SOCIAL MARKETING FOR HOUSEHOLD DISINFECTION OF WATER

Françoise Armand
Helen Crowley
Pamela Faura
Population Services International
Washington, D.C., USA

ABSTRACT

This paper presents the strategy of social marketing and how it is used to provide lower-income developing country populations with the information and health products that empower them to live healthier lives. Social marketing, as practiced by Population Services International (PSI), promotes the benefits of healthy behavior through culturally-appropriate communications campaigns and makes high-quality health products easily available at prices affordable to lower-income populations through the private, nongovernmental and community sectors. The paper also describes a water quality intervention, developed by the CDC and PAHO/WHO, that can provide easy, affordable access to safe, potable water to developing country populations. A PSI pilot project in Zambia provides a case example of how social marketing is being applied to promote and provide this affordable home-based water treatment and storage system that can become a sustainable model for reducing waterborne diseases worldwide.

1. Introduction

The World Health Organization (WHO) estimates that 80% of all disease in the developing world is caused by lack of clean water and proper sanitation. According to the Global Child Health Society, an estimated 1.2 billion people worldwide do not have access to safe water. This number is expected to increase to 1.9 billion by the end of the century. Each year around the world, an estimated 3-5 billion episodes of diarrhea result in an estimated 3 million deaths. Young children are the most vulnerable: throughout the world, diarrheal disease, often the result of unclean water containing bacteria and viruses, kills millions of children under the age of five each year. Countless others suffer from pain, malnutrition and physical and mental retardation as a result of diarrheal disease. Waterborne bacterial infections may account for as many as half of these episodes and deaths. Contaminated surface water sources and large, poorly functioning
municipal water distribution systems contribute to transmission of waterborne bacterial diseases. Despite global efforts during the water and sanitation decade of the 1980's, improvements in water and sanitation infrastructure have not kept pace with population increases and migrations in the developing world.

To address this critical problem, the U.S. Centers for Disease Control and Prevention (CDC) and the Pan American Health Organization/World Health Organization (PAHO/WHO) developed a water quality intervention that employs technologies appropriate for the developing world. Population Services International (PSI) is joining with Ministries of Health, CDC, PAHO/WHO and other organizations to ensure that underserved developing country populations have access to this innovative, practical and cost efficient intervention that provides easy, affordable access to safe, potable water.

PSI, an international nonprofit organization established in 1970, designs and operates maternal and child health, AIDS prevention and family planning social marketing programs in 48 countries in Africa, Asia and the Americas. Social marketing is one of the most effective ways to improve the health and quality of life of lower-income people worldwide. It involves selling needed health products and services at affordable prices, motivating their use, promoting related healthful behavior, and creating supply as well as demand. Social marketing of essential, life-saving health products -- in countries as diverse as India, Paraguay, Zambia and Russia -- is playing a significant role in preventing death and morbidity around the world.

PSI is undertaking a pilot social marketing project in Zambia to test a community-based social marketing approach to create demand for, access to, and use of an affordable home water treatment and storage system. The two component system, originally developed by the CDC and PAHO/WHO, consists of (1) one of three water vessels that are being tested during the pilot; and (2) a locally produced sodium hypochlorite solution. The social marketing pilot is being undertaken in conjunction with a product acceptability and effectiveness research study implemented by the U.S. Centers for Diseases Control (CDC). The target population is under-five children and their families in two communities, one in the Copper Belt and one in Lusaka. The purpose of the project is to identify, test and evaluate appropriate product, pricing, packaging, distribution, and information/education/communications (IEC) strategies for achieving household use of the water treatment system.

The pilot project is selling water vessels and the bottled disinfectant solution through local health centers and committees, commercial retail outlets, nongovernmental organizations (NGOs) and service clubs. In addition, the disinfectant will soon be made available through a bulk purchase arrangement that will allow consumers to refill their containers. An education and promotion campaign uses a wide range of communications channels to generate awareness about, create demand for and motivate use of the system. Training programs are designed and conducted to build the skills of neighborhood health committees, NGOs, retail outlets and others involved in the project to implement cost-efficient activities that will help to ensure the eventual sustainability of the project.
Research and evaluation will include focus groups, monitoring research and impact evaluation. Follow-up baseline and epidemiological evaluations of the pilot project will be undertaken through a contract with CDC.

This practical home-based water treatment and storage system has the potential to be one of the most important health interventions of the decade. The project in Zambia and those in other countries -- like the CEPIS pilot in Peru -- promise to make a significant difference in the lives of millions of peri-urban and rural populations and will help to create a sustainable model for reducing waterborne disease worldwide.

2. The Strategy of Social Marketing

2.1 Definition and Summary of Social Marketing

Social marketing, as defined and practiced by PSI, is the promotion and distribution of needed health products and services at affordable prices to lower-income populations. Social marketing strategy uses commercial marketing and media techniques and involves the business and nonprofit sectors to motivate healthy behavior among and supply high-quality, affordable health products to lower-income populations. Health products like iodized salt, oral rehydration salts, insecticide-treated mosquito nets, water disinfectant and storage vessels, condoms and contraceptives are made available through health providers, pharmacies, nontraditional outlets and local nongovernmental organization (NGO) and community networks so that the target populations can obtain them conveniently, at affordable prices, at locations they frequent every day. Products are sold, rather than given away, to ensure that the recipient will value and use them, to motivate retail outlets to carry and sell them and to promote cost recovery. Communications campaigns, implemented in tandem with product distribution activities, use mass media, mobile video units, drama and music to disseminate important health messages, to promote use of health products and to encourage sustainable behavior change. This cost-efficient, results-oriented approach, that is more akin to private businesses than to other nonprofits, is creating systemic change that contributes to motivating healthier behavior and improving the well-being of low-income people around the world.

2.2 The Role of Social Marketing in Developing Countries

Traditional systems used to deliver health products to people in developing countries often do not function adequately to assure that products reach a large portion of the population and those at the low end of the cash economy. Commercial entities typically sell products at high prices affordable only to the upper 1% of the population, usually with little or no promotion. Public health systems generally do not have adequate numbers of clinics, distribute a generic product that often is not valued by the consumer, and are managed by health officials not trained to be sensitive to consumer needs. Governmental ministries are often limited in the type and nature of motivational campaigns they can undertake.
2.3 **Product Pricing and Sales**

A main principle of social marketing is that products are sold -- albeit at low prices -- because when products are given free, the recipient often does not attach value to them and indeed often does not use them. However, there is an equally important reason why health products should be sold, even at low prices. By selling products, rather than giving them away, the resources of the local commercial infrastructure, which is motivated to stock and sell the products by the financial incentive of profit margins, can be tapped. This means that the products are available, not just in a small number of public health clinics, but also at the thousands of pharmacies and other retail and NGO outlets already existing in a country. In other words, free products are not readily accessible to the majority of the people who need them the most; using the private sector and NGO infrastructure to distribute low-priced products makes them both affordable and easily accessible at places that the target populations go to every day, like small grocery stores and market stalls.

2.4 **Product Sales Revenues**

All revenues from product sales go back into programs, either into procuring more health products or into educational and advertising activities that promote purchase and use of the products. Health products are also sold to NGOs and retail outlets at a wholesale price, and these organizations or outlets then resell the products in their communities at the retail price, thus generating their own revenues.

2.5 **Tapping Local Commercial Infrastructures**

Social marketing programs help develop and expand local businesses. Sometimes a distributorship is established in a developing country, but invariably existing wholesalers and retailers are used. In addition, working with local advertising agencies and other such businesses in developing countries to provide necessary services of the social marketing program. In instances where a developing country does not have these resources, local individuals and businesses are trained to develop these capabilities, making them part of the social marketing network. In former socialist countries, social marketing can contribute to the creation of a local commercial infrastructure, including training retailers and other private sector entrepreneurs. Promotional activities often stimulate sales by commercial vendors of products similar to those sold by the social marketing project. Finally, when a local market is expanded, new commercial activities, like local manufacturing, are often fostered.

2.6 **Collaboration with Ministries of Health and Nongovernmental Organizations**

Social marketing projects operate mainly in the private sector, but are also part of and complementary to the host government’s public sector health programs. In many cases,
a formal protocol is established with the host government, and in some informal
government approval is obtained to operate within the country. Government officials are
often trained in social marketing and communications techniques, so that these
individuals are able to manage public sector programs more effectively.

Collaboration with local NGOs is critical, because one objective of social marketing
projects is to develop expertise so that the local NGO eventually can assume more
functions of the project, thus ensuring institutional sustainability. Increasingly, NGOs and
community organizations are distributing products in remote and difficult-to-reach areas.
Typically, these organizations are trained in both marketing and motivational techniques.

2.7 Financial Sustainability

Social marketing programs in relatively well-to-do developing countries can become, in
part or in whole, financially sustainable. Theoretically, any program can become
sustainable if the product price is simply increased to cover all costs. The problem with
doing this in most developing countries, particularly the poorest ones, is that the price
would become too high for most people in the country. Even where a social marketing
program cannot be made fully financially sustainable, it is able to recover a large
percentage of operating costs through sales revenues, and programs are made as
sustainable as possible through efficient management of program resources, sale of
multiple products to spread overhead, high sales volume so that per unit cost is reduced
and sale of higher priced products to cross-subsidize lower priced products.

2.8 Ensuring Proper Use of Health Products

Independent research organizations are used to evaluate project impact in a variety of
ways, such as retailer surveys, consumer intercept studies and focus groups, and through
general-population research, such as knowledge, attitude and practices (KAP) studies.
This research helps assure that products are used and used properly and that health
benefits are maximized. Carefully-designed instructions are included with products and
vendors and medical practitioners are trained in product use.

2.9 Impact of Social Marketing Programs

Social marketing programs have been highly successful in terms of efficiency, high
proportional sales, and reduction of disease and mortality. In 1997, distribution and use
of social marketed health products averted significant numbers of children's deaths due
to dehydration caused by diarrheal diseases; in Pakistan alone, millions of new users of
iodized salt were created (thus allowing millions of babies, who otherwise would have
suffered from iodine deficiency disorder, to lead healthy lives); prevented tens of
thousands of new HIV cases, provided more than 6.7 million couple years of protection
from unwanted pregnancies and prevented other mortalities and morbidity among lower
income families.
2.10  Information, Education and Communications (IEC) Campaigns to Motivate Healthy Behavior and Promotion of Health Products

2.10.1  Culturally-Appropriate Brands and Attractive Packaging

Social marketed health products are branded and attractively packaged. Advertising agencies -- local ones where they exist in a country -- are contracted to help design catchy logos and slogans that aim to build brand awareness and convey the benefits of the health product. Consumer research, such as focus groups with the target population, helps determine local perceptions and preferences and ensures that brands, packaging, logos and promotional materials are culturally appropriate and appealing to the target populations.

2.10.2  Motivating Use of Health Products

A key ingredient of a successful social marketing project is effective communications to encourage the adoption of appropriate health practices, including proper use of the products. In some instances, there is a latent demand for the products, and effective distribution at affordable prices is all that is needed to motivate use. Whether or not this is so, increased demand and high sales are stimulated through the use of innovative and effective advertising and promotion, and also through complementary generic communications (IE&C) programs that are not brand specific and that educate individuals and motivate them to engage in more appropriate health behavior. Developing and refining innovative techniques harness the power of the mass media to reach illiterate and remote populations. Diverse communications methods include mobile video units, soap operas, point-of-sale advertising, itinerant poets, billboards, and movie spots. Soap operas like the one produced in Côte d'Ivoire, SIDA dans la Cité, won the FESPACO International Film Festival award for best T.V. drama; promotional activities in South Africa, including a popular television series featuring Archbishop Desmond Tutu encouraging sexually active young people to use condoms for HIV and pregnancy prevention, won the William D. Novelli award for innovation in social marketing.

2.10.3  Product Supply and Demand Creation

Social marketing projects control both the supply of a product that enables behavior change and the messages that motivate demand for those products. Communications campaigns bring consumers face-to-face with high quality, affordable products such as iodized salt, ORS, bed nets, home chlorination systems and other products. This comprehensive approach better guarantees that the health of target groups will, in fact, be improved. By contrast, other communications projects, which are operated without assuring supply, often create demand that cannot be satisfied because neither normal market nor government systems supply the product.

2.10.4  Understanding the Target Population
Communications campaigns take measures to understand thoroughly the population targeted for behavior change and then utilize motivational techniques that are aimed to change their behavior. The first step examines current levels of awareness and attitudes through extensive audience research. Barriers to change, called "resistance points," are identified, and qualitative research probes to understand the influences that can shape attitudes and make change possible. Culturally based norms and practices are often significant contributing influences to developing effective messages and strategies, in culturally appropriate terms, that address and overcome the resistance points. Communications campaigns are monitored and refined as the project is implemented and, afterwards, evaluation assesses overall impact.

2.10.5 Creative and Innovative Communications

Health communications campaigns are often as nontraditional as they are effective. Use of creative and new ideas wins the day on Madison Avenue, and PSI is determined to apply what works in the commercial world to the social goals of the organization. To get the word out on AIDS in a Burkina Faso program, village griottes are recruited for their respected and historical role of storytelling. So, too, are imams who now use their mosques to preach messages on marital fidelity and abstinence -- all part of the national campaign in Guinea to prevent HIV/AIDS. In many programs, mobile video units, equipped with camcorders and large screens, put on shows that intersperse health messages with feature movies and other entertainment, and are particularly effective in rural areas.

2.10.6 Multiple Types of Activities and Channels

Using varied types of communications activities and a wide range of outlet channels ensures that a substantial portion of the targeted audience is reached and motivated. Activities range from brand advertising informing that a quality product is available and where it can be purchased, to generic educational efforts that help people understand why changing behavior is necessary and important. A social marketing project in Côte d'Ivoire provides an illustration. Saturation level brand promotion informs the public about the project's branded condoms and that their use protects against contracting HIV/AIDS. That activity is complemented by producing and broadcasting a popular television soap opera, SIDA dans la Cité (AIDS in the City). The multi-part program engages viewers in a gripping drama about a family in which the father is diagnosed with AIDS because he was unfaithful without protection. This dual approach, based on research and testing, recognizes that people learn in different ways and a variety of messages will more effectively reach a larger audience.

Communications channels often combine mass media and interpersonal communications. For example, in Pakistan, projects use both methods to promote iodized salt to different target audiences. Local salt processors are educated and encouraged to produce iodized salt, and the communities in which people live, work, and trade are also targeted. Informational seminars on the ways in which iodized salt can
prevent iodine deficiency and child defects are held for opinion leaders, including retailers, clergy, physicians and health officials. At the same time, commercials air on radio, on television, and in cinemas and create the consumer demand critical to the project’s success.

Other communications activities include point-of-sale material; radio call-in shows and profiles and other programs; television documentaries and debates; musical songs and videos; cinema ads and trailers; theater troupe presentations and puppetry; product demonstrations and information distribution at work places, community meeting places, and special events; print materials, posters, brochures, cartoons, and packaging inserts; informational kiosks and peer education activities at sporting events and in high traffic areas throughout communities; and providing information to and training target populations such as journalists, pharmacists, women’s groups, retailers and clergy.

3. Social Marketing of Water Treatment Systems

3.1 Countries Affected by Waterborne Diseases

Each year around the world, an estimated 3-5 billion episodes of diarrheal illness result in an estimated 3 million deaths, mostly among children. Waterborne bacterial infections may account for as many as half of these episodes and deaths. Close to 2 billion persons living in poverty in the developing world are at high risk. Contaminated surface water sources and large, poorly functioning municipal water distribution systems contribute to transmission of waterborne bacterial diseases. Despite global efforts during the water and sanitation decade of the 1980’s, improvements in water and sanitation infrastructure have not kept pace with population increases and migrations in the developing world. Construction of new water systems and correction of defects in large centralized water treatment and distribution systems are expensive and take years to complete. Innovative, practical, interim solutions are required to provide underserved populations with potable water more quickly.
3.2 **Home Water Treatment**

The Centers for Disease Control and Prevention (CDC) and the Pan American Health Organization/World Health Organization (PAHO/WHO) have developed a household-based water quality intervention that employs technologies appropriate for the developing world. The strategy is to make water safe through disinfection and safe storage at the point of use. The basis of the intervention is:

- treatment of contaminated water with sodium hypochlorite made from water and salt using appropriate technology, or obtained from local commercial enterprises;
- safe water storage in plastic containers with a narrow mouth and a spigot;
- filtration devices with inexpensive, replaceable materials;
- behavior change techniques, including social marketing, communications and education.

3.3 **Home chlorination interventions in Latin America and Africa**

Field trials of household water disinfection and safe storage have been conducted by CDC in South America, Asia, and Africa:

- In Bolivia, a series of field trials demonstrated that
  - Indian families with contaminated water sources who used this intervention in their homes were able to improve their water quality to meet WHO guidelines.
  - Households that used the intervention had more than 40% fewer episodes of diarrhea than households not using the system.
  - Street vendors that used this intervention experienced improved microbiologic quality of their beverages and rinse water.

- In Pakistan, families that used this treatment and storage system improved their domestic water quality.

- In Guatemala, street vendors using the intervention improved the microbiologic quality of their beverages.

- In Guinea Bissau, hospital workers in cholera treatment wards, where bulk oral rehydration solution stored in buckets became heavily contaminated with enteric microorganisms, were able to eliminate fecal contamination of stored ORS using this intervention.

- In Zambia, families using the sodium hypochlorite solution and either the special 20-liter vessel from the project or locally-available, narrow-mouthed jerry cans improved their water quality and had over 40% fewer diarrhea episodes than control families.
In Peru and Nicaragua, locally produced disinfectant and plastic vessels of different sizes and shapes, but embodying the same concept, have also proven effective at improving water quality in periurban and rural populations.

3.4 Cost vs. Benefits

A cost-benefit analysis of the intervention in Bolivia indicated that, from a societal point of view, the intervention would save more money in clinical care costs than it costs to implement if it can prevent 30% of diarrheal illness.

4. Application of Social Marketing Techniques to Home Water Treatment -Zambia Case Study

4.1 Diarrheal Diseases in Zambia

Diarrheal diseases are a leading cause of morbidity and mortality in under-five children in Zambia. They claim the lives and retard the physical and intellectual development of millions of Zambian children. Lack of clean water and proper sanitation are a leading cause of morbidity and mortality in children less than five years of age in Zambia; it is likely that the country’s high infant mortality rate (109 infant deaths per 1,000 live births annually) is largely influenced by diarrheal disease. Zambia has a population of 9.4 million, and more than 40% of Zambians do not have access to safe water. Recurrent outbreaks of cholera attest to persistent problems of water quality and sanitation faced by the Zambian population. These alarming statistics speak to the critical need to protect children and their families from the bacteria, viruses and parasites contained in unclean water that are a major source of death and disease in Zambia and throughout the developing world.

Recurrent outbreaks of V. Cholera 01 attest to the persistent problems of water quality and sanitation faced by the Zambian population. Other water-borne pathogens include Shigella, non-typhoidal Salmonella, Salmonella Typhi, Campylobacter, enterotoxigenic Escherichia coli, enteric viruses, and Giardia.

Water contamination occurs both at the point of collection and at the point of use. In many peri-urban Zambian communities, household drinking water is collected from shallow wells dug by most households. These shallow wells are usually built close to pit latrines, and have low aprons, both of which lead to contamination. In other areas, the water source is a stream or dambo, both of which are also contaminated due to run-off. Even in areas that have municipal, piped water, the water becomes contaminated due to inadequately maintained pipes, low water pressure, intermittent delivery, clandestine water connections and the lack of chlorination.

Unfortunately, improving water at the source often involves long-term, large-scale, capital products, such as capped, tube-wells, piped-water systems, water storage tanks,
treatment plants, flush toilets and septic systems, etc. Cost and logistical barriers limit their use, especially in lower-income communities.

Even where water is potable at the source of collection, lack of sanitary practices results in drinking water becoming contaminated at the household level. In peri-urban and rural communities, water is typically stored in containers with wide openings that are often uncovered and permit dirty hands or implements to contaminate the water. Studies have shown that levels of bacterial contamination are substantially higher in household waters than at water sources, indicating a two-step contamination process.

Most water treatment options at the household level are ineffective, impractical and expensive. The traditional ‘emergency’ practice of boiling water is prohibitively expensive for most households due to the high cost of firewood or other fuels such as kerosene. Water must be boiled for 20 minutes to make it safe, and this practice has proved difficult at the household level. Chemical disinfectants, such as ozone, silver, or iodine, are practical alternatives to boiling, but they are usually too expensive for household use.

4.2 The Zambia Project -- Overview

PSI and its local partner in Zambia, the Society for Family Health (SFH), are implementing a pilot project to provide safe drinking water at the household level, to reduce the incidence of diarrheal diseases, especially in children under 5 years of age. The pilot project is using a community-based social marketing approach to create demand for, access to, and use of an affordable home-based water treatment and storage kit. It will identify, test and evaluate appropriate product, pricing, packaging, distribution, and information/education/communications (IEC) strategies for achieving household use of a Home Chlorination Kit. The project is working in collaboration with the Centers for Disease Control (CDC), with funding from USAID.

The target population for the initial pilot is under-five children and their families in two communities, one in the Kitwe District in the Copperbelt Province and one in Lusaka. The extension phase will cover all of the Kitwe district and all of Lusaka, and then other parts of Zambia.

The two component system, originally developed by the CDC and PAHO, consists of 1) one of three water vessels that minimize possibilities of re-contaminating the water after treatment, and 2) disinfectant (a locally produced sodium hypochlorite solution) to treat the water. The water vessels and the disinfectant solution are sold through health centers and committees, commercial retail outlets, nongovernmental organizations (NGOs) and service clubs. The disinfectant is sold either at the retail level in 250 ml. bottles or to wholesalers in bulk, allowing consumers to refill their bottles more cheaply than purchasing a branded bottle each time. An education and promotion campaign uses a wide range of communications channels to generate awareness about, create demand for and motivate use of the kit. Retailers, sales agents, neighborhood health committees, NGOs and others involved in distribution of the product and of IEC messages are being
trained. Research activities include baseline studies, focus groups, monitoring research and impact evaluation.

The project is working directly with the city councils, Department of Health Management Teams (DHMTs), Health Centers (HCs) and neighborhood health committees (NHCs) to implement this pilot project, evaluate its progress and design the extension phase. SFH is also collaborating with CDC and the Tropical Diseases Research Center (TDRC) in the development and execution of the product acceptability and effectiveness research study.

The CDC study is being undertaken in Kitwe, Zambia in two periurban communities: Ipusukilo for the intervention group and Luangwa for the control group. The study includes an assessment of the effectiveness of the intervention to improve water quality and prevent diarrheal diseases, through use of the two-component home-based water and treatment system described above, and it is also testing behavior change interventions that inform the target populations about the system, where to obtain it and how to use it properly. In addition, the CDC has undertaken a household baseline survey and is monitoring household water samples and diarrhea surveillance in the target sites. Preliminary evaluation of the intervention indicates that there was a statistically significant difference in diarrhea rates between intervention and control families, with intervention families experiencing a 55% decreased risk of illness caused by diarrhea.

4.3 **Pilot Project - Design and Implementation**

4.3.1 **Site Selection and Criteria**

The pilot project is being carried out in two communities, Ipusukilo in Kitwe, Copperbelt and Mandevu compound in Lusaka. Site selection criteria included: (1) lack of access to a safe water supply; (2) socio-demographics; (3) recognition by community leaders that drinking water safety is a major problem; (4) existence of a functioning neighborhood organization, such as Neighborhood Health Committee (NHC), with active and effective health promoters; (5) local population interest in participating in the pilot project; (6) permission of local authorities to implement the pilot project. Candidate communities were identified in conjunction with CDC=s study and in consultation with local city councils, DHMTs, HCs, NHCs, the TRDC, BASICS and USAID, as well as through community meetings and focus groups with parents, teachers and health providers.

4.3.2 **Goal**

The goal of the project (pilot and extension phase) is to reduce the incidence of diarrheal diseases in under-five children and their families in Kitwe and Lusaka. Kitwe has a total population of 407,000, or approximately 68,000 households, assuming six people per household. Assuming 80% of these households are in areas without access to clean water, the extension phase target is approximately 54,000 households. In Lusaka, the
target population is 151,000 households (assuming 70% of a total of 217,000 households or 1.3 million residents).

4.3.3 Objectives and Indicators

The specific outputs for the home chlorination kit pilot are:

1. Branded home chlorination kit developed for sale in two pilot sites. The products will include a disinfectant solution and appropriate water storage vessels.

2. The most effective and appropriate water container identified.

3. Distribution system that achieves convenient access to affordable water storage vessels and disinfectant in the pilot sites established. Community-based, commercial retail, and NGO/service group channels will be utilized as appropriate.

4. IEC and promotional campaign that increases knowledge about, demand for, and purchase and proper use of appropriate water storage vessels and the disinfectant solution by the target population designed and implemented.

5. Establish optimal pricing and payment schemes to make the purchase of appropriate water storage vessels and disinfectant affordable while collecting the maximum amount of revenue possible to ensure sustainable resupply.

6. 3.5 year follow-on program scaling up to cover Kitwe and Lusaka designed and implemented.

Based on the results of the pilot, new objectives will be developed for the expansion phase. Examples of objectives and indicators for the follow-on phase include:

Objective 1. Target populations have improved access to an affordable method to ensure a safe water supply in their homes.

Indicators:

- Purchase and correct use of the disinfectant solution in an approved storage vessel by xx percentage of households in the pilot sites and xx% of follow-on sites (disinfectant sales of at least xxxx by end of pilot, and yyy by end of extension phase);

- Decreased incidence of *E. coli* contamination, from xx% to y%.
• Cost recovery of at least xx% of the cost of producing the disinfectant solutions, xx% of the landed cost of goods for specialty vessels and xx% for all locally resold vessels.

• Disinfectant solution available in xx% local shops, HCs and NHCs in the pilot sites and follow-on sites, either as a retail purchase of the branded bottle or as a refill of the same bottle as disinfectant is needed.

• xx% of target population can confirm that disinfectant is available within a 20 minute walk from their home or workplace.

**Objective 2**: Target population demonstrates an improved understanding of the causes of diarrhea and how to avoid it.

**Indicators**:

• xx% of adults in the pilot sites and follow-on sites will have correct knowledge of contaminated water as a cause of diarrheal disease.

• xx% of adults in the pilot sites and follow-on sites will have correct knowledge that children under 5 are the most vulnerable to diarrheal disease and the consequences of it.

• xx% of adults in the pilot sites and follow-on sites will be aware of the home water treatment system and can properly describe how to use it.

4.3.4 **Products**

*Two types of vessels are being tested for water treatment and storage.* (1) A 20-liter plastic vessel with a narrow, screw-cap mouth and a spigot. Developed by CDC, this vessel (specialty vessel) is produced in the U.S. and Bolivia. The mouth of the vessel was designed such that it is large enough to allow a hand to enter to clean the vessel, but not large enough for a hand and a cup to enter. This design allows people to clean the vessel, while still protecting the water from contamination by discouraging use of the mouth for drawing water due to its narrowness. If the specialty vessels turn out to be the preferred option, the project would make the substantial investment of purchasing the vessel molds so that they could be produced locally. (2) *Approved* water storage vessels. Pilot project tests sale of the water disinfectant by itself. Consumers will be advised to use the disinfectant with their choice of *Approved* water containers. A communications campaign includes education on the types/sizes of locally available water containers that can be used with the disinfectant solution.

*Disinfectant Solution*. The disinfectant solution is the key to the intervention, and the project will focus efforts to ensure that the target population understands that regular
retreatment of the water is essential for improved health. The disinfectant solution is packaged in containers of appropriate size, procured locally, and sold at the retail level. The bottle cap serves as a measuring device for the disinfectant solution. As the solution costs only a few cents, the primary cost is the container. The chlorine solution is slightly subsidized, to account for commissions to sales agents and mark ups to the trade. In addition, the solution is being made available in bulk form so that people can refill their bottles at a lower price.

4.3.5 Pricing and Procurement of Water Vessels

Market research is being conducted to determine consumers’ ability and willingness to pay for specialty vessels and disinfectant solution. For the 20 liter vessels, procured in the U.S., the pricing objective is to recover as much of the US$4.84 manufacturing cost, plus as large a distribution margin as possible. The cost of shipping will not be included as this is only being done for the pilot. If the pilot is successful, then specialty vessels will be produced locally at roughly the same price. Assuming a 25% retail mark-up, the consumer price of a specialty vessel will be about US$6.00. Since other options for containers will be available, the strategy at this stage is to sell the specialty container at recovery cost for those who can afford it. If, however, the pilot phase demonstrates that using the specialty vessel will result in substantially improved compliance, pricing options such as credit terms, price subsidy or vouchers to lower the price or cash out-lay may be considered. Pricing for resold local vessels will be set at the local market price.

4.3.6 Pricing and Production of Disinfectant

It is assumed that disinfectant solution can be sold on a break-even basis, and perhaps for a slight profit, depending on local packaging costs, as discussed above. This pilot will also explore the selling of disinfectant on a refillable basis, which would lower the unit cost of disinfectant substantially. A much higher margin, based on the cost of disinfectant alone, would be offered to disinfectant vendors who purchase in bulk and then refill consumers’ 250 ml disinfectant containers.

The disinfectant solution is currently being produced using SANILEC hypochlorite generators, which convert ordinary salt and water into a sodium hypochlorite solution through electrolysis. In its field study, CDC has helped to organize a micro enterprise within the Ipusukilo Health Center. The sale of chlorine covers the costs of production and allows a small profit that can be shared among NC members, the clinic, and the SANILEC operators. The Kitwe Rotary Club is assisting the SANILEC operators in setting up and maintaining an accurate financial system and to review expense, sales and earning reports. One machine operates at each pilot site. Running for 12 hours a day, each machine can produce 8,000 250 ml. bottles/day. Thus, one day’s production can produce enough disinfectant solution for about 8,000 families (40,000-48,000 people) to treat their water for a period of four weeks.
Preliminary results from this effort to organize a micro enterprise within the Health Center have not been promising. Conflicts between members of the management committee have led to problems in maintaining regular production schedules. Therefore the project is proposing to set up an independent enterprise separate from the health centers. Health centers will still be partners in the distribution of the solution and in IEC efforts. Also being explored is the possibility of a joint venture with a local chlorine manufacturer that produces bleach in Zambia. The manufacturer would supply both of the disinfection and home chlorine kits with labels/logo with instructions for use which would be placed on the bottle. This collaboration with the private sector represents the preferred and more cost-efficient option, as it would establish a local, sustainable supply of the solution with the minimum of management input from project staff.

4.3.7 Brand Development and Packaging

Focus group research and in-depth interviews were conducted with local consumers, retailers, and health committee members to determine preferences for packaging presentations and brand names for the disinfectant solution and for the specialty vessel. In cases where non-specialty vessels are used, they are be promoted as A(BRAND NAME) approved or Aapproved for use with (BRAND NAME) water disinfectant. Branded products allow for more effective product promotions and building a high quality product image that would not be possible with a generic product.

4.3.8 Product Distribution

A key objective of this project is to determine the most efficient mechanisms for the distribution of vessels and disinfectant solution. Therefore a variety of distribution mechanisms are being tested and evaluated, as follows:

Water Storage Vessels. (1) Community-based distribution through HCs and neighborhood health committees: Utilizing the existing HC and NHC networks already established in local communities, agents have been appointed to sell either the specialty vessel or approved vessels in their communities. Project staff recruit and train these agents in diarrheal disease education, use of the clean water system, sanitation practices, sales, promotion, and record keeping. Agents receive a commission for vessels that they sell, and revenues are turned in to the project site coordinator. Agents= performance is monitored by NHC=s and the project site coordinator. (2) Commercial retail sales: While traditional commercial retail outlets are not numerous in the pilot sites, appropriate shops, kiosks and local markets are used to distribute water vessels. Retailers are given training in health education and provided with point-of-sale materials to advertise that they stock vessels. These retailers are also an access point for distribution of educational materials about diarrheal disease prevention. Other means of promotion, i.e. posters, leaflets, and mobile PA systems are used to alert consumers about where they can buy approved water vessels. (3) NGOs/Service Clubs: A variety of NGO/service club partners, such as local Rotary Clubs, work with the project. These
groups assist with vessel sales in several ways, including serving as retail outlets or community sales agents for vessel sales and purchasing vessels for member households.

Disinfectant Solution. Establishing accessible channels for household purchase of disinfectant solution is one key to sustainability of the home chlorination kit. Establishing enough outlets selling disinfectant solution in each site also prevents agents/outlets from having a monopoly on the market and inflating prices. Both community based outlets (e.g. the local HC, NHC-appointed agents) and commercial retail outlets distribute the disinfectant solution.

To minimize the cost of the disinfectant, two different distribution mechanisms are being tested, as follows: (1) Disinfectant solution is bottled and sold in locally-procured 250 ml containers. Consumers purchase a new bottle of disinfectant each time, like most other household consumables, which require about 12 bottles per year for the average family of six. (2) The disinfectant will also soon be sold as a refillable product, through agents who purchase $\text{Bulk} \equiv$ disinfectant and then $\text{Refill} \equiv$ the containers brought in by consumers. The advantage of the $\text{Refillable}$ approach is that the cost of disinfectant will be cheaper to the consumer. However, to make it feasible, a network of trustworthy, bulk disinfectant retailers must be established in each community. These include the local HC, agents appointed by NHCs, or local entrepreneurs. Agents selling bulk disinfectant will be trained in product storage, dispensing and disposal.

4.3.9 Information, Education and Communications (IEC) Programs, Community-based programs and Mass Media Communications

An IEC campaign to increase knowledge levels about the causes of diarrheal disease, its effects on the health status of under-five children and the benefits and effectiveness of the home water treatment system is being implemented continuously during the pilot. The campaign may include small media and outdoor advertising; mobile video unit presentations; drama groups; school programs; interpersonal and small group activities; and special events. The primary target groups for the IEC campaign are:

- Parents with under-five children
- School teachers
- Health providers (HC and neighborhood health committees)

A wide variety of promotional and IEC vehicles are used to educate, generate awareness, create demand for and motivate use of the home water treatment system, and include the following:

- Point of Purchase - Signs, stickers and place cards to identify outlets and agents where water vessels and disinfectant solution are sold and to promote the kit’s brand name. Sales agents are given baseball caps and/or badges emblazoned with the project logo to identify them as certified home chlorination kit vendors.
• Promotional Materials - Branded utilitarian items such as plastic drinking glasses, cups, t-shirts, stickers and pens are used to help promote awareness of the home chlorination kit.

• Small media and outdoor advertising - Posters, billboards, and brochures/leaflets promote the benefits of using the home water treatment system. These materials use low-literacy pictorial images and are written in local languages.

• Mobile Video - A mobile video unit (MVU) is being used in around the country to promote its health products. A video on the home water treatment system is being produced for use in MVU presentations, and the MVU team is developing an educational/promotional program to accompany the video.

• Peer Educators - Educators recruited through the neighborhood health committee, or already established CHWs (community health worker) do household or small group education on the clean water problem and the home water treatment system solution.

4.3.10 Training

The purpose of training programs is to ensure that all players in this pilot have the information and skills necessary to implement the above-described activities. Training curriculum for all project activities is developed in collaboration with city councils, DHMTs, NHCs and others as appropriate. Training includes the following:

(1) Distribution and Sales. Health Center staff, NHCs and agents, commercial retailers, and NGO/service club representatives that are involved in the sale of water storage vessels and disinfectant solution have been trained in product information, storage, salesmanship, record keeping and reporting. A trainer of trainers approach is being used with community agents, and is organized by HC staff. Workshops are also being held for interested commercial retailers and NGO/service organizations.

(2) Production of Disinfectant Solution. A certification course has been developed for appointed staff in each pilot site that is producing and bottling the disinfectant solution. Training includes the operation and maintenance of the SANILEC machine, measurement of the hypochlorite concentration, product safety, record keeping and reporting.

(3) IEC Application. Health Center staff and NHCs are the primary participants for training in the development and use of community-based IEC activities. Participants are being taught how to design, plan and implement IEC strategies and activities for their communities.
(4) **Inventory/financing.** In using community-based sales mechanisms, HC staff, and 
NHC representatives are being trained in inventory management, accounting, credit 
monitoring and collection. Terms of consignment and or credit extended to NHCs, 
NGO/service clubs and work sites are monitored by the project site manager.

(5) **Monitoring and Evaluation.** DHMT and HC staff are being trained in monitoring and 
evaluation systems for tracking inventories, sales, revenues and program activities. 
Monitoring and evaluation criteria for the home water treatment and storage system is 
being established as part of the District Action Plans in the pilot areas.

4.3.11 **Monitoring and Evaluation**

Monitoring and evaluation of the home water treatment pilot consists of the field 
evaluation conducted by the CDC, a baseline study conducted by project staff in Lusaka, 
formative research for brand development, a distribution survey, and a follow up 
epidemiological evaluation of the pilot to be conducted by the CDC. The follow up 
evaluation will include a household water quality study and diarrhea surveillance studies.

4.3.12 **Personnel and Management**

The following outlines the personnel requirements and their duties for the home 
chlorination kit activities:

1. **Site Coordinators** - A project Site Coordinator oversees all project activities in 
each location. Site coordinators have been provided with a motorcycle for use 
during working hours to facilitate operations.

2. **Sales Assistant** - Two sales assistants, one for each site, have been hired by 
the project to assist the Site Coordinator with establishing distribution systems 
in each community. Each sales assistant is provided with a bicycle to facilitate 
operations.

3. **Child Health Marketing Manager** - The project’s Child Health Marketing Manager 
supervises the Site Coordinators and provides considerable technical input into 
the development of project components in the areas of brand development, 
promotional and IEC strategies, sales and distribution, training curriculum and 
research. He is based in Lusaka, but travels as needed to the project site. The 
Child Health Marketing Manager devotes 50% of his time to the home water 
treatment pilot.

4.3.13 **Donors and partners**

The home chlorination kit pilot is being implemented in collaboration with CDC, the 
Ministry of Health, city councils, DHMTs, HCs, NHCs, Kitwe and Lusaka Rotary Clubs 
and other and local service groups. BASICS, CDC and TDRC will participate in overall 
strategy development and in the monitoring of project activities. Initial pilot project funding
was provided by USAID through BASICS and additional USAID support is anticipated. In addition, Rotary Clubs in Lusaka and Kitwe are involved in the pilot project and clubs in Estes Park, Colorado and Tokyo, Japan are expected to provide support for the expansion phase.

4.3.14 Risks and Assumptions

The primary risk to success of the home water treatment and storage system pilot is the degree to which the intended target households can be convinced to use the products. Traditional practices around water storage and use may be difficult to overcome. Diarrheal diseases may be viewed with complacency and may not be treated with the same sense of urgency as more “serious” diseases like fever or measles (i.e. “children are always getting diarrhea, what can you do?”). The ability to motivate households to use a product designed for “prevention” of diarrheal disease rather than “treatment” is an unknown. Adding a further challenge is that the system requires on-going use to be effective. That is, there may be initially good compliance with purchasing a container and a bottle of disinfectant, but on-going purchase and proper use of the disinfectant along with improved sanitary practices must be achieved in order for the system to have a lasting health impact.

Related to the above risk, is the reality that the pilot will be conducted in areas with low household incomes. Therefore, consumer ability to pay may be a critical factor. While this could be offset by providing a subsidy for the purchase of approved water vessels, especially the specialty vessel with a tap, subsidies or lenient payment policies would lower cost recovery and sustainability. Education to make the home water treatment system a priority household expenditure, creative financing schemes, and diligent collection of sales revenues will be required to achieve both health impact and sustainability.

Since this pilot utilizes, in part, a community-based approach, time resources and competence of local implementing partners (DHMTs, HC and NHC staff and local NGOs and service clubs), are key to the project’s success. This project is competing for time and personnel resources at these levels with the myriad of other health activities that newly decentralized district health offices are charged with implementing. The ability of local HCs or NHCs to manage inventories and collect funds is unknown. This is partially mitigated by utilizing commercial retail distribution, where possible. However, because the pilot site populations are small, utilizing commercial outlets also runs the risk that product will be diverted out of the pilot area in order to make a quick profit. This risk will be minimized after scaling up to all of the Kitwe and Lusaka.

5. Conclusion

This practical home-based water treatment and storage system -- being piloted in Zambia by PSI and CDC and in Peru by CEPIS -- is the most appropriate, effective and
cost-efficient technology available to ensure that people in need, especially children, have access to clean water. The intervention has the potential to be one of the most important health interventions of the decade. Starting new and expanding pilot projects promises to make a significant difference in the lives of millions of peri-urban and rural populations and will help to create a sustainable model for reducing waterborne disease worldwide.