

ABSTRACT

We report preliminary findings of a 5-year water partnership between Sawyer, Inc., The Last Well, and Calvin College which seeks by 2020 to distribute filters to all Liberian households who must walk more than 15 minutes to access an improved source of drinking water. Findings demonstrate significant reduction in odds of diarrhea after 2 and 8 week follow-ups.

INTRODUCTION

Liberian Context

- Approximately **4.6 million residents**
 - **54%** in poverty
 - **73%** has access to clean water within 30 minutes of residence
 - **56%** rural vs. **86%** urban have access to clean water

Effects of diarrhea

- **6th** leading cause of death for Liberian children under 5 (**4th** for ages 1 to 59 months)
- Closely associated with malnutrition and stunting

Project aims

- By 2020, distribute Sawyer® PointONE filters to all Liberian households without access to improved sources of water
- Hypothesis: Access to filters at the household level will be positively associated with reductions in diarrheal disease.

METHODS

Research Design & Sampling

- Households who must walk more than 15 minutes to an improved source of water receive a PointONE water filter
- All participating households complete surveys at baseline, 2 weeks, and 8 weeks
- Sample consists of 24,363 households receiving filters between November 2017 and July 2018

Measures

- Independent variables: Age (Under 5, 5-17, 18 and older)
- Dependent variable: Days of runny stomach (diarrhea) in the past 2 weeks
- Control variables: Location, water source, season

Participant Characteristics

Table 1: Sample characteristics: Age by household

Group	Mean	Median	Total
Under 5	0.72	0	38084
5-17	2.08	2	109857
18 and older	3.04	3	160186

Figure 1: Progress of project, September 2018

(Source: <https://thelastwell.org>)



RESULTS

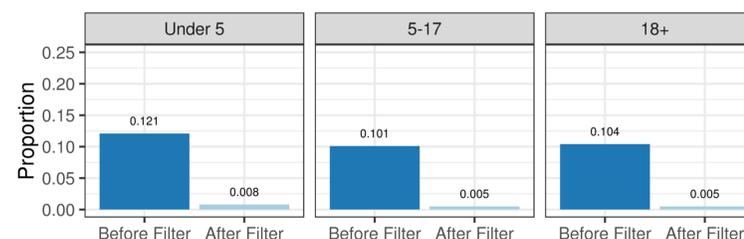
Analysis

- Data analyzed using generalized linear mixed effects models fitted in R using glmmTMB package

Changes in diarrheal rates

- The odds of experiencing diarrhea in past 2 weeks were reduced significantly between baseline and 8 weeks
- 12-fold reduction in odds for children under 5, 23-fold reduction in odds for children 5 to 17, and a 25-fold reduction in odds for adults 18 and older

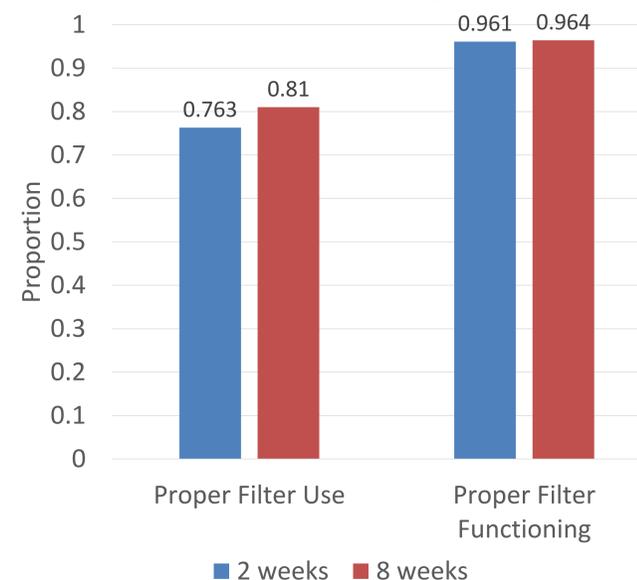
Figure 2: Changes in diarrhea incidence between baseline and second follow-up



Filter use and filter function

- After 2 and 8 weeks, the majority of filters were being used correctly and functioning properly

Figure 3: Proportion of proper filter use and functioning



DISCUSSION

Findings suggest mass distribution of water filters is one viable and economical solution to the global water crisis, serving as means to decrease diarrheal and other water-borne disease morbidity.

Limitations

- Limited demographic data collected
- Challenges in timely follow-up visits due to terrain and climate

Strengths

- On-going data collection; anticipating 1 year follow-ups with subset of population
- Built-in training for data collection and filter distribution
- Cloud-based/GIS enabled data collection software

REFERENCES

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