



Procter & Gamble – Providing Safe Drinking Water

Situation

Established in 1837, The Procter & Gamble Company began as a small, family operated soap and candle company in Cincinnati, Ohio, USA. Today, P&G markets almost 300 products to more than five billion consumers in 140 countries. Procter & Gamble's corporate tradition is rooted in the principles of personal integrity, respect for the individual and doing what's right for the long-term. More than 98,000 P&G people work every day to provide products of superior quality and value to the world's consumers.

The P&G Health Sciences Institute is dedicated to identifying, developing and using leading health care technologies in the development of effective products for both the developing and developed world. One aspect of their work is looking at the more than 1 billion people who do not have access to safe water. Diarrheal diseases resulting from a lack of safe water remain a leading cause of illness and death in the developing world, with about two million children dying every year due to these diseases. The Millennium Declaration Goal (MDG) is to halve the proportion of people unable to reach or afford safe drinking water by 2015.

The P&G Health Sciences Institute has worked in partnership with the International Council of Nurses (ICN) and the Centers for Disease Control and Prevention (CDC) to find alternative, affordable solutions to the problem of safe drinking water.

The ICN is a federation of 124 national nurses' associations representing millions of nurses worldwide. Operated by nurses for nurses since 1899, ICN is the international voice of nursing and works to ensure quality care for all and sound health policies globally.

The CDC, located in Atlanta, Georgia, USA, is an agency of the US Department of Health and Human Services. CDC protects people's health and safety by preventing and controlling diseases and injuries, enhances health decisions by providing credible information on critical health issues, and promotes healthy living through strong partnerships with local, national and international organizations.

Targets

A complementary approach to providing piped-treated water is through treatment of drinking water directly in people's homes. This point-of-use (POU) model, combined with safe storage, has the advantages of cost, immediate availability and ease of distribution to reach rural areas. The World Health Organization (WHO) and United Nations Children's Fund (UNICEF) have recognized that POU water treatment and safe storage at the household level can provide significant health benefits by reducing the incidence of diarrhea in developing countries. Because of the potential to dramatically improve the health of vulnerable populations this approach is receiving increased attention including the recent announcement of the collaboration of more than 20 organizations, including P&G, the ICN and the CDC, in the International Network to Promote Household Water Treatment and Safe Storage.

There is conclusive evidence that simple, acceptable, low-cost interventions at the household and community level are capable of dramatically improving the microbial quality of household stored water and reducing the attendant risks of diarrheal disease and death. The provision of safe water alone will reduce these and other enteric diseases by 6 to 50%, even in the absence of improved sanitation or other hygiene measures. Overall, combined solutions that bring unwanted and harmful matter together in small masses in water, as well as chlorine disinfection systems have shown considerable promise as microbiological purifiers of household water.

The aim of PuR is to create safe drinking water through the removal of pathogens and the use of disinfectants in turbid waters. P&G believes that if it can provide affordable products that meet a real consumer need, then there will be demand for these products in the developing world.

Activities

A new POU technology, a combination coagulation, flocculation and disinfection treatment system, has been developed through collaboration between the Procter & Gamble Health Sciences Institute and the US Centers for Disease Control and Prevention (CDC).

The PuR product was developed based on tests with thousands of consumers in developing countries. These consumers consistently say they want visible signals that the water is cleaner, at-home control, and affordability.

The PuR product uses the same ingredients as those in municipal water systems, but is reverse engineered to effectively be a mini-water treatment plant in a sachet. A small sachet of powdered product:

- visibly separates the cleaned water from the murky masses while providing residual chlorination;
- uses ingredients used in municipal treatment plants including ferric sulphate to remove phosphate and calcium hypochlorite as a disinfectant;
- provides superiority to chlorine alone in performance in turbid waters and reduction of organics including humic acid (a fertilizer) and DDT (an insecticide), as well as heavy metals;
- remains stable, providing potential for long-term consumer use as well as for providing emergency water.

The water purification process involves simple implements that consumers have in their homes:

- Add 1 sachet to 10 litres of water and stir to begin process of separating the cleaned water from the murky masses;
- Stir water for 5 minutes until clear;
- Filter water through a cloth and dispose of separated floc in the latrine;
- Let clear water stand for 20 minutes to allow for complete disinfection;
- Store in a suitable container to prevent recontamination.

Testing

PuR has been tested in the laboratory against model test waters for removal of pathogenic bacteria, viruses, and parasites as well as a selection of heavy metals and organics. It has been tested in the field in numerous countries for removal of turbidity and fecal organisms. The Centers for Disease Control and Prevention have conducted two large health intervention trials to determine effectiveness in reducing diarrheal disease.

Distribution

Previous public health interventions have used a market-based approach to build consumer awareness of the need for the intervention through social mobilization and mass media. This approach uses existing commercial infrastructures to ensure broad and convenient access. A market-based approach may also be effective for providing POU systems. Initial efforts are underway with the combination treatment system to develop a sustainable market-based approach and to learn how to best make POU products available. Three separate complementary models are being explored:

- (1) a social model led by non-profit organizations
- (2) a commercial model led by the private sector
- (3) an emergency relief model led by relief organizations.

These efforts will use broad public-private partnerships with governments, research institutions, NGOs, professional associations, and the private sector.

Social Model

In some countries, a social model may be most appropriate due to economic and infrastructure constraints that limit the commercial model. The social model involves the use of established social marketing distribution channels by non-profit organizations as well as a social network approach with local NGOs and Ministries of Health. This model is being used effectively in many parts of the developing world to provide important health products.

Commercial Model

The commercial model leverages the technology innovation and distribution and marketing infrastructure of the private sector, combined with advocacy, education and research efforts by collaborating groups to build awareness of the need to properly treat and store water. This model is being explored in initial commercial test markets that were conducted in Guatemala, the Philippines, Morocco and Pakistan. Specific activities include a scientific symposium and outreach to build awareness, local training sessions involving village health workers, and health intervention trials conducted by MERTU and the CDC. Collaboration with Johns Hopkins University Communications Program is underway in order to identify the key factors needed to enable long-term consumer habit change needed for PCU technologies.

Emergency Relief Model

Every year there are tens of millions of people who lack access to safe drinking water either because of natural disasters such as floods and earthquakes or because of armed conflicts resulting in internally displaced people or refugee situations. The emergency relief model involves product distribution along with education materials, typically by a relief agency.

The combined treatment system has several potential advantages for emergencies including long-term stability so the product can be stockpiled in areas of frequent disasters, ease of transport and robustness to treat even very turbid surface waters. Several NGOs, including the International Rescue Committee and the International Committee of the Red Cross are evaluating the combination system for use in emergency situations. Simple education materials in multiple languages have been developed for the combination system to allow for rapid deployment.

Innovation

The innovation in this project lies in the three different models P&G will use to approach emerging market opportunities. Specifically, P&G will use the strengths of the private sector for its technology, scale, resources and generating capacity, and NGOs and governments for their program skills, government ministry access and connectedness, access to public health expertise and resources, as well as education and advocacy programs.

Packaging

The packaging of the product in small sachets that sell well in poor countries are also an innovation. They are convenient to store over long periods of time and thus can be kept for emergency use or consumers can buy many without it being cumbersome. One small sachet, costing about US\$ 0.10 in the commercial model, will treat 10 litres of water (enough drinking water for an average family for two days), an acceptable price per litre in initial market tests. PuR can also be bought in bulk quantities for use such as emergency disasters or miniature treatment plants.

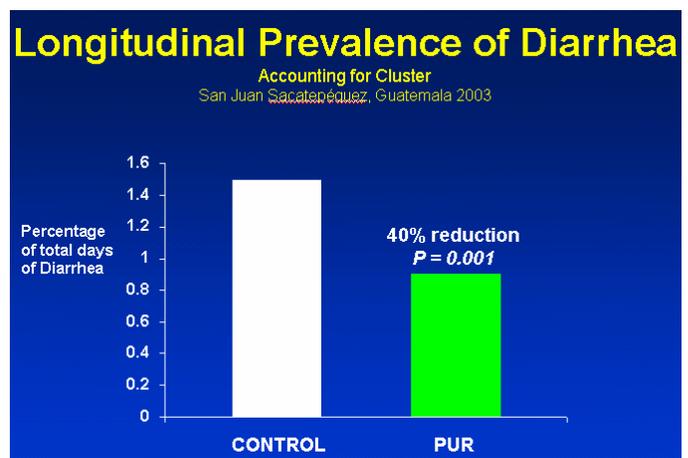
Challenges

The challenges encountered so far have centred around sustaining a consumer habit change. P&G believes that partnerships will be absolutely essential to making these efforts more efficient, i.e. through partnerships on education about the causes, consequences and ways to treat unsafe water.

Results

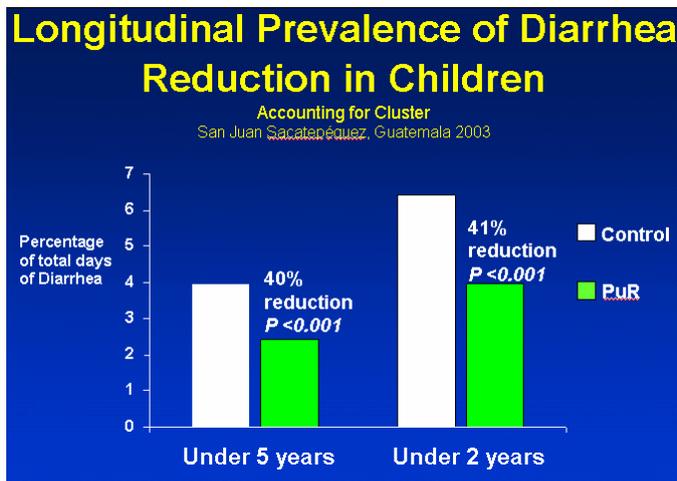
Laboratory evaluations in test waters demonstrate that this treatment system effectively reduces the levels of representative waterborne bacteria, viruses and parasitic pathogens from test waters. Two health intervention trials conducted by the CDC in rural Guatemala demonstrate that the combination system can significantly reduce the incidence of diarrhea.

In addition to microbial contaminants, the treatment system increases water clearness and removes a variety of chemical contaminants such as arsenic, making it suitable for treating a wide variety of water sources in developing countries. Because the treatment makes



water significantly clearer, the amount of microbes in the water is less than compared to disinfection alone in highly turbid waters, thus providing a strong visual signal to consumers that the treatment is effectively cleaning the water.

Results of the tests in the 492 Guatemalan households showed that at baseline 1% of water samples from intervention households were potable. However, 21% were potable at 4 months and 47% were potable after three rounds of weekly encouragement. After adjustment for week, age, and group interactions, persons in households given the product had significantly less diarrhea than the baseline by week 31, whereas households given bleach alone had 18% less. Households given the product had less turbid water (51% mean reduction) than baseline.



In another test of 514 households in 14 villages in San Juan Sacatepéquez Guatemala, where diarrhea is a leading cause of death, families who used the product to treat their drinking water had cleaner drinking water and 40% less days of diarrhea compared to neighbouring households who used standard water handling practices. In addition, the households using PuR had 50% less prolonged episodes of diarrhea in children under the age of 2.

Consumers describing their experience with PuR reported clearer water and find the process simple to use. They also find the pricing (\$US 0.01 per litre of treated water) acceptable. It is clear, however, that educational efforts including product

demonstrations are necessary to encourage a consumer habit change.

Lessons Learned

Point-of-use drinking water solutions using a market-based approach require broad collaborations involving the private sector, governments, NGOs and research institutions in order to provide effective education, marketing and product distribution.

A one-time educational program did not bring about widespread regular use of any of the point-of-use interventions; reinforcement was critical. The visual appeal of clear water and the potential for profit-funded continual promotion of the product could result in sustained use, thereby empowering household to reduce diarrheal illness.

+ Support Material

More information on the P&G Health Sciences Institute in general and the PuR product in particular can be found on the P&G Health Sciences Institute website at <http://www.pghsi.com>.

A video detailing the PuR product and its use is also available on the site.