GLOBAL TASK FORCE ON
CHOLERA CONTROL

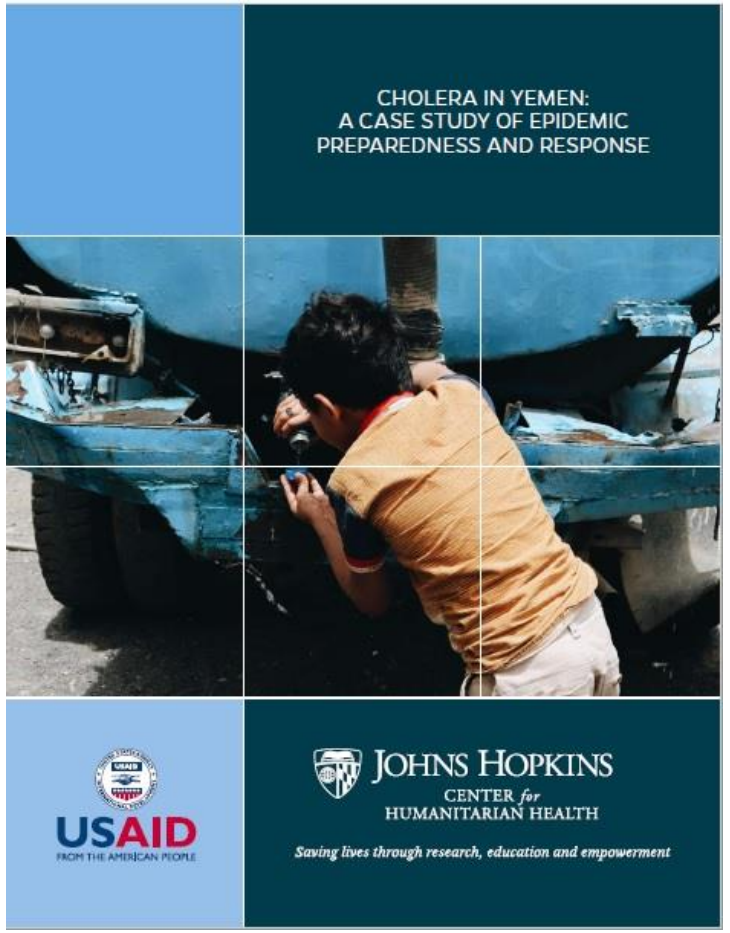
CASE AREA TARGETED INTERVENTIONS (CATIS) FOR CHOLERA OUTBREAKS IN HUMANITARIAN SETTINGS

Paul Spiegel
Mustafa Sikder
Chiara Altare
Shannon Doocy
Andrew Azman
Daniele Lantagne (consultant)

JOHNS HOPKINS
CENTER for
HUMANITARIAN HEALTH

BACKGROUND

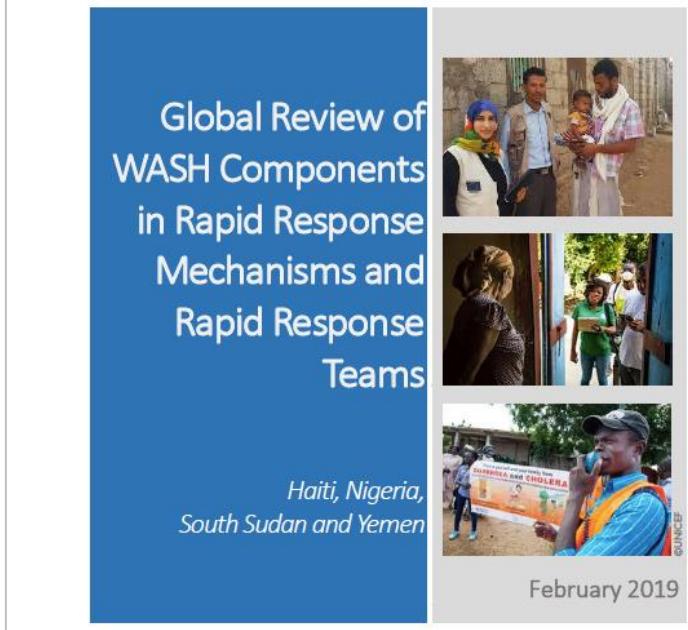
- Humanitarian settings and fragile states especially vulnerable to major outbreaks
- Case Area Targeted Interventions (CATIs) target households with cholera cases and immediate neighbors, and provide WASH and/or health interventions via home visits
- CATIs **may** be important containment strategy in cholera outbreaks in resource-constrained environments; however, their impact remains poorly characterized, as does optimal scale of timing and implementation protocol



OBJECTIVES

1. Systematic peer-reviewed literature conducted to **summarize available evidence** on CATI effectiveness in cholera epidemics with aim of informing response in future outbreaks
2. **Characterize and define** RRT and CATI composition, scope, activities and mechanisms and conduct landscape analysis using grey literature review
3. **Document retrospective evidence** of how CATI approaches in cholera outbreaks were implemented using case studies (DRC, Haiti, Yemen and Zimbabwe)

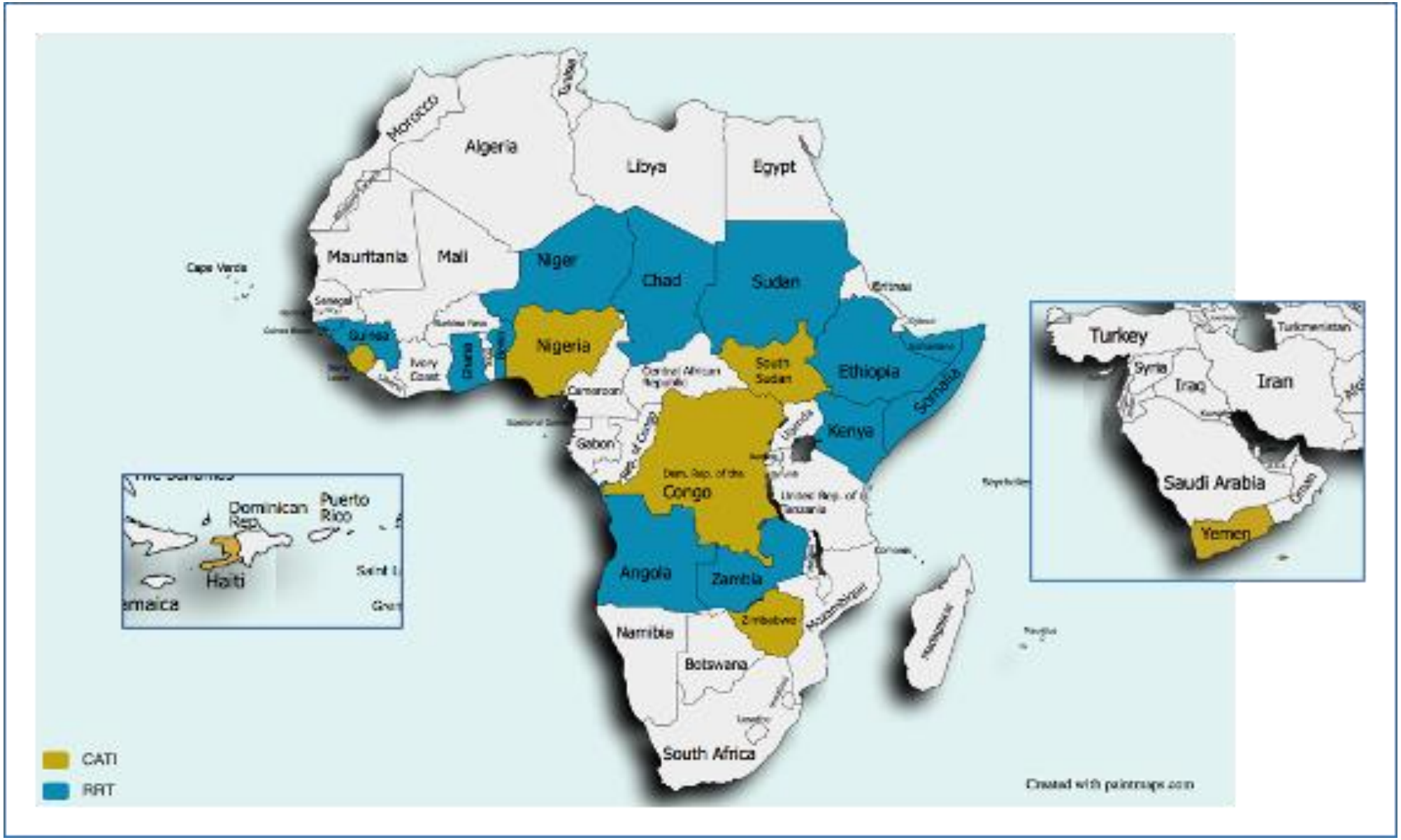
With a focus on health and surveillance components and their interaction with WASH



METHODS

- **Grey Lit:** google web search, ReliefWeb, technical and coordinating bodies, implementing organizations, donor organizations
- **Peer Lit:** systematic search of peer-reviewed literature using PubMed and EMBASE
- **Retrospective:** standardized questionnaire, key informant interviews among government ministries (WASH and Health), UN and NGOs

FINDINGS: USE OF RRT AND CATI IN CHOLERA OUTBREAK RESPONSE (GREY LIT)



FINDINGS: DEFINITION OF SCOPE AND ACTIVITIES OF RRT AND CATI (GREY LIT)

- Great variability of composition, intervention components, activation mechanisms
- All RRTs and CATIs included WASH
- Few details about health activities

		RRT	CATI
Assess.	WASH rapid assessments	x	x
Water	Bucket chlorination	x	
	Emergency water provision	x	x
	Water point disinfection	x	x
	Water infrastructure improvement	x	x
	Water supply treatment at community level or household level	x	x
	Water quality monitoring	x	x
	Water supply storage improvement/construction	x	
	Water for Cholera Treatment Centers (CTCs) or Cholera Treatment Units (CTUs)	x	x
Sanitation	Construction of drainage pits	x	
	Latrine construction	x	x
	Construction of bathing facilities	x	
	Waste Management	x	x
	Waste pit management and physiochemical treatment	x	
	Sanitation for CTCs and CTUs	x	x

		RRT	CATI
Behavior Change	Household or community level training on safe water handling	x	x
	Hygiene promotion messaging, including media campaigns	x	x
	Health promotion	x	
	Hygiene messaging for CTCs and CTUs Community engagement	x	x
NFI	NFI distribution (Soap, chlorination tabs, jerry cans, hygiene kits, oral rehydration therapy, or Cholera kits)**	x	x
Capacity Building	Training and capacity building on WASH systems	x	
	Cholera epidemic control training for community or volunteers	x	
IPC	WASH household disinfection teams	x	x
	IPC & WASH disinfection for facilities as support	x	
	Safe and dignified burials	x	
Health	Oral Cholera vaccine	x	x
	Oral chemoprophylaxis	x	x
	Health education	x	x
	Referrals to CTC	x	x
	Treatment	x	

INTERVENTIONS

WASH activities

WASH Interventions	
Household activities:	**Community:**
☐ Household disinfection	☐ WASH assessment
☐ Latrine disinfection	☐ Health promotion
☐ Hygiene education session	☐ Aquatab distribution
☐ Aquatab distribution	☐ Bucket chlorination
☐ Water storage container distribution	☐ Chlorination at water point
☐ Water quality monitoring	☐ latrine construction in public areas
☐ Cholera kit distribution	☐ Water point rehabilitation
☐ Hygiene kit distribution	☐ Waste management
☐ Soap distribution	☐ Garbage holes dug
☐ Laundry powder distribution	☐ Cholera kit distribution
☐ Chlorinated solution distribution	☐ Hygiene kit distribution
	☐ Safe burials
	☐ Community volunteer training

Health and surveillance activities

Health Interventions
☐ Oral cholera vaccine
☐ Chemoprophylaxis
☐ ORT through mobile clinics
☐ Referrals to CTC
☐ ORS distribution
☐ Case identification

FINDINGS: USE OF CATIS IN CHOLERA OUTBREAK RESPONSE (PEER LIT)

- 11 peer-reviewed articles published between 2009-2019 reported on CATIs in seven countries

Location	Transmission*	Outbreak Timeframe	Outbreak Duration	Setting	Outbreak Size (cases)	Intervention Type(s)
Africa						
Douala, Cameroon	Epidemic	Jan - Aug 2004	8 months	Urban (no crisis)	4,941 treated	CATI (Integrated)
Nyanza Province, Kenya	Endemic	Jan – Apr 2008	4 months	Rural (no crisis)	790 cases	CATI (WASH)
Juba, S Sudan	Epidemic	Jun - Oct 2015	4 months	Urban (conflict)	6,269 reported	CATI (integrated)
Middle East						
National and Hodeidah City, Yemen	Epidemic	Oct 2016 - present	---	Urban & rural (conflict)	2,316,197 suspected	CATI (WASH)
Asia						
Dhaka, Bangladesh	Endemic	(2013-14)	---	Urban (no crisis)	Not available	CATI (WASH)
Kathmandu Valley, Nepal	Epidemic	Jun - Nov 2016**	6 months	Urban & rural (post-earthquake)	169 confirmed	CATI (WASH)
Americas						
National, Port au Prince, Carrefour, Haiti	Endemic	(2010-19)	---	Urban (post-earthquake)	819,000 suspected (2010-19)	CATI (WASH & Integrated)

*epidemics occurring in countries where cholera is endemic; **intervention timeframe, outbreak timeframe unclear

FINDINGS: CATI COVERAGE AND SCALE (PEER LIT)

- CATIs either included in WASH interventions only (n=6) or were integrated (i.e., included health and WASH interventions) (n=5); No CATIs delivered health interventions alone
- Differed in types of households targeted and both scale and intensity of interventions
- Moderate coverage (26-65%) such that not all outbreaks were responded to and targeted households may not have been reached
- Implementation barriers in several settings included coordination with alert/surveillance systems and coordination of timely reporting of confirmed cases

If high levels of coverage cannot be attained, CATIs may be less effective than anticipated

FINDINGS: CATI EFFECTIVENESS (PEER LIT CONT)

- Overall CATI effectiveness, measured in terms of cholera case reduction, was reported in only 2 of 11 included studies
- A randomized control trial in Bangladesh found a modest but statistically significant reduction of 5% in symptomatic infections among intervention recipients vs. controls (George et al., 2016)
- In Haiti, integrated CATIs including antibiotics delivered in CATIs significantly reduced number of new cases and outbreak duration

Evidence for effectiveness of CATI, as implemented in real-world setting and assessed in terms of cholera case reduction is limited

FINDINGS: CATI EFFECTIVENESS (RETROSPECTIVE)

- Striking variability in WASH, health and surveillance among four countries, with evolution in DRC, Haiti & Yemen; WASH-only in Zimbabwe
- Many protocols and standard operating procedures not written down
- Choosing number of surrounding households around case is variable acc. to context and ultimately depends upon CATI team leader
- Sharing of linelists problematic in many responses at beginning with WASH, but improves over time

Integration of WASH, Health and surveillance not uniform and needs to be considered and acted upon pre-outbreak; donors play important role

CONCLUSIONS

- High heterogeneity in reporting of information in all studies (peer, grey, retro); documentation strongest on WASH components with limited information on health and surveillance, and even less information on integration
- Health interventions in CATIs are less clear and understood by governments, organizations and donors than WASH interventions
- Coordination mechanisms and systems for implementation among governments and organizations need more clarity
- Standard operating procedures according to context and feasibility need to be developed and improved upon as more data become available

CONCLUSIONS CONT

- Modelling studies suggest that spatially targeted interventions such as CATIs may be more efficient mechanisms to reduce cholera transmission than mass interventions; however, little compelling real-world evidence of their effectiveness was identified in the review
- Delays in case confirmation, reporting, or CATI delivery could substantially decrease the effectiveness of the CATI approach, even if the interventions delivered by CATIs are themselves effective
- Additional evidence of CATIs' delivery and effectiveness is critical to a more successful implementation of the Global Task Force on Cholera Control (GTFCC) cholera reduction strategy

CONCLUSIONS CONT (RATNAYAKE ET AL., IN PRESS)

- Limited understanding of mechanisms by which interventions work for CATI; antibiotic and single dose OCV will have different impacts on reducing transmission rapidly and then sustaining it in addition to household WASH interventions
- There is also unexplored potential for better use of enriched RDTs for targeting CATIs to true cases (vs AWD)
- A spatio-temporal zone of 100-m for 7-days around primary case households is justified by evidence
- While CATIs with good detection capacity are justified in early/late phases of outbreak or after mass vaccination, it's capacity to contain transmission will be limited during large-scale epidemic