
Recent Research on Cholera

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Spraying or Wiping?

Household Spraying



K. Gallandat, 2018

- Traditional approach
- Guidelines deprioritize / do not recommend
 - Lack of evidence
 - Stigmatization concerns
 - Surface recontamination
 - Delay in reaching patient household
 - Dessication of *V. cholerae*
 - Lack of spraying recommendations
 - Possible damage to HH items
 - Resource and staff intensive

Spraying or Wiping?

Household Disinfection Kits



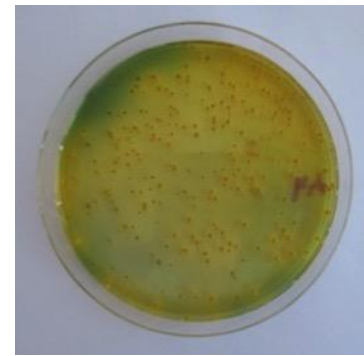
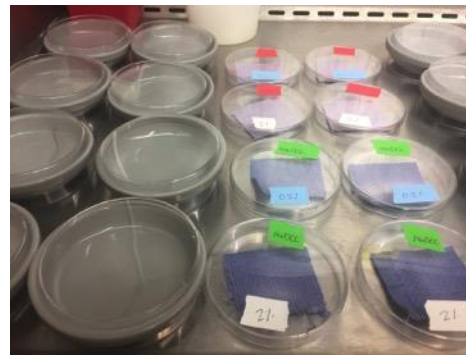
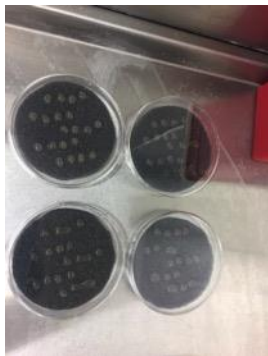
MSF Haiti

- New intervention
- Limited implementation
- Lack of evidence and standardization
- Guidelines recommend distribution
 - Strategic use of resources
 - Possible repeat use by household
 - Training to households?

ACF, 2013; Olson et al., 2017; UNICEF, n.d.

Laboratory Study

Evaluate the **efficacy** of different spraying and wiping guidelines against *V. cholerae* on various surfaces.



Methods

Surfaces
Stainless Steel
HDPE Plastic
Ceramic
Nitrile
Tarp
Wood
Terracotta
Foam
Cloth
Dirt

X

240 tests

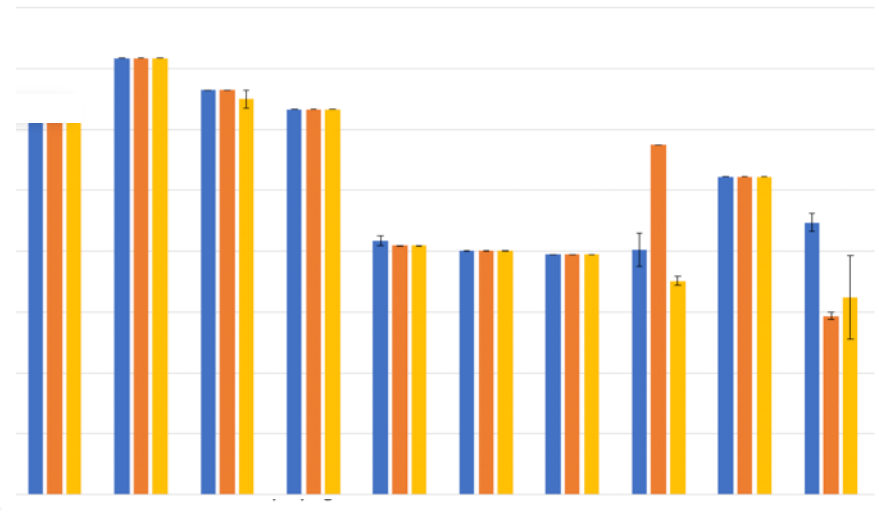
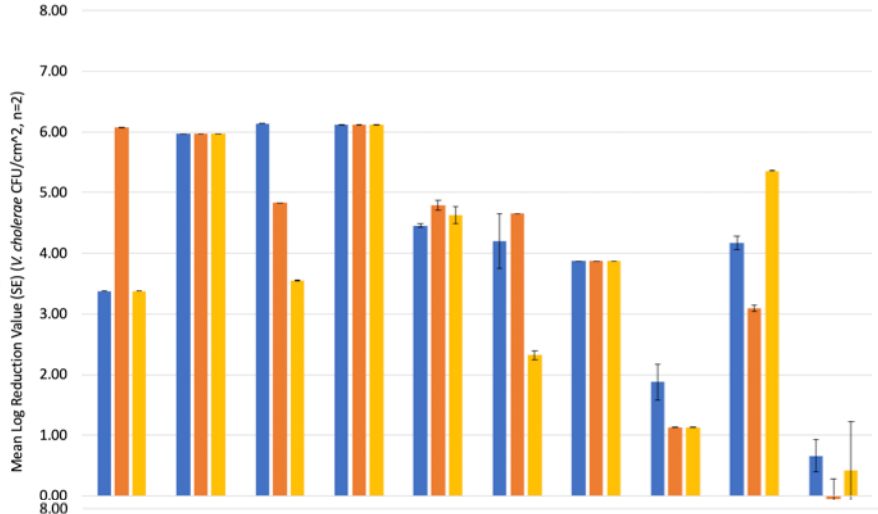
- Surface inoculated with 2 mL 10^6 *V. cholerae* CFU/100 mL

Results – Spraying

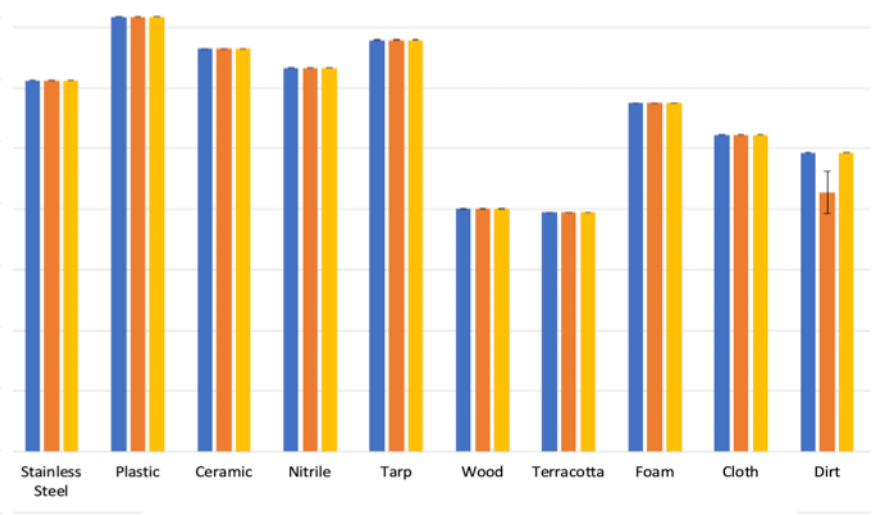
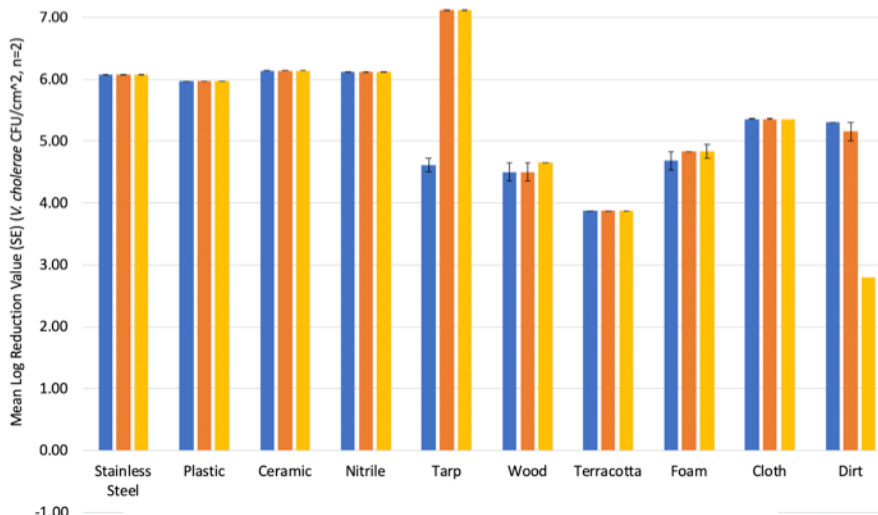
1 min

10 min

0.2 %



2.0 %



9/10 tests achieved >3 LRV

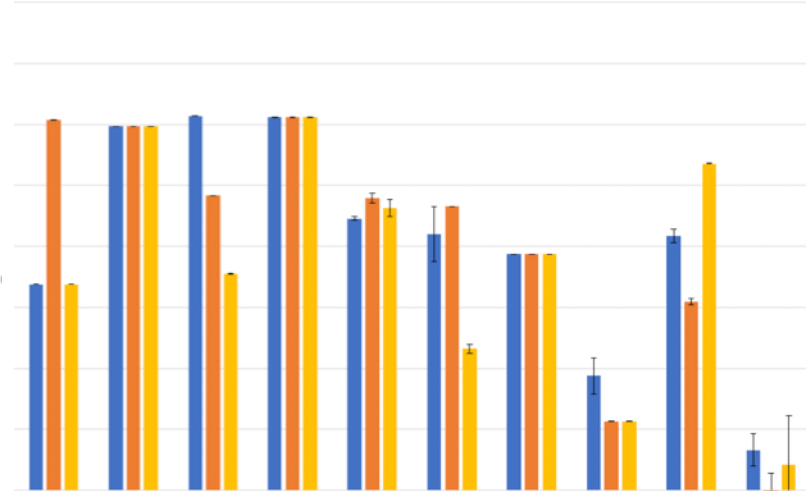
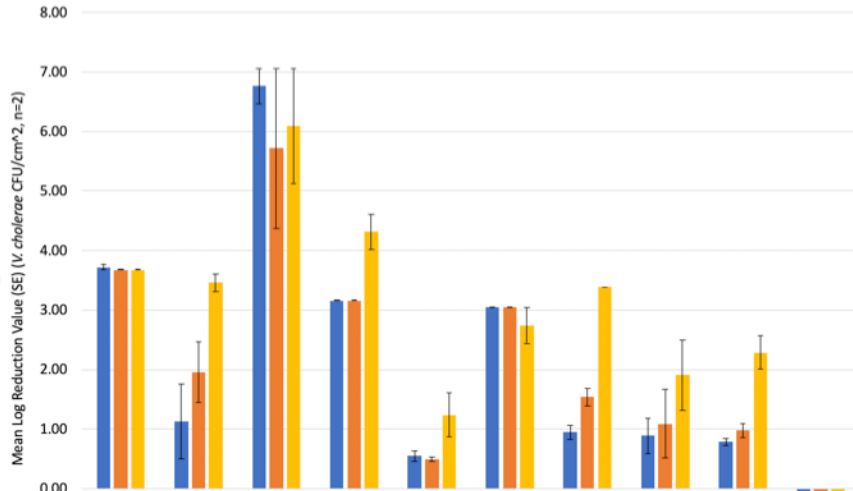
10/10 tests achieved >3 LRV

Results – Wiping

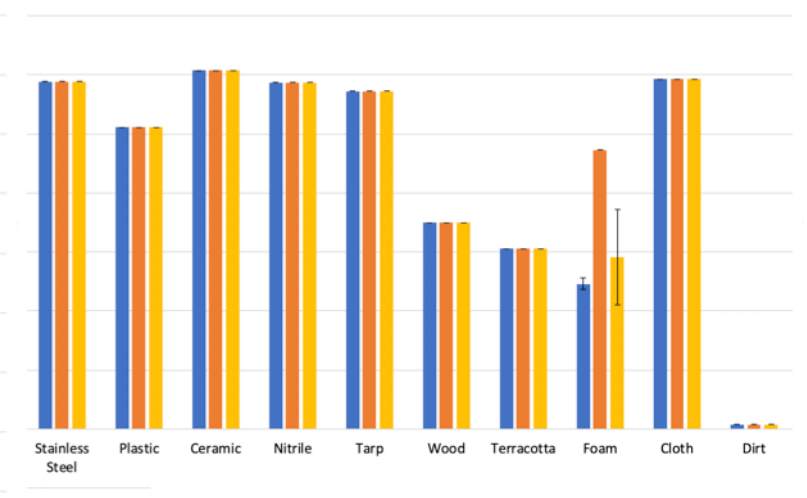
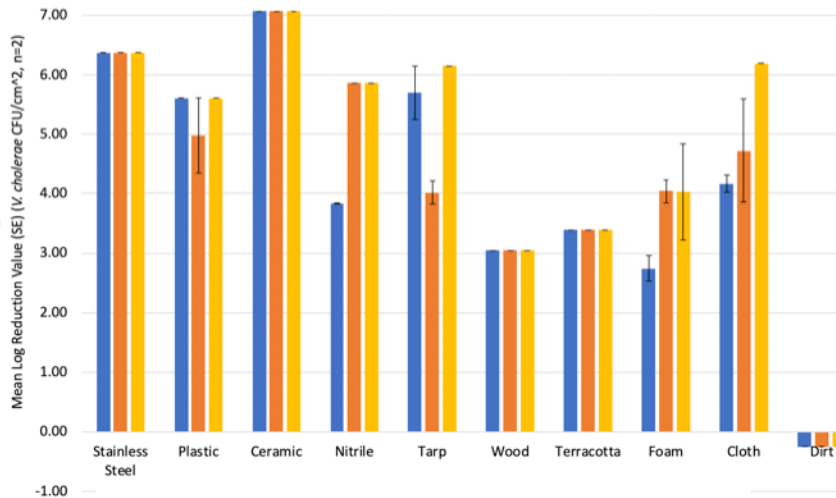
1 min

10 min

0.2 %



2.0 %



8/10 tests achieved >3 LRV

8/10 tests achieved >3 LRV

Conclusions

- No significant differences chlorine types
- Significantly **↑ LRV** on surfaces **sprayed**
- Significantly **↓ LRV** on **porous surfaces**
- **Recommendations:**
 - Use 0.2/2.0% when spraying
 - Non-porous and porous
 - Use 2.0% when wiping



*Smalllike,
Noun Project*



*Fariha Begum,
Noun Project*

Household Spraying in Cholera Outbreaks: Evaluation of Three Programs

K. Gallandat, J. Rayner, A. Huang, G. String, D. Lantagne
9th EEHF, Geneva – June 18-19, 2019

V. cholerae on Selected Household Surfaces

PROGRAM A

BEFORE					SURFACE
HH01	HH02	HH03	HH04	HH05	
High	High	Intermediate	High	High	Kitchen / inside floor
High	Low	Intermediate	Not detected	Not detected	Latrine floor
Low	Not detected	Low	Not detected	Low	Patient's bed
Low	Not detected	Low	Not detected	Intermediate	Jerrycan
Intermediate	Not detected	Not detected	Low	Not detected	Wall
Not detected	Not detected	Not detected	Not detected	High	Furniture (table)
Not detected	Not detected	Not detected	Not detected	Intermediate	Curtains
Low	Not detected	Not detected	Not detected	Not detected	Door

Systematic
5-10 L/HH
5-10 min/HH

- (High) High: $\geq 5,000$ CFU/100 cm²
- (Intermediate) Intermediate: 200-5,000 CFU/100 cm²
- (Low) Low: < 200 CFU/100 cm²
- (Not detected) Not detected

PROGRAM B

BEFORE					SURFACE
HH06	HH07	HH08	HH09	HH10	
High	High	High	Low	High	Patient's bed
Not detected	High	High	High	High	Kitchen floor
Not detected	High	High	High	High	Latrine floor
High	Not detected	Not detected	Intermediate	Not detected	Floor close to bed
Not detected	High	Intermediate	Low	Low	Wall
Not detected	Intermediate	Intermediate	Not detected	Low	Curtain
Not detected	Low	Low	Not detected	Not detected	Jerrycan, container
Not detected	Low	Low	Not detected	Not detected	Latrine door / wall
Not detected	Low	Not detected	Low	Not detected	Entrance door

Ad hoc
0.2 L/HH
2-5 min/HH

Key results

- Spraying *can reduce* contamination on HH surfaces if implemented properly
- Intervention coverage is limited
- Challenge: HH identification

Recommendations (if HH spraying is implemented)

- Systematic procedure to ensure complete coverage
 - Spray until surface is wet
 - Kitchen area is critical (2.0%)
- Increase community coverage
- Use HH spraying opportunities for hygiene promotion
- Travel with patient's relatives / provide phones/radio

Household disinfection kits: facilitators, barriers, training and evidence needs

Camille Heylen, Cawo Ali, Karin Gallandat, Daniele Lantagne, Gabrielle String

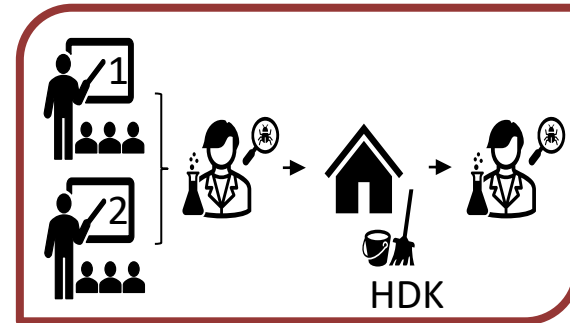
Study design and data collection

Implementers **interviews** on household disinfection interventions



- 14 informants
 - 5 international-level
 - 9 national-level

In-field **pilot study** on HDK use in Haiti



- Two sessions
 - Lecture, demonstration
- 20 participants
- Surface samples

KII Results

1. Confusion between HDK and Hygiene kit

2. Disconnect between international and national respondents

Respondents **didn't often make a choice** between HS and HDK because of a **lack of knowledge** or their position in the decision-making chain.

3. Four themes evolved through interview to classify their perceptions :

- Effectiveness and certainty of the method (93% of respondents)

"HS ensures that the environment has been disinfected as it should, that there are no new risks because when the household is told to do so, there is always a risk that is not (well) done"

*"There was no evidence to support HS effectiveness. And we just realized that we just go there once to spray the house, spray the walls and what's the point?
We also thought that it wasn't a factor for physically effective at killing the bacteria"*

- Implementation of the intervention (86%)

*« You sent a team out : two people to go to the house with the spraying kit and the chlorine.
But as soon as the number of cases per day increased, it wasn't possible to achieve the coverage and it was a big expense"*

« With the household disinfection kits, you still need human resources that are distribution, carrying out the hygiene promotion sessions,..."

- Chlorine/Bleach perception (73%)

"Bleach creates higher risk to the household or family lives because they do not understand how to use it, it is too harmful"

- Beneficiaries' behavioral change (73%)

"It is basically to empower the household to look after themselves"

More drawbacks than advantages for HDK and HS

Perceived **gap of effectiveness** for both method so need to rely on other parameters/themes

Household Disinfection **questioned** and not a priority

Field Study Results

- Bedroom, latrine, and kitchen floors highest contamination
- Differences between training groups:

	Lecture-based session (1)	Demonstration session (2)
Significant bacteria reduction (p-value)	Vibrio spp. (p=0.012)	Vibrio spp. (p<0.001) <i>E. coli</i> (p<0.001)
Self-reported HDK use	17-50% of participants	78-89% of participants

- 60-73% participants reported using correct concentrations

Complex:

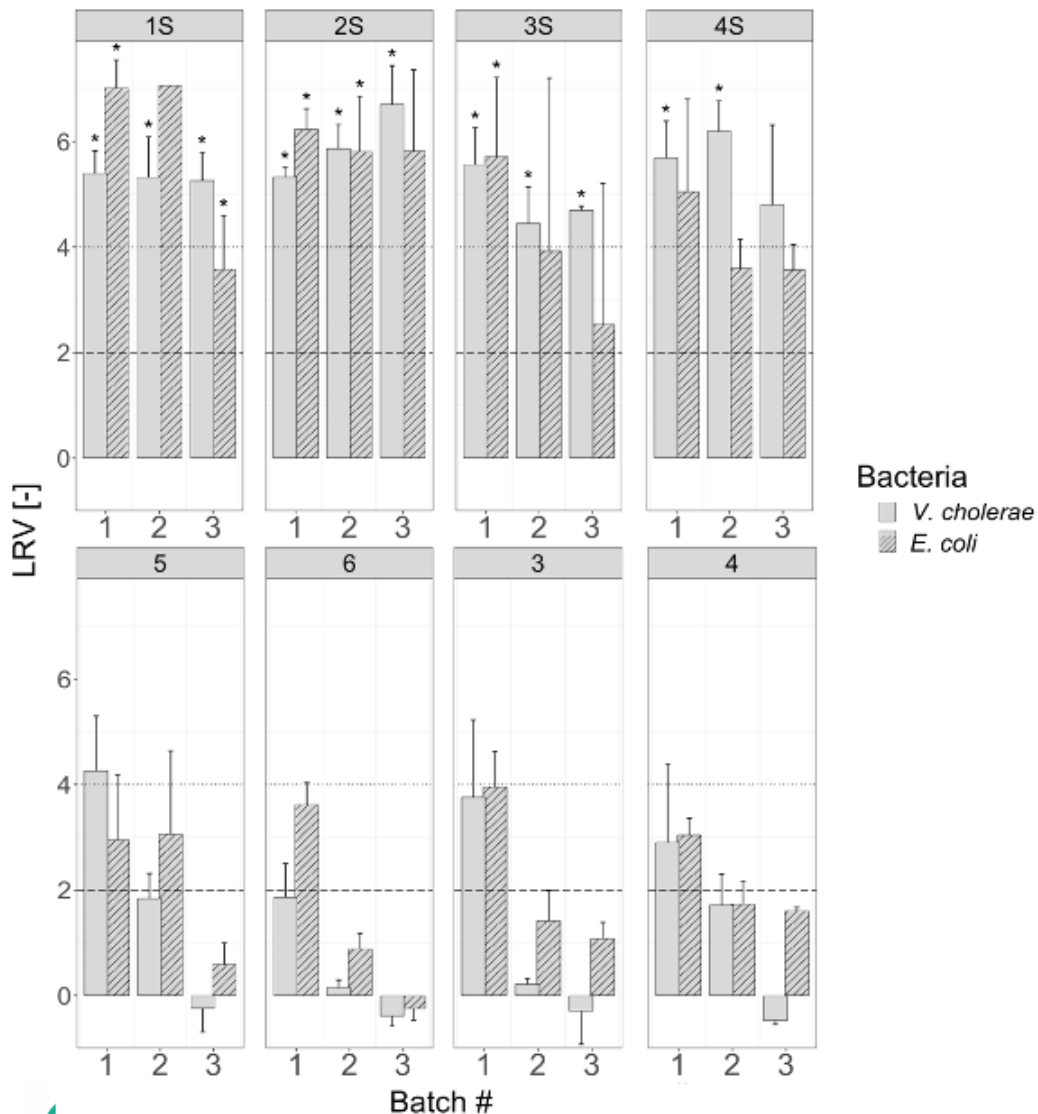
- Not simply HS or HDK is better, or one should be promoted.
- Factors related to efficacy, implementation, training, socio-behavioral, etc.

Ceramic Filters & *V. cholerae* removal

- Ceramic filters
 - Locally-acceptable HWT option
 - Efficaciously remove *E. coli*
 - 3 mechanisms removal
 - Size exclusion
 - Physio-chemical
 - Silver disinfection

What about *V. cholerae*?





Filters (s) with silver

- High LRVs for *E. coli* & *V. cholerae*

Filters without silver

- Lower LRVs for *V. cholerae* than *E. coli*

Silver mechanism critical

- Depends on manufacturing
- Influent water quality can cause elution over time
- How confirm silver?

Thank you!

