



WaterSHED's Handwashing Initiative in Cambodia

Summary of Progress
& Preliminary Findings

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Background

Handwashing with soap at key times prevents diarrheal diseases and respiratory infections, two of the top three causes of child death in WaterSHED's program countries of Cambodia, Laos, and Vietnam. Of the three, Cambodia has the highest child diarrhea mortality rate.

An assessment of handwash practice in one Cambodian province found just 6% of Cambodian child caretakers washed their hands after fecal contact (cleaning a child's bottom or defecating themselves)². The study identified poor handwash technique (one hand, no soap), inappropriate equipment (one basin), and lack of running water as problematic, constraining good handwash practice.



The WaterSHED Project is supporting an initiative in Cambodia to develop a low-cost marketable handwash device product that will facilitate proper handwashing with soap at critical times for health, targeted at households lacking indoor piped water. To begin, a team of University of California - Davis and University of North Carolina - Chapel Hill researchers undertook a survey of existing household handwashing practices and equipment in two provinces of Cambodia and conducted consumer interaction trials to test a range of alternative device designs and features. This summary highlights preliminary findings from this new work.

WaterSHED Cambodian Handwash Study Overview



Working with Lien Aid, WaterSHED's Cambodian partner, the research team designed and led the handwashing survey and consumer device testing study in Kampong Speu and Kandal Provinces during June and July 2009. The survey assessed household handwashing practices, occasions, equipment usage, interest and preferences for dedicated handwash equipment with mothers and adult female child caretakers from a sample of 79 households in 10 villages.

In the follow-up consumer behavioral study, 11 different experimental handwash devices were installed and tested in a subset of 22 households from 5 of the study

¹ This summary is based on the internal report: "Assessment of Household Handwashing Practices and Equipment Options in Cambodia: Preliminary Findings", October 2009, written by Aprajita Anand and Mimi Jenkins for the WaterSHED Project.

² Adventist Development and Relief Association (ADRA) study entitled "Handwashing Perceptions and Practices among Rural Cambodian People" presented by Leonard Uisetiawan, Advisor to ADRA Cambodia.

villages. Each household tested 2 devices, each for 1 week. Households had the option to purchase either of the test devices at the end of the trial. Five design concepts and several alternative water storage containers were tested, including the Tippy Tap and one commercial off-the-shelf collapsible product. To our knowledge, this is the first time systematic consumer testing of the Tippy Tap device has been undertaken, despite being recommended and promoted widely.

The consumer trial generated in-depth perspectives on consumer device style and feature preferences, including reasons for preferences. By having households test each device for a week, the study captured comparative advantages and disadvantages of test devices and consumers' experiences and perceptions of changes in handwashing-related behavior and device use.

Together, the findings provide valuable material for product design and marketing, and strong evidence that a well-designed commercial handwash device, encompassing the feature preferences identified in the study, produces significant improvement in hygiene behavior and practice, while delivering tangible benefits valued by low-income Cambodian consumers.

Preliminary Highlights from Handwash Behavior Assessment Survey

The three most frequently reported occasions for handwashing in the study area were; before eating (87%); after eating (70%); and, before preparing food (67%). Less than one in four respondents reported washing hands after defecation (23%), while only 3 reported doing so after cleaning a child's feces (6.7% of households with children under 5).

Although respondents in a majority of households were aware that diseases can be spread by hands, they associated this mostly with food preparation and eating occasions. Not washing hands, in contrast, provoked feeling unclean as a person, feeling bad, dirty, and smelly, repulsion and social rejection, and feeling anger and frustration when other family members won't or don't wash hands, in addition to fear of disease.

The most common handwash method involved filling a basin or bowl with water from an outdoor storage jar using a dipper, immersing hands into the bowl to wash and then re-filling the bowl from the storage jar, often several times, to rinse, while squatting near the storage jar. Only 5% of surveyed households had dedicated handwashing equipment, comprised in every case of a metal sink installed at a fixed location, and in all but one, with a plastic tap or metal faucet connected to some form of piped water on the property. In each case, the equipment had been purchased and installed to make handwashing easier for the family.



Encouragingly, the survey found that over half of households without equipment had considered building or buying dedicated handwashing equipment in the past, indicating relatively high levels of dissatisfaction with their current handwash equipment and method, and significant latent consumer interest in a well-designed handwash device. Most desired features included a tap, a basin and soap holder. These were inspired by handwash facilities connected to piped water supplies seen at friends' and relatives' homes, hospitals, on TV, and other away settings.

A slight major of surveyed households expressed difficulty with access to enough water for the household's needs in the dry season, a potential constraint for sustained handwashing under conditions of water scarcity during the dry season which requires further investigation.

Highlights of Findings from Consumer Interaction Trials



Of the four different water delivery mechanisms tested (tap, ladle, hose, foot-operated Tippy Tap), a controllable tap was by far the most desired and preferred. 80% of those testing a tap device installed on a non-collapsible container purchased the tap device over an alternative water delivery mechanism (ladle, hose).

Only when the tap device's container was too small, not durable and difficult to refill, was the tap device reluctantly rejected on occasion for a device with highly-valued container qualities. Both ability to turn water flow on/off and to control flow volume by turning a tap were valued attributes of the tap over other mechanisms. Observed purchase choice behavior is consistent with the tap being the most desired feature of a sought-after handwashing device from survey findings. A tap may

embody both aspirational and functional value to consumers. Participants also highlighted tap durability as an important consideration.

Test households consistently cited the following attributes of the water storage container as both highly valued and important:

- I. High degree of material durability and sturdiness for rough handling and installation outdoors where devices are exposed to the sun, weather, animals and children;
- II. Rigidity and stability to maintain shape and stay in place when set down, whether empty or full, in positioning the device for daily use (hanging the device was disliked) and placing it on the ground during refilling;
- III. Wide mouth opening (with easily removable lid) to allow rapid and easy refilling under the typical process of using the dip and pour method at the household's water storage jar;
- IV. Minimum water storage capacity of 15 liters with preference for 20 liters, to allow for normal refill rates not exceeding 1- 2 times per day and for children to refill the device;
- V. Strong handle for easy carrying of the device by adults and by children between installation location and water jar location for refilling

Children were responsible for device refilling in a third of test households. Transparency of the container material was appreciated but viewed as a less important attribute compared to the features above, especially if the inside of the container could be conveniently inspected by lifting the lid to quickly and easily check the water level. Round and square-edged containers and solid white and solid blue containers were tested, but no clear preferences for shape or color emerged as dominant concerns in the study.

Participants appreciated the fact that the new devices allowed everything needed for handwashing to be maintained together in one place and installed at a fixed location. Households chose to install devices preferably on a surface at a height that allowed them to stand while washing hands. Hanging from the wall was disliked. Thus an elevated surface or stand, and wood frame for the Tippy Tap, was required. Apart from providing the specialized Tippy Tap frame, all but five of the 22 households were able to find a surface to install the stand-alone test devices without assistance. For the five households either too poor to build a stand, or own an object, a bamboo stand was provided on which to install the device.

When compared to the family's old method, all devices including the Tippy Tap (particularly when tested first) were seen as improvements. However, when compared to an alternative non-tap free standing device design (ladle and



hose) or when tested second, participants considered the Tippy Tap inferior and 5 of 6 Tippy Tap test households chose to purchase the alternative device. Negative perceptions of the Tippy Tap included difficulty operating the foot mechanism to make water flow, the narrow opening of the container for refilling, higher frequency of daily refilling due to smaller container volume, durability of the container, and children's difficulties operating the device on their own.



A very high level of exclusive use of test devices during the trial was observed, attributed by participants to significant improvement using the devices to wash hands over their old method. All but one participant purchased a test device. Uniformly, all households mentioned the greater ease, convenience, and speed of handwashing and greater cleanliness achieved using the device, including the ability to wash hands unassisted for mothers and young children, compared to the family's old method, which sometimes required requesting another family member to pour water over one's hands and where things needed for handwashing were not in one fixed place.

All households said they and their children were able to get their hands cleaner than with their old method because the devices produced flowing water that carried dirt away. Soap also played a part in perceptions of improved hand cleanliness using the device. Each test device came installed with a bar of soap in a mesh bag hanging from the device. Although soap

was mentioned by all 79 survey households as used for handwashing, and some form of soap (usually liquid dish or shampoo), either possessed or borrowed, was used during the handwashing demonstration by all but five survey households, it became clear during the trial that the soap bar attached to the test device was a highly valued feature as any soap use for handwashing was uncommon in a large majority of trial households prior to the trial. Making handwashing fun, easy and playful for children was an unexpected benefit mothers highlighted as leading to increased and better hand washing by children and reducing their frustration and anxiety over child handwashing.

Apart from one mother and elderly grandparents in six households, the family's old method of handwashing was completely abandoned by all test household members once the new device was installed and usage demonstrated. The mother who occasionally reverted to her old method did so during the week of testing a narrow-mouth, collapsible, smaller volume (10 L) device which was time consuming to fill and requiring more frequent refilling. The hose delivery mechanism was sometimes difficult to operate, particularly for old people with poor vision or fine motor control.

All households, irrespective of which device they tested, mentioned that the device had led to them and their family washing their hands much more frequently than before. Six out of 7 specifically mentioned seeing the device reminded them or their children to wash their hands, serving as a visual trigger for handwashing.

A nearly twofold increase was observed in occasions when hands were washed using the device compared to trial participants' pre-trial behavior. Handwashing at key occasions for health increased among trial participants from 32% before to 50% during the trial, for after defecation, and from 4.6% to 18.2%, after cleaning children's feces. Handwashing after contact with animal feces, not practiced at by trial participants prior to the trial, increased to 13.6% during the trial.

The devices also led to a number of other unanticipated improvements in hygiene conditions and practices in the home. When asked how using the devices had changed handwashing practices, 73 % of trial participants reported their stored water no longer got dirty using the devices, as they no longer dip dirty hands into the water storage jar to handwash in the old way. Washing hands upon waking in the morning, when other body parts including the face often also are washed,

increased from 27% under the old method to 73% with the device. Large increases in the frequency of using the device, compared to before the trial also occurred for handwashing before sleeping and after working in the fields.

Concluding Points

The high level of interest in handwashing devices, as demonstrated by the survey and end-of-trial purchase of test devices, combined with encouraging findings on design preferences and improved hygiene behaviors, all provide solid evidence for the commercial potential and health impacts of a well-designed handwashing device tailored to the Cambodian market. To verify changes and design preferences under water scarce conditions, we recommend consumer interaction trials in the dry season in any future rounds of device development and testing



In FY 2010, WaterSHED will coordinate a regional effort to develop manufacture and market low-cost consumer handwashing devices to improve hygiene practices among low-income populations lacking in-home piped water. This initiative will link WaterSHED to a similar initiative in Vietnam begun by the World Bank's Water & Sanitation Programme (WSP). WaterSHED is utilizing the findings from its handwashing work in Cambodia to inform its evolving handwashing partnership activities in Vietnam.