



Center for Global Safe  
Water, Sanitation,  
and Hygiene

# WASH in Healthcare Facilities: Experiences in Cambodia



## Background

Since 2004, The General Electric Foundation (GEF) has been working with various partners to design and install water treatment systems for healthcare facilities (HCF) in developing countries. As one of the first major philanthropic donors in the area of “safe water for healthcare”, GEF has steadily transformed its donation program into a comprehensive, evidence-based water treatment intervention that ensures *sustainable* clean water in their partner HCF. With assistance from public health researchers at the Center for Global Safe Water, Sanitation and Hygiene at Emory University (CGSW), the safe water program has championed sustainable safe water provision and capacity building that encourages ownership and maintenance of the donated GE water treatment technology.

Through the Safe Water for Cambodian Health Facilities Program, 10 referral hospitals across Cambodia received water treatment systems from GEF. The CGSW and implementation partner, Assist International, worked closely together accomplish several goals: 1) to identify hospital sites that met necessary criteria for system installation, 2) monitor system functionality and water quality, and 3) develop a sustainable maintenance and repair program for staff responsible for the system. The CGSW also conducted training with hospital personnel on WASH. Additionally, the CGSW and Assist International worked to increase government engagement and program sustainability by signing a Memorandum of Understanding (MOU) with the Ministry of Health (MOH) prior to launch and growing the relationship with the MOH throughout the program. The CGSW also worked in partnership with WaterAid, that hosted the CGSW team in their Cambodia offices and supported in-country safe water activities. Together, the CGSW and WaterAid advocated for the improvement of WASH in HCF within the country.



## Water Quality Monitoring



Above: CGSW staff tests water at the hospital for microbial contamination

Monitoring of the water treatment systems occurred in three stages. First, the CGSW visited the 10 partner hospitals every month for a year and a half to test the quality of water produced by the treatment systems. Monthly water quality tests examined levels of chlorine, turbidity, total coliform, and E. coli, while *Pseudomonas aeruginosa* was tested for bimonthly. Water samples were collected from taps within the hospital to measure the quality and safety of the water provided.

The data collected were then reviewed by the CGSW and Assist International to determine if the water treatment systems were functioning properly and to investigate the cause of any abnormal water quality results. The water quality testing was instrumental in detecting, for example, a pipe misconnection in two hospitals, the use of a bypass valve in a surgery ward of another hospital, and the need to chlorine shock old pipe networks in two other hospitals.

In the last stage of monitoring, the water quality data were shared back to the hospitals. In a country where it is uncommon to drinking water directly from the tap, demonstrating the quality of the water was a critical component in building trust among users. The hospital directors were better engaged, encouraging of their staff to utilize safe water.

## Applied Research

In addition to monitoring water quality, the CGSW conducted applied research on WASH in HCF in Cambodia. A baseline assessment was conducted at the start of the program to document the WASH infrastructure, resources and conditions in the 10 hospitals. The data were then compared to the WASH in HCF service ladder from the WHO/UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP). Results showed that while all hospitals met the criteria for basic water, none met the criteria for basic sanitation, and both hygiene and waste management had significant gaps.

Further, to determine the sustainability of safe water provision via the GEF water treatment system within the hospitals, the CGSW conducted multiple assessments using a tool known as the Safe Water Sustainability Metric (SWSM). The tool was first tested in GEF hospital sites in Ghana and Honduras and after several revisions the tool was implemented in Cambodia. The first sustainability assessment in Cambodia was used as a progress check to determine which aspects of the program required strengthening in order to ensure sustainability of the treatment systems. The second assessment came at the close of the program to provide recommendations to the hospitals as they moved forward without donor support.

The CGSW also examined the association between HCF infrastructure and environmental contamination in the maternity wards of two public hospitals in Phnom Penh. The mixed-methods approach included: unstructured observations of staff behavior; an assessment of the WASH conditions within the maternity wards; and microbiological testing (total coliforms, *E. coli*, and *S. aureus*) of environmental samples taken from medical equipment, surfaces, water, and the hands of staff within the wards. The study demonstrated a possible link between poor WASH infrastructure and practices and environmental contamination in the maternity ward. In particular, a significant difference was found in the hand contamination of healthcare workers between the two hospitals. This may reflect a lack of consistent handwashing habits, limited access to handwashing stations with soap and water, and a lack of promotional handwashing messaging.



Above: A patient drinks treated water supplied by the GE treatment system

## Training on WASH-Related Behaviors

While providing WASH infrastructure, such as a water treatment system, is important to the improvement of WASH in HCF, hardware interventions alone are not sufficient to sustainably improve conditions. In Cambodia, the CGSW engaged the MOH to implement a training program to address WASH-related behaviors, which includes hand hygiene, medical equipment processing, environmental cleaning and healthcare waste management. Using existing national Infection Prevention and Control (IPC) curriculum, an expert panel of local WASH and health practitioners was convened to design the necessary components of a WASH training for healthcare workers and cleaners in the Cambodian context. Following a training needs assessment which showed that more than half the staff surveyed had never received training on IPC, the expert panel concluded that all aspects of WASH-related behaviors needed to be included in the training. The panel also determined that an on-site training with all staff, vs. the Training of Trainer (ToT) model, would be most impactful in the Cambodian HCF setting.

The CGSW and the Ministry of Health developed a WASH training for health facility staff, based on the existing IPC curriculum. A one-day facilitator training was first held for representatives of each hospital's Infection Control Committee (ICC) and a 2.5-day staff training for doctors, nurses, midwives and cleaners. The ICC was then provided a monitoring checklist and materials for refresher trainings. At three- and six-month evaluation visits, the CGSW and MOH used the monitoring checklist to evaluate changes in WASH-related behaviors and hospital conditions. Feedback from this evaluation was provided to the ICC and hospital management to support follow-up trainings.

## In-Country Advocacy and Technical Support

From previous GEF 'Safe Water for Health Center' programs, it became clear that safe water interventions in hospitals did not exist in a vacuum. Without the engagement and support of the health sector, ranging from the MOH to the facility management, sustainability of the water treatment systems and behavior change would be limited. Therefore, the CGSW advocated nationally and regionally within Cambodia for improved WASH in HCF in an effort to support both the existing GEF donation program and to extend the impact of our work beyond the 10 hospitals that received water treatment systems.

In 2015, the CGSW joined WHO-Cambodia and WaterAid to form an informal working group focused on identifying priority activities for WASH in HCF in Cambodia. WaterAid commissioned a policy analysis which found there to be a lack of data and policies and guidelines on WASH in HCF within the country. Following the study, the working group contributed to the revision process for both the national Cambodia IPC guidelines and the Minimum Package of Activities for health centers to ensure WASH was included. The working group also drafted the new National Guidelines for WASH Infrastructure in Healthcare Facilities, which is pending completion. In addition, based on recommendations from the WaterAid study, the working group successfully advocated for the Cambodian government to conduct a large baseline study of WASH conditions in 115 HCF in five provinces in 2016.

The working group now includes additional partners from the MOH, UNICEF, and various NGOs and continues to raise the profile of WASH in HCF in Cambodia. In June 2017, the MOH hosted the first National Workshop on WASH in HCF in Cambodia, supported by the CGSW, WaterAid, WHO-Cambodia and UNICEF. The event brought together 80 participants from the WASH and health sectors to discuss the status of WASH in Cambodian HCF and the way forward. From this workshop, the development of a WASH in HCF strategy for the country is underway.



Above: Cleaners practice proper handwashing technique during training

## Challenges and Lessons Learned

One of the main challenges of the Safe Water for Cambodian Health Facilities Program was the inconsistent use of the treated water for drinking. Cambodians are unaccustomed to drinking water from sinks, leading to mistrust of the water quality. Furthermore, they dislike the taste of chlorine, reducing the likelihood of drinking chlorinated water. The program did not anticipate these issues of acceptability and therefore did not address them until the program was well underway. Future WASH in HCF programs would benefit from undertaking an acceptability assessment at the outset to determine the specific behaviors and attitudes of the target population related to drinking water.



Above: Participants at the National Workshop on WASH in HCF discuss IPC and WASH relationships.

Another challenge of the program was the long-term sustainability of the treatment system. The MOU, signed by the MOH, and the hospital agreements, signed by the hospital directors, both described the expectations of maintaining the treatment systems. During the program, Assist International trained hospital staff on routine maintenance and troubleshooting. The CGSW trained hospital staff on the use and interpretation of water quality testing. Initial assessments of sustainability directed further trainings and efforts to increase knowledge and understanding of the systems. During visits to the hospitals six months after the CGSW closed the program, the systems were found to be functional and in use, however none of the hospitals had tested their water despite considerable emphasis placed on the importance of routine water quality testing. While the MOH supported recommendations for testing, there were no monitoring mechanisms in place to ensure it had occurred.

### About the Center