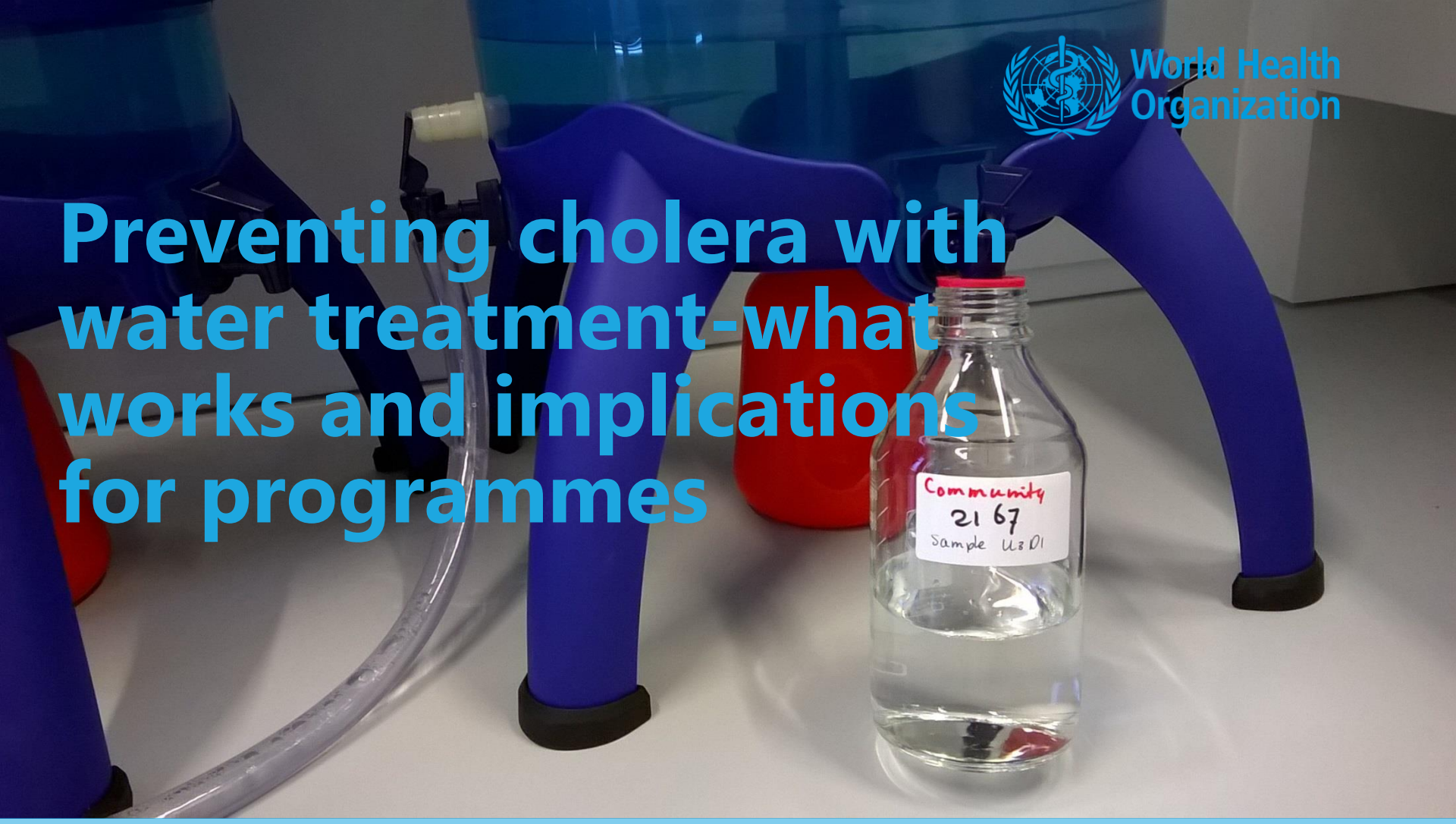


World Health Organization

Preventing cholera with water treatment-what works and implications for programmes

WHO International Scheme to Evaluate Household Water Treatment Technologies

Global Taskforce on Cholera Control WASH Working Group Mtg, Feb 2019

Batsi Majuru & Maggie Montgomery ¦ Water, Sanitation, Hygiene & Health

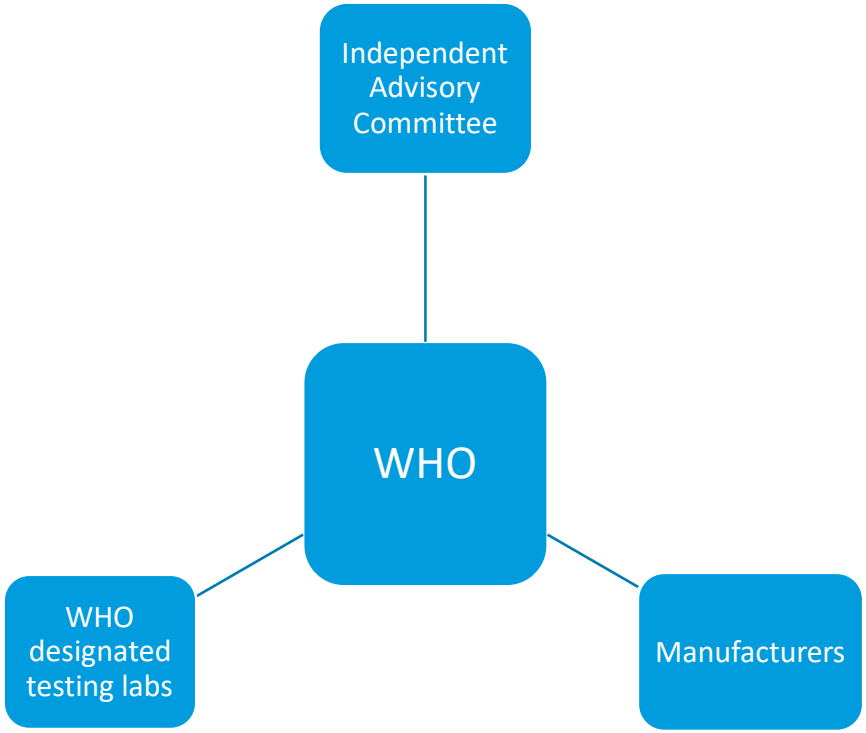
Outline

- Describe scheme
- Present highlights of testing results from Rounds I-II
- Discuss implications for implementers with a focus on chlorination

Why an evaluation Scheme?

- Issue: HWT market is diverse; product performance varies
- Need: Independent health-based performance evaluation to guide selection
- Gap: Many countries lack health-based regulations and technical capacity to test performance

Scheme objectives



- Promote and coordinate independent and consistent evaluation of HWT products, and guide product selection
- Strengthen national capacity in conducting complimentary evaluations, regulation of HWT products

HWT performance evaluation criteria

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E.g.: If a filter demonstrated 99.999% protozoa reduction, 99.9% bacteria reduction, and 90% virus reduction, what performance classification would it achieve?

Performance classification	Bacteria (log_{10} reduction required)	Viruses (log_{10} reduction required)	Protozoa (log_{10} reduction required)	Interpretation (with correct and consistent use)
★★★	≥ 4	≥ 5	≥ 4	Comprehensive protection
★★	≥ 2	≥ 3	≥ 2	
★	Meets at least two-star (★★) criteria for two classes of pathogens			Targeted protection
–	Fails to meet criteria for one-star (★)			Little or no protection

99.999% = 5 log **99.9% = 3 log** **90% = 1 log**

Round I results

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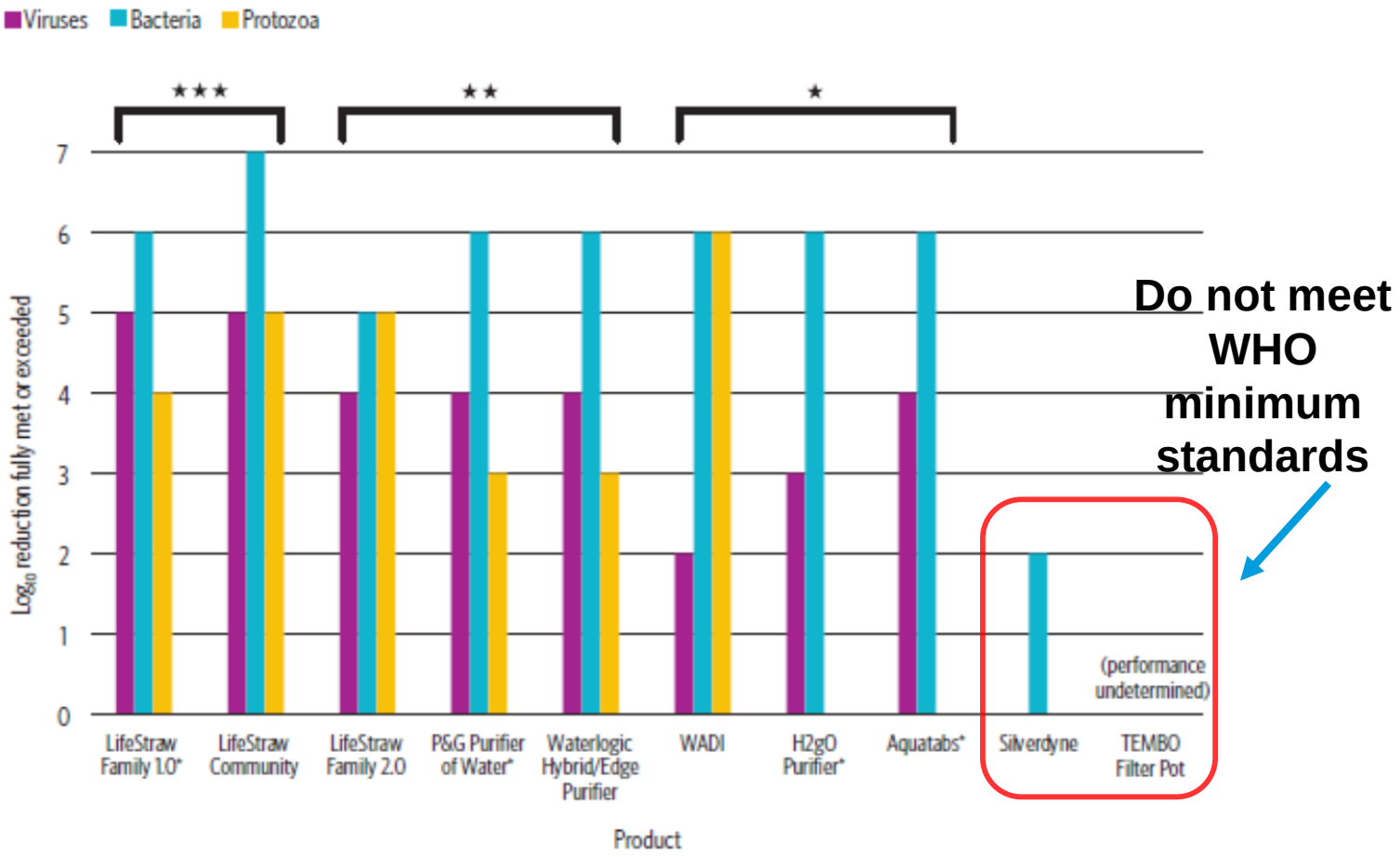
FIGURE 5

Log_{10} reduction of bacteria, viruses and protozoa met or exceeded by products evaluated in Round I



Do not meet WHO minimum standards

Products evaluated in Round II

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Technology	Product trade name	Manufacturer	Microbial groups evaluated
Membrane filtration	GrifAid®M3	Safe Water Trust	Bacteria and viruses
	LifeFilta LFJC Jerry-Can with back-wash	SenseSeveri GCV	Bacteria and viruses
	Uzima Filters UZ01	Uzima Water Filters	Bacteria and viruses
Ceramic filtration	Nazava Water Filters	PT Holland for Water	Bacteria and viruses
	SPOUTS Water Filter	SPOUTS of Water Ltd	Bacteria, viruses and protozoa
	Tulip Table Top Water Filter	Basic Water Needs B.V.	Bacteria and viruses
Flocculation-biofiltration	BlueQ™ 2 Stage	Amway Corporation	Bacteria, viruses and protozoa
UV disinfection	Water Elephant	Years of Water	Bacteria and viruses
	Mesita Azul®	Fundacion Cantaro Azul	Bacteria and viruses
Solar / thermal disinfection	AquaPak	Solar Solutions	Bacteria, viruses and protozoa
	JAMEBI Solar Water Pasteurizer	Relevant Projects Ltd	Bacteria and viruses
	SolarBag®	Puralytics	Bacteria, viruses and protozoa
Flocculation-disinfection	AquaSure Tab 10	AquaSure	Evaluation nearing completion
	Rubicon	Prideco Holdings	Evaluation ongoing
Flocculation-disinfection-filtration	DayOne Waterbag™	Day One Response Inc	Evaluation ongoing
Chemical disinfection	BioCool Clean Water	Biocool	Evaluation ongoing
	Chloritard	Karnis & Hals Chemicals Pvt Ltd	Evaluation recently completed
	Flogenic / Aquatabs Flo	Medentech Limited	Evaluation ongoing
	Oasis Water Purification Tablets	Hydrachem Ltd	Evaluation recently completed
	WATA-Standard®	Antenna Technologies	Evaluation ongoing

Implications for chlorination

WaterAid

- Chlorine demand is variable and affected by many parameters *(natural organic matter (TOC), salts, pH, temperature)*
- Aim is to achieve **consistent free chlorine residual**

  (≥0.2 mg/L at the point of delivery; ≥0.5 mg/L throughout piped systems in outbreaks)
- Must conduct residual testing; adjust dosing as needed-need a site specific approach
- More centralized chlorination approaches preferred

Key takeaways from Round I and II

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- ✓ **Many HWT products meet WHO performance criteria**, including commonly procured products in emergencies and cholera outbreaks

  -8/30 provide comprehensive protection

  -12/30 provide limited protection (some only in non-turbid water)

  -5/30 Products fail

  (testing ongoing for five products)

Key takeaways from Round I and II

- Manufacturing quality control for many product types is weak
- Performance claims are often overstated
- Many use instructions unclear, unrealistic, assume advanced knowledge

Tufts University/ Daniele Lantagne, Justin Rayner

Performance of many product types highly variable

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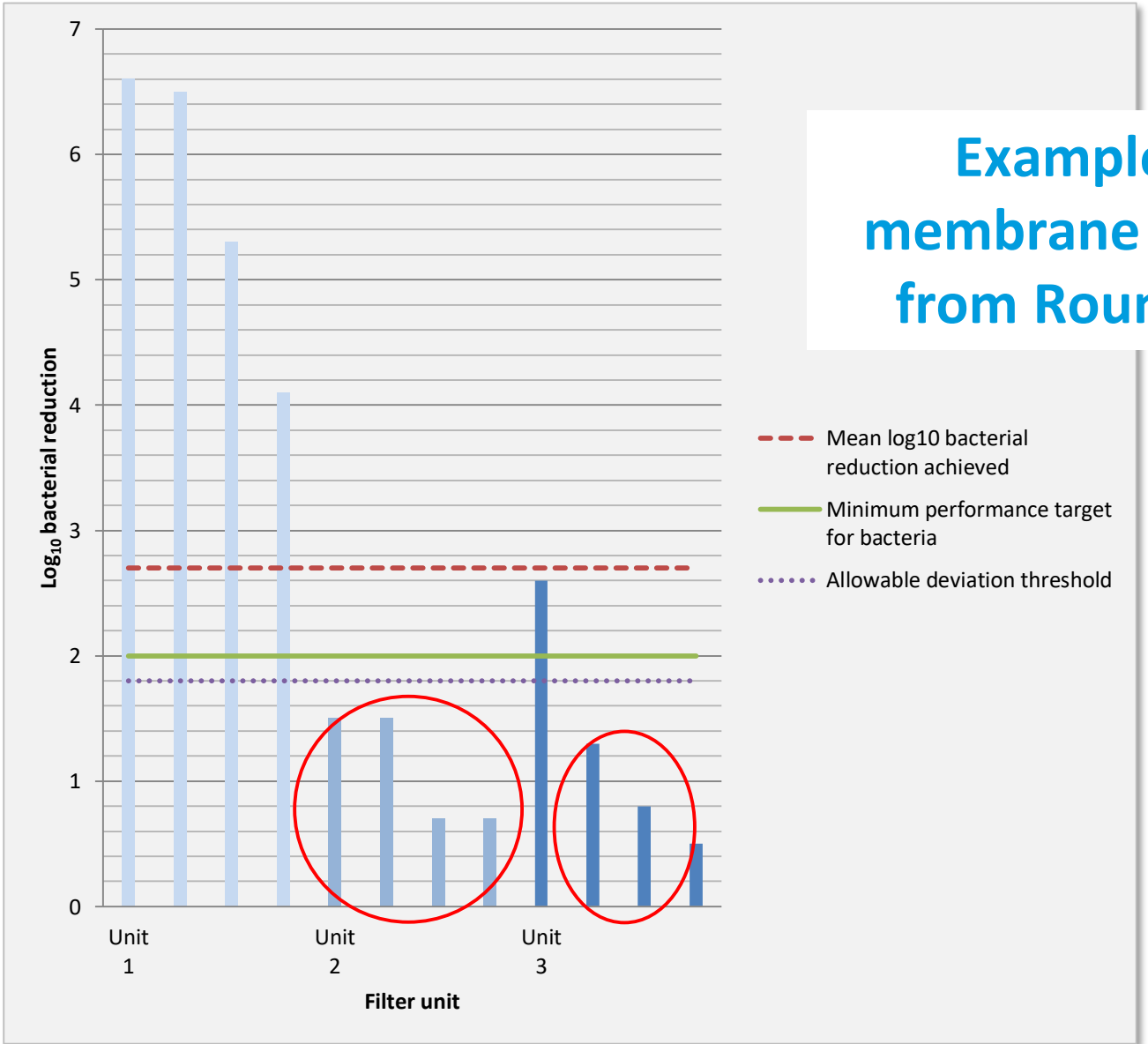

Example: membrane filter from Round II

What to look for in manufacturer claims?

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GHANA STANDARDS AUTHORITY

Tested at Ghana Standards Authority with positive results.

...st effective technology best suited for
...ter disinfection. XX can

All the above were from products that FAILED.

...e show XX eliminates 99.999% bacteria including E. Coli, Shigella, Legionella, Salmonella and Cholera, Aspergillus Niger, Staphlococcus Aureus, and Trichophyton Mentagrophytes, to name a few.

- ✓ Tested against three main class of pathogens (bacteria, viruses and protozoa) in **independent** laboratory
- ✓ Tested with **different types** of water
- ✓ Use instructions are reasonable and clear
- ✓ Manufacturing follows QA/QC principles and/or appropriate ISO certification
- ✓ Evidence of uptake and water quality improvements

Summary

- There is **NO** benefit in distributing / promoting products that do not work
- Effective chlorination requires regular monitoring and adjustments
- Send us your products for Round III!
- More info: http://www.who.int/water_sanitation_health/water-quality/household/scheme-household-water-treatment/en/

  Email: hhwater@who.int

Thank you