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# DISTRIBUTION OF POINT OF USE WATER TREATMENT PRODUCT THROUGH MUTUAL HEALTH ORGANIZATIONS IN RWANDA: BASELINE SURVEY RESULTS



June 2008

This publication was produced for review by the United States Agency for International Development. It was prepared by Slavea Chankova, MPA, Abt Associates Inc. and Damascene Butera, Abt Associates consultant for Health Systems 20/20 Project and the Social Marketing Plus for Diarrheal Disease Control: Point-of-Use Water Disinfection and Zinc Treatment (POUZN) Project.

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The mission of the **Social Marketing Plus for Diarrheal Disease Control: Point-of-Use Water Disinfection and Zinc Treatment (POUZN)** Project is to implement a diarrhea reduction project using point-of-use (POU) water disinfection and zinc treatment, thereby contributing to the reduction of mortality and morbidity from diarrhea, a key USAID strategy. The project ensures long-term sustainability of zinc and POU by expanding commercial production and sales of products within targeted countries.

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**Submitted to:** John Borrazzo, CTO  
Karen Cavanaugh, CTO  
Yogesh Rajkotia, co-CTO  
Office of Health, Infectious Disease and Nutrition  
Bureau for Global Health  
United States Agency for International Development

**Cover Photo:** Slavea Chankova

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Abt Associates Inc. | 4550 Montgomery Ave., Suite 800 | Bethesda, Maryland 20814 |

T: 301/347-5000 | F: 301/913-9061 | [www.healthsystems2020.org](http://www.healthsystems2020.org) | [www.pouzn.com](http://www.pouzn.com)

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# **DISTRIBUTION OF POINT OF USE WATER TREATMENT PRODUCT THROUGH MUTUAL HEALTH ORGANIZATIONS IN RWANDA: BASELINE SURVEY RESULTS**

## **DISCLAIMER**

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# ACRONYMS

<b>CTAMS</b>	<i>Cellule Technique d'Appui aux Mutuelles de Santé</i> (Health Scheme Technical Support Unit)
<b>DHS</b>	Demographic and Health Survey
<b>HH</b>	Household
<b>MHO</b>	Mutual Health Organization
<b>MOH</b>	Ministry of Health
<b>ORS</b>	Oral Rehydration Salts
<b>POU</b>	Point-of-use
<b>POUZN</b>	Point-of-Use Water Disinfection and Zinc Treatment project
<b>PSI</b>	Population Services International
<b>USAID</b>	United States Agency for International Development





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# EXECUTIVE SUMMARY

## INTRODUCTION

Mutual health organizations (MHOs) are voluntary community-based health insurance organizations that focus on informal sector, low-income populations. MHOs are a promising channel for reaching these target groups with low-cost health products. However, MHOs have rarely been tapped for social marketing of health promotion products, and there is limited evidence on the impact of such interventions. In early 2007, Health Systems 20/20 started to explore options to implement and evaluate a pilot project centered on the promotion and distribution of a child health product through MHOs.

In Rwanda, MHOs (called *mutuelles de santé*) cover about 75 percent of the population. Diarrheal disease is one of the leading causes of death for Rwandan children. Unsafe water and poor hygiene and sanitation are major contributors to diarrhea prevalence. While there is overwhelming evidence that point-of-use (POU) water treatment reduces diarrhea prevalence, use of POU treatment in Rwanda is very low. Taking into account these factors, Health Systems 20/20 partnered with Population Services International (PSI)/Rwanda to implement a pilot project that aims to integrate the promotion and distribution of *Sûr'Eau*, a chlorine-based POU water disinfection product, through the *mutuelles*. The goal of the intervention is to increase household use of *Sûr'Eau*, decrease prevalence of diarrhea, and reduce expenditures on treatment of diarrheal disease (both payments by the *mutuelles*, and out-of-pocket payments by households).

*Sûr'Eau* has been available in Rwanda since 2002, and is currently sold through health centers and commercial outlets throughout the country. However, use of the product in poor rural communities is very low. Through the pilot project, *mutuelles* in two districts in Rwanda (Nyagatare and Rubavu) will promote and sell *Sûr'Eau* at the community level through the *mutuelle* outreach agents based at the village level. In addition, in one of the two pilot districts, *mutuelles* will sell the product at a discounted price to *mutuelle* member households.

A baseline evaluation was conducted in December 2007, to assess knowledge, attitude, and use of the product and diarrhea prevalence among *mutuelle* families with children under five. The baseline evaluation was conducted in the two intervention districts and one control district, Karongi (where the pilot project will not be launched in 2008). A follow-up evaluation will be conducted in late 2008, to assess the impact of this pilot project on the use of *Sûr'Eau* and diarrhea prevalence among children under five.

This report presents the findings from the baseline survey, and the resulting recommendations for the pilot project implementation.

## PROJECT DESCRIPTION

Health Systems 20/20 and PSI/Rwanda, in collaboration with the Rwandan Ministry of Health (MOH), trained *mutuelle* representatives in the two intervention districts in the technical aspects of household water treatment, management of *Sûr'Eau* stocks, and distribution and sales at the community level. These *mutuelle* committee members will conduct small-group outreach sessions and household-level

sales of Sûr'Eau in their communities. Expectations are that simultaneous sales of Sûr'Eau directly to mutuelle members at the village level will offset one potential barrier of consistent use: accessibility of the product. Taking the product out to communities could be key to increasing consistent use, by reducing the cost of transport and time lost in traveling to the nearest health center. The pilot project includes targeted mass media (radio) campaign, mobile cinema, and interpersonal communications to promote Sûr'Eau. Project partners will carry out regular promotional activities to support the Sûr'Eau initiative, and will provide ongoing assistance with the general project management at the community, mutuelle, health center, and district levels. In early 2009, the project partners will evaluate the successes, constraints, and impact of this pilot activity, to determine if a national scale-up should follow.

## **METHODOLOGY OF THE IMPACT EVALUATION**

The impact evaluation will use a difference-in-differences study methodology. This methodology will compare the change in an indicator (such as diarrhea prevalence) from the baseline until the follow-up evaluation in the intervention district with the change in the control district. For the purposes of the study, Nyagatare and Rubavu are intervention districts, while Karongi is the control district. The data for the baseline study were collected through a household survey of households with children under five years. All households were members of a mutuelle. The same households interviewed at baseline will be interviewed at follow-up. The baseline survey was conducted in 49 sub-cells (villages or neighborhoods) in the three study districts, and covered 2,378 households. The sample of sub-cells was chosen using systematic random sampling, and in each sub-cell we interviewed all mutuelle households that had at least one child under five years. Relative household wealth was measured by an asset wealth index created through principal components analysis (following the methodology of the Demographic and Health Survey [DHS]). Households were divided into five quintiles of wealth. We compared indicator measures in the intervention and in the control districts to identify important differences between these groups at baseline. Logistic regression analysis was employed to investigate the factors that are correlated with diarrhea prevalence and POU water treatment at the household level.

## **FINDINGS**

### **Household Characteristics**

Results on household assets and housing characteristics indicated that the three study sites are poor rural communities. Most households (range across the three districts: 83-94 percent) have mud/dung/earth as house floor material and use wood or straw as cooking fuel (87-95 percent). Few households have electricity. Nearly all households use some form of pit latrine, and very few have piped water in their residence. These findings are largely consistent with the results from the 2005 DHS.

Households in Karongi are much poorer than those in Nyagatare and Rubavu: 62 percent of Karongi households belong to the poorest two quintiles, compared to 24 percent for Nyagatare and 38 percent for Rubavu. There is significant variation in the type of drinking water source used in each district. The water source in Rubavu is better than in the other two districts: in Rubavu, 70 percent of households get their drinking water piped from a public tap; in Nyagatare, the two most common sources are a public well (36 percent) and surface water (30 percent), while in Karongi, 67 percent of households use a public well as the primary source of drinking water. In each district, nearly all households use a pit latrine. However, a significantly higher proportion of households in Nyagatare use a ventilated improved pit latrine, compared to the other two districts.

Most household heads (82-88 percent) are farmers or shepherds, and they are typically employed permanently. There are a few notable differences in the head of household characteristics among the three districts. One of them is that household heads in Rubavu are better educated, compared to the other two districts. A smaller proportion of household heads in Nyagatare are permanently employed (as opposed to unemployed or temporarily employed), compared to the other two districts.

We also collected information on the age, education, and role within the household of the person in charge of water. In nearly all households, that person was the same as the child caregiver. In most households, the person in charge of water is the wife of the head of household, or the head of household in the case of female-headed households. The only notable difference in the profile of child caregivers is that those in Nyagatare have lower education, compared to the other two districts.

### Prevalence of Diarrhea

For each household member, data collectors inquired about whether the household member had had diarrhea in the past 15 days. We estimated the prevalence of diarrhea at the individual and at the household level for three age groups: all individuals, children under five, and children under two years (Table ES1). Prevalence across all age groups was 2-3 percent (range across the three districts), and was highest among children. While 5-6 percent of children under five had a diarrhea episode, prevalence was 6-9 percent among children under two years. Household prevalence<sup>1</sup> across all age groups was 11-12 percent, among children under five it was 7-9 percent, and among children under two it was 7-10 percent.

**TABLE ES1: DIARRHEA PREVALENCE IN TWO WEEKS PRECEDING SURVEY**

	Intervention Districts		Control District
	Nyagatare	Rubavu	Karongi
<b>Individual level (% of people in relevant age group)</b>			
All individuals	2.2	2.5	2.5
Children under 5	6.3	5.9	5.1
Children under 2	8.6	7.8	6.3
<b>Severity of diarrhea episode, % of cases reported as:</b>			
Not serious	13.9	31.4	44.0
Serious	39.2	47.7	22.2
Very serious	46.9	20.9	33.7
<b>Household level (% of households with at least one member in relevant age group)</b>			
At least one case (any age)	11.4	10.9	11.7
At least one case of child under 5	9.0	8.4	7.1
At least one case of child under 2	10.0	8.8	6.8

<sup>1</sup> There is a correlation of diarrhea cases in the household, due, for example, to same-source or transmission among household members. Therefore, prevalence at the household level may be a more appropriate indicator to consider, particularly when looking at the impact of POU water treatment (since household members share drinking water). At the household level, prevalence is defined as *at least one case* among household members in the relevant age group.

There are no significant differences in prevalence among the three districts for any of the age groups. This result holds for both the individual and household-level measures of prevalence. However, one notable difference between the control and intervention sites is that a significantly larger proportion of diarrhea cases in Nyagatare were reported as “serious” or “very serious” (86 percent), compared to Karongi (56 percent).

We used multiple logistic regressions to investigate the factors that are correlated with diarrhea prevalence at the household level. The characteristics that are significantly associated with at least one case of diarrhea among children under five in the household are the following:

- *Age of caregiver*: the odds of a diarrhea case decrease by 2 percent with each year of increase in caregiver’s age
- *Water source*: households with piped water at home are less likely to have a child diarrhea case compared to households with well water, whereas households with water from a public pipe, borehole, rainwater, or surface water (river/canal/lake) are more likely to have a diarrhea case compared to those with well water

No other characteristics were significant predictors of diarrhea prevalence among children under five. The regression analyses did not identify any significant predictors of diarrhea prevalence among children under two years. These results were largely confirmed by analyses at the individual level.

### **Treatment and expenditures on diarrhea**

We collected information on the treatment of all reported diarrhea cases, as well as expenditures associated with care received at a health facility. In Nyagatare, 22 percent of cases received no treatment, while this proportion was twice as high in Karongi (45 percent). There are substantial differences in formal care-seeking rates in the intervention and control groups: while 45 percent of cases in Nyagatare and 59 percent of cases in Rubavu were taken to a health provider, only 31 percent of cases in Karongi were seen by a health provider. A possible explanation for this difference may be that a larger proportion of cases in Nyagatare were reported as “serious” or “very serious” (86 percent), compared to Karongi (56 percent), which may indicate that the cases in Nyagatare are caused by more virulent pathogens.

The majority of cases that received home treatment were treated with traditional medicines or herbs (68 percent), while 21 percent received packaged or home-made oral rehydration salts, and 11 percent received antibiotics.

In each district, nearly all cases taken to a health provider were at public or mission facilities, where mutuelles cover part of treatment costs. Of the cases taken to a health provider in Nyagatare, 80 percent were mutuelle members, compared to 86 percent in Rubavu and 94 percent in Karongi. This indicates that one in five diarrhea cases in mutuelle member households in Nyagatare that were taken to a health provider was not covered by a mutuelle; this proportion is lower in the other two districts. Accordingly, average out-of-pocket payment for care received at a health facility is higher in Nyagatare (RFR 551) than in Rubavu (RFR 346) and Karongi (RFR 318).<sup>2</sup>

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<sup>2</sup> Out-of-pocket payment includes payments made for consultation, lab tests, drugs, and hospitalization.

## Knowledge, attitude, and practices related to point-of-use water treatment

In Nyagatare, 77 percent of households used some form of POU water treatment; this proportion was significantly lower in Rubavu (56 percent) and Karongi (61 percent). A potential explanation of this difference is that water supply is of better quality in Rubavu, compared to the other two districts: the majority of households in Rubavu (74 percent) get piped drinking water, compared to 27 percent in Nyagatare and 11 percent in Karongi. Boiling is the most-common method for POU water treatment (51-75 percent of households), whereas very few households said they used Sûr'Eau when asked about POU treatment (only 1 percent in Nyagatare and Karongi, and 4 percent in Rubavu).<sup>3</sup>

In each district, the majority of respondents had heard of Sûr'Eau and had correct knowledge of what the product is used for. Knowledge of Sûr'Eau is better in Nyagatare (86 percent), and worse in Rubavu (65 percent), compared to the control district (77 percent). The main source of information on Sûr'Eau is the radio, followed by health facility, and a community resource person such as an *animateur de santé*. In Rubavu, a significantly higher proportion of respondents had heard of the product from a community resource person (24 percent), compared to the other two districts (9-12 percent).

Overall use of Sûr'Eau (total sample of households) was higher in the two intervention districts, compared to the control district: about 11 percent of households in Karongi reported they ever used Sûr'Eau, compared to 18 percent in Rubavu and 19 percent in Nyagatare.

While 65-86 percent of households had heard of Sûr'Eau, only 13-22 percent of those who knew the product reported ever using it. Among those who had heard of the product, use was significantly higher in the two intervention districts, compared to the control district.

Current use of the product was very low in each of the three districts (less than 4 percent), but was somewhat higher in Nyagatare and Rubavu, compared to Karongi. About half of recent users knew the correct frequency of use, which underscores the importance of educating current and future users on the proper application of the product.

The most frequently cited reason for never using Sûr'Eau was not knowing where to buy it (about 30 percent of respondents), followed by "lack of money" (13-20 percent). Further investigation of the latter finding reveals that the proportion of those who gave 'lack of money' as a reason is correlated with wealth: while 9 percent of those in the richest quintile said that lack of money was a reason for not buying Sûr'Eau, 26 percent of respondents from the poorest quintile gave this answer.

The most frequent source of Sûr'Eau in Nyagatare and Karongi was a retail shop/chemist, whereas in Rubavu it was a community health worker. Interestingly, nearly half of users in Rubavu purchased Sûr'Eau from a community health worker, and, as previously noted for Rubavu (1) a community resource person was the second most frequent source of information on Sûr'Eau (24 percent of respondents), and (2) the district had higher current use of the product compared to the other two districts. This may indicate that availability of Sûr'Eau from a community outreach person is linked to higher use of the product.

We used multiple logistic regressions to investigate the factors that are correlated with POU water treatment and use of Sûr'Eau. Household characteristics that are significantly associated with any type of POU water treatment include:

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<sup>3</sup> However, we did not probe for consistent or correct use of the type of POU treatment that respondents mentioned, and we believe that these figures may reflect what households do only occasionally or part of the time to make their drinking water safe.

- *District of residence*: households in Rubavu were less likely and those in Nyagatare were more likely to use POU treatment, compared to households in Karongi
- *Education of the child caregiver* (who is typically also the person in charge of water): those with primary or higher education were more likely to practice POU water treatment, compared to those with no education
- *Household wealth*: households in each of the top four wealth index quintiles were more likely to use some type of POU treatment compared with households in the poorest quintile, and the likelihood of use increases with quintile
- *Type of water source*: households using surface water were less likely to practice POU treatment, compared to households with water from a well, whereas households with any other water source (piped water, borehole, or rainwater) were more likely to do so.

We also investigated the determinants of use of Sûr'Eau among those who had heard of the product. The question we asked respondents was: "Have you ever treated your water with Sûr'Eau?"<sup>4</sup> The household characteristics that are significantly associated with use of Sûr'Eau include:

- *Education of the child caregiver*: those with primary or higher education were more likely to use Sûr'Eau, compared to those with no education
- *Household wealth*: households in each of the top four wealth index quintiles were more likely to use Sûr'Eau, compared with households in the poorest quintile

The type of water source did not emerge as a predictor of Sûr'Eau use. It is possible that the small number of households using Sûr'Eau did not allow us to detect water source as a significant predictor.

While our intention was to select a control district that is as similar as possible to the two districts where the pilot project is implemented, the baseline survey results indicate that there were significant differences in a number of key characteristics between the control and intervention sites. Such differences may threaten the internal validity of the difference-in-differences evaluation. In the final evaluation, we plan to address this problem by applying multivariate regression analyses that control for differences in household wealth, education of the child caregiver, type of water source, and other variables that may be associated with prevalence of diarrhea among children and POU water treatment.

## CONCLUSIONS AND RECOMMENDATIONS

The findings from the baseline study support several conclusions. First, in nearly all households, the person in charge of water is also the main caregiver of children under five. This implies that the campaign for promoting and distributing Sûr'Eau may be more effective in ensuring uptake of the product if the mutuelles highlight the benefits of Sûr'Eau for child health.

Second, the survey found that the main reason for non-use of Sûr'Eau is not knowing where to buy the product. This indicates that in the promotion campaign, mutuelles should emphasize the new distribution channels available through the pilot project.

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<sup>4</sup> We also enquired whether Sûr'Eau was recently or currently used, but the number of households who answered positively this question was very low, leading us to choose *ever use* as a more feasible variable to use in the regression analysis.



Third, our study found that relative household wealth (within the group of mutuelle households with children under five) is associated with POU water treatment, and with use of Sûr'Eau: richer households were more likely to practice POU treatment, compared to poorer households. We also found correlation between wealth quintile and the proportion of non-users of Sûr'Eau who never bought the product because of "lack of money." This indicates that the association between wealth and use of Sûr'Eau is likely due primarily to financial reasons. However, mutuelles may benefit from exploring whether there are other contributing factors, such as lack of empowerment or feeling of self-efficacy among the poorest when it comes to POU water treatment. Mutuelles may then consider a number of options to ensure that the intervention does not disproportionately exclude the poorest households among their members. For example, they can offer Sûr'Eau at a larger discount to their poorest members, and at a smaller or no discount to all other members.

Fourth, we found that education of the child caregiver is positively associated with POU water treatment. This indicates that mutuelles should tailor the design and implementation of the project promotion campaign in a way that caters to women with little or no education.

And lastly, the baseline survey showed that a large proportion of families practice POU water treatment, and nearly all of them use boiling. Accordingly, the promotion campaign may achieve higher uptake of Sûr'Eau by highlighting the advantages of Sûr'Eau over boiling.



# I. BACKGROUND

## I.1 CONCEPT OF THE PROJECT

Mutual health organizations (MHOs), also known as community-based health insurance schemes, have been growing at a rapid pace in many developing countries since the 1990s. MHOs focus on informal sector, low-income populations and are a promising channel for reaching these target groups with low-cost health products. However, MHOs have rarely been tapped for social marketing of health products.

One of the most prominent problems for MHOs is their financial sustainability. Therefore, they are always looking for innovative ways to reduce costs without negatively affecting the benefit packages offered to members. Increasing the uptake of proven health promotion products by MHO members is one way for MHOs to reduce costs. Accordingly, investing in the promotion and distribution of a health product to members can be a promising cost-reduction strategy for MHOs.

In early 2007, Health Systems 20/20, a global project sponsored by the United States Agency for International Development (USAID), initiated discussions on designing a pilot project to distribute a child health product through MHOs. The conceptual idea of the pilot project was to answer the following questions:

- Can MHOs increase use of child health products among their members?
- Does this result in lower child morbidity?
- Are there cost savings to MHOs from reduced morbidity?
- Is the intervention cost-effective for MHOs?

Answers to these questions have implications for the feasibility of scaling up and replicating a pilot project to reach low-income communities with child health products through MHOs.

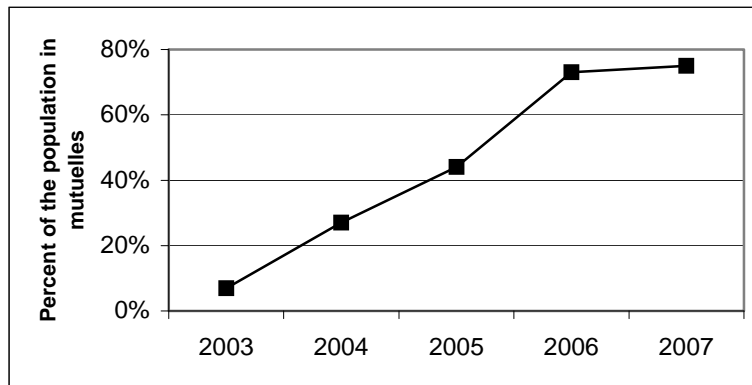
## I.2 PROJECT SITE

MHOs have become part of the national health financing strategy in a number of countries in sub-Saharan Africa. In Rwanda, where MHOs are known as *mutuelles de santé*, 75 percent of the population is covered by about 400 mutuelles organized around public and mission health centers throughout the country. Rwanda is one of the poorest countries in sub-Saharan Africa, with 60 percent of the population living below the official poverty line (World Bank 2007). The country has one of the world's highest child mortality rates: one in five Rwandan children does not live to his or her fifth birthday (UNICEF 2008). The high MHO coverage and poor child health situation in Rwanda make the country a suitable choice for the pilot project. Health Systems 20/20 partnered with Population Services International (PSI) to design and implement the pilot project in Rwanda.

### I.3 MUTUELLES IN RWANDA

The development of mutuelles in Rwanda was a targeted strategy of the government to overcome the worrisome decline of primary health care services utilization after the re-introduction of user fees in 1997. In 1999, the Ministry of Health (MOH), with technical support from the USAID-sponsored Partnerships for Health Reform Project, initiated pilot mutuelle schemes in the three largest health districts of the country. Since then, mutuelles in Rwanda have experienced significant growth, reaching 75 percent national enrollment rate and 6.7 million beneficiaries in 2007 (MOH/CTAMS 2007) (Figure 1).

**FIGURE 1: ENROLLMENT IN MUTUELLES IN RWANDA, 2003-2007**



Source: MOH/CTAMS

Administratively, Rwanda is divided into four provinces and Kigali city, which spread over 30 districts. Each district is divided into sectors, and sectors are further divided into cells. An administrative cell comprises several sub-cells (villages or neighborhoods, known as *umudugudu*, each including about 100 households). A health center typically covers one sector.

The mutuelle enrollment unit is the household and the premium is RFr 1,000 (\$1.81) per person per year. The benefit package includes all preventive and curative services, prenatal care, delivery care, and laboratory exams provided at the primary health care level, as well as drugs on the MOH essential drug list and ambulance transport to the district hospital. Members make a co-payment of RFr 200 (\$0.36) for each visit at the health center level.

The current organizational system of mutuelles is built around three levels. The lowest level, known as a mutuelle section, operates around a defined health center catchment area. The mutuelle sections are managed by a board that includes a chairman, a secretary, a treasurer, and an auditor (who are volunteers elected by a general assembly of mutuelle members) and supported by a permanent salaried staff dealing with the daily business of the scheme. At the cell level, the mutuelle sections are represented by a mutuelle committee that includes three to four volunteers. The mutuelle committees are responsible for mobilizing the community to join the mutuelles, identifying indigent families to be supported by the schemes for membership, and collaborating with village authorities in implementing the mutuelle agenda. Many of the mutuelle committee members are *animateurs de santé*, community health outreach volunteers who are under the coordination of health centers.

The second organizational level is the district mutuelle, which includes all mutuelle sections in a given administrative district. There are currently 30 district mutuelles throughout the country and each of them is in charge of contractual relations with the district hospital, hospital reimbursement, and quality-

of-care supervision. District mutuelles are funded by 10 percent of the premium contributions collected by the mutuelle sections, plus subsidies from the national risk-pooling fund and from the district. They are managed by a board that includes representatives from the mutuelle sections and other organizations in the district, but daily management of district mutuelle operations is conducted by a permanent staff paid by the district. Access to district hospital care for mutuelle members requires an authorized referral from the health center level. Members are entitled to a comprehensive package of services provided at this level, and pay 10 percent of the total hospital bill.

The third organizational level for mutuelles in Rwanda is the Health Scheme Technical Support Unit (*Cellule Technique d'Appui aux Mutuelles de Santé*, or CTAMS), which is set up at the central level to provide technical assistance to all mutuelles in the country. CTAMS is also in charge of the National Risk Pooling Fund set up by the government to provide (1) a complementary benefit package for secondary and tertiary health care to mutuelle members, and (2) subsidies for enrollment of indigents in the mutuelle. The CTAMS, through the National Risk Pooling Fund, makes annual block transfers to the district mutuelles for hospital care coverage of their members. Tertiary care at the national referral hospitals is managed directly by the National Risk Pooling Fund. Access to tertiary hospital care requires an authorized referral from a district hospital and members pay 10 percent of the total hospital bill. Funding of CTAMS and the National Risk Pooling Fund comes primarily from the government, with subsidies from external donors such as the Global Fund for AIDS, Tuberculosis, and Malaria.

There are several challenges for mutuelles in Rwanda today. One of them is the insufficient training and capacity of mutuelle boards at the section and district level, which is a major constraint for efficient management of the schemes. For example, lack of capacity to maintain proper records allows for leakages of funds, and constrains the transparency and accountability of schemes. Currently, the monitoring and supervision system for mutuelles both at the central and district level is weak, due to shortage of personnel and lack of capacity. Current challenges in the health system include overcrowding in health centers, resulting in long waiting time and low quality of care in some health facilities.

Despite these challenges, mutuelles in Rwanda have increased members' access to health services and there is general satisfaction of beneficiaries with the services available through their mutuelle membership (Schneider et al. 2001; Diop and Butera 2004). Development of mutuelles is in close collaboration with health providers and with the support of two key ministries: the MOH and the Ministry of Local Government. Mutuelles in Rwanda now play an important role in the health system. In addition, the high enrollment rate and the proximity of mutuelle structures to communities makes mutuelles a high-potential channel for community-based activities such as promotion of health education and preventive activities. Such activities can reduce curative care costs for mutuelles in Rwanda, and contribute to their financial sustainability. Preventive activities and products with potential to be promoted through mutuelles include proven low-cost interventions such as oral rehydration salts (ORS), POU water treatment products, zinc to prevent and treat diarrheal disease, insecticide-treated nets, childhood immunization, and behavior change to improve hygiene, nutrition, and other health-related practices.

## **I.4 DIARRHEAL DISEASE IN RWANDA**

Diarrheal disease is one of the leading causes of child death in Rwanda, accounting for an estimated 24 percent of child deaths<sup>5</sup> (World Health Organization 2006). The 2005 Demographic and Health Survey

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<sup>5</sup> Excluding neonatal causes from the data on causes of child death.

(DHS) found that 14 percent of children under five had diarrhea in the two weeks preceding the survey. Unsafe water and poor hygiene and sanitation are major contributors to diarrhea prevalence. While there is overwhelming evidence that POU water treatment reduces diarrhea prevalence (Fewtrell et al. 2005, Arnold and Colford 2007, Clasen et al. 2007), use of POU treatment in Rwanda is very low. Taking into account these factors, the pilot project initiated by Health Systems 20/20 and PSI/Rwanda aims to integrate the provision of a POU water treatment product and targeted outreach activities for use of the product through the mutuelles.

## 2. PROJECT DESCRIPTION

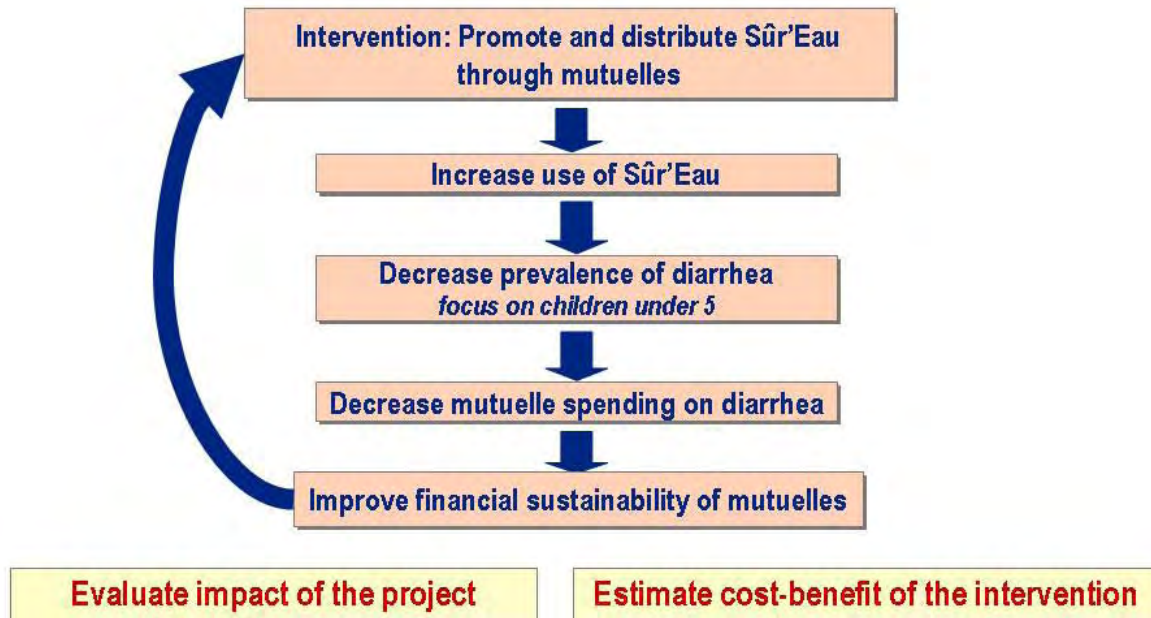
### 2.1 OVERVIEW

Sûr'Eau ("safe water"), a chlorine-based point-of-use (POU) water disinfection product, has been available in Rwanda since 2002, when it was introduced by PSI/Rwanda through social marketing. In the following years, there were periodic stock-outs and irregular distribution of the product, and overall use of Sûr'Eau has been very low, particularly in rural areas. In 2007, PSI revived the social marketing of Sûr'Eau through the USAID-sponsored Point of Use and Zinc Project (POUZN). Currently, Sûr'Eau is sold through health centers and commercial outlets throughout the country. One bottle of Sûr'Eau (in the currently produced formulation) is sold at RFr 300 (\$0.55) and can treat the drinking water of a family of four to five members for about six weeks.



The current pilot project, implemented by Health Systems 20/20 and PSI/Rwanda in collaboration with MOH and mutuelles in Rwanda, aims to increase use of Sûr'Eau primarily among poor rural communities. The main intervention of the project is the promotion and distribution of Sûr'Eau at the community level through the mutuelle committees. Increased use of the product is expected to lead to decreased prevalence of diarrhea, and lower costs for diarrhea treatment for the mutuelles. This, in turn, will provide further incentive for mutuelles to institutionalize the intervention and consider including similar distribution of other health promotion products for their members. The objectives of the pilot project are illustrated in Figure 2.

**FIGURE 2: OBJECTIVES OF THE PILOT PROJECT**



An integral part of the pilot project is a formal impact evaluation that will measure the effect of the intervention on use of the product in the targeted communities, prevalence of diarrhea among children, and out-of-pocket expenditures for diarrhea treatment. In addition, a cost-effectiveness study of the intervention will be conducted, to assess whether the intervention results in decreased costs for the mutuelles.

The project will be implemented in two districts, Nyagatare and Rubavu, where Sûr'Eau will be promoted and sold to mutuelle members by the mutuelle committees. In addition, mutuelle members in Nyagatare will be able to buy Sûr'Eau at a discounted price (33 percent off the regular price) from the mutuelle committees (Table 1). For the purposes of the impact evaluation (which is described in greater detail later, in the Methodology section), a control district, Karongi, will be included in the study. In all three districts, Sûr'Eau will continue to be available as usual through health centers and commercial outlets.



**TABLE I: PROJECT DISTRICTS**

	Intervention Districts		Control District
	Nyagatare	Rubavu	Karongi
Intervention	Sûr'Eau promoted and sold at <u>discounted price</u> to mutuelle members by health center and mutuelle staff	Sûr'Eau promoted and sold at <u>full price</u> to mutuelle members by health center and mutuelle staff	Sûr'Eau available as usual through health centers and commercial outlets
Price of Sûr'Eau to mutuelle members	RFr 200 (\$0.36)	RFr 300 (\$0.55)	RFr 300 (\$0.55)

Sûr'Eau will be distributed to participating mutuelles by PSI/Rwanda at the wholesale price of RFr 150. Therefore, mutuelles will make a profit margin of RFr 50 to RFr 100 for each bottle sold. Part of this profit margin will be given to the mutuelle committee members conducting the outreach and sales activities for Sûr'Eau, and part of the profit will remain with the mutuelle to help cover management costs.

## 2.2 STUDY SITES

The three study districts were chosen by the project partners, Health Systems 20/20 and PSI/Rwanda, in collaboration with the MOH and the mutuelles advisory board based on the following criteria:

- *Disease prevalence:* The pilot districts, Nyagatare and Rubavu, were chosen for the very high prevalence of diarrheal disease in past years. Both districts have suffered cholera outbreaks in the past year, and continually have the highest burden of diarrheal disease in the country. Impact of the pilot project is expected to be greater in such settings.
- *High coverage of the population by mutuelles:* In Nyagatare, 82 percent of the population was enrolled in mutuelles in 2007, while in Rubavu coverage was 51 percent. In the control district of Karongi, mutuelle coverage was 68 percent.
- *Strong support systems:* All three districts have strong mutuelle systems, and local government support for both the mutuelles and this project. Strong support for mutuelles and the project are considered essential to successful implementation.
- *Geographical location:* Nyagatare is located in the northeast, while Rubavu is located in the northwest of the country. Implementing the pilot in two different regions of the country will help establish differences in impact that may be due to geographical location. The control district, Karongi, is located in the west. Like Rubavu, it borders Lake Kivu.



All three districts are predominantly rural, and similar in population size (about 300,000 people). While Nyagatare and Karongi have a similar number of mutuelles (18 and 17 mutuelles, respectively), Rubavu has significantly fewer mutuelles (only eight). This difference is due to the fact that Rubavu is smaller in territory and more densely populated than the other two districts, and thus has fewer health centers (which are the units around which mutuelles are established). Table 2 summarizes the district characteristics.

**TABLE 2: STUDY DISTRICTS**

	Intervention Districts		Control District
	Nyagatare	Rubavu	Karongi
Population	280,000	300,000	280,000
Location	Northeast	Northwest	West
Area (square km)	1,741	600	993
Number of mutuelles	18	8	17
Mutuelle coverage	82%	51%	68%

### 2.2.1 NYAGATARE DISTRICT

The District of Nyagatare is one of the seven districts that constitute the Eastern Province of Rwanda. The district is divided into 14 sectors, which are further divided into 106 cells and 630 villages. Nyagatare spreads over an area of 1,741 km<sup>2</sup> with 280,000 inhabitants. There are 18 health centers and an equal number of mutuelles in the district, and mutuelle coverage in 2007 was 82 percent.

The hydrographic network in Nyagatare is very limited. There are only three main rivers: the Muvumba, which cuts across the district, and the Akagera and Umuyanja rivers, which constitute the district and country borders with Tanzania and Uganda respectively. There is no other consistent river that can be exploited as a water source by the population in Nyagatare – the few other rivers in the district are erratic and intermittent. The weak river network limits the availability of reliable water supply for households and there are frequent reports of cholera outbreaks in the district. In the first quarter of 2007, about 1,000 cases of cholera were registered.

### **2.2.2 RUBAVU DISTRICT**

Rubavu is one of the seven districts constituting the Western Province of Rwanda. The district covers an area of about 600 km<sup>2</sup> and is home to over 300,000 inhabitants. Rubavu is divided into 12 administrative sectors, 80 cells, and 469 villages. There are eight health centers, with some covering more than one administrative sector. Eight mutuelles have been established alongside each health center. Mutuelle coverage in 2007 was 51 percent.

Many households in Rubavu draw water from Lake Kivu. The water is not potable and there are frequent cholera outbreaks. The last cholera epidemic in Rubavu occurred in January and February 2007.

### **2.2.3 KARONGI DISTRICT**

Karongi district is in the West Province and is situated on the shores of Lake Kivu. The district is divided into 14 sectors, 88 cells, and 539 villages. Karongi spreads over an area of 993 km<sup>2</sup> with 280,000 inhabitants. The district has 17 health centers, and an equal number of mutuelles. Mutuelle coverage in 2007 was 68 percent. As in Rubavu, many households take their drinking water from Lake Kivu.

## **2.3 PROJECT IMPLEMENTATION**

The preparatory phase of the project started in April 2007, with consultations on the choice of the pilot districts and the design of the intervention. The project design was presented to stakeholders in the two intervention districts, Nyagatare and Rubavu. The stakeholders included representatives from each mutuelle section, health centers, and district authorities. A baseline study (pre-intervention evaluation) was conducted in December 2007.

In December 2007-January 2008, Health Systems 20/20 and PSI/Rwanda, in collaboration with the MOH, conducted a two-level training of mutuelle managers: (1) training of trainers for managers of the mutuelle sections, and (2) training of mutuelle committee members. The training of trainers included two representatives from the management board of each mutuelle section, the director (or a representative) of the health center corresponding to the mutuelle, and the coordinator of the *animateurs de santé* (community health outreach volunteers). In total, 140 trainers were trained in a six-day training that focused on the technical aspects of household water treatment and on management of product stocks/storage, inventories, vouchers, and distribution/sales through the health center pharmacies (where the mutuelle supplies of Sûr'Eau will be stored).

Since mutuelles in Rwanda have a mutuelle committee in each village, the promotion and selling of Sûr'Eau was decentralized down to the village level. In January-March 2008, more than 3,000 mutuelle committee members were trained in Nyagatare and Rubavu, with at least two members from each village. These mutuelle committee members will be acting as outreach agents for the pilot project and

will be conducting small group outreach sessions and household-level sales of Sûr'Eau in their communities. Expectations are that simultaneous sales of Sûr'Eau directly to mutuelle members at the village level will offset one potential barrier of consistent use: accessibility of the product. Bringing the product out to communities could be key to increasing consistent use, by reducing the cost of transport and time lost in traveling to the nearest health center. The pilot project includes targeted mass media (radio) campaign, mobile cinema, and interpersonal communications to promote Sûr'Eau. Mutuelle committee members and the health center animateurs who conduct small group outreach sessions about safe water, sanitation, and promotion and who will sell Sûr'Eau at the community level will receive t-shirts and promotional materials to assist them in their work. Messages included in animateurs' outreach sessions will be consistent with the information heard through radio, mobile cinema, and at health centers. Animateurs will coordinate their outreach and promotional activities in order to reach each community in their area at least once a month, to ensure consistent supply of Sûr'Eau and to monitor correct use in households.

The official launch of the project in Nyagatare district was in February 2008 at Rukomo health center where an incentive of one free bottle of Sûr'Eau was given to all families who had signed up for the 2008 mutuelle membership. The launch of the project in Rubavu was in April 2008.

Project partners will carry out regular promotional activities to support the Sûr'Eau initiative, and will provide ongoing assistance with the general project management at the community, mutuelle, health center, and district levels. Six months into project implementation, a midterm review of activities, successes, constraints, and lessons learned will take place. In early 2009, the project partners will evaluate the successes, constraints, and impact of this pilot activity, to determine if a national scale-up should follow.

# 3. METHODOLOGY OF THE IMPACT EVALUATION

## 3.1 RESEARCH QUESTIONS

This section describes the methodology of the impact evaluation of the pilot project. The cost-effectiveness study will be conducted separately and is not included in this report. The evaluation study aims to assess the impact of two interventions targeted at mutuelle member households:

- (1) Promotion and sale of Sûr'Eau at a *discounted* price to mutuelle members by the mutuelle committees (Nyagatare district)
- (2) Promotion and sale of Sûr'Eau at the *regular* price to mutuelle members by the mutuelle committees (Rubavu district)

The study will assess the impact of these two interventions, seeking answers to the following research questions:

- (1) Does the intervention change the use of Sûr'Eau?
- (2) Does the intervention result in changes in diarrhea prevalence, particularly among children under five?
- (3) Does the intervention result in changes in expenditures on diarrhea treatment?

The study population will include only mutuelle member households with children under five, as this age group has the highest prevalence of diarrhea.

## 3.2 STUDY DESIGN

The impact evaluation will use a difference-in-differences study methodology. The study consists of a pre-intervention (baseline) and a post-intervention (follow-up) evaluation of indicators related to the three research questions. The baseline evaluation was conducted in mid-December 2007, shortly before the start of program implementation. The follow-up evaluation will be conducted one year later. For the purposes of the study, Nyagatare and Rubavu are intervention districts, while Karongi is a control district. To measure the impact of each of the two interventions, we will compare the change in key indicators (from baseline to follow-up) in the control group to the change in the intervention group (a difference in differences measure). Table 3 illustrates this method.

**TABLE 3: MEASURING THE EFFECT OF THE INTERVENTION**

Group	Diarrhea prevalence at BASELINE	Diarrhea prevalence at FOLLOW-UP	Difference in diarrhea prevalence
Intervention	a	b	b-a
Control	c	d	d-c
Effect of the intervention = (b-a) – (d-c)			

The groups in this case are samples of mutuelle member households with children under five. Data collection is based on a household survey. The same households that are interviewed at baseline will be approached for the follow-up survey. The study protocol was reviewed and approved by the National Institute of Statistics of Rwanda, and by the Institutional Review Board of Abt Associates Inc.

### 3.3 SAMPLE SELECTION

Systematic random sampling was used to select the sample of households. The sample in each district was selected independently. The primary sampling unit was the sub-cell (or *umudugudu*), an administrative division that includes about 100 households and typically covers a village or part of a village. In Rubavu, where a complete list of the sub-cells in the district was available, 19 sub-cells were selected with probability proportional to size (where size was determined by the number of households in the sub-cell). In Nyagatare and Karongi, we were unable to obtain a complete list of sub-cells and sampling was first done at the cell level. In each of these two districts, 15 cells were selected, using systematic random sampling. One sub-cell was then randomly selected from each of the sampled cells.<sup>6</sup>

In each of the sampled 49 sub-cells, the data collectors identified all households that were mutuelle members and had at least one child under five years. Membership of the head of the household or the spouse of the head was used as a proxy for household membership. Village chiefs, mutuelle coordinators, and other community members helped to identify these households. Data collectors aimed to interview all such households. The resulting sample size is summarized in Table 4.

**TABLE 4: STUDY SAMPLE**

Sample	Nyagatare	Rubavu	Karongi	Total Sample
Number of clusters ( <i>sub-cells</i> )	15 (out of 630)	19 (out of 525)	15 (out of 540)	49
Number of mutuelle households with children under 5 yrs	862	825	691	2,378
Number of individuals in sampled households	4,906	4,469	3,719	13,094
Number of children under 5 in sampled households	1,339	1,259	997	3,595

<sup>6</sup> A complete list of sub-cells in Nyagatare and Karongi was not available from the central level at the time when field activities started. It was, however, feasible to obtain a list of the sub-cells in each of the selected cells (from authorities at the sector or cell level).

### 3.4 DATA COLLECTION INSTRUMENTS

The household survey used two types of structured questionnaires:

- (1) *Household questionnaire*: administered to household heads or their spouses<sup>7</sup> (Annex A)
- (2) *Curative care questionnaire*: administered to household members and caregivers of children who have had diarrhea in the two weeks preceding the survey (in the selected households) (Annex B)

The household questionnaire collected data on the demographic and socio-economic characteristics of the household, as well as information on individual mutuelle membership, and knowledge, attitude, and practices related to use of Sûr'Eau. In a household where a member was reported to have had diarrhea in the two weeks preceding the survey, that person or a knowledgeable adult (or the caregiver in case of children) was interviewed using the curative care questionnaire. The curative questionnaire collected data on use and expenditures for health care services related to the diarrhea episode. Both questionnaires were translated into Kinyarwanda, and all interviews were conducted in Kinyarwanda. Verbal informed consent to participate in the research was obtained from every individual interviewed for this study.

Data collection took place in the last two weeks of December 2007. The data was then entered in an electronic dataset using CSPro. All analyses were conducted using Intercooled Stata v.8.

### 3.5 ANALYTIC METHODS

Comparisons between each of the two intervention districts and the control district are presented for the indicators measured in the baseline survey. Statistical significance of differences in indicator estimates is measured using the student t-test for binary variables, and chi-square test for categorical variables. Statistical significance of differences was only measured for a two-way comparison between the control district and each of the two intervention districts. In addition, logistic regression analysis was employed to investigate the factors that are correlated with diarrhea prevalence and POU water treatment at the household level. Results were considered statistically significant only if the corresponding p-value was 0.05 or less.

Sample weights reflecting the probability of a household to be selected in the sample were assigned to each household, and to each member within the household. The weights were equal to the inverse of the probability of selection into the sample, and were adjusted for non-response. All descriptive statistics and regression analyses presented in this report use the sample weights.

An asset wealth index was constructed using principal components analysis of a set of household assets and housing characteristics. Annex C provides further details on the composition of the asset wealth index. The index was constructed by using the pooled sample of households across the three districts. The index scores were then ranked and households were divided into five asset wealth quintiles. For individual-level analyses, each household member was assigned the income quintile of his/her household.

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<sup>7</sup> Data collectors asked to interview the household head and the person who is most knowledgeable about water collection and treatment at the household.





## 4. FINDINGS

### 4.1 DESCRIPTIVE STATISTICS OF THE STUDY SAMPLE

This section presents the set of indicators that were measured in the baseline survey. In all data tables, statistically significant differences in an indicator estimate between an intervention district and the control district are noted by an asterisk (\*).

About half of respondents interviewed were heads of household (49 percent), whereas the spouse of the head of household was the respondent in nearly all other households (48 percent). In a few cases (4 percent), a knowledgeable individual other than the head of household or the spouse was interviewed. There was no significant difference among the three districts in the proportion of respondents who were head of household or spouse.

Following the methodology of the DHS, the survey gathered information on certain housing characteristics (access to electricity, drinking water source, type of toilet facilities, roofing and flooring materials) and ownership of various modern durable goods (radio, television, refrigerator, bicycle, motorcycle/scooter, car/truck). These characteristics were used to evaluate the economic conditions of the household. Table 5 summarizes descriptive statistics for these characteristics for the households in the sample. As the results show, the three study sites are poor rural communities. Most households (range across the three districts 83-94 percent) have mud/dung/earth as house floor material and use wood or straw as cooking fuel (87-95 percent). Few households have electricity. Nearly all households use some form of pit latrine, and very few have piped water in their residence. These findings are largely consistent with the results from the 2005 DHS.

Comparison across districts reveals several patterns. Households in the two intervention districts are slightly larger and have more children under five than the control district. A notable difference among the districts is the proportion of houses with a metal sheet roof. This difference is explained by the fact that Karongi is an area with abundant availability of clay, whereas large parts of Nyagatare and Rubavu are areas with dryer and sandy soil. The average number of large livestock (cows) owned by households in Nyagatare is higher compared to the other two districts. A smaller proportion of households in Karongi own each of the assets for which data were collected, compared to the other two districts. Accordingly, households in Karongi are classified by the asset wealth index as much poorer, compared to those in Nyagatare and Rubavu: 62 percent of Karongi households belong to the poorest two quintiles, compared to 24 percent for Nyagatare and 38 percent for Rubavu.

There is significant variation in the type of drinking water source used in each district, but the water source in Rubavu is better than in the other two districts. In Rubavu, 70 percent of households get their drinking water piped from a public tap. In Nyagatare, the two most common sources are a public well (36 percent) and surface water (30 percent), while in Karongi, 67 percent of households use a public well as the primary source of drinking water. In each district, nearly all households use a pit latrine. However, a significantly higher proportion of households in Nyagatare use a ventilated improved pit (VIP) latrine, compared to the other two districts.

**TABLE 5: HOUSEHOLD CHARACTERISTICS  
(% OF HOUSEHOLDS)**

	<b>Nyagatare</b>	<b>Rubavu</b>	<b>Karongi</b>
Average household (HH) size	5.6	5.4	5.4
Average number of children under 5 per HH	1.5*	1.5*	1.4
% with electricity	2.6	5.6	1.6
Farmland ownership	71.3**	80.3	84.5
Home ownership	84.5	85.1	89.0
Average no. of people per room	2.2*	1.7	1.9
House floor			
Earth/mud/dung	83.3	83.7	93.6
Cement, wood, or other	16.7	16.3	6.4
<i>p-value</i>	*	-	
House roof			
Metal sheet	80.6	66.6	18.3
Clay	1.1	29.3	74.2
Straw/grass	17.5	2.8	7.1
<i>p-value</i>	**	**	
Livestock ownership (average no. per household)			
Goats	0.8	0.7	0.8
Sheep	0.04*	0.1	0.1
Cows	1.7**	0.4	0.6
Asset ownership			
Radio	73.5	56.2	53.2
TV	1.3	2.9	0.8
Refrigerator	0.4	0.6	0.1
Non-mobile phone	0.4	2.3	0.1
Bicycle	51.7	11.4	3.1
Motorcycle/scooter	3.2	1.2	0.7
Car or minitruck	1.0	0.6	0.0
Mobile phone	18.8	12.8	5.3
Primary sanitation facility			
Flush toilet	0.7	1.4	0.7
Pit latrine	27.4	40.5	48.2
Ventilated improved pit latrine	70.8	57.5	49.2
Bush/field as latrine	1.1	0.7	1.9
<i>p-value</i>	*	-	
Main source of drinking water			
Piped water in residence	1.6	4.2	1.1
Piped water from public tap	25.0	69.8	10.2
Well inside dwelling	0.5	0.6	2.7
Public well	36.3	3.5	67.0
Borehole	6.4	0.2	0.7
River/canal/lake/spring	29.9	14.5	18.3
Rainwater	0.4	7.2	-
<i>p-value</i>	*	**	
Relative Wealth Index Quintile			
Poorest	11.2	13.1	38.6
Poor-middle	12.9	25.2	23.8
Middle	15.2	21.6	24.4
Middle-rich	34.0	17.2	5.0
Richest	26.7	22.9	8.3
<i>p-value</i>	**	**	
Note: * significant difference between intervention and control district at 5% level (p<0.05) ** significant difference between intervention and control district at 1% level (p<0.01)			

Table 6 summarizes key characteristics of the head of the household, and the main caregiver of children under five in the household. Most household heads (82-88 percent) are farmers or shepherds, and they are typically employed permanently. There are few notable differences in the head of household characteristics among the three districts. One of them is that household heads in Rubavu are better educated than households in the other two districts. A smaller proportion of household heads in Nyagatare are permanently employed (as opposed to unemployed or temporarily employed), compared to the other two districts. A larger proportion of household heads in Nyagatare are Catholic, compared to the other two districts.

We also collected information on the age, education, and role within the household of the person in charge of water. This is the person who collects, transports, and purifies water for the household. In nearly all households, that person was the same as the child caregiver. In most households, the person in charge of water is the wife of the head of household, or the head of household in the case of female-headed households. The only notable difference in the profile of child caregivers is that those in Nyagatare have lower education, compared to the other two districts.

**TABLE 6: CHARACTERISTICS OF HEAD OF HOUSEHOLD AND CHILD CAREGIVER  
(% OF HOUSEHOLDS)**

	<b>Nyagatare</b>	<b>Rubavu</b>	<b>Karongi</b>
% female-headed HHs	15.2	12.1*	17.0
<b>Head of household</b>			
Education			
No education	60.2	46.2	59.6
Primary	29.9	35.5	32.6
Post-primary	5.7	13.6	5.8
Secondary or higher	4.2	4.7	2.1
<i>p-value</i>	-	**	
Type of occupation			
Unemployed	3.1	2.5	3.2
Temporary/Occasional	11.6	4.4	2.2
Permanent	85.3	93.1	94.6
<i>p-value</i>	**	-	
Field of occupation			
Unemployed	3.1	2.5	3.2
Farmer/shepherd	81.5	82.0	88.3
Civil servant/govt/military	4.3	4.8	3.7
Trader/artisan	11.1	10.8	4.8
<i>p-value</i>	-	-	
Religion			
Catholic	44.9	34.3	25.8
Protestant	38.5	34.3	38.3
Adventist	12.4	24.6	33.3
Other	4.1	6.8	2.6
<i>p-value</i>	**	-	
Languages spoken			
Kinyarwanda	99.8	98.9	99.4
French	5.2	6.8	5.2
English	5.9	1.1	2.3
Swahili	5.3	4.1	2.2
Other	7.9	0.7	0.3

<b>Primary caregiver of children under 5</b>			
Age (years)	33	31	32
Education			
No education	71.8	60.0	61.4
Primary	21.4	31.5	33.7
Post-primary	4.3	6.8	4.1
Secondary or higher	2.3	1.7	0.8
<i>p-value</i>	*		
<b>Person in charge of water <sup>a</sup></b>			
Role within the household			
Head of household	15.9	12.8	12.4
Spouse of household head	79.1	85.0	75.9
Child/grandchild	3.9	1.6	11.0
Other	1.1	0.5	0.8
<i>p-value</i>	**	**	

Note: \* significant difference between intervention and control district at 5% level

\*\* significant difference between intervention and control district at 1% level

<sup>a</sup> In nearly all households, the person in charge of water is the same as the child caregiver. Therefore, age and education statistics are not reported separately.

Households were eligible for inclusion in the study if the head of household or his/her spouse were mutuelle members, although other household members were not necessarily mutuelle members. In each district, 85-88 percent of individuals in sampled households were current mutuelle members (with last enrollment no earlier than December 2006), and very few had other type of health insurance (Table 7). There is no difference in enrollment rates of male and female household members. Individuals older than 25 years are more likely to be enrolled than are younger household members. Children under five are least likely to be enrolled, often because newborn babies are enrolled when the rest of household members renew their membership, typically at the end of the year.

**TABLE 7: HEALTH INSURANCE MEMBERSHIP**

	<b>Nyagatare</b>	<b>Rubavu</b>	<b>Karongi</b>
<b>Enrollment in health insurance (% of individuals)</b>			
Mutuelle member	88.3	86.5	85.4
Other health insurance	0.9	0.4	1.6
Both mutuelle and other health insurance	0.1	0.1	0.6
No health insurance	10.7	13.0	12.4
<b>Mutuelle enrollment</b>			
% of members enrolled in past 12 months (Dec. 2006 or later)	94.0	99.4	94.8
<b>By sex (% in mutuelle)</b>			
Male	86.7	85.7	86.1
Female	90.0	87.4	86.0
<b>By age group (% of age group in mutuelle)</b>			
0-4	77.8	75.8	77.8
5-14	91.4	86.6	87.7
15-24	87.1	88.5	82.3
25-49	94.5	96.2	93.7
50 or above	93.4	95.8	92.8

	Nyagatare	Rubavu	Karongi
By role in the household (% of group in mutuelle)			
Head of household	94.1	95.2	93.1
Spouse of household head	97.8	96.9	95.3
Child	86.6	82.3	83.5
Grandchild	77.6	79.3	71.9
Other	63.5	66.4	69.3

## 4.2 PREVALENCE OF DIARRHEA

For each household member, data collectors inquired about whether the member had had diarrhea in the past 15 days. Table 8 summarizes the prevalence of diarrhea at the individual and at the household level, for three age groups: all individuals, children under five, and children under two years. Prevalence across all age groups was 2.2-2.5 percent, and was highest among children. While 5-6 percent of children under five had a diarrhea episode, prevalence was 6-9 percent among children under two years. However, there is a correlation of diarrhea cases in the household, for example, due to same-source or transmission among household members. Therefore, prevalence at the household level may be a more appropriate indicator to consider, particularly when looking at the impact of POU water treatment (since household members share drinking water). At the household level, prevalence is defined as *at least one case* among household members of the given age group. Household prevalence across all age groups in our sample is 11-12 percent, among children under five it is 7-9 percent, and among children under two it is 7-10 percent.

There are no significant differences in prevalence among the three districts for any of the age groups. This result holds for both the individual and household level measures of prevalence. However, individual-level prevalence among children under five in our sample (5-6 percent) was much lower than that measured by the 2005 DHS (14.1 percent). There are a number of potential explanations of this difference. First, DHS data collection took place in March-July, which is during the long rainy season, and we collected our data in the short dry season. Diarrhea prevalence is known to increase substantially in the rainy season, compared to the dry season. Another explanation may have to do with a recent initiative under which about 11,000 animateurs de santé were deployed across the country. Hygiene and sanitation are two of the areas which the animateurs are expected to address in their communities. Furthermore, starting in 2005, district mayors were obliged to sign a two-year performance contract with the government, which includes, among other issues, improvements in water and sanitation such as obliging each household to construct a proper toilet.

One notable difference between the control and intervention sites is that a significantly larger proportion of diarrhea cases in Nyagatare were reported as “serious” or “very serious” (86 percent), compared to Karongi (56 percent). Since there are no notable cultural differences in the population groups across the three study sites, we do not expect that this difference is due to different perceptions of diarrhea severity among respondents in each study site.

**TABLE 8: DIARRHEA PREVALENCE**

	Intervention Districts		Control District
	Nyagatare	Rubavu	Karongi
<b>Individual Level (% of people)</b>			
<b>Prevalence in past 2 weeks</b>			
All individuals	2.2	2.5	2.5
Children under 5	6.3	5.9	5.1
Children under 2	8.6	7.8	6.3
<b>Severity of diarrhea episode, % of cases reported as:</b>			
Not serious	13.9	31.4	44.0
Serious	39.2	47.7	22.2
Very serious	46.9	20.9	33.7
p-value	**	**	
<b>Household Level (% of household with at least one case)</b>			
<b>Prevalence in past 2 weeks</b>			
All age groups	11.4	10.9	11.7
Children under 5	9.0	8.4	7.1
Children under 2	10.0	8.8	6.8

Note: \* significant difference between intervention and control district at 5% level

\*\* significant difference between intervention and control district at 1% level

We used multiple logistic regressions to investigate the factors that are correlated with diarrhea prevalence at the household level (Table 9). A relevant pooled sample of households or individuals from all three districts was used in each regression. The characteristics that were significantly associated with at least one case of diarrhea among children under five in the household include:

- *Number of children under five in the household:* households with more children are more likely to have a child diarrhea episode.
- *Age of caregiver:* the odds of a diarrhea case decrease by 2 percent with each year of increase in caregiver's age
- *Water source:* households with piped water at home are less likely to have a child diarrhea case compared to households with well water; whereas households with water from a public pipe, borehole, rainwater or surface water (river/canal/lake) are more likely to have a diarrhea case compared to those with well water (Wald test p-value=0.07)

There were no other characteristics that were significant predictors of diarrhea prevalence among children under five at the household level. The regression analyses did not identify any significant predictors of diarrhea prevalence among children under two years.

Table 9 also shows the regression results for diarrhea across all age groups combined. The results are similar to those for the sub-group of children under five. The likelihood of a diarrhea case decreases as the age of the child caregiver (who is also the person in charge of water in nearly all households) increases. The type of water source is a predictor of diarrhea (Wald test p-value=0.001): households with piped water at home are less likely to have a diarrhea case compared to households with well water, whereas households with water from a public pipe, borehole, rainwater, or surface water

(river/canal/lake) are more likely to have a diarrhea case compared to those with well water. While relative household wealth does not appear to be a predictor of diarrhea prevalence among children under five, it appears to be a predictor in the regressions including all household members (Wald test p-value=0.01): households in the three middle quintiles are less likely to have a diarrhea case, compared to households in the poorest quintile.<sup>8</sup> These results were robust for different specifications of the regression model and the two variations of the asset wealth index shown in Annex C.

**TABLE 9: PREDICTORS OF DIARRHEA AMONG CHILDREN UNDER FIVE AND OTHER HOUSEHOLD MEMBERS (LOGISTIC REGRESSION RESULTS)**

Dependent Variable	At least one case of diarrhea among children under 5 at the household (yes=1)	At least one case of diarrhea at the household (yes=1)
Independent Variables	Odds Ratio	
	N=2,368	N=2,367
District (base: Karongi)		
Nyangatara	1.13	0.88
Rubavu	0.89	0.80
Female-headed household (base: male headed)	0.73	0.88
Number of children under 5 in the household	1.51**	-
Number of household members	-	1.11**
Age of child caregiver	0.98**	0.97**
Education of child caregiver (base: no education)		
Primary	1.19	1.10
Post-primary or higher	1.51	1.32
Household relative wealth status (base: poorest 20%)		
Middle-poor 20%	1.14	0.97
Middle 20%	0.80	0.61*
Middle-rich 20%	0.75	0.66*
Richest 20%	1.17	1.03
Household water source (base: well water)		
Piped water in residence	0.21	0.14
Piped water from public tap	1.48	1.21
River/canal/lake	1.62*	1.67**
Rainwater or borehole	2.30*	2.87**

Note: \* p<0.05    \*\* p<0.01

The results discussed above were largely similar in individual-level regressions for each of the three age groups (children under five, children under two, and all individuals).

<sup>8</sup> Households in the richest quintile appear more likely to have a diarrhea case, compared to the poorest quintile. It is unlikely that richer households are more likely to report a case, and this result is not confirmed in the regression using the alternative wealth index, so this is likely a result from noise in the data.

### 4.3 TREATMENT AND EXPENDITURES ON DIARRHEA

The curative care questionnaire collected information on the treatment of all reported diarrhea cases, as well as expenditures associated with care received at a health facility (Table 10). In Nyagatare, 22 percent of cases received no treatment, while this proportion was twice as high in Karongi (46 percent). There are substantial differences in formal care-seeking rates in the intervention and control groups: while 45 percent of cases in Nyagatare and 59 percent of cases in Rubavu were taken to a health provider, only 31 percent of cases in Karongi were seen by a health provider. A possible explanation for this difference may be that a larger proportion of cases in Nyagatare were reported as “serious” or “very serious” (86 percent), compared to Karongi (56 percent), which may indicate that the cases in Nyagatare are caused by more virulent pathogens.

**TABLE 10: TREATMENT OF DIARRHEA CASES**

	Intervention Districts		Control District
	Nyagatare	Rubavu	Karongi
	<i>% of diarrhea cases</i>		
<b>Type of treatment</b>	<b>N=115</b>	<b>N=126</b>	<b>N=98</b>
Not treated at all	22.4	30.5	44.5
Treated at home	37.2	22.1	28.1
Taken to health provider	44.7	59.4**	31.1
	<i>% of cases taken to health provider</i>		
<b>Formal care seeking</b>	<b>N=49</b>	<b>N=74</b>	<b>N=31</b>
<b>Type of health provider visited</b>			
Public/mission hospital	23.2	26.6	35.5
Public/mission health center	62.1	64.5	63.8
Dispensary	5.6	2.4	-
Private clinic, other	7.0	6.5	-
p-value	-	-	
Mutuelle members	80.0	85.6	93.7
<b>Out-of-pocket expenditures on treatment (RFr)</b>	<b>551*</b>	<b>346</b>	<b>318</b>

Note: \* significant difference between intervention and control district at 5% level

\*\* significant difference between intervention and control district at 1% level

The majority of cases that received home treatment were treated with traditional medicines or herbs (68 percent), while 21 percent received packaged or home-made ORS, and 11 percent received antibiotics (n=102 in all three districts).

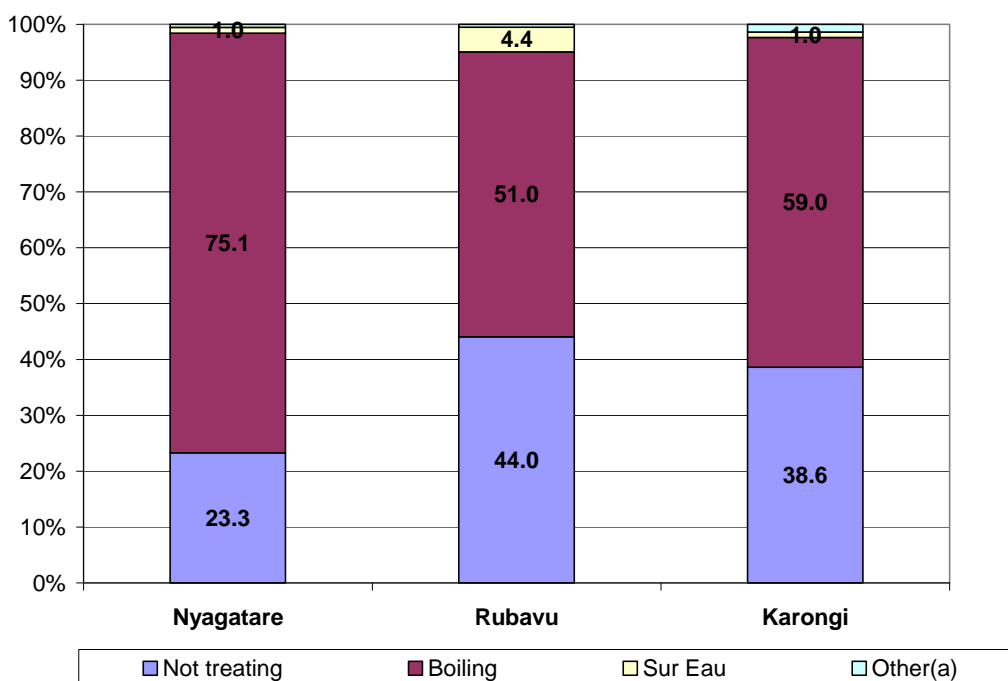
In each district, nearly all cases taken to a health provider were at public or mission facilities, where mutuelles cover part of treatment costs. Of the cases taken to a health provider in Nyagatare, 80 percent were patients who were mutuelle members, compared to 86 percent in Rubavu and 94 percent in Karongi. This indicates that one in five diarrhea cases in mutuelle member households in Nyagatare that were taken to a health provider were not covered by a mutuelle, while this proportion is lower in the other two districts. Accordingly, average out-of-pocket payment for care received at a health facility is higher in Nyagatare (RFr 551) than in Rubavu (RFr 346) and Karongi (RFr 318). Out-of-pocket payment includes payments made for consultation, lab tests, drugs, and hospitalization, but does not include the cost of transportation to the health facility.



## 4.4 KNOWLEDGE, ATTITUDE AND PRACTICES RELATED TO POU WATER TREATMENT

In Nyagatare, 77 percent of households used some form of POU water treatment, while this proportion was significantly lower in Rubavu (56 percent) and Karongi (61 percent). A potential explanation of this difference is that water supply is of better quality in Rubavu, compared to the other two districts: the majority of households in Rubavu (74 percent) get piped drinking water, compared to 27 percent in Nyagatare and 11 percent in Karongi. Boiling is the most common method for POU water treatment (51-75 percent of households), whereas very few households said they used Sûr'Eau when asked about POU treatment (only 1 percent in Nyagatare and Karongi, and 4 percent in Rubavu) (Figure 3). However, we did not probe for consistent or correct use of the type of POU treatment that respondents mentioned, and we believe that these figures may reflect what households do only occasionally or part of the time to make their drinking water safe.

**FIGURE 3: TYPE OF SAFE WATER TREATMENT  
(% OF HOUSEHOLDS WHO REPORTED THEY TREAT DRINKING WATER)**



In each district, the majority of respondents had heard of Sûr'Eau and had correct knowledge of what the product is used for (Table 11). However, knowledge of Sûr'Eau is better in Nyagatare, and worse in Rubavu, compared to the control district. The main source of information on Sûr'Eau is the radio, followed by health facility, and a community resource person such as an animateur de santé. In Rubavu, a significantly higher proportion of respondents had heard of the product from a community resource person, compared to the other two districts. While very few households mentioned that their source of knowledge on Sûr'Eau was a mutuelle coordinator, it should be noted that in some areas about half of mutuelle coordinators are also animateurs.

**TABLE 11: KNOWLEDGE OF SÛR'EAU**

	Intervention Districts		Control District
	Nyagatare	Rubavu	Karongi
<b>Have heard of Sûr'Eau?</b>	86.0*	64.8*	77.1
<b>What is Sûr'Eau used for?</b>	N=745	N=540	N=528
To make drinking water safe	64.7	70.2	58.0
Kills germs	25.6	13.6	33.4
Other response	9.3	14.3	8.5
Don't know	0.5	2.0	0.2
<b>Source of information on Sûr'Eau?</b>			
Community resource person (animateur, community health worker, etc.)	8.6	24.4**	11.8
Community meeting	7.5*	5.1	3.1
Neighbor/family/friends	11.2*	7.3	6.8
Radio	86.1**	72.4	72.4
Mutuelle coordinator	1.1	1.7	1.9
Health facility	17.0	20.0	19.8

Note: \* significant difference between intervention and control district at 5% level

\*\* significant difference between intervention and control district at 1% level

While 77-86 percent of households had heard of Sûr'Eau, only 13-22 percent of them reported ever using it. Among those who had heard of the product, use was significantly higher in the two intervention districts, compared to the control district (Table 12).

**TABLE 12: USE OF SÛR'EAU COMPARED TO KNOWLEDGE**

	Intervention Districts		Control District
	Nyagatare	Rubavu	Karongi
	N=736	N=536	N=522
Ever used Sûr'Eau? (as % of households who had heard about product)	21.4*	22.2*	13.3

Note: \* significant difference between intervention and control district at 5% level

\*\* significant difference between intervention and control district at 1% level

Overall use of Sûr'Eau was higher in the two intervention districts than in the control district. About 11 percent of households in Karongi reported they ever used Sûr'Eau, compared to 18 percent in Rubavu and 19 percent in Nyagatare. Current use of the product was very low in each of the three districts (less than 4 percent), but was somewhat higher in Nyagatare and Rubavu than in Karongi (Table 13).

**TABLE 13: USE OF SÛR'EAU**

	Intervention Districts		Control District
	Nyagatare	Rubavu	Karongi
	N=862	N=825	N=691
Ever used Sûr'Eau?	18.8*	17.6	10.9
Currently using Sûr'Eau?	2.1	4.1*	1.3

Note: \* significant difference between intervention and control district at 5% level

\*\* significant difference between intervention and control district at 1% level

The most frequently cited reason for never using Sûr'Eau was not knowing where to buy it (about 30 percent of respondents), followed by "lack of money" (13-20 percent) (Table 14). Further investigation of the latter finding reveals that the proportion of those who gave "lack of money" as a reason is correlated with wealth (chi-square test  $p=0.004$ ): while 9 percent of those in the richest quintile said that lack of money was a reason for not buying Sûr'Eau, 26 percent of respondents from the poorest quintile gave this answer. A significantly lower proportion of households in Rubavu gave "no need" as a reason for not treating their water – a somewhat surprising finding, given that the quality of water source in Rubavu is generally better than in the other two districts.

**TABLE 14: REASONS FOR NOT USING SÛR'EAU**

	Intervention Districts		Control District
	Nyagatare	Rubavu	Karongi
	N=571	N=395	N=443
Expensive	6.3*	4.6	2.2
Bad taste/smell	3.48	2.8	4.6
Don't need	14.07	6.8*	14.0
Too difficult to use	1.5*	6.5	4.4
No money	17.5	12.9*	19.9
Don't know where to buy	29.6	31.6	31.5

Note: \* significant difference between intervention and control district at 5% level

\*\* significant difference between intervention and control district at 1% level

The most frequent source of Sûr'Eau in Nyagatare and Karongi is a retail shop/chemist, whereas in Rubavu it is a community health worker (Table 15). Interestingly, nearly half of users in Rubavu purchased Sûr'Eau from a community health worker, and, as previously noted for Rubavu (1) a community resource person was the second most frequent source of information on Sûr'Eau (24 percent of respondents), and (2) the district had higher current use of the product compared to the other two districts. This may indicate that availability of Sûr'Eau from a community outreach person is linked to higher use of the product.

**TABLE 15: USUAL SOURCE OF SÛR'EAU AMONG RECENT USERS**

	Intervention Districts		Control District
	Nyagatare	Rubavu	Karongi
	N=37	N=72	N=21
Community health worker	2.1	48.6	24.6
Stockist	22.1	12.5	13.5
Health facility	26.3	22.3	20.6
Retail shop/chemist	43.7	11.4	35.7
Other	5.8	5.0	5.6
<i>Total</i>	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>

Correct use of Sûr'Eau means that the product should be added to the water storage vessel every time water is collected. About half of recent users knew the correct frequency of use (Table 16), which underscores the importance of educating current and future users on the proper application of the product.

**TABLE 16: FREQUENCY OF USE OF SÛR'EAU**

	All 3 districts (% of households)
<b>Frequency of use:</b>	<b>N=133 (recent users)</b>
Every time water is collected	48.0
At least once a week	24.9
A few times per month	19.5
Occasionally	6.8
<b>Last treatment of current drinking water:</b>	<b>N=71 (current users)</b>
Today	37.06
Yesterday	38.01
2 days ago	13.3
3 or more days ago	11.6

#### 4.5 DETERMINANTS OF POU WATER TREATMENT

We used multiple logistic regressions to investigate the factors that are correlated with POU water treatment and use of Sûr'Eau (Table 17). The question on POU water treatment was: "Do you do anything to treat your water to make it safe to drink?" If the respondent said "yes," the interviewer did not probe for how consistent or correct this water treatment was. Accordingly, the dependent variable for POU water treatment reflects what respondents may do occasionally, and does not necessarily mean that treatment is done properly (e.g., water may not be boiled long enough). Rather, the variable may only indicate initiative on part of the household to do some form of POU water treatment. As already noted, the most-frequent type of POU water treatment is boiling.

**TABLE 17: PREDICTORS OF POINT-OF-USE WATER TREATMENT AND USE OF SÛR'EAU (LOGISTIC REGRESSION RESULTS)**

Dependent Variable	Household uses POU water treatment (yes=1)	Household used Sûr'Eau <sup>a</sup> (yes=1)
<b>Independent Variables</b>	<b>Odds Ratio</b>	
District (base: Karongi)	N=2,368	N=1,739
Nyagatare	1.49	1.35
Rubavu	0.57*	1.49
Female-headed household (base: male headed)	0.81	1.11
Age of child caregiver	1.00	1.00
Education of child caregiver (base:no education)		
Primary	1.15	1.05
Post-primary or higher	2.09**	2.12**
Household relative wealth status (base: poorest 20%)		
Middle-poor 20%	1.13	2.28*
Middle 20%	1.47*	2.40**
Middle-rich 20%	1.76**	2.12*
Richest 20%	3.54**	4.38**
Household water source (base: public well)		
Piped water in residence	1.29	0.93
Piped water from public tap	1.01	0.90
River/canal/lake	0.80	1.21
Rainwater or borehole	2.20*	0.57

Note: <sup>a</sup>Sample includes only households who have heard of Sûr'Eau.

\* p<0.05    \*\* p<0.01

Household characteristics that are significantly associated with POU water treatment include:

- *District of residence*: households in Rubavu were less likely and those in Nyagatare were more likely to practice POU treatment, compared to households in Karongi (Wald test p=0.001)
- *Education of the child caregiver* (who is typically also the person in charge of water): those with primary or higher education are more likely to practice POU water treatment, compared to those with no education (Wald test p=0.009)
- *Household wealth*: households in each of the top four wealth index quintiles are more likely to use some type of POU treatment, compared with households in the poorest quintile, and the likelihood of use increases with quintile (Wald test p=0.000)
- *Water source*: households using surface water are less likely to practice POU treatment, compared to households with water from a well, whereas households with any other water source (piped water, borehole, or rainwater) are more likely to do so (Wald test p=0.04)

Table 17 also presents logistic regression results on use of Sûr'Eau among those who had heard of the product. The question we asked respondents was: "Have you ever treated your water with Sûr'Eau?"<sup>9</sup> As with overall POU treatment, the dependent variable used in the analysis may only indicate initiative on part of the household to try Sûr'Eau, rather than consistent use. The household characteristics that are significantly associated with use of Sûr'Eau include:

- *Education of the child caregiver:* those with primary or higher education are more likely to use Sûr'Eau, compared to those with no education (Wald test  $p=0.002$ )
- *Household wealth:* households in each of the top four wealth index quintiles are more likely to use Sûr'Eau, compared with households in the poorest quintile (Wald test  $p=0.002$ )

The type of water source did not emerge as a predictor of Sûr'Eau use. It is possible that the small number of households using Sûr'Eau did not allow us to detect water source as a significant predictor.

These results were robust for different specifications of the regression model and the two variations of the asset wealth index. Additionally, we applied the regression model for use of Sûr'Eau to the total sample of households (i.e., including the households that have not heard of Sûr'Eau in the sample) and obtained similar results.

## 4.6 IMPLICATIONS OF THE FINDINGS FOR THE EVALUATION STUDY

While our intention was to select a control district that is as similar as possible to the two districts where the pilot project is implemented, the baseline survey results indicate that there were significant differences in a number of key characteristics between the control and intervention sites. Such differences may threaten the internal validity of the difference-in-differences evaluation. In the final evaluation, we plan to address this problem by applying multivariate regression analyses that control for differences in household wealth, education of the child caregiver, type of water source, and other variables that may be associated with prevalence of diarrhea among children and POU water treatment.

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<sup>9</sup> We also inquired whether Sûr'Eau was recently or currently used, but the number of households who answered positively was very low, leading us to choose *ever use* as a more feasible variable to use.

## 5. CONCLUSIONS AND RECOMMENDATIONS

The findings from the baseline study support several conclusions. This section summarizes them and highlights some corresponding recommendations for the implementation of the pilot project in the two intervention districts. Most of our recommendations address features of the project promotion campaign.

First, in nearly all households, the person in charge of water is also the main caregiver of children under five. This implies that the campaign for promoting and distributing Sûr'Eau may be more effective in ensuring uptake of the product if the mutuelles highlight the benefits of Sûr'Eau for child health.

Second, the survey found that the main reason for non-use of Sûr'Eau is not knowing where to buy the product. This indicates that in the promotion campaign, mutuelles should emphasize the new distribution channels available through the pilot project.

Third, our study found that relative household wealth (within the group of mutuelle households with children under five) is associated with POU water treatment and with use of Sûr'Eau: richer households were more likely to practice POU treatment than poorer households. We also found correlation between wealth quintile and the proportion of non-users of Sûr'Eau who never bought the product because of "lack of money": while only 9 percent of those in the richest quintile never used Sûr'Eau for lack of money, this proportion was 26 percent among households from the poorest quintile. This indicates that there are financial barriers to the use of Sûr'Eau that are strongest among the poorer. However, mutuelles may benefit from exploring whether there may be other contributing factors, such as lack of empowerment or feeling of self-efficacy among the poorest when it comes to POU water treatment. Mutuelles may then consider a number of options to ensure that the intervention does not disproportionately exclude the poorest households among their members. For example, they can offer Sûr'Eau at a larger discount to their poorest members, and at a smaller or no discount to all other members.

Fourth, we found that education of the child caregiver is positively associated with POU water treatment. This indicates that mutuelles should tailor the design and implementation of the project promotion campaign in a way that caters to women with little or no education.

And lastly, the baseline survey showed that a large proportion of families practice POU water treatment, and nearly all of them use boiling. Accordingly, the promotion campaign may achieve higher uptake of Sûr'Eau by highlighting the advantages of Sûr'Eau over boiling.





# **ANNEX A. HOUSEHOLD QUESTIONNAIRE**

**BASELINE EVALUATION  
EFFECTS OF Sûr' Eau DISTRIBUTION THROUGH MUTUELLES DE SANTE  
(December 2007)**

**HOUSEHOLD QUESTIONNAIRE**

**INTRODUCTION AND INFORMED CONSENT**

Hello. My name is [ ]. I work for Health Systems 20/20, a USAID-sponsored project, and we are conducting a study about prevention and treatment of diarrhea in your district. The purpose of the survey is to learn about current practices in water treatment, and how the mutuelles de sante can help improve water safety, so we can help reduce the prevalence of diarrhea. First, I would like to ask you some questions about your household and whether or not you are a member of a mutuelle de sante. As part of the questionnaire, I will be asking about all the people who reside in your household, and whether or not they have had diarrhea in the past two weeks. For those family members who had diarrhea, I would then like to ask some additional questions about their experience receiving health care services, and expenditures incurred for consultation and drugs. I would like to assure you that your responses will be confidential, and will only be used for the purposes of this study. You will not be penalized or lose your mutuelle de sante membership if you decide not to participate in this survey. You have the right to refuse to answer any question, and you can terminate the interview at any time. This survey is voluntary, and will take approximately 30 minutes to complete. If you have any questions or concerns about this study, you may contact Mr. Ignace Rwakayiro at phone number 08 47 96 32.or by e-mail: ciedep @ yahoo.fr

<b>S1. Do you agree to participate in this survey?</b>	
YES.....1	→ CONTINUE
NO.....2	→ END and thank repondent

<b>S2. Is the head of this household or the spouse currently a member of mutuelle de sante?</b>	
YES, the head of household is a member of mutuelle.....1	→ CONTINUE
YES, the spouse of the head of household is a member of mutuelle.....2	→ CONTINUE
YES, both are currently members of mutuelle.....3	→ CONTINUE
NO, neither of the two is a member of mutuelle .....4	→ END and thank repondent

<b>S3. Are there any children under the age of 5 yrs in this household?</b>	
YES.....1	→ CONTINUE
NO.....2	→ END and thank repondent

**IDENTIFICATION**

<b>District:</b>	NYAGATARE ..... 1
	RUBAVU ..... 2
	KARONGI ..... 3

**Sector**

**Cell**

**Name of Town or Village:**

<b>Area</b>	URBAN..... 1
	RURAL..... 2

**Name of the Head of Household:**

Time Started: \_\_\_\_\_ Time Ended: \_\_\_\_\_  
(Example: write "1230" for 12:30pm)

<b>Respondent to questionnaire</b> (Circle one)	1 Head of household 2 Spouse	3 Other (Specify)
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<b>Interviewer</b>		<b>Team leader</b>		<b>Data Entry</b>		<b>Unique Household ID</b>			
<b>Name</b>		<b>Name</b>		<b>Name</b>					
<b>Day</b>		<b>Day</b>		<b>Day</b>					
<b>Month</b>		<b>Month</b>		<b>Month</b>					

**SECTION 1: HOUSEHOLD ROSTER**

First, I would like to ask you about all the people who live in this household (that is those who share living arrangements and eat meals together at this household). **I would like to only ask about those who are currently living here or have been absent for less than 3 months.** I would like to start with the head of the household.

Line No.	Usual Residents	Relationship to Head of Household	Sex	Age	Health Insurance Membership	Date of last health insurance enrollment	Recent Diarrhea Episode
	First Name	1=Household head 2=Spouse 3=Child 4=Grandchild 5=Other relative 6=Domestic worker 7=Other	1= Male 2=Female	How old is this person?  Record age in years	1= Member of Mutuelle de Sante 2= Other health insurance scheme 3=Both 3=Not insured	Record Month and Year  88 = Don't know 99 = NA (person not enrolled in health insurance) <b>If H106=3 record the date for mutuelle enrolemtn</b>	Has [person] had diarrhea in the past 15 days? 1= Yes 2= No
<b>H101</b>	<b>H102</b>	<b>H103</b>	<b>H104</b>	<b>H105</b>	<b>H106</b>	<b>H107</b>	<b>H108</b>
1.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> <input type="text"/>	<input type="checkbox"/>	Month <input type="text"/> <input type="text"/> Year <input type="text"/> <input type="text"/>	<input type="checkbox"/>
2.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> <input type="text"/>	<input type="checkbox"/>	Month <input type="text"/> <input type="text"/> Year <input type="text"/> <input type="text"/>	<input type="checkbox"/>
3.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> <input type="text"/>	<input type="checkbox"/>	Month <input type="text"/> <input type="text"/> Year <input type="text"/> <input type="text"/>	<input type="checkbox"/>
4.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> <input type="text"/>	<input type="checkbox"/>	Month <input type="text"/> <input type="text"/> Year <input type="text"/> <input type="text"/>	<input type="checkbox"/>
5.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> <input type="text"/>	<input type="checkbox"/>	Month <input type="text"/> <input type="text"/> Year <input type="text"/> <input type="text"/>	<input type="checkbox"/>
6.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> <input type="text"/>	<input type="checkbox"/>	Month <input type="text"/> <input type="text"/> Year <input type="text"/> <input type="text"/>	<input type="checkbox"/>

Line No.	Usual Residents	Relationship to Head of Household	Sex	Age	Health Insurance Membership	Date of last health insurance enrollment	Recent Diarrhea Episode
	First Name	1=Household head 2=Spouse 3=Child 4=Grandchild 5=Other relative 6=Domestic worker 7=Other	1= Male 2=Female	<b>How old is this person?</b>  Record age in years	1= Member of Mutuelle de Sante 2= Other health insurance scheme 3=Both 3=Not insured	Record Month and Year  88 = Don't know 99 = NA (person not enrolled in health insurance) <b>If H106=3 record the date for mutuelle enrolemtn</b>	<b>Has [person] had diarrhea in the past 15 days?</b> 1= Yes 2= No
7.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> <input type="text"/>	<input type="checkbox"/>	Month <input type="text"/> <input type="text"/> Year <input type="text"/> <input type="text"/>	<input type="checkbox"/>
8.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> <input type="text"/>	<input type="checkbox"/>	Month <input type="text"/> <input type="text"/> Year <input type="text"/> <input type="text"/>	<input type="checkbox"/>
9.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> <input type="text"/>	<input type="checkbox"/>	Month <input type="text"/> <input type="text"/> Year <input type="text"/> <input type="text"/>	<input type="checkbox"/>
10.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> <input type="text"/>	<input type="checkbox"/>	Month <input type="text"/> <input type="text"/> Year <input type="text"/> <input type="text"/>	<input type="checkbox"/>
11.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> <input type="text"/>	<input type="checkbox"/>	Month <input type="text"/> <input type="text"/> Year <input type="text"/> <input type="text"/>	<input type="checkbox"/>
12.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/> <input type="text"/>	<input type="checkbox"/>	Month <input type="text"/> <input type="text"/> Year <input type="text"/> <input type="text"/>	<input type="checkbox"/>

Enumerators, after completing this questionnaire, fill out a Curative Care Questionnaire for each person who has had diarrhea in past 15 days. That is, each person for whom the answer to H109 is YES=1.

NO.	QUESTIONS AND FILTERS	RESPONSES	SKIP TO
H109	Who takes care of children under 5 years in this household?	INAME -----	
H110	How old is he/she?  <b>WRITE RESPONSE IN YEAR</b>	<input type="text"/> <input type="text"/>	
H 111	What is the highest level of school successfully completed by that person?	NONE.....1 Primary .....2 Post Primary .....3 Secondary .....4 Superior .....5 OTHER .....96 (SPECIFY) _____ Don't know.....88	

## SECTION 2: HEAD OF HOUSEHOLD CHARACTERISTICS

Now I would like to ask you a few questions about the head of this household.

NO.	QUESTIONS AND FILTERS	RESPONSES	SKIP TO
H201	What is the highest level of school successfully completed by the head of the household?	NONE.....1 Primary .....2 Post Primary .....3 Secondary .....4 Superior .....5 OTHER .....96 (SPECIFY) _____ Don't know.....88	
H202	What languages does the head of this household speak ?  <b>Multiple responses allowed</b>	Français .....1 Anglais .....2 Kinyarwanda.....3 Autre .....96 (à préciser) _____ <b>NON DECLARE(E).....88</b>	
H203	What was the main activity of the head of household during the past month?	UNEMPLOYED ..... 1 HOUSEWIFE ..... 2 STUDENT ..... 3 RETIRED/PENSIONER.....4 Farmer ..... 5 Shepherd ..... 6 Fisher ..... 7 Civil servant ..... 8 Company employee ..... 9 OTHER ..... 96 (SPECIFY) _____ Don't know.....88	IF 1, 2,3 OR 4→ H206

NO.	QUESTIONS AND FILTERS	RESPONSES	SKIP TO
H204	What employment position does the head of household have?	Independent.....1 Head of unit .....2 Technician .....3 Employee .....4 Day Laborer .....5 SPECIFY _____ Don't know.....88 NA .....99	
H205	What is the nature of this work? That is, is it permanent, temporary, or occasional?	PERMANENT .....1 TEMPORARY/ OCCASIONAL .....2 OTHER .....96 (SPECIFY)..... DON'T KNOW.....88 NA .....99	
H206	What is the religion of the head of household?	CATHOLIC .....1 PROTESTANT .....2 7 <sup>TH</sup> DAY ADVENTIST .....3 MUSLIM.....4 TRADITIONALIST .....5 OTHER .....96 (SPECIFY)..... DON'T KNOW.....88	

**SECTION 3: HOUSEHOLD CHARACTERISTICS**

NO.	QUESTIONS AND FILTERS	RESPONSES	SKIP TO																
H301	Does your family/household own farmland?	YES .....1 NO .....2 DON'T KNOW.....88																	
H302	How many of the following animals does your household own: goats? sheep ? cows ?  <b>READ LIST AND RECORD RESPONSE FOR EACH ITEM.</b> If none, enter « 00 ». If 96 or more, enter « 96 ». If number is not known, enter « 98 ».	<table border="1"> <thead> <tr> <th colspan="2"></th> <th colspan="2">NUMBER</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>GOATS</td> <td></td> <td></td> </tr> <tr> <td>B</td> <td>SHEEP</td> <td></td> <td></td> </tr> <tr> <td>C</td> <td>COWS</td> <td></td> <td></td> </tr> </tbody> </table>			NUMBER		A	GOATS			B	SHEEP			C	COWS			
		NUMBER																	
A	GOATS																		
B	SHEEP																		
C	COWS																		
H303	Do you own or rent your home?	OWN .....1 RENT.....2 OTHER .....96																	
H304	How many rooms are in your dwelling? /	NUMBER OF ROOMS <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr></table> DON'T KNOW .....88																	
H305	What is the main material of the floor in the dwelling where your household lives ?  <b>INTERVIEWER: READ LIST IF NECESSARY</b>	EARTH/SAND/MUD/DUNG .....1 PARQUET OR POLISHED WOOD .....2 CARPET.....3 CERAMIC TILES.....4 CEMENT.....5 OTHER .....96 (SPECIFY)																	

NO.	QUESTIONS AND FILTERS	RESPONSES	SKIP TO																								
H306	What is the main material of the roof in the dwelling where your household lives?  <b>INTERVIEWER: READ LIST IF NECESSARY</b>	Concrete ..... 1 Metal Sheet ..... 2 Clay ..... 3 Straw ..... 4 Other ..... 96 (specify) _____																									
H307	Does your household have:  <b>READ LIST AND RECORD RESPONSE FOR EACH ITEM</b>	<table border="1"> <thead> <tr> <th colspan="2"></th> <th>YES</th> <th>NO</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>ELECTRICITY</td> <td>1</td> <td>2</td> </tr> <tr> <td>B</td> <td>RADIO</td> <td>1</td> <td>2</td> </tr> <tr> <td>C</td> <td>TELEVISION</td> <td>1</td> <td>2</td> </tr> <tr> <td>D</td> <td>REFRIGERATOR</td> <td>1</td> <td>2</td> </tr> <tr> <td>E</td> <td>NON-MOBILE TELEPHONE</td> <td>1</td> <td>2</td> </tr> </tbody> </table>			YES	NO	A	ELECTRICITY	1	2	B	RADIO	1	2	C	TELEVISION	1	2	D	REFRIGERATOR	1	2	E	NON-MOBILE TELEPHONE	1	2	
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C	TELEVISION	1	2																								
D	REFRIGERATOR	1	2																								
E	NON-MOBILE TELEPHONE	1	2																								
H308	Does any member of your household own:  <b>READ LIST AND RECORD RESPONSE FOR EACH ITEM</b>	<table border="1"> <thead> <tr> <th colspan="2"></th> <th>YES</th> <th>NO</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>BICYCLE</td> <td>1</td> <td>2</td> </tr> <tr> <td>B</td> <td>MOTORCYCLE / SCOOTER</td> <td>1</td> <td>2</td> </tr> <tr> <td>C</td> <td>CAR OR MINI-TRUCK</td> <td>1</td> <td>2</td> </tr> <tr> <td>D</td> <td>MOBILE TELEPHONE</td> <td>1</td> <td>2</td> </tr> </tbody> </table>			YES	NO	A	BICYCLE	1	2	B	MOTORCYCLE / SCOOTER	1	2	C	CAR OR MINI-TRUCK	1	2	D	MOBILE TELEPHONE	1	2					
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D	MOBILE TELEPHONE	1	2																								
H309	What is the <b>main</b> source of drinking water for members of your household?  <b>SINGLE RESPONSE</b>	PIPED WATER IN RESIDENCE ..... 1 PIPED WATER IN PUBLIC TAP ..... 2 INSIDE WELL ..... 3 PUBLIC WELL ..... 4 BOREHOLE ..... 5 RIVER, CANAL OR SURFACE WATER ..... 6 RAINWATER ..... 7 TANKER TRUCK ..... 8 SACHET/BOTTLED WATER ..... 9 OTHER ..... 96																									
H310	What kind of toilet do <u>most</u> members of your household use? /Quel genre de toilettes la plupart des membres de votre ménage utilisent?  <b>SINGLE RESPONSE</b>	OWN FLUSH TOILET ..... 1 SHARED FLUSH TOILET ..... 2 PIT LATRINE ..... 3 VENTILATED IMPROVED PIT (VIP) LATRINE ..... 4 BUSH/FIELD AS LATRINE ..... 5 OTHER ..... 96																									
H311	What do you use as your <b>main</b> source of fuel for cooking in this household?  <b>SINGLE RESPONSE</b>	LPG/NATURAL/BIO GAS ..... 1 KEROSENE ..... 2 ELECTRICITY ..... 3 COAL ..... 4 WOOD/STRAW ..... 5 OTHER ..... 96 SPECIFY _____																									

**SECTION 4: KNOWLEDGE, ATTITUDE, AND PRACTICES RELATED TO  
WATER STORAGE/TREATMENT AND Sûr' Eau**

**Now I would like to ask you a few questions about water handling and treatment. If you are not the person in charge of this, I would like to ask that the person in charge joins us to help answer these questions.**

NO.	QUESTIONS AND FILTERS	RESPONSES	SKIP TO
H401	Who takes care of water in this household?	NAME ..... HOUSEHOLD ROSTER NUMBER (H101) <input type="text"/> <input type="text"/>	
H402	How old is he/she? <b>WRITE RESPONSE IN YEARS</b>	<input type="text"/> <input type="text"/>	
H403	What is the highest level of school successfully completed by that person?	NONE.....1 Primary .....2 Post Primary .....3 Secondary .....4 Superior .....5 OTHER .....96 (SPECIFY) _____ Don't know.....88	
H404	Do you do anything to treat your water to make it safe to drink?	YES .....1 NO.....2 DON'T KNOW .....88	IF NO → H406
H405	What do you do?	BOILING.....1 FILTRATION .....2 COMPRIME .....3 PERMANGANATE .....4 BLEACH (EAU DE JAVEL).....5 SUR'EAU.....6 OTHER .....96 SPECIFY _____ NA .....99	IF SUR'EAU → H407
H406	Have you heard of <b>Sûr' Eau</b> ?  <b>If the answer is 'NO' end questionnaire here.</b>	YES .....1 NO.....2	IF NO → <b>END</b>
H407	How did you learn about <b>Sûr' Eau</b> ?  <b>Interviewer, do not read responses.</b>  <b>MULTIPLE RESPONSES ALLOWED</b>	COMMUNITY RESOURCE PERSON (ANIMATEUR, CHW, ETC) .....1 BROCHURE/POSTER .....2 PROMOTIONAL SHOW .....3 COMMUNITY MEETING .....4 NEIGHBOR, FAMILY, FRIENDS .....5 RADIO .....6 MUTUELLE COORDINATOR .....7 HEALTH FACILITY .....8 OTHER .....96 SPECIFY ..... NA .....99	
H408	What is <b>Sûr' Eau</b> used for?	TO MAKE DRINKING WATER SAFE.....1 KILLS GERMS .....2 DON'T KNOW .....88 OTHER .....96 SPECIFY ..... NA .....99	



NO.	QUESTIONS AND FILTERS	RESPONSES	SKIP TO																																			
H409	Have you ever treated your water with <b>Sûr' Eau</b> ?	YES ..... 1 NO..... 2 DON'T KNOW ..... 88 NA ..... 99	If Yes or Don't know → H411																																			
H410	Why did you never treat your water with <b>Sûr' Eau</b> ?  <b>MULTIPLE RESPONSES ALLOWED</b>  <b>If never treated water, end questionnaire here.</b>	EXPENSIVE..... 1 BAD TASTE/SMELL..... 2 IT RESEMBLES BLEACH (EAU DE JAVEL) ..... 3 DON'T NEED ..... 4 TOO DIFFICULT TO USE ..... 5 NO MONEY ..... 6 DON'T KNOW WHERE TO BUY ..... 7 OTHER ..... 96 SPECIFY ..... NA ..... 99	ALL → END																																			
H411	How often do you treat your drinking water with <b>Sûr' Eau</b> ?  <b>SINGLE RESPONSE</b>  <b>If answer is '5' end questionnaire here.</b>	EVERY TIME WE COLLECT WATER ..... 1 AT LEAST ONCE A WEEK ..... 2 A FEW TIMES PER MONTH ..... 3 ON SPECIAL OCCASIONS ..... 4 NO RECENT USE ..... 5 OTHER ..... 96 SPECIFY ..... NA ..... 99	If 5 → END																																			
H412	Pouvez-vous décrire les différentes étapes de l'utilisation de <b>Sûr' Eau</b> ?  <b>Choisi oui pour chaque étape décrite, si on ne décrit pas l'étape, Choisi non</b>	<table border="1"> <thead> <tr> <th colspan="2"></th> <th>YES</th> <th>No</th> <th></th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Remplir le capuchon avec sûr eau</td> <td>1</td> <td>2</td> <td></td> </tr> <tr> <td>B</td> <td>Verser dans un bidon de 20 litres</td> <td>1</td> <td>2</td> <td></td> </tr> <tr> <td>C</td> <td>Verser 2 capuchons dans un bidon de 20 litres pour de l'eau trouble</td> <td>1</td> <td>2</td> <td></td> </tr> <tr> <td>D</td> <td>Fermer le bidon et bien agiter</td> <td>1</td> <td>2</td> <td></td> </tr> <tr> <td>E</td> <td>Attendre pendant 30 mns avant de boire l'eau</td> <td>1</td> <td>2</td> <td></td> </tr> <tr> <td colspan="2">NA ..... 99</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			YES	No		A	Remplir le capuchon avec sûr eau	1	2		B	Verser dans un bidon de 20 litres	1	2		C	Verser 2 capuchons dans un bidon de 20 litres pour de l'eau trouble	1	2		D	Fermer le bidon et bien agiter	1	2		E	Attendre pendant 30 mns avant de boire l'eau	1	2		NA ..... 99					
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E	Attendre pendant 30 mns avant de boire l'eau	1	2																																			
NA ..... 99																																						
H413	Did you treat the drinking water you are currently using with <b>Sûr' Eau</b> ?  <b>SINGLE RESPONSE</b>	YES ..... 1 NO..... 2 DON'T KNOW ..... 88 NA ..... 99	If NO → H 415 If 88 → H 416																																			
H414	When did you treat your current drinking water?  <b>SINGLE RESPONSE</b>	TODAY ..... 1 YESTERDAY ..... 2 TWO DAYS AGO ..... 3 THREE OR MORE DAYS AGO ..... 4 DON'T KNOW ..... 88 NA ..... 99	ALL → H416																																			
H415	What is the <b>main</b> reason you did not treat the drinking water you are currently using with <b>Sûr' Eau</b> ?  <b>SINGLE RESPONSE</b>	MY CURRENT WATER SOURCE IS SAFE/DOES NOT NEED TREATMENT ..... 1 NO SUR'EAU IN THE HOUSE ..... 2 FORGOT ..... 3 TOO BUSY ..... 4 CHILDREN/SPOUSE COMPLAINED ABOUT THE TASTE/SMELL ..... 5 OTHER, SPECIFY ..... 96 NA ..... 99																																				

NO.	QUESTIONS AND FILTERS	RESPONSES	SKIP TO				
H416	Where do you <b>usually</b> buy <b>Sûr' Eau</b> ?  <b>SINGLE RESPONSE</b>	COMMUNITY HEALTH WORKER (CHW) ..... 1 STOCKIST ..... 2 HEALTH FACILITY ..... 3 RETAIL SHOP/CHEMIST ..... 4 COMMUNITY GATHERING ..... 5 MUTUELLE ..... 6 OTHER, SPECIFY ..... 96 NA ..... 99					
H417	For how long have you been treating your water with <b>Sûr' Eau</b> ?  <i>Enter number for <u>either</u> days or months according to response.</i>	DAYS..... <table border="1" data-bbox="1084 424 1214 457"><tr><td></td><td></td></tr></table> MONTHS..... <table border="1" data-bbox="1084 457 1214 491"><tr><td></td><td></td></tr></table> . DON'T KNOW ..... 88 NA ..... 99					

THANK YOU FOR YOUR TIME

# **ANNEX B. CURATIVE CARE-SEEKING QUESTIONNAIRE**

**BASELINE EVALUATION  
EFFECTS OF Sûr' Eau DISTRIBUTION THROUGH MUTUELLES DE SANTE  
(December 2007)**

**CURATIVE CARE -SEEKING QUESTIONNAIRE**

INTRODUCTION AND INFORMED CONSENT	
<p>Hello. My name is [            ]. I work for Health Systems 20/20, a USAID-sponsored project, and we are conducting a study about prevention and treatment of diarrhea in your district. The purpose of the survey is to learn about current practices in water treatment, and how the mutuelles de sante can help improve water safety, so we can help reduce the prevalence of diarrhea. I understand that you or your child have recently had diarrhea (in past two weeks)? I would like to ask you some questions about your experience receiving health care services. I assure you that your responses will be confidential, and will only be used for the purposes of this study. You will not be penalized or lose your mutuelle membership if you decide not to participate in this survey. I would greatly appreciate your voluntary participation in this survey, which will take approximately 30 minutes to complete. You have the right to refuse to answer any question, and you can terminate the interview at any time. If you have any questions or concerns about this study, you may contact Mr. Ignace Rwakayiro at phone number 08 47 96 32.or by e-mail: ciedep @ yahoo.fr</p>	
<b>S1. Do you agree to participate in this survey?</b>	
YES.....1	→ CONTINUE
NO.....2	→ END and thank repondent
<b>S2. Before we begin, I would like to verify that you are eligible for this survey. Did you/your child have diarrhea in the past 15 days?</b>	
YES.....1	→ CONTINUE
NO.....2	→ END and thank repondent

IDENTIFICATION							
<b>District</b>	NYAGATARE ..... 1 RUBAVU..... 2 KARONGI ..... 3						
<b>Sector</b>							
<b>Cell</b>							
<b>Name of Town or Village:</b>							
<b>Area</b>	URBAN ..... 1 RURAL..... 2						
<b>Name of the Head of Household:</b>							
<b>Household ID Number</b>	<table border="1"> <tr> <td> </td><td> </td><td> </td><td> </td><td> </td><td> </td> </tr> </table>						
<b>Line No. from Household Survey (H101) for Respondent</b>	<table border="1"> <tr> <td> </td><td> </td> </tr> </table> Name: _____						
<b>Line No. from Household Survey (H101) for Patient</b>	<table border="1"> <tr> <td> </td><td> </td> </tr> </table> Name: _____						
<b>Time Started :</b>	<b>Time Ended :</b>						
<b>Final Result (circle one)</b>	1 Completed 2 Partially completed 3 Refused 4 Respondent not at home 5 Other reason (Specify) _____						
<b>Interviewer</b>	<b>Team Leader</b>	<b>DATA ENTRY</b>					
<b>Name</b>	<b>Name</b>	<b>Name</b>					
<b>Day</b>	<b>Day</b>	<b>Day</b>					
<b>Month</b>	<b>Month</b>	<b>Month</b>					

NO.	QUESTIONS AND FILTERS	RESPONSES	SKIP TO
<b>SECTION 1: SELF TREATMENT AND INFORMAL SOURCES OF CARE</b>			
C101	What is the age of the person who had diarrhea?	<div style="display: flex; align-items: center;"> <input style="width: 40px; height: 20px; margin-right: 5px;" type="text"/> <input style="width: 40px; height: 20px;" type="text"/> </div> <i>(if less than 1 year, enter "00")</i>	
C102	What is the sex of this person?	MALE ..... 1 FEMALE..... 2	
C103	How serious is/was the diarrhea?	VERY SERIOUS ..... 1 SERIOUS ..... 2 NOT SERIOUS ..... 3 DON'T KNOW .....88	
C104	How many days ago long ago did the diarrhea start?	NUMBER OF DAYS <input style="width: 40px; height: 20px; margin-right: 5px;" type="text"/> <input style="width: 40px; height: 20px;" type="text"/> DON'T KNOW ..... 88	
C105	Did you/your child take any medication that you had at your house to treat the diarrhea?	YES ..... 1 NO ..... 2 DON'T KNOW ..... 88	If NO or Don't know → C201
C106	What did you take for the diarrhea?	ORAL REHYDRATION SALT PACKAGE ..... 1 HOME-MADE ORS SOLUTION..... 2 ANTIBIOTICS..... 3 OTHER ..... 96 (specify) _____ DON'T KNOW ..... 88 NA..... 99	
C107	Did the diarrhea stop after you used this home treatment?	YES ..... 1 NO ..... 2 DON'T KNOW ..... 88 NA..... 99	If YES → C201
C108	For this diarrhea, did you seek care from a chemical seller, pharmacist, herbalist or traditional healer?	YES ..... 1 NO ..... 2 DON'T KNOW.....88 NA..... 99	If NO or Don't know → C201
C109	From whom did you seek care?	CHEMICAL SELLER..... 1 PHARMACIST..... 2 HERBALIST/ TRADITIONAL HEALER ..... 3 OTHER..... 96 (SPECIFY) _____ NA..... 99	
C110	How much did you pay this provider, including for the consultation and any herbs/drugs that you received?	AMOUNT IN RWF DK..... 8888 NA.....9999	
<b>SECTION 2: FORMAL CARE-SEEKING OUTSIDE THE HOME</b>			
C201	Did you seek treatment from a health facility or hospital for the diarrhea?	YES ..... 1 NO ..... 2 DON'T KNOW .....88 NA ..... 99	IF YES → C203  IF Don't know → <b>END</b>

NO.	QUESTIONS AND FILTERS	RESPONSES	SKIP TO
C202	Why did you <b>not</b> seek care from a health facility or hospital?  <b>SINGLE RESPONSE</b>	CANNOT AFFORD..... 1 HEALTH FACILITY TOO FAR AWAY ..... 2 ILLNESS PASSED/WILL GO AWAY ..... 3 TREATED AT HOME ..... 4 OTHER REASON.....96 (SPECIFY) _____ NA.....99	<b>ALL → END</b>
C203	Which health facility or hospital did you go to?  <b>SINGLE RESPONSE</b>	PUBLIC HOSPITAL ..... 1 CERTIFIED HOSPITAL ..... 2 PUBLIC HEALTH CENTER..... 3 CERTIFIED HEALTH CENTER ..... 4 DISPENSARY ..... 5 PRIVATE DOCTOR/CLINIC..... 6 OTHER ..... 96 (SPECIFY) _____ DON'T KNOW ..... 88 NA..... 99	
C204	After the diarrhea started, when did you first seek treatment: the same day, next day, or later?  <b>SINGLE RESPONSE</b>	SAME DAY..... 1 NEXT DAY ..... 2 THIRD DAY ..... 3 FOURTH DAY ..... 4 FIVE DAYS OR MORE ..... 5 DON'T KNOW ..... 88 NA..... 99	

Now I would like to ask about the services and drugs that you received at this visit/health facility

<b>FEES FOR SERVICES</b>					
<b>INSTRUCTIONS TO ENUMERATOR: READ LIST OF SERVICES (A-D) AND ASK FOR ANY "OTHER" SERVICES. FOR SERVICES RECEIVED, PROCEED WITH QUESTIONS ACROSS ROW. IF SERVICE NOT RECEIVED, INDICATE "NA" AND SKIP TO NEXT LINE.</b>					
<b>SERVICES</b>	During the visit, which of the following services did you receive?	Were you asked to pay for this [SERVICE]?	If yes, how much did you pay for this [SERVICE]?	How much did the mutuelle pay for this [SERVICE]?	Why did you <b>not</b> pay for [service]?
	<b>C205</b>	<b>C206</b>	<b>C207</b>	<b>C208</b>	<b>C209</b>
	1= YES 2= NO 88=DK	1= YES 2= NO 88=DK 99=NA	AMOUNT IN RWF  8888=DON'T KNOW  9999= NA	AMOUNT IN RWF  8888=DON'T KNOW  9999= NA	1= EXEMPTED 2= COVERED BY HI 3= COULD NOT AFFORD 96= OTHER 88=DK 99=NA
<b>A. CONSULTATION</b>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
<b>B. LAB</b>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
<b>C. DRUGS</b>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
<b>D. HOSPITALIZATION/ ADMISSION</b>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
<b>E. OTHER (SPECIFY)</b> _____	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
<b>F. TOTAL PAID</b>			.....	.....	

NO.	QUESTIONS AND FILTERS	RESPONSES	SKIP TO
C210	Was your/your child's illness cured after you sought treatment at this health care facility?	YES ..... 1 NO ..... 2 NA ..... 99	
C211	Were all the drugs that were prescribed available at the health facility?	YES ..... 1 NO ..... 2 DID NOT INQUIRE ..... 3 NA/NO DRUGS WERE PRESCRIBED ..... 99	If YES → C301
C212	Did you go elsewhere to purchase these drugs?	YES ..... 1 NO ..... 2 NA ..... 99	IF NO → C301
C213	Where did you go?/Where will you go?	PRIVATE CHEMIST ..... 1 OTHER ..... 2 NA ..... 99	
C214	How much did you pay/will you pay for the drugs at this other place?	AMOUNT IN RWF ..... NA ..... 9999	
<b>SECTION 3: SECOND VISIT AND REFERRALS</b>			
C301	Besides the visit to the health facility that we were just talking about, did you make <b>another</b> visit to a health facility for this diarrhea episode?	YES ..... 1 NO ..... 2 DK ..... 88 NA ..... 99	IF NO or Don't know → END
C302	Was this second visit to the <b>same</b> health facility/provider?	YES ..... 1 NO ..... 2 NA ..... 99	IF YES → C308
C303	Which <b>other</b> health facility did you visit for the diarrhea?	PUBLIC HOSPITAL ..... 1 CERTIFIED HOSPITAL ..... 2 PUBLIC HEALTH CENTER ..... 3 CERTIFIED HEALTH CENTER ..... 4 DISPENSARY ..... 5 PRIVATE DOCTOR/CLINIC ..... 6 OTHER ..... 96 (SPECIFY) _____ NA ..... 99	

Now I would like to ask about the services and drugs that you received at that second visit/health facility.

FEES FOR SERVICES					
INSTRUCTIONS TO ENUMERATOR: READ LIST OF SERVICES (A-D) AND ASK FOR ANY "OTHER" SERVICES. FOR SERVICES RECEIVED, PROCEED WITH QUESTIONS ACROSS ROW. IF SERVICE NOT RECEIVED, INDICATE "NA" AND SKIP TO NEXT LINE.					
SERVICES	During the visit which of the following services did you receive?	Were you asked to pay for this [SERVICE]?	If yes, how much did you pay for this [SERVICE]?	How much did the mutuelle pay for this [SERVICE]?	Why did you not pay for [service]?
	C308	C309	C310	C311	C312
	1= YES 2= NO 88=DK	1= YES 2= NO 88=DK 99=NA	AMOUNT IN RWF  8888=DON'T KNOW  9999= NA	AMOUNT IN RWF  8888=DON'T KNOW  9999= NA	1= EXEMPTED 2= COVERED BY HI 3= COULD NOT AFFORD 96= OTHER 88=DK 99=NA
A. CONSULTATION	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
B. LAB	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
C. DRUGS	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
D. HOSPITALIZATION/ ADMISSION	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
E. OTHER (SPECIFY) _____	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
<b>F. TOTAL PAID</b>			.....	.....	

C313	Was your/your child's illness cured after you sought treatment at this health care facility?	YES ..... 1 NO ..... 2 NA ..... 99	
C314	Were all the drugs that were prescribed available at the health facility?	YES ..... 1 NO ..... 2 DID NOT INQUIRE ..... 3 NA/NO DRUGS WERE PRESCRIBED ..... 99	If YES → <b>END</b>
C315	Did you go elsewhere to purchase these drugs?	YES ..... 1 NO ..... 2 NA ..... 99	IF NO → <b>END</b>
C316	Where did you go?/Where will you go?	PRIVATE CHEMIST ..... 1 OTHER ..... 2 NA ..... 99	
C317	How much did you pay/will you pay for the drugs at this other place?	AMOUNT IN RWF  ..... NA ..... 9999	

THANK YOU FOR YOUR TIME



# ANNEX C. COMPOSITION OF ASSET WEALTH INDEX

The asset wealth index was constructed in Stata v. 8 using principal components analysis of a set of asset variables. Table C1 shows the list of variables and corresponding scoring coefficients of the asset index that was selected for use in the analyses in this report (Index 1). Additionally, all analyses were repeated using a version of the index that excludes 'type of roof' (Index 2), because it may be the case that the higher proportion of households with tin roof in the two intervention districts, compared to the control district, may bias the index – in general, tin roof would indicate a better housing structure compared to clay roof, but in the context of our three study districts this may not be correct indication. The reason for the latter is that Nyagatare is situated in an area with dry sandy soil, whereas Karongi is in an area with abundant clay deposits. Thus, having a clay roof in Nyagatare is rare, while it is more common in Karongi; and the type of roof may not necessarily be related to household wealth.

**Table C1: Scoring Coefficients for Asset Wealth Index**

Variable	Coefficients for Index 1	Coefficients for Index 2
People per room	-0.026	-0.020
Number of sheep and goats owned	0.006	0.005
Number of cows owned	0.089	0.087
Electricity	0.311	0.327
Radio	0.140	0.133
Television	0.279	0.296
Refrigerator	0.189	0.202
Fixed telephone	0.130	0.134
Bicycle	0.080	0.058
Motorcycle/scooter	0.140	0.141
Car pr mini-truck	0.167	0.177
Mobile telephone	0.273	0.275
Earth/mud/dung floor	-0.712	0.000
Cement/wood floor	0.000	0.729
Metal sheet roof	0.000	-

Variable	Coefficients for Index 1	Coefficients for Index 2
Clay roof	-0.295	-
Straw/grass roof	-0.194	-
Other roof	-0.037	-
Flush toilet	0.231	0.246
Pit latrine	0.000	0.000
VIP latrine	0.322	0.311
Bush/field as latrine	0.019	0.020
Coal as cooking fuel	0.000	0.667
Wood/straw as cooking fuel	-0.662	0.000
Other cooking fuel	-0.017	0.151

The weighted distribution of households by wealth index quintile is shown in Table C2. For both indexes, there is significant difference in the quintile distribution of households between each of the intervention districts and the control district. Both indexes categorize a larger proportion of households in the control district in the poorest two quintiles, compared to each of the intervention districts. This difference is more dramatic for Index 2.

**Table C2. Distribution of Households by Asset Wealth Index Quintile  
(% of households in district)**

Relative Wealth Index Quintile	Nyagatare	Rubavu	Karongi
<b>Index 1</b>			
Poorest	11.2	13.1	38.6
Poor-middle	12.9	25.2	23.8
Middle	15.2	21.6	24.4
Middle-rich	34.0	17.2	5.0
Richest	26.7	22.9	8.3
<i>p-value*</i>	0.000	0.000	
<b>Index 2</b>			
Poorest	9.2	8.0	46.4

<b>Relative Wealth Index Quintile</b>	<b>Nyagatare</b>	<b>Rubavu</b>	<b>Karongi</b>
Poor-middle	11.3	21.0	30.1
Middle	22.7	25.1	11.3
Middle-rich	30.3	22.3	4.4
Richest	26.6	23.6	7.8
<i>p-value*</i>	<i>0.000</i>	<i>0.000</i>	

\* p-value corresponding to Pearson chi-square test comparing an intervention and a control district.

We use Index 1 in the analyses shown throughout this report but we also replicated all analyses involving the wealth index with Index 2, to ensure that the results that we highlight are robust with either of the two indexes shown here.

# ANNEX D. REFERENCES

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