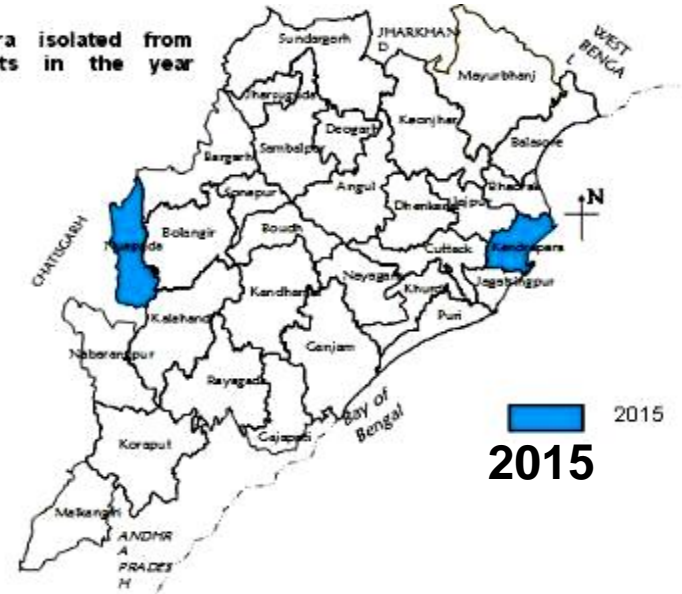


# Year wise cholera isolated in surveillance districts (2014-2016)

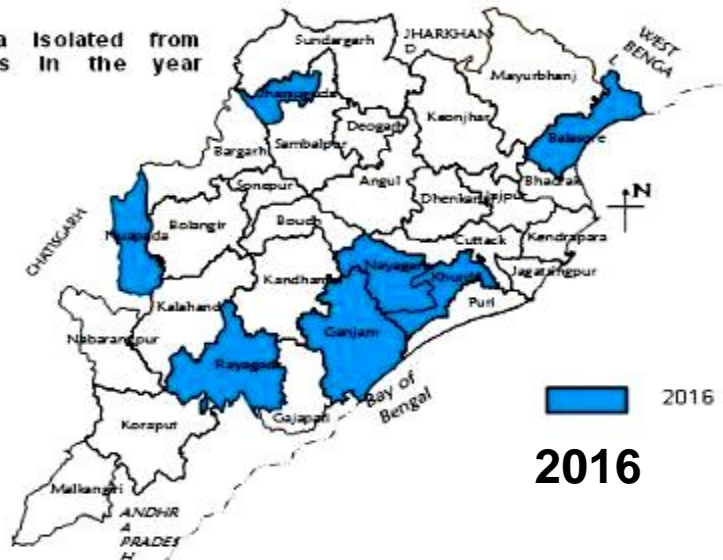
Cholera isolated from districts in the year 2014.



Cholera isolated from districts in the year 2015.

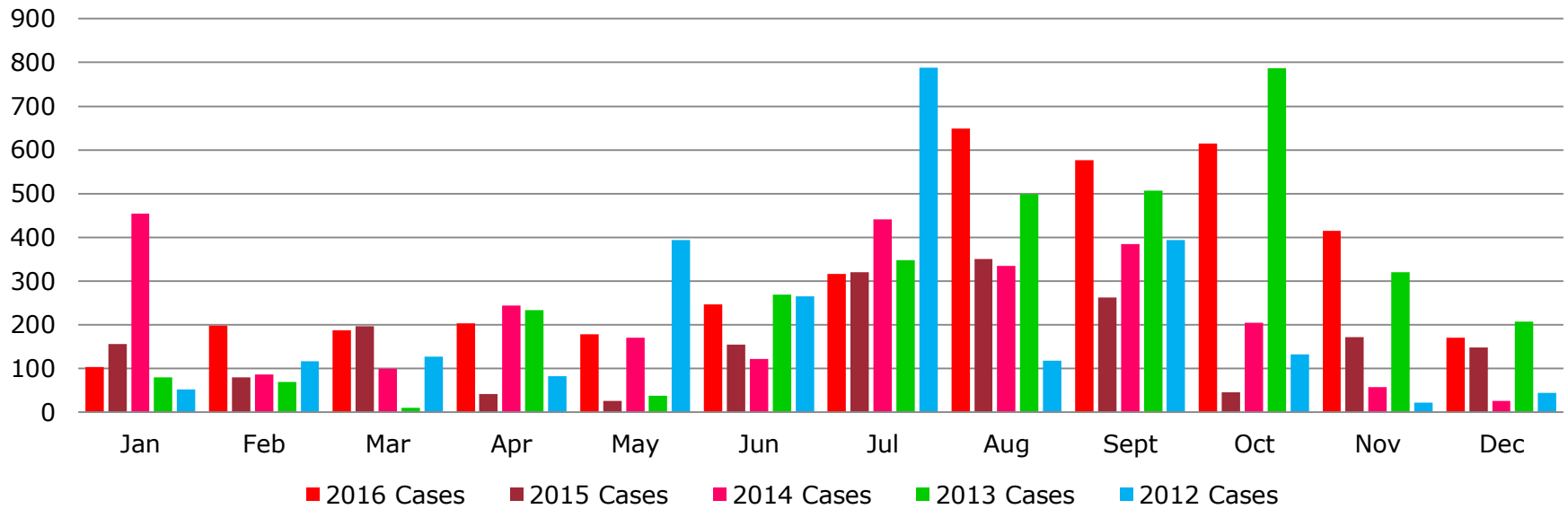


Cholera isolated from districts in the year 2016.

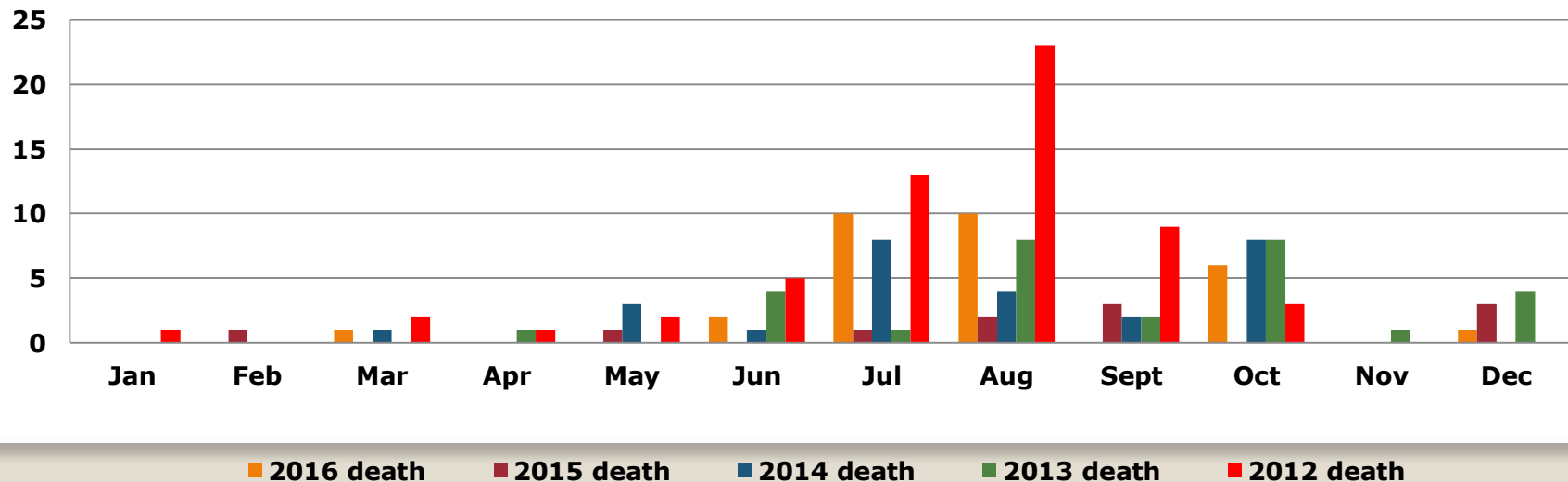


# Month wise cholera cases 2012-16

## Cases/month



## NO OF DEATH REPORTED MONTH WISE





# Mass vaccination steps

## Flow of Daily Activities in Vaccination Booth



### SCREENING & CONSENTING



### VACCINATION



# Vaccination coverage and costs

- 31, 552 received first dose
- 23,751 received second dose
- Coverage rate of **61.3%** for one dose and **46.2%** for two doses in 1 year and above (non-pregnant) population
- Public health vaccine delivery cost was **\$0.49** per dose or **\$1.13** per fully vaccinated person

# **Prevention and control measures**

# Prevention & control of ADD and Cholera outbreaks

- Trend of Acute Diarrhoeal Disease (ADD) shows peak between June and October( monsoon & post monsoon)
- Guideline & SOP shared with districts for prevention and management of outbreaks
- Prepositioning of anti-diarrhoeal drugs, ORS, Halogen tablets, bleaching powder ensured
- Early case detection and referral mechanism of severe diarrhea cases
- Case based surveillance
- Key informants at village level identified for early information
- Sensitization/Coordination between departments for preventive measures
- Malaria Dengue Diarrhoea (MDD):- **A special annual campaign** between July & October every year for mass awareness
- **Disinfection** of drinking water sources
- Routine water quality **monitoring**

# ***Community scenario- Social Mobilization***

## **Community Suggestions:**

- Sensitization of PRI members, local PHC staff, ASHA, AWW and community
- Other modes of community mobilization:
  - Miking
  - Interpersonal Communication by door-to-door visit
  - Placards, slogans, songs
  - Banners, Posters, leaflets



**PRI members**



**Local PHC staff, ASHA, AWW**



# Preparedness of Cholera Control

- Continuous **weekly surveillance at community and health facility level** throughout the year
- **Continuous laboratory surveillance of ADD** in all districts with availability Carry Blair media at health facility level
- Suspected ADD outbreaks investigated for cholera
- Visit of collector to affected sites for monitoring quick action
- Early warning & prompt action by squad

## Source

- Surveillance report
- Community volunteer reporting and media alert
- Field worker reports during surveillance
- **IEC campaign (May-Oct)**
  - All media (TV, News Paper, Radio, Internet)
  - Banner
  - Community Miking
- Campaign for use of ORS (**ORS Corner** in village set-up for free distribution)
- ASHA, Anganwadi visit door-to-door for distribution of ORS & Zinc

# **Supply of Safe Drinking water**

**Main sources of safe drinking water supply:**

**Tube well**

**Pipe water supply**

**Preventive maintenance of tube well by RDSS department every year**

**Alternate water supply in source contamination**

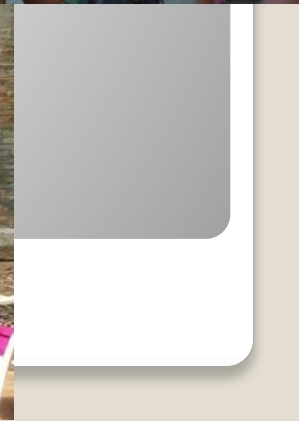
**Water quality checking by H<sub>2</sub>S kit & Orthotoludine test weekly in endemic districts**

# Policy makers meetings

- **State level** (health secretary and chief secretary appraisal and policy formation during pre monsoon)
- **District level** (Regularly by collector & CDMO, RDSS and monthly)
- **Sector level** (Monthly with weekly appraisal)
- **Block level** (Block MO-Monthly)
- **All stack holder involvements in meetings**



# Sensitization of community



# **Mapping country capacities**



# **Objectives of mapping:-**

1. Identify hazards that may negatively impact on health
2. Physical characteristic of the hazards outlined
3. Analysis and describe the public health risks
4. Rank the hazard risks map the public health risks across the ecological zones of the state

# Features identified

- **Seriousness**
- **Manageability**
- **Acceptability**
- **Urgency**

# Assessment of hazard levels mapping

- ❑ Probability - Number of episodes of the event e.g. number of outbreak over period of five years
- ❑ Exposure - Average length between episodes
- ❑ Impact - Average case fatality rate

## **The variables for measuring health vulnerability of cholera**

- ❑ The geographic location, architectural or structural safety and critical systems, equipment and infrastructural safety of health facilities
- ❑ The health status of the community including health service available coverage.
- ❑ Social determinants of health such as access to good housing, safe drinking water supply, sanitation, literacy status and hygiene practices that may have implications on transmission and carriage of cholera.

## **Health coping capacity**

- ❑ Community and Health facility preparedness for impending ADD and Cholera**
- ❑ The capacity of the health system to implement disaster risk management programmes**
- ❑ The functional capacity of health facilities, meteorological agencies, agencies for disposal and management of waste.**
- ❑ Community knowledge, attitude and practice of preventive and healthy lifestyle such as hand washing, first aid, hygiene education, health seeking behavior, food culture**
- ❑ Quality surveillance and identification of early warning signals**

# Thank you

