

The health consequences of inadequate water and sanitation services include an estimated 4 billion cases of diarrhea and 1.9 million deaths each year, mostly among young children in developing countries. Diarrheal diseases lead to decreased food intake and nutrient absorption, malnutrition, reduced resistance to infection, and impaired physical growth and cognitive development. Since 1996, a large body of published work has proven the effectiveness of interventions to improve water quality through household water treatment and safe storage (HWTS) in reducing diarrheal disease. It is preferable, especially when using treatment options that do not leave residual protection, to store treated water in plastic, ceramic, or metal containers with the following characteristics, which serve as physical barriers to recontamination:

- A small opening with a lid or cover that discourages users from placing potentially contaminated items such as hands, cups, or ladles into the stored water;
- A spigot or small opening to allow easy and safe access to the water without requiring the insertion of hands or objects into the container; and,
- A size appropriate for the household water treatment method, with permanently attached instructions for using the treatment method and for cleaning the container.

If containers with these characteristics are not available, efforts should be made to educate household water treatment users to access the water by pouring from the containers rather than dipping into it with a possibly contaminated object. Evidence also suggests that safe storage containers (in the absence of household water treatment) are effective at preventing contamination of potable water during transport and storage.

Safe storage options fall into three general categories: 1) existing water storage containers in the home; 2) water storage containers used in the community and modified by an intervention program; or, 3) commercial safe storage containers purchased by the program and distributed to users. To determine the appropriate safe storage container for a program, first identify containers currently used for water collection, transport, and storage in the community, as these existing containers might already be safe, or could easily be modified to be safe storage containers. Programs are also encouraged to review the options for safe water storage containers presented herein to determine which ones may be most appropriate. For more information, contact safewater@cdc.gov. Care should be taken to avoid using any container previously used for transport of toxic materials (such as pesticides or petroleum products) as a drinking water storage container. Lastly, locally-appropriate cleaning mechanisms – such as use of soap and brushes, or chlorine solution, or an abrasive – should be developed and recommended to clean the container on a regular basis.

The Oxfam Bucket

The 14-liter Oxfam Bucket was designed to provide a safe storage option to organizations working on water safety in the home or refugee camps. It is manufactured in England, and sold unassembled to NGOs for use in program implementation. The lids snap on to prevent entry of the hands or objects into the container. The Oxfam Bucket costs about US\$4, excluding transport from England to the program site. A minimum order of 200 is required. Contact fieldlog@oxfam.org.uk to order.



The Oxfam Bucket (Oxfam)



The CDC Container (CDC)

The CDC Container

In the initial Safe Water System programs, CDC designed 20-liter modified jerry cans and provided them to users. This jerry can is now produced in Uganda, Afghanistan, Kenya, and the United States. Each jerry can costs approximately \$5, excluding transport. Contact safewater@cdc.gov.



*A woman carrying a jerry can in Mozambique; A jerry can;
(CDC, D. Lantagne)*

Jerry Cans

In many countries in Africa, 20-liter jerry cans, initially used to transport vegetable cooking oils, are cleaned and used to transport and store water. They are easy to carry on the head and are a good option for safe storage. The opening is too small to allow hands or utensils into the water, and thus the water is poured out. They can be modified by drilling a hole in the plastic and adding a tap, which offers easier access to the treated water and provides a handwashing station in the home. Used jerry cans cost approximately \$1-5 on the open market in Africa.

Bucket with Lid and Tap

Five gallon (19-liter) buckets are widely available in many countries and are often used for water transport and storage. Buckets can be modified for safe storage by ensuring there is a tight-fitting lid, drilling a hole through the plastic and installing a sturdy tap, placing a label with instructions for water treatment on the bucket, and teaching people to use the tap instead of dipping into the bucket. In Haiti, this is an easy educational message, since the tap is seen as a sign of higher socio-economic status, and families take pride in using it. Taps and labels can be imported or locally made.



*Modified Bucket in Haiti
(Emory, M. Ritter)*

Modified Clay Pots

In many cultures, clay pots are the preferred storage container, because as water evaporates through the clay the water inside the container is cooled. In some rural areas, water is transported in clay pots, but in most areas water is transported in plastic containers and then stored in clay pots. By working with local potters, it is possible to modify clay pots to have a tap, as seen in the two examples. Contact safewater@cdc.gov for technical assistance on manufacturing the pots.



*Modified Clay Pots in Kenya and Nicaragua
(CDC, R. Quick and D. Lantagne)*