Water, Sanitation, and Hygiene in Cholera Response

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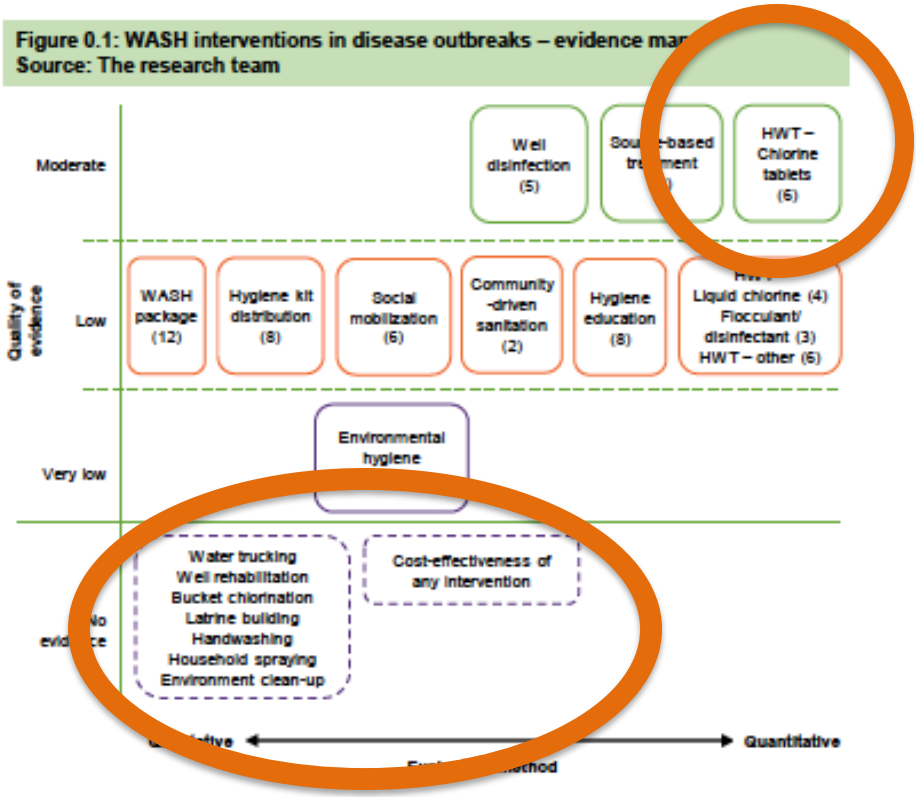
WASH Evidence in Outbreaks (Cholera)

- Systematic Review
  - 15,000 documents
  - Outcomes, impacts
- Evidence base is thin
  - High in water treatment
  - Low in hygiene/sanitation
  - Low in emergency only interventions
  - “CISUR”



Credit: Travis Yates

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Recent Research – Filling in Gaps

LAB

- Efficacy of bucket chlorination (R2HC)
- Efficacy of households spraying/wiping and household disinfection kits (R2HC)
- Cleaning jerricans cans and taps / biofilm (OFDA, Kohler)
- Fouling in membrane filters (Tufts)

FIELD

- Effectiveness of
  - Water trucking (OFDA)
  - Bucket chlorination (OFDA, R2HC)
  - Household spraying and household disinfection kits (R2HC)
  - Hygiene kits, cash transfers, shared latrines (UNICEF/Myanmar)

POLICY

- Chlorine tablet selection and alignment (OFDA)
- Impacts of coordination, quality in response (Cluster, Oxfam/SI)

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Spraying/Wiping – Lab Efficacy Study Design

Surfaces		Chlorine Concentration		Chlorine Type		Exposure Time		Application
Stainless Steel	X	0.2 %	X	Sodium hypochlorite (NaOCl)	X	1min	X	Spray
HDPE Plastic								
Ceramic				High-test hypochlorite (HTH)				
Nitrile		2.0 %				10 min		Wipe
Tarp				Sodium dichloroisocyanurate (NaDCC)				
Wood								
Terracotta								
Foam								
Cloth								
Dirt								

- Matrix sampled in duplicate with + / - controls
- Surfaces inoculated with 2 mL of *V. cholerae* culture.
- Chlorine concentration confirmed within +/- 10%
- Surface carriers neutralized in sodium thiosulfate.

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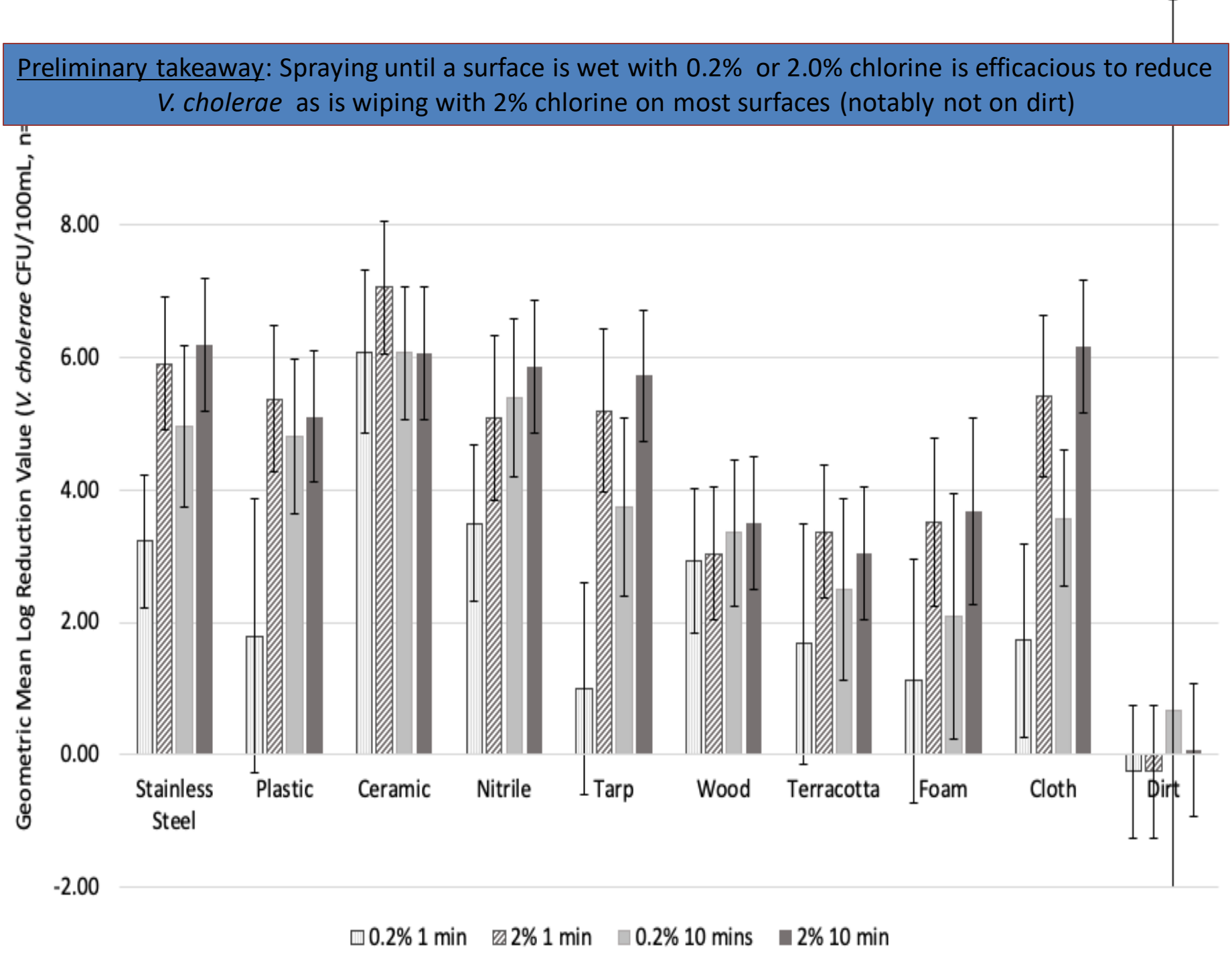
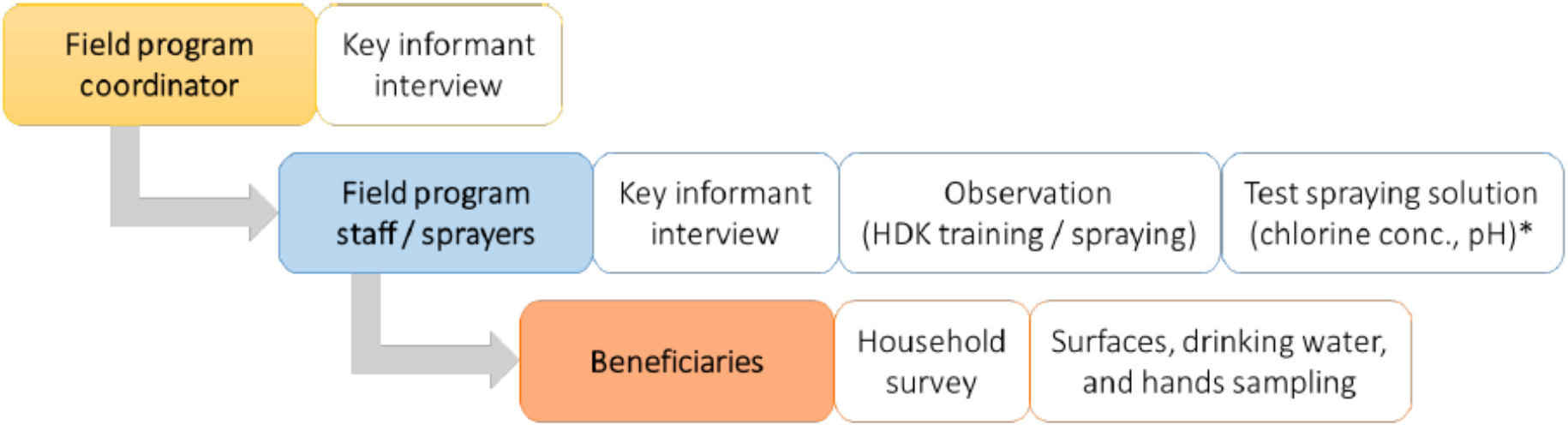
Preliminary takeaway: Spraying until a surface is wet with 0.2% or 2.0% chlorine is efficacious to reduce *V. cholerae* as is wiping with 2% chlorine on most surfaces (notably not on dirt)



Field - Household Spraying - Protocol



*For household spraying only.

Slide credit: Karin Gallandat

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Detection of culturable *V. cholerae* on surfaces

BEFORE					SURFACE	AFTER: 30 MINUTES					AFTER: 24 HOURS				
HH01	HH02	HH03	HH04	HH05		HH01	HH02	HH03	HH04	HH05	HH01	HH02	HH03	HH04	HH05
					Kitchen / inside floor										
					Latrine floor										
					Patient's bed										
					Jerrycan										
					Wall										
					Furniture (table)										
					Curtains										
					Door										

BEFORE					SURFACE	AFTER: 30 MIN					AFTER: 24 HRS				
HH06	HH07	HH08	HH09	HH10		HH06	HH07	HH08	HH09	HH10	HH06	HH07	HH08	HH09	HH10
					Patient's bed										
					Kitchen floor										
					Latrine floor										
					Floor close to bed										
					Wall										
					Curtain										
					Jerrycan, container										
					Latrine door / wall										
					Entrance door										

- High (>5000 CFU/100 cm²)
- Intermediate (200-5000 CFU/100 cm²)
- Low (<200 UCF/100 cm²)
- Not detected

Conclusions

Key results

- Spraying can reduce contamination on HH surfaces if implemented properly
- Intervention coverage is limited (asymptomatic & community cases)
- Challenge: identification of HH
- VBNC *V. cholerae* not detected in this work; their relevance remains unclear

Recommendations
(if HH spraying is implemented)

- Systematic procedure to ensure complete coverage
  - Spray until surface is wet
  - Kitchen area is critical (2.0%)
- Prioritize approaches that increase community coverage
- Use HH spraying opportunities for hygiene promotion
- Travel w/ patient's relative and give sprayers phones/radio

Acknowledgements

- Travis Yates
  - Systematic Review
- Karin Gallandat
  - Household Spraying Field
- Gabrielle String
  - Bucket Chlorination / Lab

r2hc Research for health in humanitarian crises | elrha

USAID FROM THE AMERICAN PEOPLE

Action Research on Common Under Researched WASH Interventions
Tufts University, in collaboration with response organizations

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