

Discussion Points – Pure Home Water & WTP for Ceramic Water Filters



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London School of Economics

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Outline – 4 Discussion Points



Introduction– Pure Home Water

#1) WTP may be seasonally dependent

#2) IPA vs PHW sales methods

#3) Objective measure - digital flow-time recorder

#4) Which Aid works? Positive price or free?

Pure Home Water – YouTube Video

http://www.youtube.com/watch?v=wHeSYy2XZKw&feature=youtube_gdata_player



Credit: Alexandr Nishichenko

Pure Home Water

- Pure Home Water (PHW): a social enterprise founded in 2005 to provide safe drinking water via household water treatment and safe storage (HWTS) in Northern Ghana.

PHW has 2 goals:

1. Reach all people in Ghana with safe water, but especially focusing on those most in need of safe water, sanitation and hygiene (WASH), especially in Northern Ghana, the poorest part of Ghana
2. Become financially and locally self-sustaining



Pure Home Water – 2 changes since IPA study

2. Flowerpot design-> hemisphere design
= higher flow rate (1-3 L/hr vs. 10 L/hr)
and more durable.

1. Rebranding: Kosim Filter -> AfriClay Filter

Is your family's drinking water *SAFE*?

Make sure! Use an

AfriClay Filter

by *Pure Home Water*



For more information, call **0573-333-355**
or visit **purehomewater.org**

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Sign produced by Bob Acheampong Ltd.

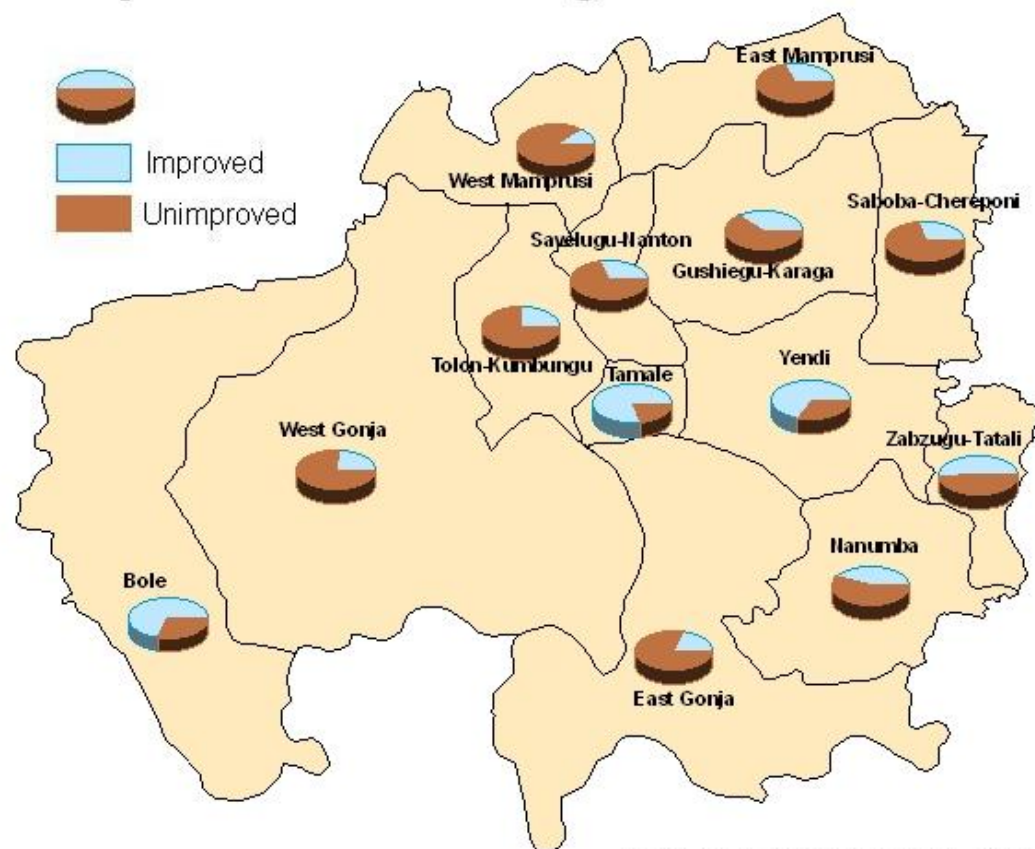


Typical Unimproved Water Supply (Taha, Ghana next to PHW factory)



50% (0.9 million out of 1.8 million people) in Northern Region, Ghana currently use an unimproved source

Percentage Use of Improved and Unimproved Drinking Water Sources

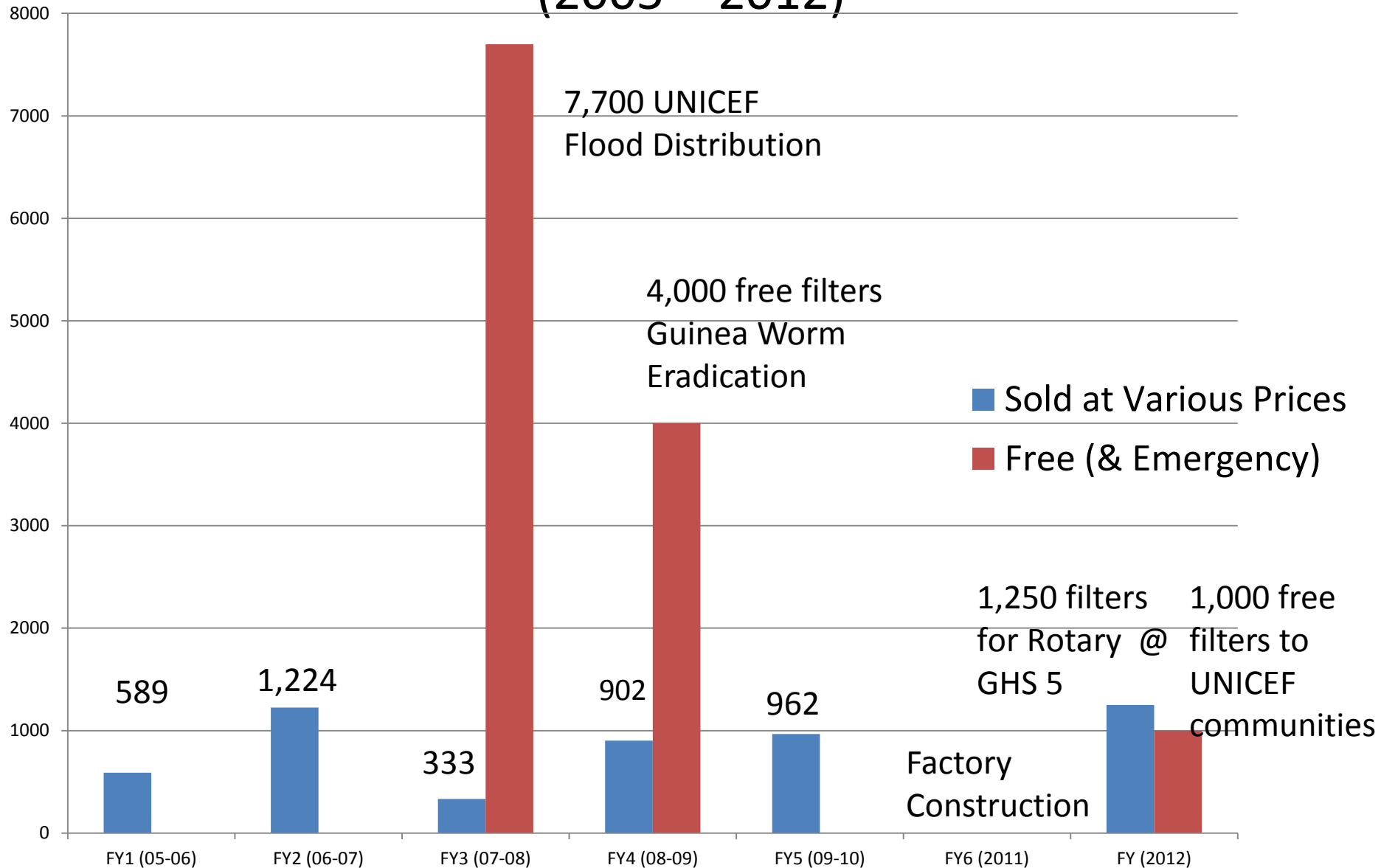


Data: Ghana Statistical Service, 2003
Map: J. VanCalcar, 2006

- **Improved Sources**
 - Boreholes
 - Household connection
 - Public standpipe
 - Rainwater harvesting
 - Protected springs and dug wells
- **Unimproved Sources**
 - All surface water sources
 - Unprotected springs and dug wells
 - Tanker trucks
 - Vendor water

Pure Home Water Filter Sales

(2005 – 2012)



Profile of PHW's Rural Customers

- Farmers without irrigation,
- 1 harvest per year during dry season,
- Cash on hand during harvest (dry) season



Pooled estimates (95% CI, if applicable)		
Average number of individuals per household (n = 214)		8.0
Average number of children <5 per household (n = 214)		1.6
Respondent (n = 208)	Mother	75.5%
	Grandmother	8.7%
	Other primary caretaker	15.9%
Primary dry season water source (n = 214)	Surface water	98.6%
	HDW unprotected	0.9%
	HDW protected	0.0%
	Borehole	0.5%
	Piped	0.0%
	Community	0.0%
Secondary dry season water source (n = 47)	Surface water	0.0%
	HDW unprotected	20.7%
	HDW protected	0.0%
	Borehole	24.1%
	Piped	25.9%
	Community	29.3%
Household water treatment method (n = 213)	None	43.7%
	Cloth filter	52.6%
	Ceramic filter	1.9%
	Boil	0.0%
	Alum	1.9%
	Chlorine	0.0%
Method for dispensing drinking water (n = 213)	Cup or scoop w/o handle	83.6%
	Cup or scoop w/ handle	14.6%
	Spigot	1.9%
	Other	0.0%
Hand-washing with soap (n = 160)	No	95.0%
	Yes	5.0%
Soap present in household (n = 126)	No	0.8%
	Yes	99.2%
Interest in purchasing water filter (n = 209)	No	0.5%
	Yes	99.5%
Under-five prevalence of illness in 48 hours preceeding survey (n = 200)	Diarrhea	23% (17% to 29%)
	Severe diarrhea	11% (7% to 16%)
	HCGI	18% (13% to 23%)
	Cough or difficulty breathing	25% (19% to 31%)
	Severe cough or difficulty breathing	18% (13% to 24%)
General population prevalence of illness in 48 hours preceeding survey (n = 200)	Diarrhea	9% (5% to 13%)
	Severe diarrhea	5% (2% to 8%)
	HCGI	8% (4% to 12%)
	Cough or difficulty breathing	13% (8% to 17%)
	Severe cough or difficulty breathing	10% (5% to 14%)

Right now, PHW faces the challenge of both selling and giving free filters to different rural communities, based on grant contracts



Free Distribution

(based on donors support for guinea worm eradication)



GHS 5 Contribution (full price = GHS 40)

(based on donors belief that recipient should pay something)

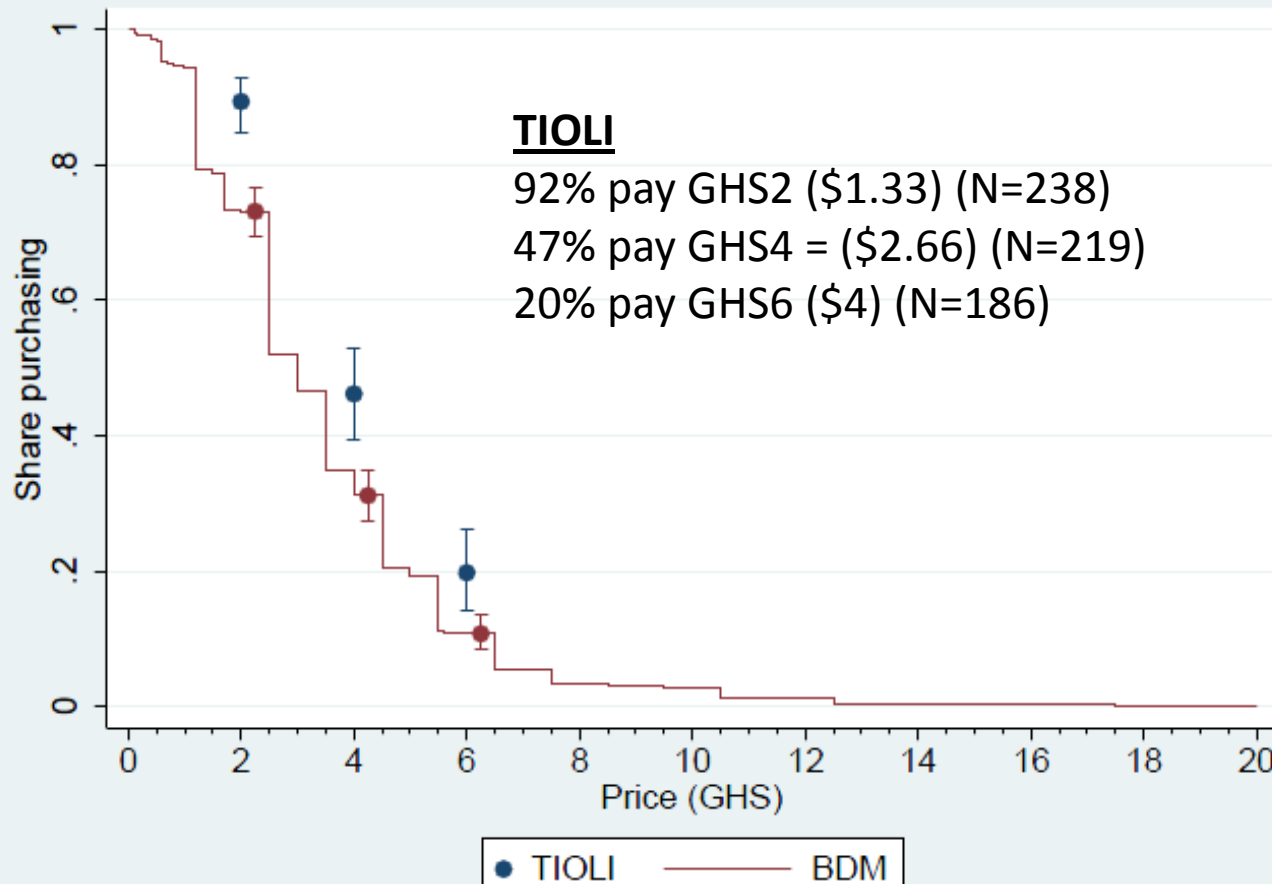


Discussion Point #1

IPA WTP Study Result vs.
Rotary Contract Sale Results
(so far)

Willingness to Pay (WTP) for Ceramic Filters

BDM-TIOLI Comparison



TIOLI – take it or leave it

BDM = Becker Degroot-Marchak Mechanism –

Berry, Fischer and Guiteras, 2012.
Eliciting and Utilizing Willingness to Pay: Evidence from Field Trials in Northern Ghana. Innovations for Poverty Action. Working Paper. New Haven, CT.



Notes: the solid line plots the share of BDM respondents with bids at or above the indicated price. In the BDM case, the markers indicate the share of respondents with a bid greater than or equal to the indicated price, with 95% confidence intervals. In the TIOLI case, the markers indicate the share of respondents who purchased the filter at the offered price with 95% confidence intervals. 603 BDM observations. 660 TIOLI observations, of which 244 at a price of 2, 223 at a price of 4 and 187 at a price of 6.

Rotary International Project

- Sale of 1,250 filters and distribution Tippy Tap handwashing stations.
- Filters to be sold at GHS 5. Tippy taps are free with purchase.
- Emelia Ataya, Zainab Salifu and Connie Lu (MEng '12) performed the baseline survey in Jan. 2012
- 99.5% expressed WTP of GHS 5 (n=209)



ROTARY INTERNATIONAL®
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Rotary Contract Ceramic Filter WTP

- Jan. 2012 Baseline Rotary survey (dry season) - 99.5% (n= 209) expressed WTP GHC 5 (US\$3)
- June/July 2012 actual sale (rainy season) yielded 0% WTP (hence courtesy response)
- Ghanaians explained that during the rainy season, any cash goes into buying seeds for planting. Therefore, WTP is perhaps seasonally dependent.
- Also, people consider rainwater as pure water, so they believe there is no need to filter water when rain water is available
- Next Steps: return during the dry harvest season (Oct – May)
- Advice?

Middle Class Neighborhood of PHW's Office

(A typical rainy day this week!)



Discussion Point #2

IPA vs Pure Home Water
Sales Methods

BDM - Sales Method

(Berry, Fischer, Guiteras, 2012)

Initial Visit

- Demonstration of filter & 2 sales mechanisms.
- Mock version of BDM and TIOLI
- Villagers informed that a filter would be installed in health liaison's home. Villagers encouraged to visit, taste the water, ask questions.
- Would return in two weeks and offer them opportunity to purchase filter via one mechanism
- Attendees encouraged to discuss with their families what they were willing to pay for the filter
- Two weeks chosen to allow families time to try the filter and determine WTP, and obtain desired level of cash.
- Census performed of all residents

BDM - Sales Method

(Berry, Fischer, Guiteras, 2012)

Reminder Visit – over next 2 weeks

- Visited each household to remind them of upcoming presentation and sale and answer any questions they had about the treatment
- Took 100 ml baseline water sample of their water for testing
- Conducted two health treatments
 - General message – link between untreated water and health and how filter helps prevent diarrhea
 - Message emphasizing child health – danger to children!

BDM - Sales Method

(Berry, Fischer, Guiteras, 2012)

Survey and Sales Visit

- Survey conducted first, for which respondents were compensated GHC 1.
- After survey, sales experiment (Scripts for sales were designed to be as similar as possible across treatments)
- Filter is not physically present in front of respondent during the bidding because (i) it is bulky and could break (ii) instructions on assembly and care should be given at time HH receives the filter
- “By conducting sale at the end of the survey on water and health, we may have primed the respondents demand for the filter.”

BDM - Sales Characteristics

(Berry, Fischer, Guiteras, 2012)

Sales Visit

- Full price in market at time of study (GHS 20)
- Exchange rate at time of study GHS1.5 = US\$1
- Bids truncated at GHS 12, because no appreciable differences among the 3 treatment groups at prices above GHS 12.

PHW Sales Method for Rotary Contract

Village and Small-Group Demo Approach

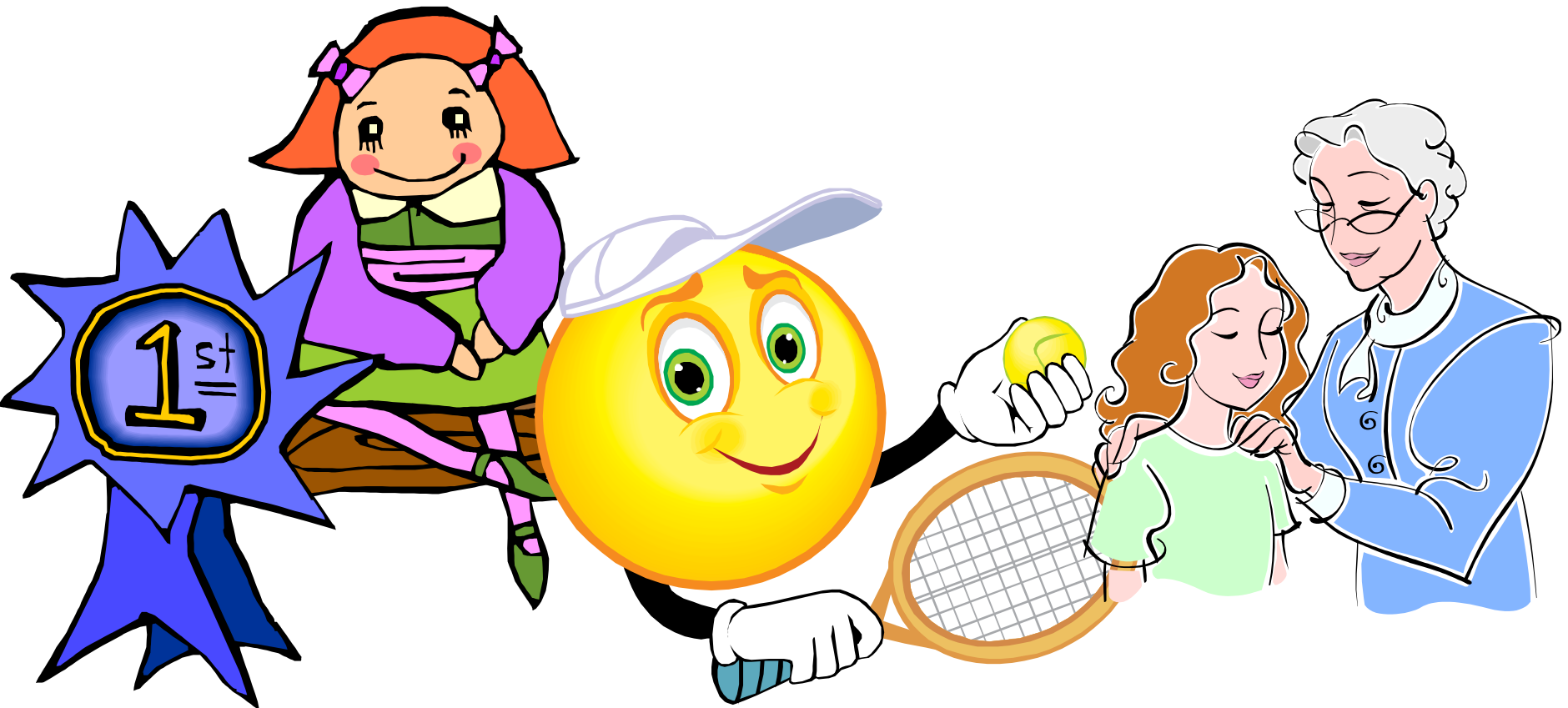
- Contact and set up meeting with chief
- Chief identifies a local health liaison or WatSan committee member as our contact.
- After formal meeting with chief, return for whole village meeting
- Whole community demo of filter assembly and cleaning.
- Small group break-out for individual home training and filter set-up
- Sale and collection of funds occurs through liaison.
- We are considering trying GHS 1 up-front payment with GHS4 paid by December 31

Pure Home Water Sales Method



Our training emphasizes “the 3 Cs”

🔥 Correct Use Consistent Use Continuous Use



Credit: Rochelle Rainey and PATH

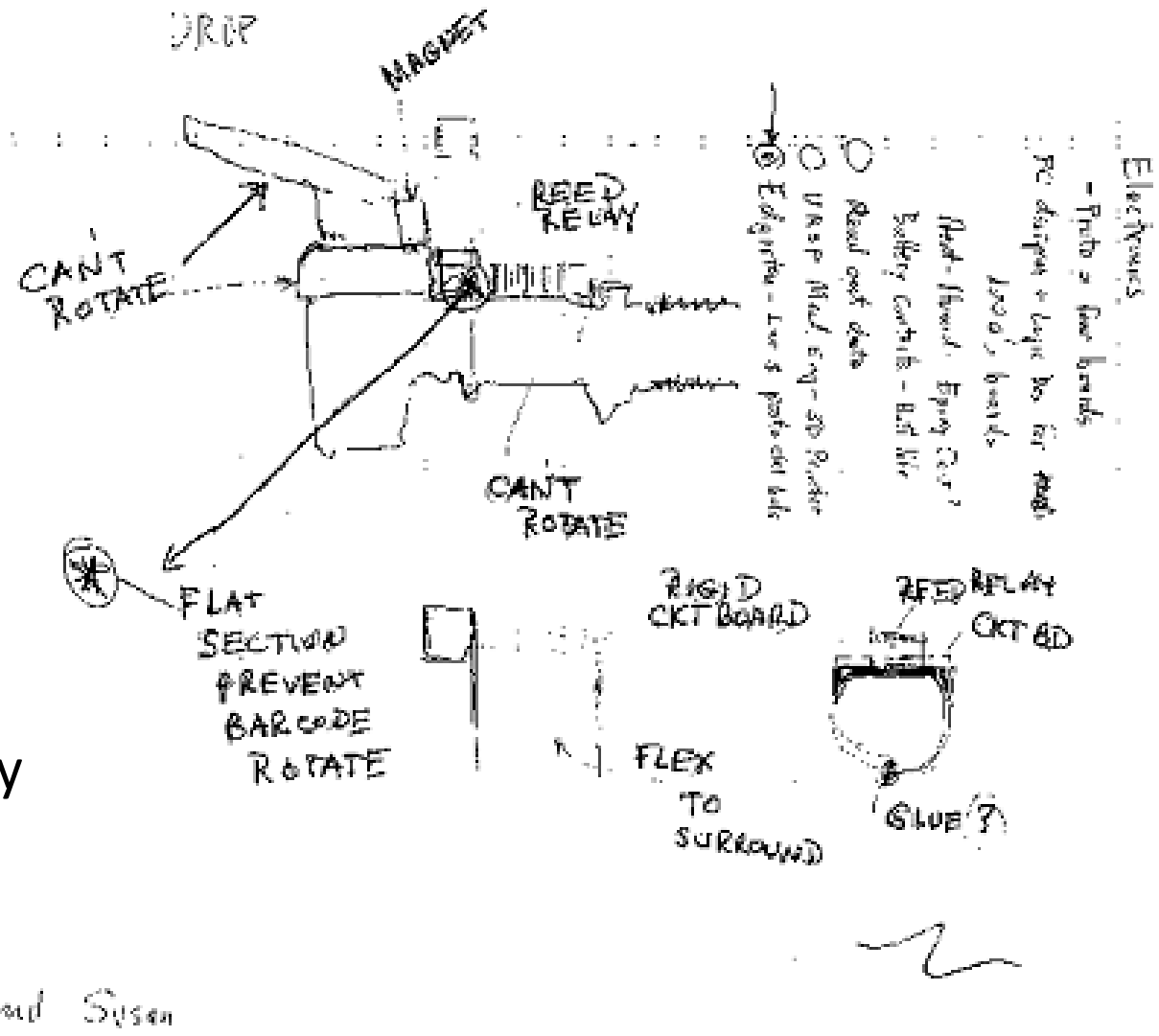
Discussion Point #3

Objective Measure
Digital Flow-Time Recorder

Objective Measure Digital Flow-Time Recorder



We expect this
prototype to be ready
for testing in 2013!



Digital Flow-Time Recorder – Tech Specs

- It counts number of seconds that tap is opened. It does not measure the actual flow.
- Bar code on the outside to know who uses the tap.
- The circuit uses very low power=consuming electronic devices, similar to digital wristwatches which can run for long periods on a small battery.
- One chip puts out a pulse at a selected rate. We might put out 5 pulses per second.
- When the handle on the tap is pressed, a magnet attached to the handle will activate a reed relay.

Digital Flow-Time Recorder – Tech Specs

- The activated relay adds counts to a 32 bit digital counter chip. A 32 bit counter can count to 2 to the 32nd power. (This number is 4.29 Billion which is more than adequate for this application).
- The circuit board will store the accumulated counts until the count is read from the board by a USB port on a PC.
- The count can be cleared, and the tap sent back into the field.
- Cost? The total board, and its plastic housing should cost should be between \$5 and \$15.
- Since your entire tap costs only \$1.00, I don't see the plastic addition costing more than \$1.00.

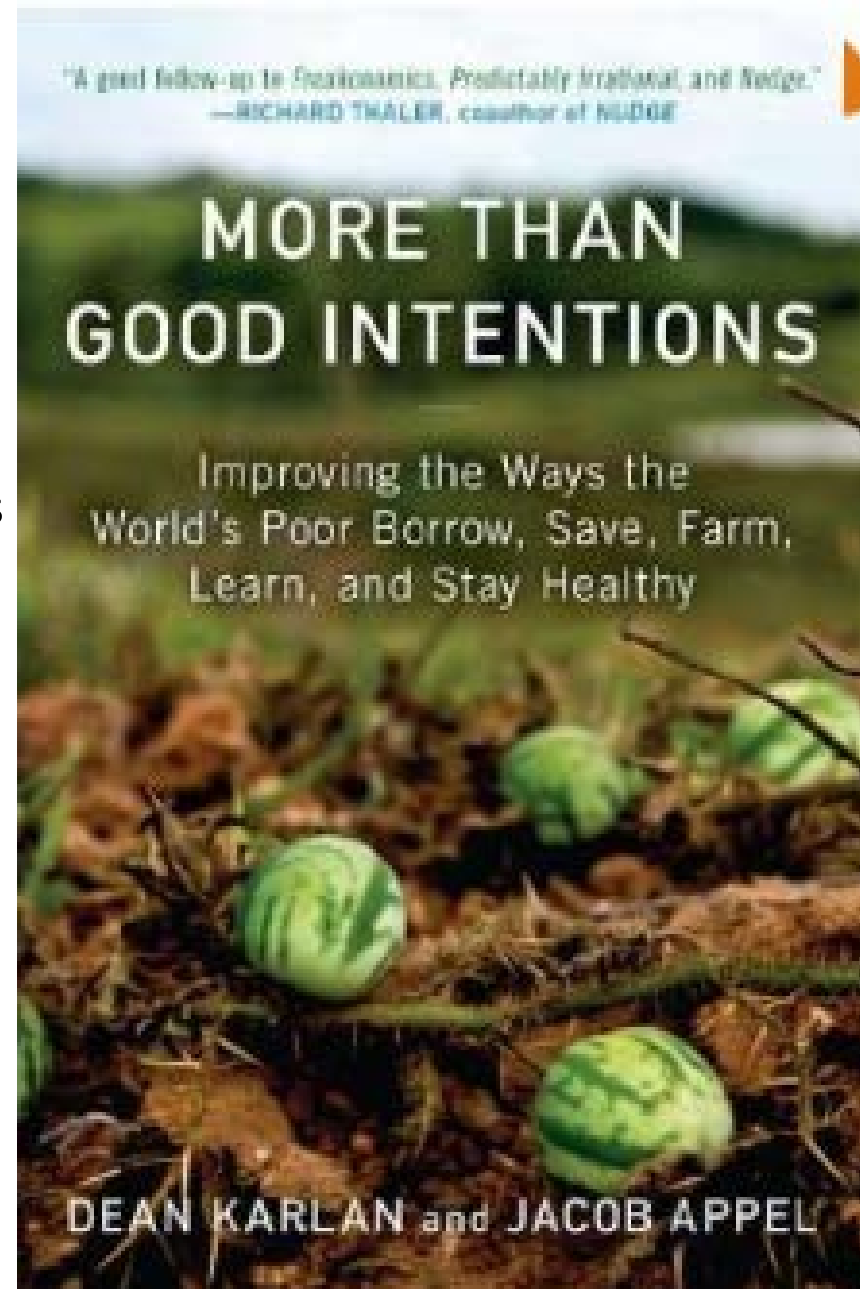
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Discussion Point #4

Which Aid works?
Positive price or free?

Karlan/Appels ask: "Which aid works?"

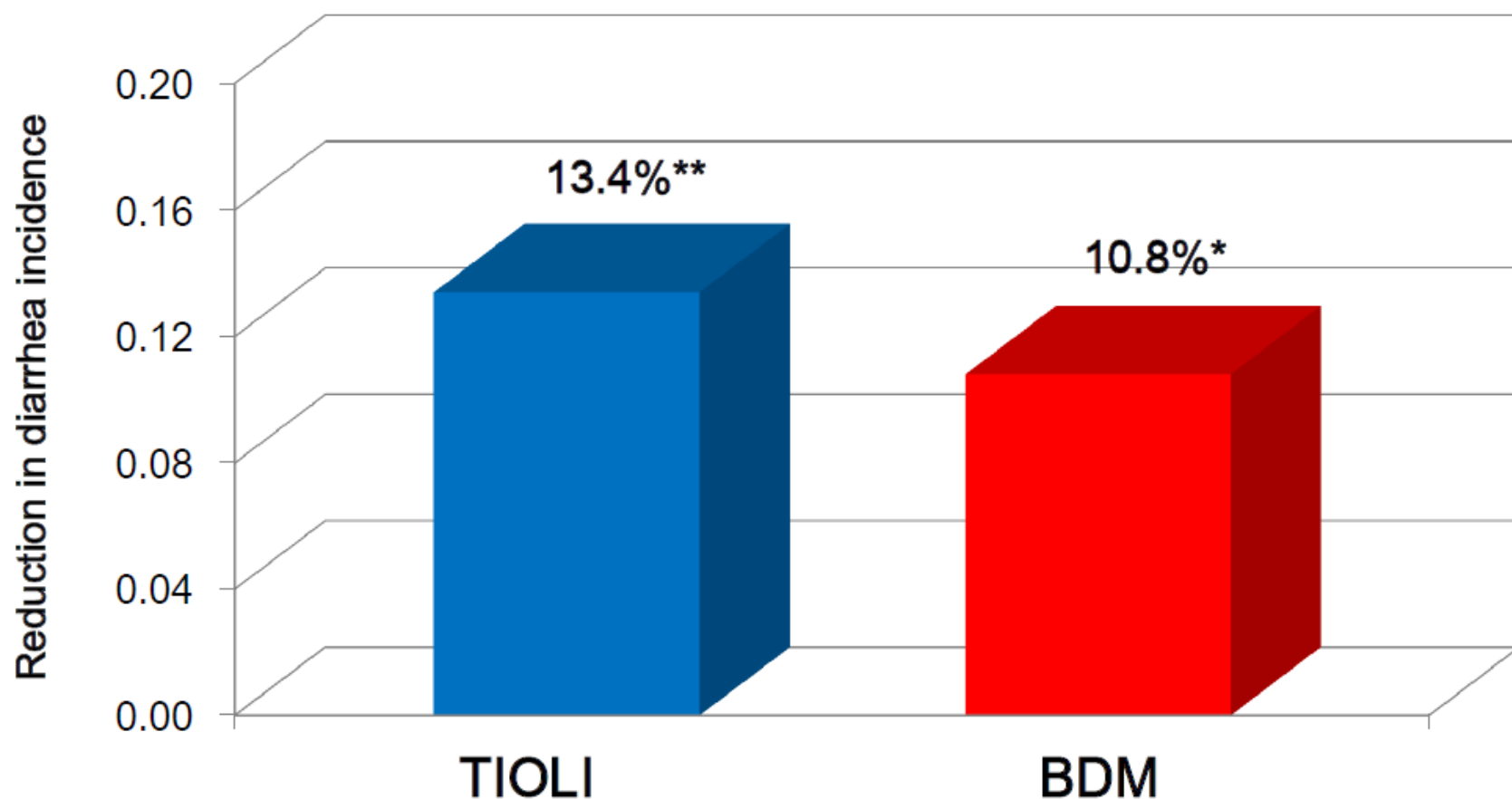
- "Let's look at a specific challenge the poor face, propose a potential solution, then test to find out whether it works. Then let's scale it up so it can work for more people. If it doesn't work, let's make changes and try something new."
- My question:
- "Does this 2-year effort to study pricing tell us that the aid (filter) intervention works?"
- What does it tell us about two specific challenges faced by Pure Home Water and its clients, the poor in Northern Ghana?



PHW Challenges

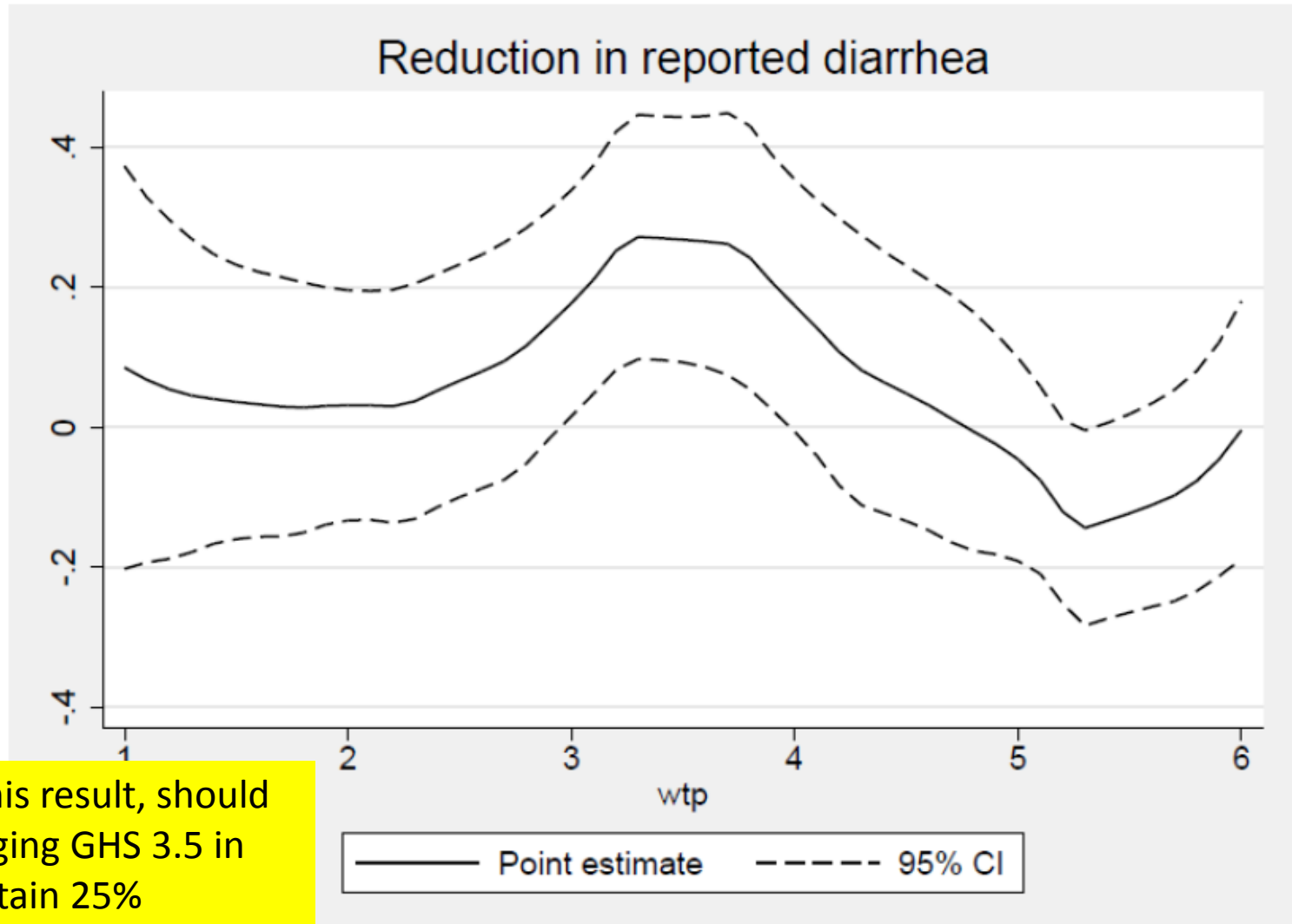
- What price do we charge the poor (defined as people earning $< \$1/\text{day}$)
- Does the level of reduction of diarrheal disease qualify as “working?” If we aren’t evaluating aid efficacy by diarrheal disease in children, what is the screening criterion?

Both TIOLI and BDM detect short-term treatment effects from having a filter



(Credit: Slide from: Berry, Fischer, Guiteras, 2012)

We calculate local average treatment effect for the entire value distribution

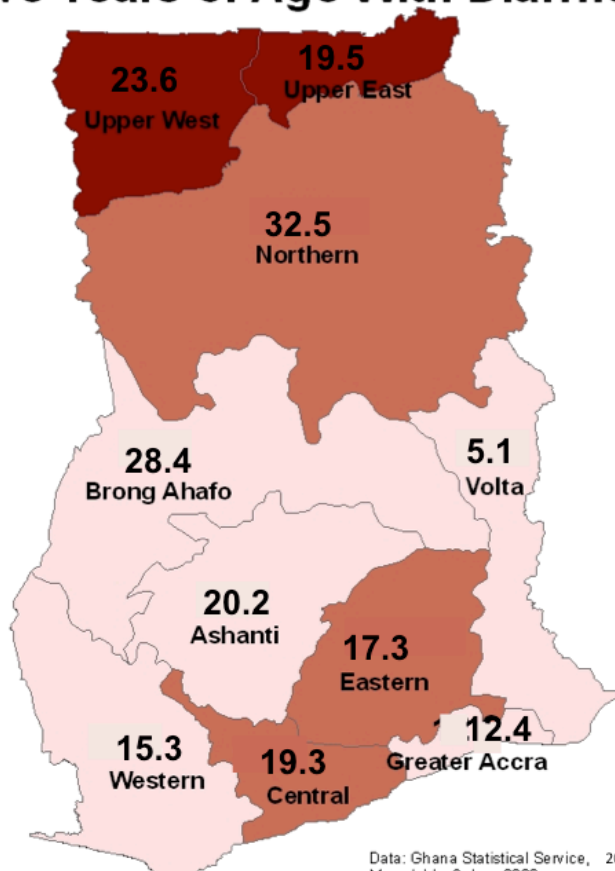


Based on this result, should we be charging GHS 3.5 in order to obtain 25% reduction in diarrheal disease?

(Credit: Slide from: Berry, Fischer, Guiteras, 2012)

Diarrhea in Children under 5 Years of Age

Percentage of Children Under Five Years of Age With Diarrhea

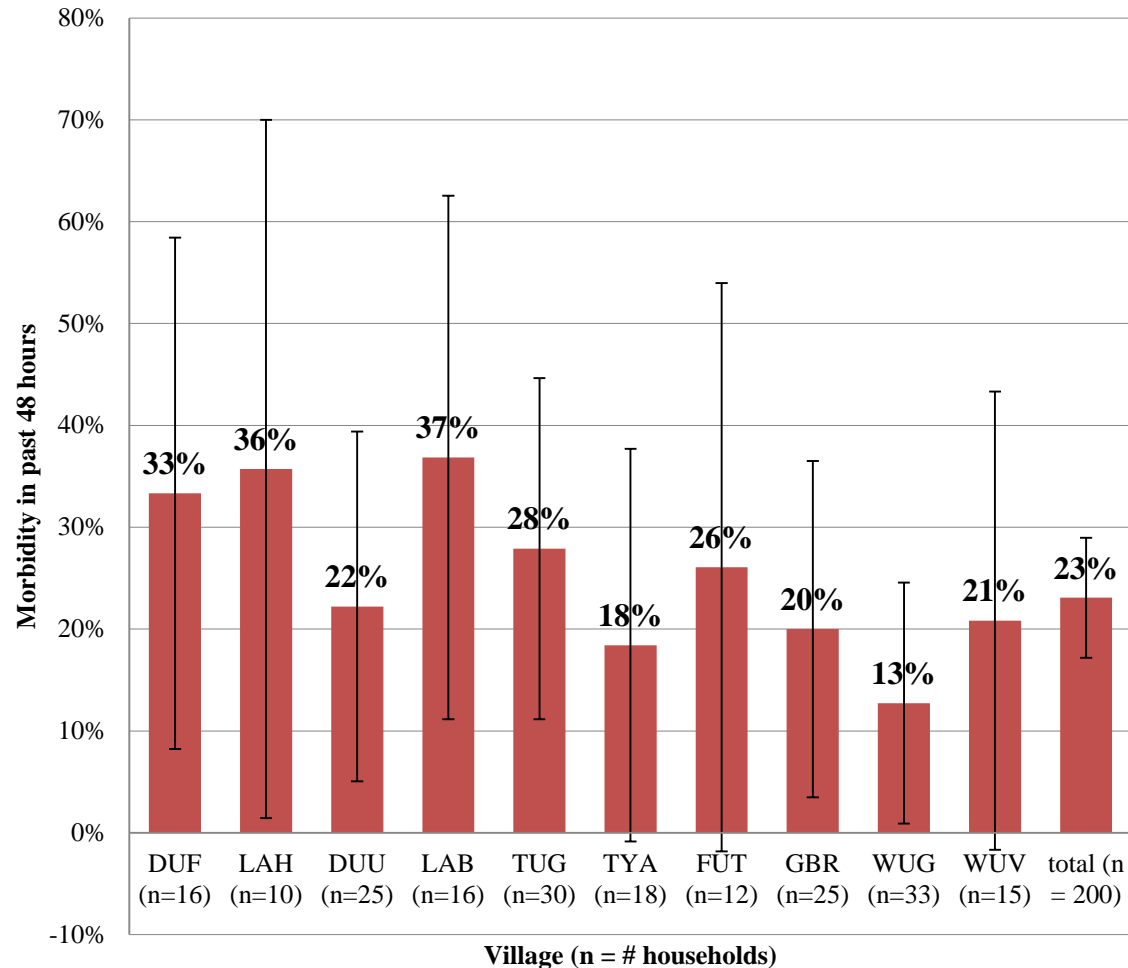


Updated map: S. Murcott and C. Lo, 2012

Data: Ghana Statistical Service, 2008
Map: J. VanCalcar, 2006

The Northern Region & Brong Ahafo, two of Pure Home Water's target regions, have the highest rates of diarrhea prevalence in Ghana, 33% and 28% respectively, acc. to DHS 2009 survey.

Prevalence of diarrhea in children under five (by community)



■ Diarrhea

Overall prevalence of reported diarrhea in children under 5 years averaged 23% across 10 baseline villages in Rotary 2012 survey (95% CI, N=200) (Lu, 2012)

What do we know? How do we act?

- BDM under-predicts price relative to TIOLI.
- BDM allow us to obtain the entire distribution of effects conditional on each individual's WTP
- BDM can also help inform targeted subsidies
- But...selling filters in rainy season (summer 2012) yielded no sales.
- So... what does our organization do? (i.e. What practical advice can be derived from this study to help one struggling NGO succeed in its goals of reaching people who need safe water and scaling up?)

Clean water for all!



How Pure Home Water Needs Your Help

(Why I am here)

- How do we resolve the question of charging positive, but subsidized, price, vs free distribution?
- How do we run a business yet financially support either unsustainable positive price or free distribution?
- What will be successful, from the point of view of our safe water for all goal?
- How can economists advise us about scaling up?

More on “Pure Home Water”

http://web.mit.edu/watsan/meng_ghana.html

<http://www.purehomewater.org>

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