

# REVIEW OF HAND WASHING PROGRAMS

*“Hand washing has been shown to be effective at reducing the incidences of diarrheal disease, it is proving to be sustainable over the longer-term, and it has been documented to be cost-effective. Hand washing could become the ‘method’ of choice for reducing diarrheal disease worldwide (Curtis, 2003).”*

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Written by Kathleen Shordt, IRC International Water and Sanitation Centre, for the Hygiene Improvement Project, funded by USAID, and with the support of the Academy for Educational Development (AED).

<http://www.hip.watsan.net/>

## 1. Impact of handwashing with soap

The simple act of washing hands with soap gives a significant health advantage. Based on an analysis of 17 studies which they judged to be of high quality, Curtis and Cairncross (2003) found that interventions which promote handwashing with soap were associated with a decreased risk of diarrhoeal disease by nearly half (47%;  $P < 0.05$  with confidence interval 24-63%). They estimated that if the practice of handwashing with soap were universal, about 1 million lives currently lost to diarrheal disease could be saved each year.

The research highlighting the reduced risk of diarrheal disease related to handwashing with soap includes:

- Han and Hlaing (1989): 30% reduction in diarrheal morbidity in Burma;
- Pinfold *et al.* (1996) median reduction of 35% (range of 30-89%) in northeast Thailand;
- Khan (1982): 84% reduction in the incidence of shigellosis in Pakistan;
- Birmingham (1997), overall reduction 39% among young children in Burundi.

In the past five years, it has been recognized that handwashing with soap provides health benefits beyond reducing diarrheal disease. In 2001, Ryan *et al.* published a study that attracted international attention with its focus on respiratory illness. An intervention was organized so that military recruits in a US training facility were encouraged to wash their hands 5 times a day. The 44,000 recruits were split into intervention and control groups. The program involved education, provision of handwashing materials and a relaxation of rules; for example, sinks did not have to be wiped dry after handwashing. The study found that the risk of respiratory infection was reduced by about 45% among the recruits under training in 1997 and 1998 compared to 1996. Interestingly, those who reported washing hand fewer than three times a day; had significantly more hospital admissions (odds ratio was 11, 95% confidence level 2.7 to 46).

A recent research by Luby *et al.* (2005) in Pakistan demonstrated an impact on diarrhea as well as acute respiratory-tract infections and impetigo. Selected at random were about 300 households as controls, 300 households with handwashing promotion using plain soap and 300 assigned to antibacterial soap. The findings showed that children 1 to 5 years in households that received plain soap and handwashing promotion had a 50% lower incidence of pneumonia than controls (95% CI -65% to -34%). Also compared with controls, children younger than 15 years in households using plain soap had a 53% lower incidence of diarrhea (CI -65% to -41%) and a 34% lower incidence of impetigo. There was no significant difference between the children using plain and antibacterial soap.

How can handwashing with soap prevent colds and pneumonia? Cairncross (2003) describes two possible links. The first is that pathogens such as enteric viruses, causing 'gastric flu' can also irritate the epithelial cells in the lungs. The second possible connection is that we can unwittingly give ourselves an infection through the skin of our hands. For example, Cairncross sights a study (Corley *et al.* 1987) in which children aged 4–8 years were trained not to touch their nose and eyes so frequently, leading to a 47% reduction in laboratory-diagnosed common cold infections. He also notes that that viruses such as the cold virus can remain viable on surfaces for several hours, that the number needed to cause infection can be very small, and that people can pick up virus particles on their hands by touching objects and surfaces contaminated by infected people.

Interestingly, in an article titled 'If there is another outbreak of SARS, how can I protect myself?' on the SARS website (<http://library.thinkquest.org/03oct/00738/outbreak.html#contentoutline>), it is recommended that people "...frequently wash their hands with soap and water or use alcohol-based hand rubs. One must also avoid touching one's eyes, nose, and mouth ..."

Handwashing appears to be relevant no matter how anal cleansing is done. Han *et al.* (1986) showed that hands easily become contaminated after defecation, even with the use of cleansing paper (reported by Curtis, 2000).

### ***Value of interventions promoting handwashing***

A small amount of research is available pointing to the effectiveness of interventions that improve handwashing practices. It shows that new, improved behaviours can be sustained. Hoque *et al.* (1996) found lower numbers of faecal colony-forming bacteria on hands and continued handwashing practices of women in intervention are compared to control areas ( $P < 0.001$ ), four years after the conclusion of an intervention in Bangladesh. Another longitudinal study carried out in 6 countries (Ghana, Kenya, Uganda, India, Nepal, Sri Lanka) demonstrated that hygiene behaviours, including handwashing with soap, are sustained beyond the end of an intervention (Shordt *et al.*, 2004). For the studies in five countries, 25 comparisons were made between hygiene practices --including handwashing--among people where the projects ended in 1998 or 2000. The results showed that in only two out of 25 comparisons made did the people practice safe hygiene behaviours more where the projects ended in later (2000) than where the projects ended in earlier, 1998. This implies that, in terms of behaviour sustainability, the amount of time since the projects ended did not make much of a difference. In 17 cases spread across four countries a comparison was made of hygiene behaviour changes between two data collection dates (2001 and 2002) about a year apart. In only one of the 17 comparisons was there a significant decrease over the one-year period. Thus, the time between surveys did not make much of a difference, providing more evidence about the sustainability of hygiene behaviours.

Recent research also points to the cost-effectiveness of hygiene promotion programs related to handwashing. The *DALY* – Disability-Adjusted Life Years -- is a measure used to determine cost-effectiveness of health sector intervention. WHO's Commission on Macroeconomics and Health states that, to measure cost effectiveness: "...interventions that avert one DALY for less than the average per capita income for a given country or region are considered very cost-effective..."(van Wijk, et. al., 2004). In a more conservative estimate, the World Bank Development Report suggests a cut-off point for a cost-effective intervention at US\$150 per DALY. The table below describes the cost-effectiveness of two programs related to handwashing, a public/civil society sector program and for public private partnership initiative (Christoffers *et al.*, 2004; Cercone *et al.*, 2004)..

***Table 1: Cost-effectiveness of hygiene promotion activities (related to handwashing)***

	<b><i>Effectiveness (% reduction in diarrhea cases)</i></b>	<b><i>Cost per case averted (in US \$\$)</i></b>	<b><i>Cost per DALY averted (in US \$\$)</i></b>
Hygiene Promotion	Up to 48%	-	\$44
Handwashing PPP Initiatives	Up to 30%	\$8.50-\$9	\$91-\$122

The cost per DALY averted found in both studies (\$44 and \$91-122) is well below even the conservative cut-off point of \$150, strongly supporting the value of hygiene promotion for handwashing.

## **2. Handwashing behaviors**

Unfortunately, handwashing with soap does not seem to be common. The *Handwashing Handbook* (World Bank, 2005) reports on six studies from India, Ghana, Peru and Senegal showing less than 35% prevalence of handwashing with soap after defecation. A review of nine studies found that the median rate of handwashing with soap after cleaning stools from the child's bottom was about 13% with a range was 0 to 20% (World Bank, 2005). Handwashing after cleaning the child is important because the caregiver often also cooks the food and feeds the child.

Handwashing with soap is a challenge in industrialized as well as non-industrialized countries. For example, the CDC (Centres for Disease Control and Prevention) promotes handwashing through several projects in the US. The American Society for Microbiology has mounted a campaign entitled: *Clean Hands save lives!* Indicative of the extensive research on handwashing in the US is an observational study carried out by Lipsett

*et al* (2001) in a large university teaching hospital. Overall handwashing rates were low (44%). Significant differences existed among health care workers, with MDs being the least likely to wash hands when needed (15% for doctors versus 50% for nurses). The study also identified gender differences among physicians ( $P = .047$ ) with women being more likely to wash hands.

In Canada, Carabin (1999) undertook an interesting study which sought to assess the effectiveness of a handwashing in reducing the incidence of respiratory and diarrheal diseases among toddlers attending day care centers in Quebec. During a one-year randomized field trial in 52 centres, absences of children for any reason and the occurrence of colds and diarrhea were recorded by the day care educators. The number of fecal coliforms on children's hands and on educator' hands were measured during unannounced visits. There was no other intervention. The incidence of diarrhea was considerably reduced (IRR = 0.73, 95% Confidence Interval 0.54 to 0.97), and the rate of upper respiratory tract infections was reduced compared to children in control groups. (IRR = 0.80, 95% CI = 0.68 to 0.93). The results highlight the relevance of handwashing in a Canadian day care setting. Interestingly, the results also imply that an intervention program based only on monitoring have played a role in reducing infections in children attending these day care centers. Monitoring alone also had an important effect in reducing the level of bacterial contamination on children's and educators' hands.

The remainder of this paper focuses, first on micro-aspects of handwashing and then on program design. A recurring theme is the importance of understanding existing behaviors and the physical, social and economic enabling environment in which they are practiced.

## **2.1 Technique: How to wash hands**

In research which measured fecal coliforms on hands after different handwashing protocols, Hoque (2003) found that effectiveness is determined by the thoroughness and the time taken to wash hands. It was the volume of the water and increased rubbing that resulted in significantly lower fecal coliform counts on hands. Using one or two liters of water for overall handwashing provided significantly cleaner hands than 0.5 liters (98%, confidence interval 1.23 to 5.25 for the right hand). Air drying hands was preferred to prevent the re-contamination of clean hands.

A typical description of the recommended handwashing process is:

- Wet the hands
- Rub both hands thoroughly with an agent (soap, ash or mud) for 20 seconds
- Rinse completely and (air) dry.

The CDC recommends a similar routine, as described in its webpage on handwashing **When washing hands with soap and water** (<http://www.cdc.gov/cleanhands/>):

- *Wet your hands with clean running water and apply soap. Use warm water if it is available.*
- *Rub hands together to make a lather and scrub all surfaces*
- *Continue rubbing hands for 20 seconds. Need a timer? Imagine singing "Happy Birthday" twice through to a friend!*
- *Rinse hands well under running water*
- *Dry your hands using a paper towel or air dryer. If possible, use your paper towel to turn off the faucet*

Attention is needed to prevailing customs. For example, many South Asians separate the use of the left hand from right hand for specific purposes. One reason for this is that the left hand is used for anal cleaning with water after defecation. Thus, one of Hoque's Bangladesh studies (1996) showed that less than half (44%) of the women washed both hands, while the others only washed their left hands. Hygiene promotion in this

situation should promote the washing of both hands; while in other settings, being a universal practice, it would not need to be promoted. The situation and customs need to be taken into account in designing interventions.

## **2.2 Critical times for handwashing**

Surprisingly, studies that reported a significant reduction in disease have promoted different critical times for handwashing. Khan's study (1982) promoted handwashing with soap after defecation and before eating. In addition to these two instances, Shahid (1996) added handwashing before handling food/cooking (Shahid, 1996). In addition to these times, Pinfold and Luby's studies (1996, 2005) promoted handwashing before feeding baby and after cleaning a baby's bottom as 'crucial times' which are also supported by USAID ([http://www.usaid.gov/our\\_work/global\\_health/ch/techareas/handwashing.html](http://www.usaid.gov/our_work/global_health/ch/techareas/handwashing.html)), WHO and UNICEF (1999).

The importance of promoting only a small number of 'crucial' handwashing times is highlighted by Curtis (2000). Curtis reports on a study by Graeff *et al* in Guatemala where field workers asked mothers to wash hands after using the latrine, after changing a nappy, before preparing food, before eating, before giving food to the infant, before touching drinking water, and before going to bed. They found that this required mothers to wash their hands an average of 32 times a day, needed an additional 20 liters of water and an additional hour per day. It is not practical to recommend washing hands on too many occasions.

In part, critical handwashing times are a function of the situation and customs. For example, with the military recruits in the USA who did not cook or have children, the project's requirement was simply washing hands five times a day, with a view to reducing the incidence of respiratory infections (Ryan, 2001).

To prioritize when handwashing is most needed with a view to reducing diarrhoeal disease, Curtis (2000) suggests focusing on hand-washing as a primary barrier to remove faecal matter from hands after contact with stools. For this Curtis recommends promoting handwashing with soap at two instances: after defecation and after cleaning baby (Curtis, 2000).

Further investigation is needed of this issue, from point of view of large-scale interventions that may aim to reduce diarrhea as well as respiratory and skin/eye infections. In addition, the practicality of the recommendations needs to be revisited... such as 'wash hands before cooking', where cooking itself can be an extended activity, punctuated with many other activities in the household.

## **2.3 Materials for handwashing**

A number of studies suggest that soap is a critical component in handwashing. However, some authors (Hoque and Briend, 1991; Pinfold, 1996) argue that poorer families can not afford soap... and there is anecdotal support of this assertion. Unfortunately, very little research is available on the effectiveness of low-cost/no-cost soap substitutes such as ash, mud or soil. Only one such study was found, by Hoque *et al.* in Bangladesh (1995, 2003); and it showed that mud, ash and soap were similarly effective in removing fecal coliforms from hands. Hoque suggests that it would be appropriate to promote handwashing using mud/soil, as this is affordable and fits with existing local practices. Further study is needed on this important issue, particularly since the very poorest groups in some societies are not likely to invest in soap of handwashing quality.

A range of materials may be used for handwashing, depending on the situation, water, soap or an abrasive, a basin/bucket, a cup, faucet in the home, some sort of spicket and so on. It is not only the availability, but the convenient location of these which may be important. For measuring handwashing compliance, Karanja (2004) suggests checking the ease with which the mother can get all the things needed for handwashing, as

measured by time (1 to 3 minutes). The implication is that if it takes a long time to organize the materials in the household, then handwashing is probably not done on a regular basis.

## **2.4 Quality and quantity of water**

In the WHO publication on quantity of water, Howard and Bartram (2003) state that for water quantity to act as a constraint on hygiene, it must be available only in very small quantities. Confirming this, the six-country study (Shordt et al., 2004) compared households with good and less good access to water. Access was measured in different ways such as the time needed to collect water (Kenya, Nepal), the distance to the source (Sri Lanka, India), the length of queues at water points (Ghana) or the reliability of the supply (Kenya, Ghana). It should be noted that for most households in the studies, access to water supply was fairly good, available within one hour's travel. However, in none of the six studies was there any significant relation between access to water and handwashing knowledge, skills or practice.

Howard argues that to act as a positive driver for improved hygiene, water should be available at high service levels and ideally supplied at least through one tap on the house (Howard, 2003). A study in Burkina Faso noted that mothers of young children were more likely to wash their hands at critical moments if they have a piped water supply (Curtis et al. 1997).

*Water quality and handwashing:* It stands to reason that handwashing with soap will be easier to practice if water can be taken from convenient sources, even those not of drinking quality such as nearby wells or ponds. Little research is available about this. In one study in Bangladesh, Hoque (2003) found that the quality of water significantly affected handwashing results ( $P < 0.0000$ , CI 1.62 to 5.25). However, the quality of the water used in this study varied significantly: tubewells (about 32 f. coliforms/100 ml) were compared to pond water (more than 17,000 f. coliforms/100 ml). The other studies already sighted did not report or appear to control water quality for handwashing. However, these studies had significant impact on reducing health risks; and, being largely action research studies, it can be assumed that the water used for handwashing in the home was not always of superior quality. Nonetheless, more precise information would be useful. The question of how clean water must be for effective handwashing is also relevant in situations where many people wash hands using the same basin of water.

In conclusion, despite some gaps in research, handwashing has been proven to be a simple and powerful means to reduce the risk of diarrhea and respiratory infections. One area which requires immediate research is the effectiveness of low-cost alternatives to soap such as mud, sand, ash. Other areas for which research information would be useful are: identification of the minimum quality and quantity of water needed for effective handwashing under most circumstances, and optimum timings of handwashing practice from the point of view of both health and convenience..

## **3. Promoting Handwashing behaviors**

Despite the gaps in the knowledge base identified on the preceding pages, it must be remembered that many successful interventions have been and are being implemented. Some useful publications with a focus in greater detail on the design of hygiene and/or handwashing interventions are:

Water Supply and Sanitation Collaborative Council/WSSCC; World Health Organization/WHO; USAID et al. (2005) *Sanitation and hygiene promotion: programming guidance*. Geneva.

[http://www.wsscc.org/dataweb/internal/Media%20and%20communications/publications/Sani\\_Hygiene\\_Promo\\_intro.pdf](http://www.wsscc.org/dataweb/internal/Media%20and%20communications/publications/Sani_Hygiene_Promo_intro.pdf)

This is a detailed source book for sanitation and hygiene promotion in general.

World Bank; BNWP; WSP (2005). *The handwashing handbook : a guide for developing a hygiene promotion program to increase handwashing with soap*. Washington, DC.

[http://www.globalhandwashing.org/Publications/Handwashing\\_Handbook.pdf](http://www.globalhandwashing.org/Publications/Handwashing_Handbook.pdf)

This handbook provides step-by-step guidance for social marketing for handwashing.

Sawyer, R. and M. Simpson-Hébert, S. (1998) *PHAST Step-by-Step Guide: a participatory approach for the control of diarrhoeal disease*. WHO, Geneva, 1998 (WHO/EOS/98.3)

[http://www.who.int/water\\_sanitation\\_health/hygiene/envsan/phastep/en/index.html](http://www.who.int/water_sanitation_health/hygiene/envsan/phastep/en/index.html)

This guide provides details of how to carry out a participatory community programme for hygiene behavioural change activities to empower community groups.

The next three sections focus on three intervention strategies for behavioural change. The first are intensive small to medium-scale interventions for handwashing and other practices, usually the safe disposal of feces. These are led by the non-profit and public sectors. The second group are organized as large-scale public-private partnerships using elements of social marketing to change attitudes and practices, focusing only on handwashing. This section begins with a brief overview of social marketing. The third strategy focuses on participatory methods that empower community groups and, through this, change hygiene behaviors including handwashing. These are led by the non-profit sector. While these three are described as distinct approaches, in field practice the strategies may overlap somewhat.

### **3.1 Program experience led by the non-profit and public sectors**

Most of the interventions and applied research mentioned thus far were organized by non-governmental institutions and universities, sometimes with public sector support. All of these interventions significantly changed handwashing practices through intensive field activities and were small to medium scale. Most were based on traditional field work approaches that involved intensive person-to-person teaching or social marketing approaches or a combination of these. For example:

*Pakistan:* The study reported by Luby (2005) in Pakistan involved around 900 households. Fieldworkers visited households weekly for 1 year to encourage handwashing by residents. The results of the intervention – significant reduction of diarrheal disease, pneumonia and impetigo are described on page 1.

*Thailand:* In the study reported by Pinfold *et al* (1996) in Thailand, fieldworkers organized about 50 neighborhood meetings for women over a nine-month period. They showed slide shows, videotapes, and pamphlets to illustrate health problems resulting from contaminated hands and provided specific handwashing instructions. Fieldworkers also reportedly visited intervention households at least once a week. The hygiene intervention costs ranged from UK £0.37 to £0.71 per person (Pinfold, 1996). Finger contamination was significantly less in intervention villages ( $P < 0.01$  and  $0.001$ ) than in control village at the end of the intervention and in the retest 5 months later ( $0.001$  and  $0.05$ ).

*Burkina Faso:* This social marketing intervention was designed by Curtis (2001) in a city with about 300,000 people in Burkina Faso. An evidence-based marketing strategy was developed using baselines and measuring behavioral change. The intervention focused on neighbourhood hygiene commissions, discussions in health centres and neighbourhood groups, street theatre., local radio, primary school hygiene programmes. After the programme had run for 3 years, the proportion of mothers who washed their hands with soap after using the latrine increased from 1% to 17%. Hand-washing with soap after cleaning a child's bottom increased from 13% to 31%. The safe disposal of children's stools did not change significantly because, Curtis suggests, the practice was already well-established (80% practiced safe disposal of the child's excreta), and it is difficult to demonstrate changes starting from such a high base. Interestingly, about the last 20% who do not safely dispose of the child's feces, Curtis noted: "People resistant to change may belong to a different target group

that requires different promotional strategies". Indeed work may be needed about how to reach the last non-adopters.

*India:* The interventions for handwashing as well as sanitation studied by Zacharia (2004) in Kerala, India were led by an NGO together with the local government and line departments, reaching roughly one million people, over a period of about 10 years. The results of the study showed that handwashing skills were significantly better in the intervention communities, even where the intervention had ended 1 to 9 years before the study, than the control communities (97% versus 10%). Reported consistent handwashing practice after defecation was better in the intervention communities (86% versus 6%) as well as having soap and water conveniently located for handwashing (93% versus 0). Eight of the recalled measures of involvement in the intervention (household women's participation, classes, video/slide shows, drama, competitions, women involved in organization, masons giving messages, and the number of home visits) showed a positive association with handwashing reported by the women of the household, although only one of these, the health education classes, was statistically significant. All the 8 measures were associated with handwashing in the expected direction; and, this in itself, is itself significant; the probability of it arising by chance is  $2^{-8} = 0.004$  (Cairncross, 2004). Interestingly the project activities, which focused more on women, were associated with the handwashing behaviour of women, but not men.

*Peru and Nicaragua:* Favin (2004) reports on projects that were organized by the Environmental Health Project (EHP) with PAHO in Peru and Nicaragua (Favin, 2004) in 2002 and implemented by NGOs. The project worked in 5 communities in Peru and 3 communities in Nicaragua having a total of about 600 children under 5 years of age. The focus was on hand washing as well as ensuring quality of water at point of use, and safe feces disposal. Field activities include: coverage via home visits through community volunteer field workers, preparation and use of communication materials (posters, guides, pictures...), provision of materials to households (chlorine, soap, detergent, towels, child potties...), training and supervision of field workers. The project took 2 years to design, implement and assess, including one year of field work. In Peru, hand washing with soap after using the latrine increased from 29% to 51%, and hand washing before breastfeeding or feeding food to a child increased from 12% to 32%. In Nicaragua, there were improvements in hand washing indicators: mothers/caretakers who washed after cleaning a child who had defecated increased from 31% to 74%; the percentage who washed before preparing and serving food, from 62% to 76%; and before feeding children, from 19% to 49%.

There are many differences among these experiences. However, a small number of commonalities emerge. In one way or another, the programs had these elements:

1. All of these successful programs used a *range of activities for communication*. All used both *media* (posters, radio, drama...) and *interpersonal communication* in the form of home visits or neighborhood meetings.
2. Most programs focused on *more than handwashing objectives*, usually safe disposal of excreta and other practices.
3. However, all of the interventions *targeted only a small number of behaviors*, as is generally agreed to represent good practice (Huttly, 1997; Curtis, 2000; Howard, 2003)
4. These were collaborative efforts. Most *worked with local groups and/or local government and line departments*.
5. Development and training of a field team. All had *full-time or voluntary field workers*, although it was not clear whether the latter received financial rewards.
6. Most appeared to *design and use materials and media events*;
7. Many appeared to have some type of *formative research*, such as behavioral trials; testing or trying out behavioural change strategies
8. Many interventions prepared *baselines*, initial measurement of behaviors that were used to demonstrate measurable changes in behaviours.

Several elements were missing from the reports of these studies. For example, it would have been useful to know more about the extent of community participation and direct versus indirect contact through family members and community groups. Information about costs of interventions was often absent or incomplete. This limits the search to identify cost-effective configurations for interventions. Only one of the studies explicitly addressed gender (India), showing a greater change in handwashing practices associated with the intervention among women than men. This is unfortunate as research elsewhere, for example in the USA (CDC, 2000; Lipsett, 2001) shows that women were significantly more likely than men to report that they always wash their hands at critical times. Further information about this can stimulate program designs which target men more explicitly.

With the exception of Burkina Faso, none of the program descriptions described the motivational principles which were used in interpersonal communication. In other words, was a health mainly used to motivate improved behaviors or other, more marketing-oriented reasons?

### **3.2 Social marketing and public-private partnerships for handwashing**

#### **Elements of social marketing**

The following brief description of social marketing is drawn from the *Handwashing Handbook* ([http://www.globalhandwashing.org/Publications/Handwashing\\_Handbook.pdf](http://www.globalhandwashing.org/Publications/Handwashing_Handbook.pdf)): The heart of the marketing task is to find out what consumers want and then to offer it to them in a way that will make it most attractive. While health may seem an obvious motivation from the point of view of the health professional, social marketers contend that it may not be the overriding or constant concern of the consumer. It is essential to understand the barriers and potential benefits or drivers to washing hands with soap after defecation, after cleaning up a baby who has defecated, before handling food (mothers). To market handwashing successfully, the following four questions about consumers must be answered:

- What are the risk practices? What are existing behaviors and habits?
- Who carries out risk practices?
- What drivers, habits, and/or environment can change behavior for handwashing with soap?
- How do people communicate? What are the channels to communicate with different groups?

Social marketing begins with study and survey. For handwashing, some indicators which can be included in the baseline survey are:

- The **presence of soap** in the home, presence of hand soap in the home; (NO
- **Ease of handwashing:** (that is, a place where water and soap and cup or containers are readily available or can be easily collected for handwashing);
- **Handwashing behavior at key times through** Structured observations, pocket voting
- **Diarrhea occurrence** among each family member in the last 24 hours.

The answers to these questions provide key elements of consumer research. Ways of finding out the answers include: semi-structured consumer interviews, focus group discussions, behavioural trials with volunteers, interviews with adopters, mapping of various types. It is essential that the findings and data be broken down for different gender and socio-economic subgroups such as urban mothers, poor fathers, school children, and so on. The communication and baseline studies typically take two months of fieldwork with a team of eight to 14 people, cover the whole target area/country, and may cost on the order of US\$20,000-80,000.

The plan which results from the study need not be complex. Curtis' study (1997) in Burkina Faso provides a useful example of a simple hygiene marketing plan drawn from a multi-faceted baseline study.

<b>Hygiene promotion plan – Burkina Faso (Curtis, 1987)</b>	
Target practices	<ul style="list-style-type: none"> <li>▪ Handwashing with soap after contact with stools</li> <li>▪ Disposal of stools in potties and latrines</li> </ul>
Primary target audiences	<ul style="list-style-type: none"> <li>▪ Mothers of children under three years</li> <li>▪ ‘maids’ and child caretakers</li> <li>▪ Children of primary school age</li> </ul>
Primary positioning	<ul style="list-style-type: none"> <li>▪ For mothers/caregivers hygiene is socially desirable</li> <li>▪ For children: hygiene helps avoid the microbes which cause diarrhea</li> </ul>
Channels of communication and materials	<ul style="list-style-type: none"> <li>▪ Neighborhood hygiene commissions//visual reminder sheets</li> <li>▪ Discussions in health centres and neighborhoods// portable poster series</li> <li>▪ Street theatre// play outline and props</li> <li>▪ Local radio// programmes and interviews</li> <li>▪ Primary schools// teaching pack</li> </ul>

- adapted from *The handwashing handbook*

<b>Advantages and disadvantages of different approaches/channels to communication</b>		
<i>Approach</i>	<i>Advantages</i>	<i>Disadvantages</i>
Mass media -mix of radio, wall paintings, billboards, posters	Low cost per capita, can raise political profile, can raise awareness	Needs high saturation (6+ contacts), audience can not interact. Special care needed to seek and respond to problems and opportunities that arise during implementation.
Direct contact -home visits, small group meetings, classes	Good interaction, high impact	High cost per capita, requires careful management to succeed, more difficult to organize for large, dispersed populations
Public channels - messages through community meetings, schools, health centers	Potentially highly sustainable as it happens in on-going structures.	Difficult to control quality of input. Low staff motivation. Difficult to supervise and monitor.

### **Public-Private Sector Partnership (PPP) programming**

PPPs are those initiatives that, while involving public and non-profit institutions, rely on commercial-sector participation. PPP handwashing initiatives are reportedly being implemented in Ghana, Nepal and are being launched in Madagascar, Peru and Senegal, among others. For information about this, see the website <http://www.globalhandwashing.org/>

The well-known experience of the Central American Handwashing Initiative provides an example of at-scale PPP (sources of this description: Environmental Health Project-EHP *et al*, 2004; Saadé *et al*, 2001). It was designed to reduce under-five morbidity and mortality through a campaign to promote handwashing with soap. Carried out in Guatemala, Costa Rica and El Salvador, the initiative primarily included a number of public players, four private sector soap producers, and a non-profit facilitating institution (EHP-BASICS). The initiative promoted increased access to soap by distributing free samples, conducting promotional and educational events (radio, television, posters, public events, schools) and sponsoring media activities. Factors that EHP judged to be essential for the initiative include: presence of a catalytic agency bringing public and private sectors together; behavioral research for designing the advertising strategy and a baseline for measuring progress; public health backing; agreed and clear roles and strategy (Saadé, 2001).

In Guatemala, where the work was most carefully documented, the initiative resulted in:

- Contact: 42% of the population could recall messages from the campaign;
- Change in behaviors: ten percent decrease (from 78% to 69%) in the number of mothers found to have inadequate handwashing practices; and
- Change in attitudes: 10 percent decrease in the number of mothers who agreed with the inaccurate statement: “Most times washing hands with water is sufficient.” A 10 percent increase in the number of mothers who agreed with the statement: “When I don’t use soap, I feel that I am not clean.”

Impact: It was estimated for Guatemala that “*over the course of the intervention there was a 4.5 percent reduction in diarrhoeal prevalence among children under five.*” Thus, while the potential impact is modest compared to the intensive interventions described earlier, the extent of the change – if 4.5% is valid–implies that more than 300,000 cases of diarrhea would be averted each year among the one and a half million children under the age of 5 in Guatemala.

Costs: Together BASICS and EHP allocated approximately \$389,000 to the Handwashing Initiative, which made it possible for the soap companies and other organizations to carry out promotional activities during the first year of the campaign.

The Guatemala Handwashing Initiative appears to be cost-effective, preventing diarrhea for less than US\$10 per case and averting a cost per DALY<sup>1</sup> of US\$91.30. Estimates made with this methodology for the Peruvian Handwashing initiative during 2003 show that preventing a case of diarrhea here also cost less than US\$10, and the cost per DALY averted was US\$122.70. The net present value (NPV) of benefits for the Guatemala project was estimated, in 2004, at US\$4.3 million in the base scenario with an internal rate of return (IRR) of 226 percent. For the Peru initiative, the NPV of benefits represents US\$8.1 million, with an IRR of 533 percent (*Extracted from Cercone et al. 2004*).

Interestingly, the largest soap manufacturers (see their websites) have also announced the launching of their own campaign activities. In India this is Lifebuoy's Swasthya Chetna ("health awakening") campaign and hygiene education in rural India. Colgate-Palmolive has signed an agreement with the World Federation of Public Health Associations and Colgate Palmolive and is reportedly working with a selected group of WFPHA member countries to plan handwashing programs.

### *Challenges facing PPPs*

Interestingly, the PPPs for handwashing seem to implement elements of, rather than the entire social marketing package. For soap manufacturers, downsides of the PPP approach, arguably, may include the time in planning and research for social marketing as well as the problem of obtaining public sector subsidies for commercial sector marketing. Thus, the effectiveness of a particular set of media and activities being applied

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<sup>1</sup> DALY, Disability Adjusted Life Year, is the quantitative indicator of burden of disease that reflects the total amount of healthy life lost, whether from premature mortality or some degree of disability during a period of time.

is not known. To examine the effectiveness of current PPP interventions, it would be useful to assess the sustainability of the Central America initiative. This could provide information to identify specific elements and activities associated with behavioural change after the end of the intervention, in order to inform other programs. In general, it would be very useful to have assessments and impact studies of the PPPs that are being implemented for handwashing.

As with all interventions, the PPP process for handwashing requires careful management, as was demonstrated in the handwashing campaign planned in Kerala, a state in southern India in 2001 (information from: World Bank, 2005; Basheer, 2003; and personal communication). Leading and cooperating groups included: the World Bank, the Water and Sanitation Program, UNICEF, the Kerala state government, the Indian Soap and the Toiletries Manufacturers' Association (ISTMA) of which Hindustan Lever Limited, the largest private soap manufacturer in India is a key member. This might have appeared to be the ideal combination of interested donors, an interested soap company, and initial demand from the government for a handwashing program. However, the state government abandoned the program, before it was implemented, in 2003 in the face of widespread criticism from local newspapers, opposition politicians, intellectuals and even doctors. The main points of this criticism included:

- (a) the choice of Kerala: it is already most advanced in India, in terms of life expectancy at birth, maternal mortality and probably personal hygiene;
- (b) the potential adverse effect on the indigenous and local soap industry by increasing the market share of multinational soap companies; and
- (c) the suggestion that the state government was being led by the World Bank.

How could the problems in Kerala have been handled better? The program needed to pay greater attention to state leadership in the program, power groups and politics. In the state it was not seen as a local, Kerala initiative, and was launched largely by institutions external to the state. Taking a lead from marketing principals, the purpose of the soap initiative might have more appropriately been placed with issues of personal welfare, livelihoods, respiratory infections, rather than largely diarrhoeal disease. Information about the benefits of handwashing could have been intensively disseminated to policy makers and health professionals before (and after) the launch of the initiative, also encouraging the two-way exchange of views. Small soap companies, universities and the development centre, NGOs, could have been better informed and more extensively consulted, with alterations in the program developed in response to their inputs. Better media management was needed, by directly responding to early media declarations of concern and, more importantly, by bringing other partners on board to support the effort and deal with the media. More transparent plans showing benefits for local manufacturers might have helped defuse the issue of large versus small, local companies.

### ***3.3 Elements of participatory strategies for handwashing practices***

Participatory strategies represent another approach to behavioural change. There has been considerable contention between professionals who advocate social marketing and professionals who advocate participatory strategies. However, both strategies have their own strengths; and both should be in the repertoire of professionals committed to improving handwashing practices. Furthermore, anecdotal evidence suggests that field staff sometimes tend to mix or attempt to combine these strategies in field work.

The participatory strategies seek to motivate participants to learn about their current situation, make plans to improve that situation and then change current behaviours (Appleton et al, 2003). The point is that people learn by self-discovery.

The approaches usually begin by forming groups as homogeneous as possible. For example, poorer mothers could form a group. Then views on a single topic are investigated by the groups by using a number of techniques. The 'basket of techniques', from which the most relevant are selected, include: mapping, ranking

exercises, trend analysis, transect walk, household and/or school hygiene self-survey, non-serial posters, pocket charts, sorting, gender analysis and so on. The techniques stimulate and organize discussions, interviews, debates and visualize or record the results. (Appleton et al, 2003; Sawyer et al, 1998).

PHAST (Participatory Hygiene And Sanitation Transformation) is an application of participatory approaches for hygiene and sanitation change. The PHAST strategy was developed and implemented on a small to mid-scale, in at least eight African countries beginning in the mid-1990s. With PHAST, handwashing with soap is tackled together with all other behaviors such as toilet construction and use, improved water handling practices. It begins with an exercise on the fecal-oral route based on the F-diagram, which people construct using drawings that are provided. This has a strong impact when participants discover that handwashing is essential to break the route of pathogens in their own environment - and they also find that they must break the pathogenic route in other ways as well (Mayling Simpson-Herbert).

As with other participatory approaches PHAST relies on well-trained field teams, visual materials that are locally relevant, and sufficient contact time in the community (Sawyer et al, 1998). A problem with PHAST is that projects do not take the effort to do a baseline and then follow-up studies. Thus, the evidence base to support PHAST is weak.

Another major challenge facing PHAST and other participatory approaches has been the difficulty of quantifying the data from the results of activities to produce comparable reports (Appleton, 2003). However, a recent methodological development—called Qualitative Information Systems or Methodology for Participatory Assessment (QIS/MPA) enables the quantification of qualitative data from participatory approaches. In this, community members, project staff and external evaluators use rating scales of various types to rank or attach a score to their observations. This makes it possible to compare the findings across projects, communities and community groups, and statistically analyse the quantitative information (Gross, 2000; van Wijk, 2002). PHAST has many strong adherents in Africa yet it lacks, but deserves, careful impact assessment in an action-research situations.

### **3.4 Measuring behaviors**

Behaviour is challenging to measure, although useful techniques have been refined over the past two decades. Pinfold (1996) quotes research stating that the traditional questionnaire-type interviews lead to over-reporting of 'good' behaviours. Another approach to measuring behavioural change is to use indirect indicators such as physical evidence. For example, observations are carried out of the location of soap, water and basins in the household. In larger projects, the recurrent sale of soap provides a useful measure. However, there are limits to what physical location or purchase of materials can imply about daily practice within a particular household..

Structured observations on a long-term basis such as all day, for several days, yield useful information about behavioral change, but are time consuming. Some observers also question the validity of observations. In this regard, Mayling Simpson-Herbert asserts: *"If we sit and observe their behavior, they will always wash their hands and use soap to impress us."*

In PHAST and other participatory approaches, a voting exercise with a pocket chart is used whereby people secretly vote on their behaviors. The requirement for this is a skilled facilitator who puts the group at ease. In the Kerala program (Zacharia, 2004) a procedure for household pocket voting was developed whose validity was confirmed through cross-checking. However, this procedure did not appear to give valid data in Uganda (Shordt, 2004).

In the MPA/QIS approach, discussions or focus group discussions are used in which the group rates behaviors on scale. Once again, a facilitator is required who can put the group at ease and can defuse expectations of project rewards that could result from rating behaviors higher or lower than reality.

Some monitoring activities combine these. For example, in one study, a member of the household was asked to demonstrate correct handwashing practice. Part of the observation includes measuring the amount of time it takes to gather the materials needed for handwashing in the households, on the assumption that if it takes more than one or two minutes, it may not be done regularly. The observations were double-checked by measuring reporting practice through pocket voting (Shordt, 2004).

## 4. Critical issues

There are some gaps in the literature about handwashing promotion that will be discussed from three points of view: the need for technical clarity, design and the evidence base.

### *Technical clarity*

Technical studies are urgently needed on:

**Timing:** the issue relates to what are the optimum (and minimum) times when handwashing with soap is needed to provide a health advantage for diarrheal disease, respiratory infections and possibly skin and eye infections as well. The fact that handwashing helps reduce the risk of respiratory infections may have programming implications.

**Quality and quantity of water:** Research is needed to determine whether water of drinking quality is required for handwashing. If not, pressure might be reduced on high-quality water sources. The quantity of water needed to ensure that washed hands are clean deserves further research, with implications for the burden of water transport among the millions of women who must carry water to the household.

**Handwashing materials:** Ash, mud, sand and/or soap? The program implications of using no-cost abrasives for handwashing can be enormous. Research is urgently needed to examine the effectiveness of ash, mud and sand in cleansing hands.

### *Program design:*

The criteria of success in a program may deserve further examination. In other words, is a program that provides a modest behavioral change more effective than a most costly program with, presumably, greater impact? Thus, for example, is a program where 5% of the people in a population of 500,000 adopt handwashing with soap at critical times, at modest per capita cost, more effective than in a program where 50% adopt the practice, presumably at greater cost over a population of 50,000?

The relatively new findings available about handwashing helping to prevent respiratory infections may have implications for program design in the future. This issue deserves further thought and investigation over the short-term.

The promotion of handwashing behaviors among men and among very poor groups have been mentioned occasionally in this paper. These two issues do not appear to be sufficiently addressed or assessed.

In handwashing programming, designs for different target populations may require more consideration. Mayling Simpson-Herbert distinguishes three such groups:

1. Urban, some disposable income and with access to radios and perhaps other media, as well as easy access to shops where soap is sold. For this group, Herbert suggests, social marketing and PPP might be most relevant.
2. Rural and urban poor, with little disposal income and little access to media. For this group, soap would be a luxury. Their current purchase of choice would be laundry soap. Strong promotion is needed.
3. Rural population, very poor, with no disposal income, rarely visiting a town, not buying soap. With this population, hand washing with ash or soil may be the only option. As they do not readily gather for group activities, access to them for promotion is a challenge.

The point is that no homogeneous program design may be relevant to all three groups. Strategies should be differentiated for different populations, which would also allow more valid intra-group programming and assessments to be done. It is not useful to judge the success of a program between these groups. Thus, for example, some strategies, such as PPP approaches may be relevant for groups 1 and 2 but not for the poorest of the rural populations. A failure with PPP among the poorest is not a failure of PPP, but of its application.

Another design issue which may deserve more attention relates to implementation of handwashing programs at various levels, that is, within a state/nation, region, zonal, district, within a community, and/or at the household-level. Greater clarity is needed about the activities required at each level as well as the vertical integration. Further attention is needed to the inputs required at the intermediate level to ensure quality implementation of a program.

Lastly, should handwashing promotion be combined with promotion for other health or hygiene practices? It appears that most of the intense interventions focus on handwashing together with other practices such as excreta disposal or household hygiene. There are many examples of PPP programmes focus exclusively on handwashing.

### ***Evidence base for programs***

Programming decisions can be no better than their evidence base. Thus, objective impact assessments as well as assessments of sustainability of programs are needed for PPPs programmes, larger marketing programmes and participatory programmes such as PHAST. To ensure efficient targeting of resources, the lack of an information base about what works, under what circumstances, deserves to be redressed quickly. In particular, it would be very useful to assess successful programs from the point to identify which activities and what mix of actions in the household, neighborhood and community provide the optimum impact.

## **5. Conclusions**

Even without answers to the questions in the preceding section, many interventions for handwashing with soap at critical times have demonstrated measurable, often substantial impact. They have been shown to be cost-effective with new handwashing practices sustained beyond the end of the intervention. Most of these successful programs were of short to moderate duration (one to two years) which has also enhanced their cost-effectiveness. Programs for handwashing have reduce the risk of diarrheal disease and also of upper respiratory infections. The implication here is that we are not required to wait until all the questions are

answered and all the gaps are filled in the knowledge base. The time is ripe for interventions on a large and medium scale that promote handwashing.

Most programs have combined different types of actions and different channels to reach target audiences. There is some evidence from the six country study (Shordt *et al*, 2004) that the intensity of the intervention and horizontal, interpersonal or small group communication, are associated with the sustainability of handwashing and hygiene behaviors.

However, in general, there is a lack of consistent monitoring and evaluation processes, something which limits our ability to develop evidence-based lessons learned. Among the approaches, PPP, participatory (particularly PHAST) and social marketing strategies need further assessment. Success at scale needs to be more fully studied.

Many of the successful programs were mounted through collaboration with health departments, local government and civil society. Inter-agency cooperation appears to be a key to effective programming. Even though handwashing may not, at first glance, be politically attractive, the PPP programs have shown that political leaders are willing to support this issue.

Overall, even through many questions remain... even though there are gaps in documentation and assessment processes... it has been demonstrated that effective programs can be mounted for handwashing with soap. The question is not whether handwashing programs, or health interventions with a handwashing component should be undertaken. The challenge is to move forward at pace, with cost-effective and focused interventions of medium and large-scale. The lessons learned from the past demonstrate that it will be possible to address this challenge successfully.

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