



ट्रान्सलेशनल स्वास्थ्य विज्ञान
एवं प्रौद्योगिकी संस्थान
TRANSLATIONAL HEALTH SCIENCE
AND TECHNOLOGY INSTITUTE

www.thsti.res.in

Update from THSTI

**Dr. Sanjukta Sen Gupta,
Senior Program Officer
Policy Center for Biomedical Research**

**5th IDEA MEETING,
HAN NOI, VIETNAM,
MARCH 8, 2017**

4th IDEA ASIA meeting at New Delhi



Before the meeting

- We had WHO prequalified vaccine manufactured in the country
- “Expert group on cholera in India” was constituted
- Evidence for cholera from different sources- Public health surveillance, ID hospitals etc.

The 4th IDEA meeting

- Gave us insight into how other countries addressed common issues like surveillance, decision-making, working with other stakeholders and communicating with the governments
- Helped us bring “**Cholera**” as an important public health problem to the drawing board of policy makers

Highlights from The “Delhi Declaration” 4th IDEA ASIA meeting



- Cholera remains a continuous threat with high economic burden in the Indian subcontinent and the South East Asia
- As access to clean water and sanitation remains a problem, OCV must be recognized as a important preventive tool, provided it is used in specific areas, conditions and populations
- Even in countries where no cholera cases are reported it is unlikely that none exist. Epidemiological surveillance is important as are improved lab tests and reporting
- Cholera burden is actually borne by population groups residing in specific areas “**Cholera hotspots**”

“Cholera hotspots”

Areas-

- where environmental conditions facilitate the dissemination of disease
- where the disease persists & re-emerges periodically
- where seasonal outbreaks take place with intermittent lull periods
- are often at the origin of spread of the disease

Cholera hotspots be identified in each country and considered primary targets for intervention*

* Kinshasa Declaration for cholera elimination in Africa Dec 6, 2014

Global Burden of cholera

- 2.8 million cholera cases 91,500 cholera deaths occur in **61** endemic countries
- 87,000 cases and 2,500 deaths in cholera epidemics
- Approx. half of the deaths occur in Africa
- **India**, Nigeria, China, Ethiopia, and Bangladesh are at highest risk

Cholera In India: grossly underreported

	Revised Estimates Ali et al .2015	Reported to WHO (WER 2015)	National Health Profile (2016)	NICED*
	India			Kolkata
Cases #	675,188	4031 (2014 estimates)	884 (2014 estimates)	>20,000
Deaths	20,256	21	5	107
Case fatality rate	3.0	0.52		

Deen et al 2008,

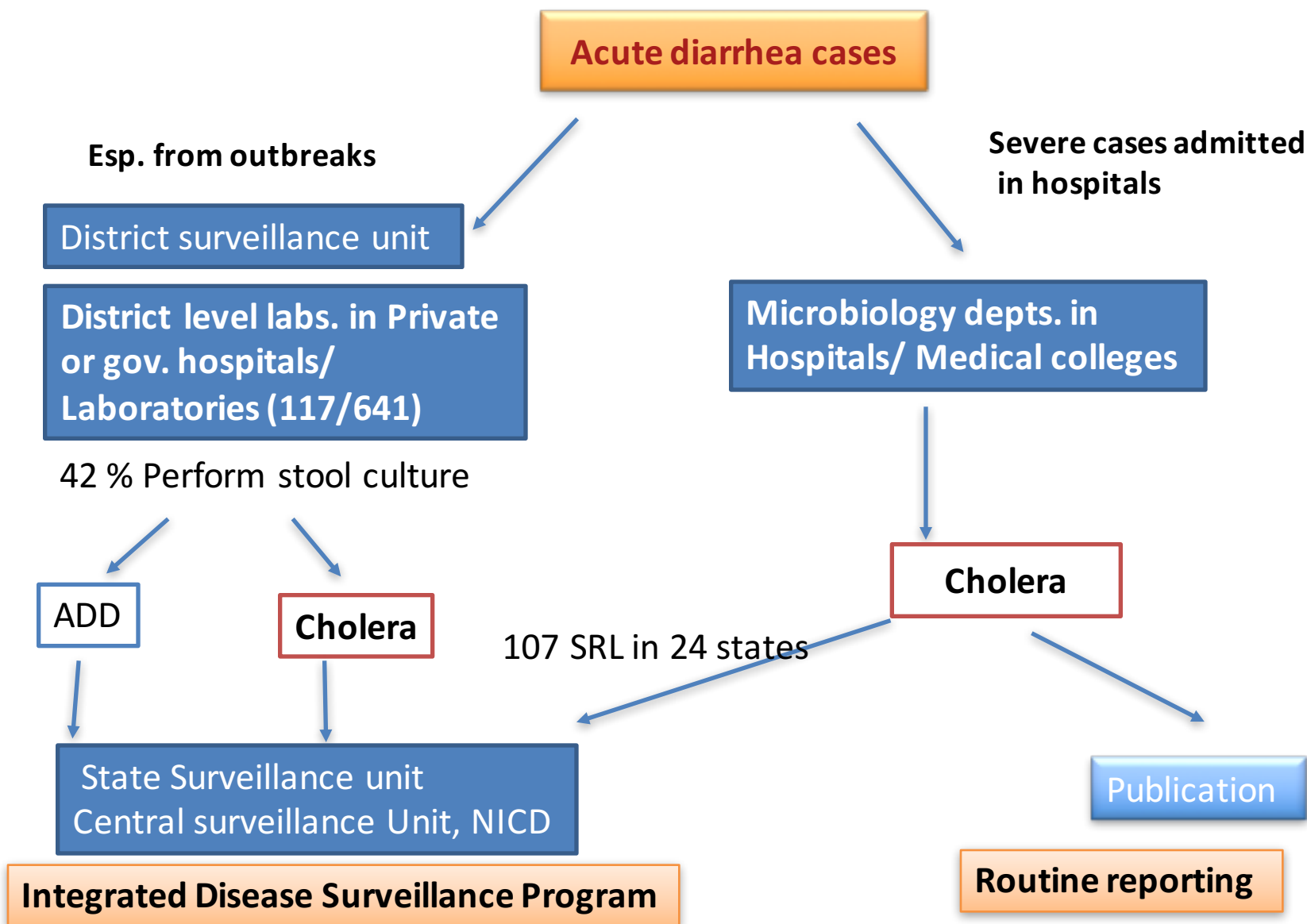
§<https://www.nhp.gov.in/>

* Source: Director NICED,

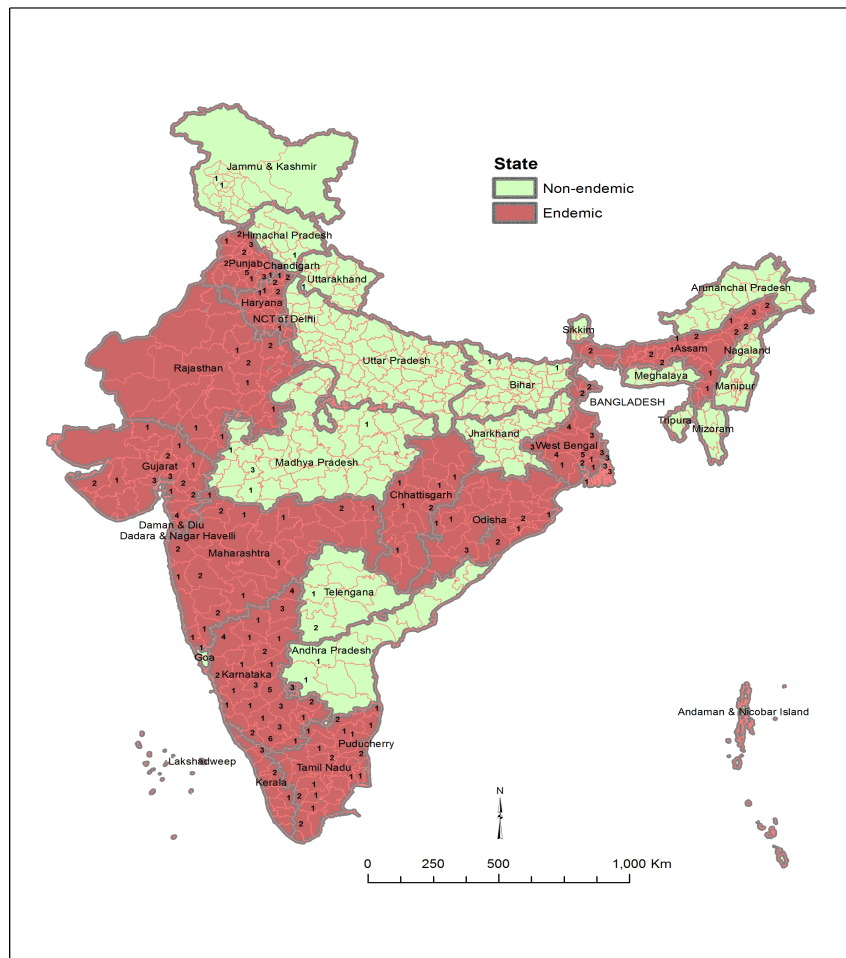
Secured funding from BMGF to

- Draft a roadmap for cholera prevention and control in India
- Evaluate the 3 commercially available Rapid Diagnostic Tests
- A supplement on OCV

Cholera reporting in India



Cholera endemic & non-endemic states in India



- A total of 27,615 cases in six years
- 12/23 states reported cholera for 3 or more years
- 150/641 districts reported cholera

Endemic districts reporting more cases of cholera

District	Population	2010	2011	2012	2013	2014	2015	Total
North 24 Parganas (WB)	10,082,852		78		1182	445		1705
Bankura (WB)	3,596,292		262	334	473		96	1165
Rayagada (ODI)	961,959	784		37	22			843
Panchkula (HAR)	558,890		5	59		761		825
Puruliya (WB)	2,927,965				539	67	46	652
Birbhum (WB)	3,502,387		341	93	126	31		591
Mysore(KAR)	2,994,744	5	71	273	129	32	65	575
Hugli (WB)	5,520,389		35	126	173	126	61	521
Ludhiana(PUN)	3,487,882	4	7		15	73	414	513
Navsari (GUJ)	1,330,711	251	46	87	32			416
Belgaum (KAR)	4,778,439	19	35	333			9	396
Nadia (WB)	5,168,488	287	21				59	367
Gulbarga (KAR)	2,564,892		14		20		330	364
Mandya (KAR)	1,808,680		42	66	226			334
Total		1350	957	1408	2937	1535	1080	9267

Note : **The above mentioned 14 districts have 1/3 rd of cholera cases reported to IDSP.**

Cholera hotspots and risk factors in India

– 5th– Initiative against Diarrheal and Enteric diseases in Asia Hanoi, Vietnam

Methods

Data and Sources

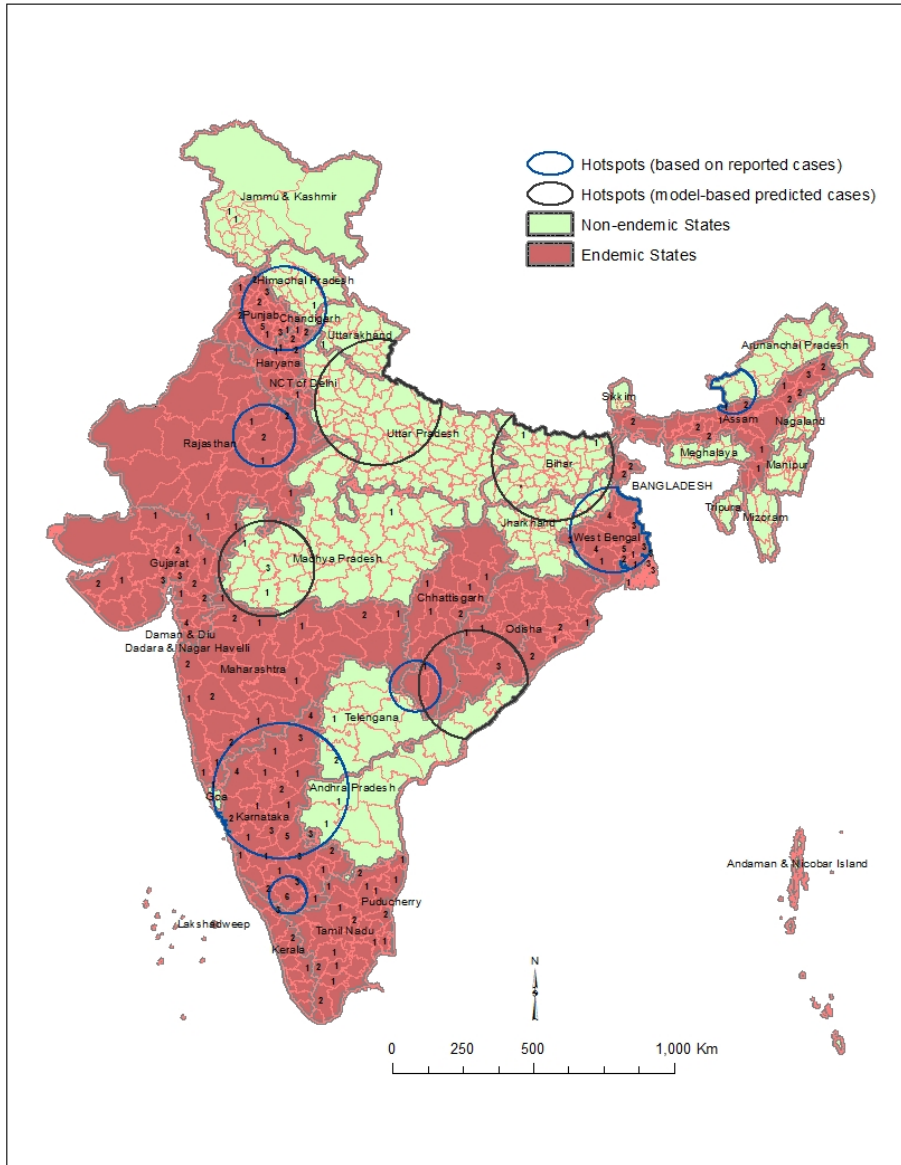
- District level cholera data from 2010 to 2015
 - **Integrated Disease Surveillance Programme (IDSP), India**
- Population and socioeconomic data
 - **Census 2011 from the website of the Ministry of Home Affairs, Government of India**
- District map of India
 - **GitHub, which is shared under Creative Commons Attribution 2.5 India license**

District level risk factors

Variables (x)	Estimate (b)	Standard Error	Wald 95% CI	Wald λ^2	P-value
1. Percent literate in the district	-0.0287	0.0008	-0.0302 to -0.0272	1381.82	<.0001
2. Percent of urban area in the district	0.0017	0.0007	0.0002 to 0.0031	5.15	0.0233
3. Percent households owning mobile telephone in the district	-0.0110	0.0006	-0.0121 to -0.0098	358.11	<.0001
4. Percent households using tap water from treated source in the district	-0.0089	0.0004	-0.0098 to -0.0081	436.43	<.0001
5. Percent households using latrine without slab/open pit in the district	0.0205	0.0009	0.0186 to 0.0223	477.61	<.0001
6. Percent households using open drainage	0.0176	0.0004	0.0169 to 0.0184	2197.82	<.0001

Predicted number of cases (\bar{y}) = $-0.0287x_1 + 0.0017x_2 - 0.0110x_3 - 0.0089x_4 + 0.0205x_5 + 0.0176x_6$

Cholera Hotspots in India



Number of hotspots

Reported cases:

- **7 hotspots**
 - 76 districts across 15 States
 - Include West Bengal, Karnataka, Punjab, and Odisha etc.

Predicted cases:

- **4 hotspots**
 - 111 districts across 9 States
 - Include states of Bihar, Madhya Pradesh, and Uttar Pradesh

Results



- **27,615** reported cholera cases during 2010-2015
- Highest number of cases was 7,330 in 2010 which included 2,229 cases in Jammu & Kashmir alone following a cloudburst
- 12/23 states & UTs were classified as endemic
- **150 (23%) of 641** districts had cholera at least one of the study years
- 31% of India's total population was found to be at risk
375 million people!
- The districts with more urban areas were found to be at higher risk

Strengths & Limitations

Strengths

Relate reported cases of cholera to the socioeconomic data from Census 2011

Limitations

Not all cholera cases from IDSP were culture confirmed

Cases were from outbreaks only

Reporting system may **vary** from state to state

- e.g., Karnataka may have better reporting system but not Uttar Pradesh
- Cholera case definition was such that we missed out on cases <5yrs of age

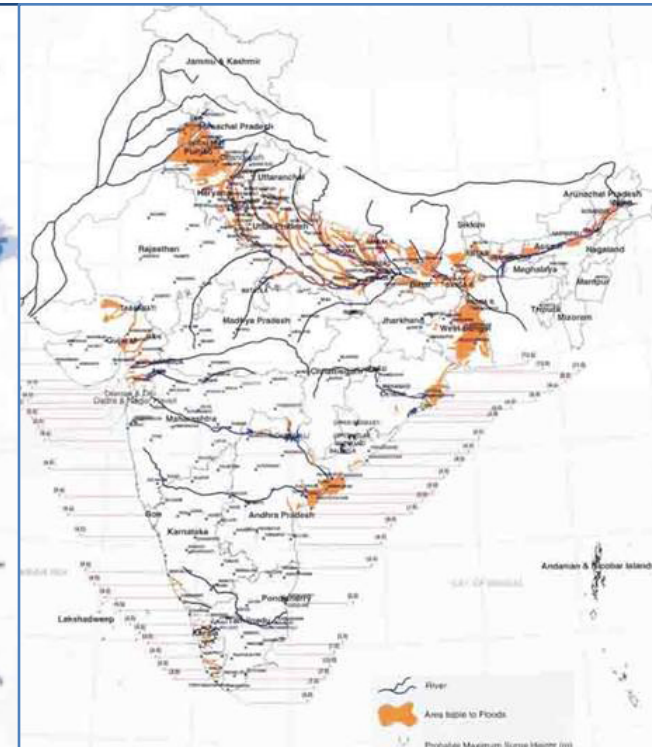
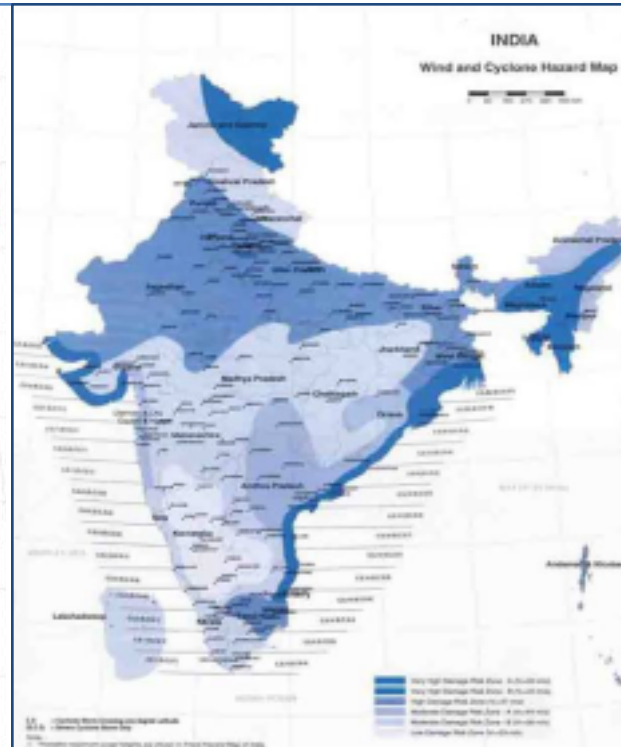
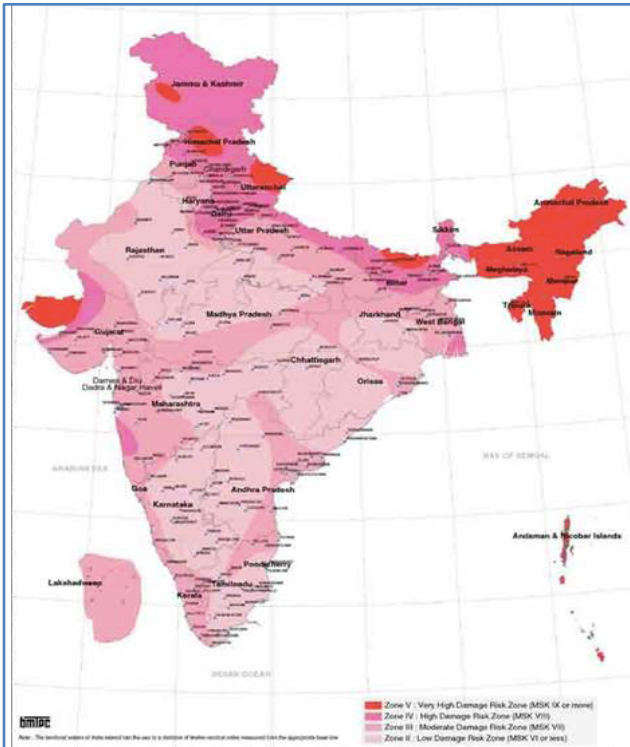
Population at risk in disaster prone regions

– 5th– Initiative against Diarrheal and Enteric diseases in Asia Hanoi, Vietnam

Earthquake prone regions

Wind & Cyclone hazard map

Flood hazard map



More than **58.6 per cent** of the landmass is prone to earthquakes of moderate to very high intensity

Of the 7,516 km long coastline, close to **5,700 km** is prone to cyclones and tsunamis.

Over 40 million hectares (12 per cent of land) is prone to floods and river erosion.

Rapid Diagnostic Test being evaluated



SD Ag O1 Rapid Test,
Standard diagnostic INC. Korea



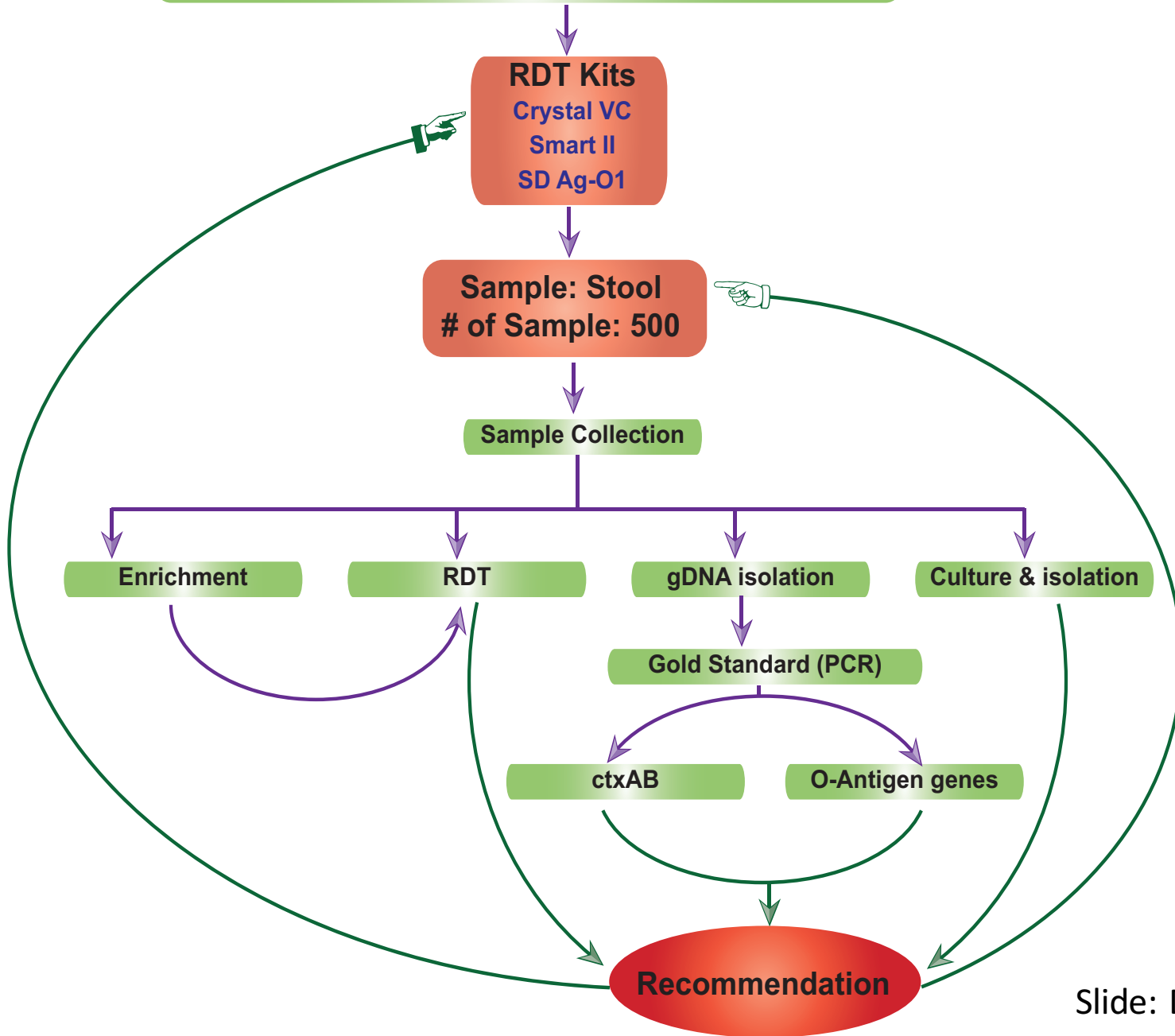
Crystal^{VC} from SPAN
diagnostics
(Now Arkay healthcare, Japan)



SMART II CHOLERA O1
lateral flow

New Horizons Diagnostics
Corporation, USA

Evaluation Of Rapid Diagnostic Tests for Cholera



WASH situation: New initiatives in India

– 5th– Initiative against Diarrheal and Enteric diseases in Asia Hanoi, Vietnam

Sanitation

- Ministry of Drinking Water and Sanitation (MDWS) and UNICEF India
- Two Sub-Missions, the Swachh Bharat Mission (Gramin) and the Swachh Bharat Mission (Urban), which aims to achieve Swachh Bharat by **2019**
- Rs 10,500 crore (105 billion INR) was allocated to SBM (G) in 2016 which has been raised to Rs.20,011 in Union Budget 2017-18
- **SBM cess @0.5% is applicable to all taxable services**
- **SBM KOSH** was established to attract CSR funding, donations from individuals and philanthropists to mobilize resources for improving sanitation facilities in the rural and urban areas, particularly, school premises.

SANITATION



Swachh Bharat Mission (Gramin)

MINISTRY OF DRINKING WATER AND SANITATION
पेयजल और स्वच्छता मंत्रालय

34,827,394

Household Toilets Built

166,056

Open Defecation Free Villages

3,035

Open Defecation Free Villages in Namami Gange

98

Open Defecation Free Districts

3

Open Defecation Free States

India 42.01% (Oct 2, 2014)

India 61.25% (As on Date)



- < 30%
- 30% - 60%
- 61% - 90%
- 91% - 100%

HANDWASH

- **“SWACHH BHARAT SWATCH Vidyalaya”** or Clean India: Clean Schools’ campaign.
- **Washing hands with soap at critical times** – after using the toilet, before eating and preparing food
- **Targets 110 million children in 1.3 million primary and upper primary schools**
- **Message** : it reduces risk of diarrhea and pneumonia by 30-50%

WAY FORWARD

- Demand for vaccines for India is being worked out for endemic and outbreaks separately
- Economic evaluation
 - Cost effectiveness of vaccination is being evaluated in different scenarios:
 - Base scenario
 - Pessimistic scenario
 - Optimistic scenario
 - Mass vaccination
- A supplement in *Vaccine* putting together evidence for use of OCV as a preventive tool

Acknowledgements

- The Expert Group on cholera in India
- BMGF, for funding the creation of a roadmap for cholera prevention and control in India
- DOVE, JHU: Dr. Mohamad Ali, Dr. David Sack and Dr. Anna Lena Lopez
- Dr. G. B Nair and Prof. N.K Ganguly

Thank you



ट्रान्सलेशनल स्वास्थ्य विज्ञान
एवं प्रौद्योगिकी संस्थान
TRANSLATIONAL HEALTH SCIENCE
AND TECHNOLOGY INSTITUTE

www.thsti.res.in

Comparison: Vietnam vs India

	Vietnam	India	
Area	332,698 Km²	3,237,263 Km²	10x
Population	92,700,000	1,210,854,777	7.6
Per capita GDP	\$ 6377	\$ 7197	
Density	276.03	391.1	