INTRODUCTION

Nyanza Province, Kenya
Highest mortality rate in children <5 years old
- 149 per 1,000 live births
High diarrhea burden
- 16% had diarrhea in the preceding 2 weeks
27% of households have access to improved water supply
Household interventions to prevent diarrhea in Kenya need to be purchased regularly.
- WaterGuard: sold as 1 month supply
- PuR: sold as 1 day supply
- Aquatabs: sold as a 20 day supply

Would a more permanent household water treatment method promote more consistent use and improve health?

Project goals: Assess filter acceptability, filter performance and measure the health impact of the filters on young Kenyan children in Nyando District, Nyanza Province, Kenya. The study was carried out in partnership with Safe Water and AIDS Project, an NGO based in Kisumu, Kenya NGO and CDC in Atlanta, Georgia.

RESULTS

Table 1: Baseline population characteristics
<table>
<thead>
<tr>
<th>Intervention (n=108)</th>
<th>Comparison (n=112)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Respondents</td>
<td>99%</td>
</tr>
<tr>
<td>Male Child</td>
<td>1%</td>
</tr>
<tr>
<td>Median age (years)</td>
<td>10 (2)</td>
</tr>
<tr>
<td>Water Source</td>
<td></td>
</tr>
<tr>
<td>Surface water</td>
<td>48%</td>
</tr>
<tr>
<td>Rain water</td>
<td>48%</td>
</tr>
<tr>
<td>Ground water</td>
<td>4%</td>
</tr>
<tr>
<td>Water storage</td>
<td></td>
</tr>
<tr>
<td>Clay pot</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>92%</td>
</tr>
<tr>
<td>Water treatment</td>
<td></td>
</tr>
<tr>
<td>Surface water</td>
<td>48%</td>
</tr>
<tr>
<td>Rain water</td>
<td>48%</td>
</tr>
<tr>
<td>Ground water</td>
<td>4%</td>
</tr>
<tr>
<td>WaterGuard</td>
<td>88%</td>
</tr>
</tbody>
</table>

Figure 1: Hollow-fiber filter

Figure 2: % of Households Reporting Drinking Water Treatment, by Group, Nyando District, Apr 2010-Apr 2011

Table 2: User Opinions of Filter

<table>
<thead>
<tr>
<th>User identified effect of filter on family (%) households reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better tasting water</td>
</tr>
<tr>
<td>Less diarrhea</td>
</tr>
<tr>
<td>Don't have to buy water</td>
</tr>
<tr>
<td>Treatment products</td>
</tr>
<tr>
<td>Reasons for using other water treatment instead of filter (%) HH reporting</td>
</tr>
<tr>
<td>Too slow</td>
</tr>
<tr>
<td>Other methods can treat</td>
</tr>
<tr>
<td>Other method is safer</td>
</tr>
<tr>
<td>Children can’t use it</td>
</tr>
</tbody>
</table>

Table 3: Reported Diarrhea in Children Under 3 Yrs. in the Previous 48 Hours, by Study Group, April 2010-April 2011

Table 4: Reported Diarrhea in Children Under 3 Yrs. in the Previous 48 Hrs. by Water Treatment Group, Apr 2010-Apr. 2011

<table>
<thead>
<tr>
<th>Filter Use</th>
<th>Diarrhea</th>
<th>Risk Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorine</td>
<td>153</td>
<td>0.33</td>
</tr>
<tr>
<td>No Water Treatment</td>
<td>476</td>
<td>1.17</td>
</tr>
</tbody>
</table>

Figure 3: Volume of Water Filtered, Intervention Households

Figure 4: Median and Interquartile Range E. coli Counts/100 mL for Intervention Group by Sampling Round

CONCLUSION and FUTURE DIRECTIONS

Modest Acceptability of Filter:
- Slow rate of filtration, small size of reservoir, difficulty of use
- Good Microbiological Performance:
  - Lower median E. coli counts than source water, lower median E. coli counts than comparison stored water

Health Impact:
- No difference in diarrhea between intervention and comparison groups
- Borderline decrease in diarrhea among filter users compared to non-treaters

Recommendations: Change design to make more user friendly

Future Directions: Continue to evaluate filter performance every four months in intervention households

Acknowledgements

Thank you to Dr. Robert Quick and Dr. James Hughes, the project mentors. Many thanks to Dr. Laura Gieraltowski, Ben Nygren, Jared Oremo, Sitnah Hamidah, Ibrahim Sadumah and all of the wonderful people at Safe Water and AIDS Project in Kisumu, Kenya.

Supported in part by Emory Global Health Institute Field Scholar Grant and the PHS Grant UL1 RR025008, and TL1 RR025010 from the Clinical and Translational Science Award program, National Institutes of Health, National Center for Research Resources.