



Joint Publication 8

The Hygiene Improvement Framework

A Comprehensive Approach for Preventing Childhood Diarrhea

Prepared by

EHP, UNICEF/WES, USAID, World Bank/WSP, WSSCC

May 2004

Prepared under EHP Project 26568/CESH.HI.ADVOCACY.Y3

Environmental Health Project
Contract HRN-I-00-99-00011-00
is sponsored by the
Office of Health, Infectious Diseases and Nutrition
Bureau for Global Health
U.S. Agency for International Development
Washington, DC 20523

Acknowledgements

EHP gratefully acknowledges the input of thought, words and time of numerous people during the production of this document which is based on a concept developed by Masee Bateman and Chris McGahey, both formerly of EHP.

Technical Direction: Eckhard Kleinau
HIF Graphic: Fran Tain
Writer/Editor: Charlotte Storti
Contributors: Sandy Callier, Sarah Fry, Eckhard Kleinau, Chris McGahey, Lisa Nichols, Eddy Perez, May Post, Fred Rosensweig, Darren Saywell, Vanessa Tobin, Merri Weinger, World Bank/WSP Staff

Reviewers

USAID: O. Masee Bateman, John Borrazzo, Ann Hirschey, Charles Llewellyn
UNICEF: Lizette Burgers, Vanessa Tobin, Mark Young
WHO WSSCC: Darren Saywell
CORE Group: Karen LeBan
World Vision: Lynette Walker
CRS: Alfonso Rosales
IRC/The Hague: Eveline Bolt
URC-CHS: Joy Riggs-Perla

About the Partners

The **U.S. Agency for International Development (USAID)** is an independent agency of the U.S. government that provides economic, development and humanitarian assistance around the world in support of the foreign policy goals of the United States. USAID has offices in Washington, D.C., and in over 80 countries. USAID's **Bureau for Global Health** has made hygiene improvement a key component of its environmental health agenda, largely as a contribution to objectives in improving child health, and works in close partnership with USAID Missions and bilateral programs, other donors, intergovernmental organizations, non-profit organizations, and the commercial private sector. Through its support of the Water and Sanitation for Health (WASH) project in the 1980s and early 1990s, and its support for the **Environmental Health Project (EHP)** since 1994, USAID's programs have evolved from hardware-centered water supply and sanitation activities to a behavior-focused approach in which hardware plays an important supporting role. USAID's environmental health activities also include work on indoor air pollution from household energy use and on integrated vector management for the control of mosquito-borne diseases, especially malaria.

The overall objective of the **UNICEF Water, Environment and Sanitation (WES) Program** is to contribute to child survival, protection and development efforts. UNICEF support for water supply and sanitation started in the late 1960s as a response to drought emergencies. Since then UNICEF has supported government programs for the provision of a minimum level of water supply and sanitation for those most in need. Increasing awareness of the need for sanitation, hygiene education, improved community participation and national capacity building, and greater emphasis on the central role of women became important features of programs during the 1990s. Today, UNICEF's sector programs, focus on the single most important lesson learned throughout the world, that water and sanitation facilities on their own do not automatically result in improved health. While access to improved facilities is important, the correct use of the facilities is what ultimately leads to disease reduction and healthier children. UNICEF is working in more than ninety countries supporting efforts to accelerate access to basic water and sanitation services and improve hygiene behavior. Hygiene, sanitation and water programs continue to be fundamental components of UNICEF's programs of support for the realization of the rights of the child.

The **Water Supply and Sanitation Collaborative Council (WSSCC)** was mandated by a 1990 UN Resolution to accelerate progress towards safe water, sanitation and hygiene for all. WSSCC facilitates this process by arguing the need for action on water, sanitation and hygiene—in short WASH issues—in every possible forum. It therefore stimulates and co-ordinates action by governments, donor agencies, professional bodies, researchers, non-governmental organizations, community associations, women's groups and the private sector. With the support of regional and national representatives currently in 33 countries, WSSCC continues to put WASH

issues on the global agenda through the management of three main programs of activity: advocacy & communications, thematic working groups and national/regional plans of action. The Secretariat for WSSCC is currently hosted by the World Health Organization in Geneva, Switzerland.

Administered by the **World Bank**, the **Water and Sanitation Program (WSP)** is an international partnership with a mission to alleviate poverty by helping the poor gain sustained access to improved water and sanitation services. WSP works to improve sector policies, practices, and capacities through the exchange of information and experiences within the water and sanitation sector. The Program forms partnerships to effect the regulatory and structural changes needed for broad sector reform and to develop innovative solutions for planning and implementing sustainable investments. With a global presence in four regions and a small headquarters operation in Washington, D.C., WSP provides targeted, field-based support and wide dissemination of lessons-learned among client groups.

Acronyms

ARI	Acute Respiratory Infection
CRDC	Construction Resource and Development Center
CRS	Catholic Relief Services
DALY	Disability-Adjusted Life Year
EHP	Environmental Health Project
HIF	Hygiene Improvement Framework
NGO	Non-governmental Organization
ORS	Oral Rehydration Solution
PSI	Population Services International
SAFE	The Sanitation and Family Education Project
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

Childhood Diarrhea: Common, Serious, Costly— and Preventable through Hygiene Improvement

At the May 2002 General Assembly Special Session on Children, the United Nations reported that 6,000 children under five die every day from diseases caused by contaminated food and water—the principal causes of diarrhea. “We have made great strides over the last decade,” noted Carol Bellamy, Executive Director of UNICEF, “but these disturbing figures show we have barely started to address some of the main problems. Far too many children are dying from diseases that can be prevented through access to clean water and sanitation.”¹

The loss of young life around the world due to diarrhea is devastating, and it is even more tragic for being almost entirely preventable. It is well known, for example, that more than 80% of the cases of diarrhea worldwide are the result of fecal-oral contamination. The Bellagio Child Survival Study Group lists water supply, sanitation and hygiene as one of the top ten proven preventive interventions for deaths of children under five.² Indeed, it is estimated that up to two thirds of all the incidents of diarrhea in children could be avoided through readily available and inexpensive hygiene improvement interventions already in use in a number of developing countries.³

Even as considerable progress has been made in the last 20 years in the case management of diarrhea, especially through oral rehydration programs, corresponding with a decline in mortality, the overall incidence of diarrhea (2 billion episodes annually among children under five) and its associated negative consequences remain almost unabated.⁴ *For further progress to be made in the fight against diarrhea, the focus will need to include prevention, especially in child health programs that can*

1 UNICEF. (2001). *State of the World's Children*. New York: UNICEF

2 Jones G, Steketee R, Black R, Bhutta Z, Morris S, Bellagio Child Survival Study Group. (2003). How Many Child Deaths Can We Prevent This Year? *The Lancet*, Vol 562. July 5.

3 Curtis V and Cairncross S. (2003). Effect of washing hands on diarrhoea risk in the community. *Lancet Infectious Diseases*, 3: 275-281; Clasen T and Cairncross S. (2004 February). Household water management: refining the dominant paradigm, *Tropical Medicine and International Health*, v. 9 n. 2, 187–191; Huttly SRA, Morris SS, and Pisani V. (1997). Prevention of diarrhoea in young children in developing countries. *Bull World Health Organization*, 75 (2): 163-17. Bateman OM et al. (2002). *Prevention of Diarrhea Through Improving Hygiene Behaviors*. Washington DC: EHP-CARE-ICDDR/B, EHP Joint Publication No. 4.

4 Murray C and Lopez AD. (1996). *Global Health Statistics*. Geneva. WHO, Harvard School of Public Health, and the World Bank.

integrate diarrhea prevention through hygiene improvement in feasible and cost-effective ways.

This paper is a progress report on the state of the struggle against diarrhea and a rallying cry for a redoubled emphasis on prevention. Specifically it:

- describes the incidence and impact of diarrhea on children, families, and household economics
- examines the achievements and limitations of efforts to fight diarrhea to date (e.g., oral re-hydration and improving resistance)
- establishes the case for a renewed emphasis on prevention through hygiene improvement presents the Hygiene Improvement Framework, a comprehensive, three-pronged approach to preventing diarrhea at its source
- presents cases of successful hygiene improvement programs from the field
- explains how to integrate diarrhea prevention efforts into ongoing health and development programs.

Better case management and improving resistance are necessary strategies in the campaign against diarrhea, but they must be linked to preventive practices to end this childhood scourge.

The Burden of Diarrhea

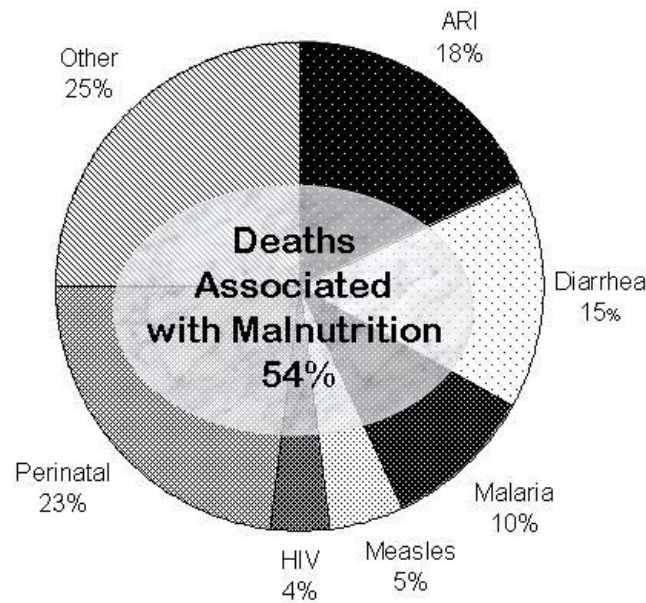
A Burden on Children

Worldwide, an estimated 4 billion episodes of diarrhea occur annually, more than half of these among children under five.⁵ In developing countries, diarrhea accounts for the deaths of nearly 1.6 million children under five every year—or almost 15% of all deaths for that population.⁶

⁵ Ibid.

⁶ World Health Organization. (1997). Health and Environment in Sustainable Development: Five years after the Earth Summit. Geneva: WHO/EHG/97.8.

Proportional Mortality Among Under Fives Worldwide 2002



Sources:
 For cause-specific mortality: Evidence and Information for Policy/WHO Child and Adolescent Health and Development, 2002;
 For malnutrition: Pelletier DL, et al. *AMJ Public Health* 1993, 83: 1130-3

Research has shown that frequent bouts of acute watery diarrhea seriously debilitate children. With each successive episode, a child moves further and further away from his/her normal weight for age,⁷ thereby greatly increasing the risk of malnutrition and impaired child development. Children under five in India, sub-Saharan Africa, and Latin America suffer four or five episodes of diarrhea every year, resulting in permanent growth retardation and diminished learning abilities.⁸ As these findings suggest, diarrhea is not only an immediate health threat to children, but can also have long-term negative effects on a country's socioeconomic development.⁹

The threat to children worsens as AIDS spreads throughout developing countries. In 2000 alone, 500,000 children died of AIDS and another 600,000 were newly infected, most of them from mother-to-child transmission.¹⁰ HIV-infected children, many of whom are also low birth weight, are exposed to multiple infections with frequent episodes of persistent or acute diarrhea. With their diminished resistance, they suffer disproportionately from malnutrition, which only exacerbates the vicious cycle.

7 Murray C and Lopez AD, *Global Health Statistics*; Pelletier DL, Frongillo EA Jr., Schroeder DG, and Habicht JP. (1995). The effects of malnutrition on child mortality in developing countries. *Bull World Health Organization*, 73 (4): 443-8.

8 Guerrant R, Kosek M, Lima A, Lortz B, and Guyatt H. (2002). Updating the DALYs for Diarrheal Disease. *Trends in Parasitology*, Vol. 18 No. 5, May.

9 Berkman DS, Lescano AG, Gilman RH, Lopez SL, and Black MM. (2002). Effects of stunting, diarrhoeal disease, and parasitic infection during infancy on cognition in late childhood: a follow-up study. *Lancet*, 359(9306): 542-571.

10 USAID. (2001). *Child Survival and Disease Programs Fund Progress Report*. Washington DC: USAID.

Taking into account both mortality and morbidity, diarrheal disease accounted for 100 million disability-adjusted life years (DALYs) in 1990,¹¹ making it the second highest disease burden in the world after acute respiratory infections (ARIs). If lifelong disability were added to the mix, the total DALYs for diarrhea would double!¹² Measles, in comparison, ranked eighth at 36.5 million DALYs. A recent article notes, “there is a growing body of evidence to suggest that the morbidity impact of diarrheal disease and enteric infections, especially in early childhood, could actually outweigh the burden of its mortality.”¹³

A Burden on the Family

Diarrhea is also a burden on the family, especially in poor households where the direct and indirect costs of the disease often wreak havoc on the family’s limited resources.

These costs include:

- The costs of treatment and visits to a clinic
- The cost of missed school for older siblings, especially girls, who stay home to care for a sick child
- The added demands on a mother’s time, especially in the case of the urban poor, where studies have shown that the time spent caring for a sick child often comes at the expense of daily income generating activities that are essential to family well-being
- The diminished learning ability and productivity of children in the long-term due to growth retardation and impaired development.

An analysis of WHO data from 12 developing countries, showing that 18–55% of children under five with diarrhea seek medical care,¹⁴ highlights the enormous burden of diarrhea on national health care systems.

Oral Rehydration and Improving Resistance: Good Results but not Enough

Over the past 20 years, USAID and UNICEF’s support of child survival programs has contributed to a substantial reduction in mortality in children under five due to diarrhea, from 4.6 million deaths in 1980 to less than 2 million in 2000. The

¹¹ Murray C and Lopez AD, Global Health Statistics.

¹² Guerrant R, et al., Updating the DALYs for Diarrheal Disease.

¹³ Ibid.

¹⁴ Verma, B.L. and Srivastava, R.N. (1990). Measurement of the personal cost of illness due to some major water-related diseases in an Indian rural population. *International Journal of Epidemiology*, Vol. 19, No. 1: 169-175.

centerpiece of this case management approach to diarrhea—oral rehydration—is used in combination with other strategies, including promising new zinc treatments, continued feeding of the child with both solid food and fluids, and enhancing the ability of caregivers to seek help for a sick child in a timely manner.¹⁵ At the same time, programs to increase host resistance to diarrhea have also met with success. Typically these programs attempt to improve a child’s nutrition through increasing its birth weight, providing complementary foods, ensuring an adequate intake of micronutrients such as vitamin A, and promoting exclusive breastfeeding, which protects against diarrhea and reduces diarrhea case fatality rates. Another strategy involves expanding efforts to vaccinate children against measles, which is another cause of malnutrition and diarrhea.

While better case management and increasing host resistance to diarrhea have saved many lives, these approaches have not reduced the overall incidence of diarrhea among children¹⁶ because they do not keep people from contracting disease in the first place. Case management and increasing resistance mitigate the health consequences of the disease in the short run, but they do not directly address the causes. In most cases, they also do not address the issue of diarrhea’s burden on the health care system, its effects on household finances and education, the added burden on mothers, and the impact on cognitive development. Moreover, the case management approach does not directly address the serious concerns about the links between diarrhea and malnutrition and long-lasting debilities.

While the death rate from diarrhea has come down significantly during the course of the child survival revolution, the *frequency* of the illness has changed little, if at all.¹⁷ Taken together, this failure to prevent diarrhea and its consequences and the declining diarrhea-related mortality rate make it clear that any further significant progress in reducing the overall burden of the disease will mean expanding the focus to address diarrhea morbidity.

Starting at the Source: The Case for Prevention

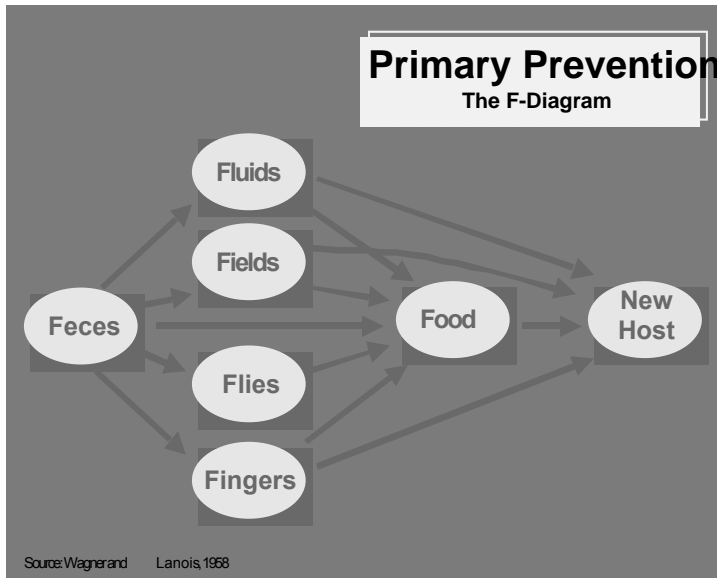
So long as children continue to be exposed to diarrhea pathogens, they will continue to contract acute watery diarrhea—and far too many will die unnecessarily. Ninety percent of the 4 billion annual episodes of diarrhea can be attributed to three major environmental causes: poor sanitation, poor hygiene, and contaminated water and food.¹⁸ If these three conditions can be successfully addressed via a comprehensive

15 Victora CG, Bryce J., Fontaine O, and Monasch R. (2000). Reducing deaths from diarrhoea through oral rehydration therapy. Bull World Health Organization, 78 (10): 1246-1255.

16 Kosek M, Bern C, and Guerrant R. (2003). The global burden of diarrhoeal disease, as estimated from studies published between 1992 and 2000. Bull World Health Organization, 81(3): 197-204.

17 Ibid.

18 World Health Organization, Health and Environment in Sustainable Development.



hygiene improvement approach—such as that advocated by USAID’s Environmental Health Project (EHP), UNICEF, the World Bank Water and Sanitation Program (WSP), and the Water and Sanitation Collaborative Council (WSSCC)—then diarrhea episodes in children under five and their debilitating health and nutrition consequences can be greatly reduced. And the place to begin is with the pathogens.

The Pathways of Contamination

The direct and indirect means or “paths” by which people come in contact with feces in their environment are well known, as explained in the classic “F-diagram”¹⁹ above.

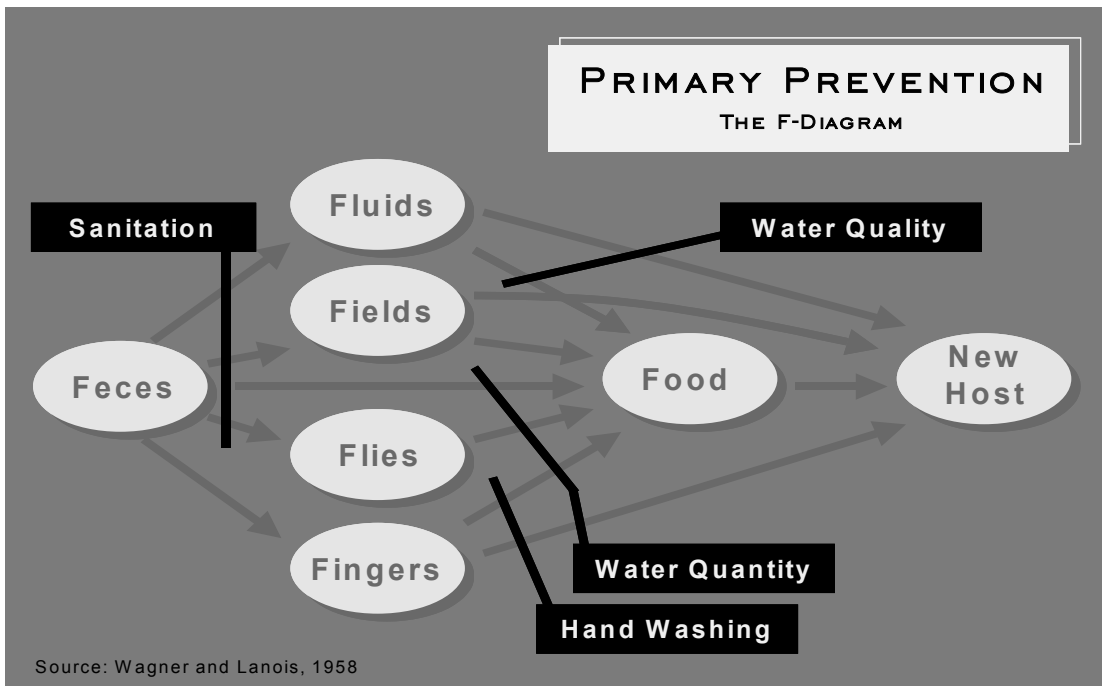
From the original causal agent—feces—the bacteria, viruses, and protozoa that cause diarrhea can make their way to the host via five different but often intersecting paths: (1) fluids, (2) fields, (3) food, (4) flies, and (5) fingers.

1. *Fluids* usually refers to the water used for drinking or cooking. The host can either drink contaminated water directly or eat food that has been washed in contaminated water.
2. *Fields*. People defecate outdoors or use fecal material as agricultural fertilizer. Children often defecate in the yard around a house. This exposes the microorganisms in feces to rain water, to flies, and to food—whence it can infect the host.
3. *Food* can be contaminated by flies, by microorganisms present on the utensils used to prepare it or in the preparation area itself, by contact with contaminated water, or by contact with contaminated fingers.
4. *Flies* touch down on feces and transmit the bacteria, protozoa, and viruses in feces to food, water, utensils, the preparation area, or directly to the mouth of the child.
5. *Fingers* can become contaminated by unhygienic cleansing practices and pass disease agents to the new host directly or by contaminating food or water.

¹⁹ Wagner EG, Lanois JN. (1958). Excreta disposal for Rural Areas and Small Communities. Geneva: WHO Monograph series No. 39.

Blocking the Paths

The exposure of children to diarrheal disease pathogens is effectively reduced by blocking several of these paths. The most successful efforts to prevent diarrhea involve interventions to improve sanitation, improve water quality, increase water quantity, and increase handwashing, all of which have been conclusively shown to reduce diarrheal disease incidence in developing countries.²⁰ Access to clean water and sanitation is important not only to prevent diarrheal diseases but other water-related diseases as well, such as ascariasis, hookworm, helminth infection, schistosomiasis, trachoma and Guinea worm.



As shown in the figure on the preceding page, each intervention blocks certain pathways to contamination but not others, suggesting that such interventions are most effective when used in combination.

The effects of each of the four interventions are summarized below:

- 1. Improved sanitation** (safely disposing of feces) blocks the paths between feces and fluids, between feces and fields, and between feces and food. A simple latrine that is minimally maintained can also block the pathway between feces and flies, either by keeping flies away from feces or by keeping flies that have had contact with feces away from people.

²⁰ Curtis V and Cairncross S, Effect of Washing Hands with Soap. Esrey SA, Feachem RG, and Hughes JM. (1985). Interventions for the control of diarrhoeal diseases among young children: improving water supplies and excreta disposal facilities. Bull World Health Organization, 63 (4):757-772.

2. **Improved water quality** (through water supply improvements, household water treatment, and safe storage of drinking water) makes water safe to drink and safe to use in all aspects of food preparation but only if that water stays clean and is not contaminated via other pathways.
3. **Increased water quantity** allows the family to wash food more thoroughly during preparation, wash food preparation surfaces and utensils more thoroughly and frequently, and to bathe and wash hands more thoroughly. These activities can block a number of the paths to contamination, including most of those involving fingers and flies and most having to do with food, but if the water thus made available remains contaminated, then merely having more of it is not the answer.
4. **Increased handwashing**, if done correctly at critical times, blocks all the pathways that directly or indirectly involve the fingers.

All of these interventions—whether of the “hardware” (sanitation facilities, community water systems) or “software” (handwashing, water protection, safe excreta disposal) variety—have been shown to considerably reduce the prevalence of diarrhea. And while each of these approaches is effective on its own, in combination they can deliver even greater results.

Health Benefits from Improved Sanitation, Hygiene, and Water Supply

- A 30-50% reduction in the burden of diarrheal diseases can be achieved through feasible prevention—improvements of water supply, sanitation, and hygiene²¹
- A recent analysis of 21 controlled field trials related to point-of-use water treatment and safe water storage at the household level showed a reduction of 42% in diarrheal disease compared with other groups.²²
- A literature meta-analysis has found that the single hygiene practice of handwashing with soap is able to reduce diarrhea incidence by over 40% and intestinal infections (cholera, dysentery, hospitalized diarrheas due to other causes) by over 50%.²³

The Hygiene Improvement Framework

A comprehensive approach to preventing diarrhea must address the three key elements of any successful program to fight disease: access to the necessary hardware or technologies, promoting healthy behaviors, and support for long-term sustainability.

Mindful of the need to combat diarrhea on its multiple fronts and using lessons learned from years of program experience, EHP developed the Hygiene Improvement Framework (HIF). The Framework has three core components:

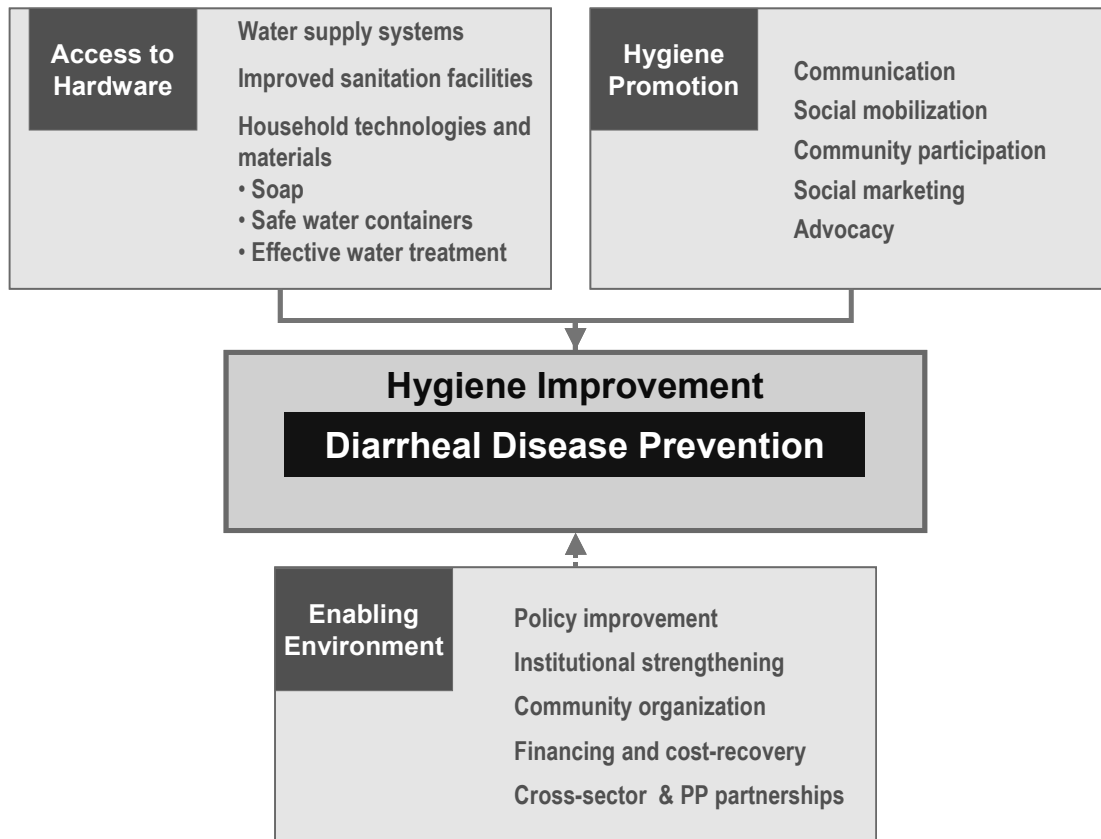
- Improving Access to Water and Sanitation “Hardware”
- Promoting Hygiene
- Strengthening the Enabling Environment.

These components are designed to encourage key household behaviors that reduce the incidence of childhood diarrhea, namely: safe disposal of feces, washing hands correctly at the right times, and storing and using safe water for drinking and cooking.

21 Esrey SA, Potash JB, Roberts L, and Shiff C. (1991). Effects of improved water supply and sanitation on ascariasis, diarrhoea, dracunculiasis, hookworm infection, schistosomiasis, and trachoma. *Bull World Health Organization*, 69 (5): 609-621; The World Bank (1993). *World Development Report 1993: Investing in Health*; Curtis V and Cairncross S, *Effect of Washing Hands with Soap*.

22 Clasen T and Cairncross S, *Household water management*.

23 Curtis V and Cairncross S, *Effect of Washing Hands with Soap*.



While this paper encourages a comprehensive approach to hygiene improvement (combining hygiene promotion with increased access to hardware) for maximum impact, selective or sequential approaches (e.g., starting with hygiene promotion) can be effective entry points in child, maternal, and other health programs. For example, hygiene improvement can play an important role in reducing opportunistic infections and improving child (and maternal) nutritional status. Safe water, improved sanitation, and improved hygiene practices, such as handwashing, will be especially important in communities with high HIV prevalence to reduce the risk of opportunistic infections. Furthermore, investments in preventing mother-to-child-transmission of HIV/AIDS (MTCT) are compromised unless safe water is available for infant feeding, and household hygiene practices such as handwashing are practiced. Recognizing the critical role of hygiene improvement in HIV/AIDS, UNICEF has identified “Hygiene Improvement and HIV/AIDS” as one of the five organizational priorities in UNICEF’s Strategic Plan 2002–2005.

A detailed description of the three components of the Hygiene Improvement Framework follows.

Increasing Access to Hardware

The first part of the Framework, the “hardware” component, contains three elements:

- Water Supply Systems
- Improved Sanitation Facilities
- Household Technologies and Materials

The first element, *water supply systems*, addresses both the issue of water quality and water quantity, which reduce the risk of contamination of food and drink. Several studies have shown that providing *more* water to a household or a community apparently leads to greater health benefits than simply providing safe water.²⁴ More water supports better personal and domestic hygiene, e.g., handwashing, bathing, food washing, and household cleaning. And it also makes water available for income generating activities (e.g., local industries) and gardening, both of which can improve a family’s diet, hence their resistance to disease. Girls who spend less time fetching water have more time for school. Similarly, ensuring *access* to water supply systems can greatly reduce the time women spend collecting water, allowing more time to care for young children and more time for income generating activities. However, the health effects of water *quality* may be underestimated because most studies looked at water systems rather than water quality at the point-of-use, namely the household.²⁵

The second element of the hardware component, *sanitation facilities*, involves providing facilities to dispose of human excreta in ways that safeguard the environment and public health, typically in the form of various kinds of latrines, septic tanks, and water-borne toilets. Sanitation coverage is important because fecal contamination can spread from one household to another, especially in densely populated areas. Access to sanitation facilities can open school doors for girls and reduce drop-out rates, since girls often stay away from schools because of the indignity of having no privacy.²⁶

The third element, *household technologies and materials*, refers to the increased availability of such hygiene supplies as soap (or local substitutes), chlorine, filters, water storage containers that have narrow necks and are covered, and potties for small children. Point-of-use chlorination in the home is gaining attention as a key way to address the problem of contaminated household drinking water. It is particularly effective in areas where water and sanitation service provision is low (such as urban slums), at health care facilities where water quality is especially important, or where there is a threat of cholera or a similar epidemic. Point-of-use chlorination should be

24 Aziz KMA, Hoque BA, Cairncross S et al. (1990). Water supply, sanitation and hygiene education: report of a health impact study in Mirzapur, Bangladesh. Water and Sanitation Report Series No.1. Washington DC: The World Bank; Esrey SA, et al., Interventions for the control of diarrhoeal diseases among young children.

25 Clasen T and Cairncross S, Household water management.

26 UNICEF. (2004). What we do. UNICEF Website: Water, environment and sanitation http://www.unicef.org/wes/index_best_wes.html.

considered as part of a hygiene improvement package that also includes the other components of the Framework.

Promoting Hygiene

According to UNICEF, “hygiene promotion is a planned approach to preventing diarrheal diseases through the widespread adoption of safe hygiene practices. It begins with and is built on what local people know, do and want.”²⁷ In the Hygiene Improvement Framework, promoting hygiene refers to advocating for, teaching, and supporting behaviors that are known to reduce diarrheal disease, namely: proper handwashing, proper disposal of feces, and storing and using safe water, at least for drinking and preparing food. The second part of the Framework consists of five basic strategies that can be applied alone or in combination depending on the nature of the program. The primary target audiences are caretakers of young children and children themselves:

- Communication
- Social mobilization
- Social marketing
- Community participation
- Advocacy.

Integrating a hygiene promotion component into an existing child, maternal, or other health program is usually quite feasible, since many of those programs already address behavior change. Hygiene promotion is based on a good understanding of how behaviors within households and communities contribute to diarrhea morbidity in children. Formative research conducted at the community level identifies knowledge and beliefs about the causes of diarrhea, current high-risk behaviors, and any barriers or enabling factors to overcoming these behaviors. This information makes it possible to identify hygiene changes that are feasible in order to promote concrete actions that people are both willing and able to take.

A comprehensive *communication* strategy raises awareness about hygiene facilities and practices, shares information, and promotes behavior change by highlighting benefits that are important to the target audience. A variety of communication channels may be used, such as traditional media, music, song and dance, community drama, literacy materials, leaflets, posters, pamphlets, videos, and home visits. Typical venues for hygiene promotion are community gatherings, health centers, schools, daycare and nutrition centers, and the household. In some settings, training health workers, teachers, and community agents in hygiene promotion skills may also be an important strategy.

²⁷ UNICEF. (1999). *Towards Better Programming: A Manual on Hygiene Promotion*. New York: UNICEF.

Social mobilization is a process to obtain and maintain the involvement of various groups and sectors of the community in the control of disease.²⁸ For example, a community group might design and implement a campaign to increase the use of soap for handwashing or to promote the proper use and maintenance of sanitation facilities.

Social marketing makes use of marketing principles and strategies to achieve social goals such as better hygiene and sanitation. A social marketing approach may involve a partnership between the public sector and manufacturers of soap or water purification products to both expand the product market and promote improved hygiene. Social marketing can create a demand for sanitation facilities and services from the agencies that are supposed to provide them.

Community participation, an essential component of the hygiene promotion process, typically involves such activities as collective examination of barriers to practicing hygiene in the community, designing measures to use sanitation facilities and improve practices, or community-based monitoring of progress in achieving behavior change. Participation means that community members from all socioeconomic, ethnic, and religious groups have a voice, including women, men and children.

Advocacy is an integral part of all aspects of hygiene promotion. Donors, program managers, and community representatives can advocate for improved hygiene behaviors and for interventions that support these behaviors to governmental and nongovernmental stakeholders.

Schools and school children are good entry points for hygiene improvement through additions to the curriculum and providing safe drinking water, sanitation and handwashing facilities for boys and girls. A UNICEF project in Mozambique demonstrated that primary school children can play a dynamic role in promoting hygiene.

²⁸ UNICEF, WHO, USAID, and BASICS. (2000). *Communication Handbook for Polio Eradication and Routine EPI*. New York: UNICEF.

From Child to Child: In Mozambique, Good Hygiene Begins at School

In the outlying area of Beira City in Mozambique, primary school children as young as seven are transforming once dank and dirty schools into healthy, inviting places of learning, in the process educating their peers, their families, and their communities about the importance of safe water, good hygiene, and private, separate sanitation facilities.

In the year 2000, UNICEF found that 80% of all primary schools here had no toilets for either boys or girls and no handwashing facilities, and few schools promoted better hygiene. To change this situation, UNICEF/WES supported the building of latrines for primary school students and teachers and handwashing facilities for practicing hygiene, and trained 17–24 year-olds to teach students about the role they could play to improve their school and community.

The most potent tool in the program turned out to be the children themselves. In 15 primary schools with 18,000 students, child-to-child sanitation clubs sprang up, promoting hygiene and healthy school environments. The young people pushed for central rubbish collection spots so that they no longer had to share their play spaces with garbage, and through theater, song, dance, and games they warned of the dangers of unhygienic environments, especially for children. Irene Luisa da Costa Tivane, a 10 year-old child-to-child club member, is certain that she is making a difference.

"Participating in hygiene promotional activities is fighting diarrheal diseases," she said. "That's why everybody should drink chlorinated water and know how to use a latrine."

Flávo Varela de Araújo, 14, is an active member of the child-to-child radio program, which supports the school sanitation clubs. He's very proud of the changes he's seen taking place in the school.

"Because of the club the school environment is changing," he said, "and the students behaviors are changing too. We will continue supporting safe practices."

And the students' exemplary behavior is catching on, as parents are listening to their children and practicing better hygiene at home. After seeing the changes in their children's schools, parents have begun to press local authorities to provide better hygiene education and services in all schools. Meanwhile, UNICEF is working closely with the Ministry of Education to see how this program can be replicated elsewhere.

The benefits of child-to-child sanitation clubs combined with building latrines and handwashing facilities have exceeded all expectations. Not only have these efforts provided safer, healthier learning environments, they have also encouraged girls' education. Older girls used to drop out of school for lack of privacy, but now they are staying in school to complete their basic education. The improved hygiene facilities have given girls back their dignity—and their books.

Source: UNICEF/WES

Strengthening the Enabling Environment

The third piece of the diarrhea prevention puzzle is creating an environment—whether at the community, municipal, regional, or national level—which supports the technology and hygiene interventions envisioned in this framework. If these interventions are to be accepted and implemented—and especially if they are to be sustained—they must be built upon a firm foundation.

Supporting the enabling environment typically takes the form of one or more of these activities:

- Policy improvement
- Institutional strengthening
- Community involvement
- Financing and cost-recovery activities
- Cross-sector and public-private partnerships

Policies that encourage and promote sustainable hygiene improvement and prevent diarrheal diseases create the circumstances whereby these activities become development priorities and are ultimately allocated the necessary human, financial, and social resources. But good policy does not simply “happen”; it grows out of heightened awareness, which in turn depends on getting good information into the hands of policymakers.

Policy improvement includes assessing the adequacy of national policies for hygiene improvement, determining where the gaps are, facilitating a process to reach consensus on a policy agenda, and developing more effective policies. There should be explicit policies for both water supply and sanitation.²⁹ Of course, the existence of good policies is not sufficient unless the political will, resources, and capacity exist to implement them.

A second key activity, *institutional strengthening*, includes helping national and implementing institutions to clearly define their missions and their roles and responsibilities, improve their leadership, develop sound systems and procedures, increase their technical competence, and train their staff. Capable institutions are an essential element of an effective hygiene improvement program.

The third feature of the enabling component, *promoting community involvement*, means developing local structures to take the responsibility for operating and maintaining local systems. When community members have done the “work” and when they have committed their own time, effort, and resources to establishing

29 Environmental Health Project. (2002). Guidelines for the Assessment of National Sanitation Policies , Myles F. Elledge, Fred Rosensweig, Dennis B. Warner, John H. Austin, Eduardo A. Perez.

improved water and sanitation systems, they are more committed to following up on and safeguarding their investments.

The fourth element of the enabling component, *financing and cost-recovery*, addresses the fact that for many communities the up-front infrastructure and technology costs of hygiene improvement are a serious challenge, as are the ongoing operating and maintenance expenses. But if these interventions can be shown to be financially viable—as they have in the case of privately owned and operated public sanitary facilities and profit-making water and sanitation utilities run by the urban poor—then financing is easier to obtain. The goal is for user fees to cover the recurrent costs of water supply and sanitation services. If users are consulted in the design process, then prospects for full cost recovery of recurrent costs are more likely.

The final element of the enabling component, *cross-sector and public-private partnerships*, involves bringing together a number of government entities or some type of public-private collaboration. Water supply and sanitation agencies may have to work together with other ministries such as health, environment, rural development, agriculture, and planning. The government sector may join forces with elements in the private sector or nongovernmental sector to accomplish jointly what neither has sufficient resources to accomplish on its own. Establishing coordinating mechanisms such as interagency committees, steering committees, and task forces is key to effective partnerships, and successfully coordinating the activities of all the partners is likewise a key element of creating an effective enabling environment.

Hand in Hand: A Partnership to Promote Handwashing

Handwashing with soap at key times is a major way to prevent diarrheal diseases and respiratory infection. Recent research (Curtis and Cairncross, 2003) suggests that handwashing with soap, especially after defecating and handling a child's stools, can reduce diarrhea by 42-47%, even in areas with poor sanitation and high levels of fecal contamination. Other research (Rabie and Curtis, 2004) shows that washing hands with soap reduces the transmission of acute respiratory infection by more than 30%.

The success of various handwashing pilot programs, such as the Central American Initiative, prompted several international organizations to form the Global Public-Private Partnership for Handwashing Initiative. With funding from the World Bank-Netherlands Water Partnership, the initiative supports large-scale country handwashing programs and publicizes lessons and experiences.

The initiative brings together diverse partners and expertise for the purpose of creating an enabling environment to promote handwashing, including:

- *Governments*: to make handwashing a priority measure for preventing disease and to convey messages through national, regional, and local structures and programs.
- *The private soap industry*: to share expertise, expand its markets, and improve soap marketing.
- *Donor organizations and NGOs*: to apply international lessons and experiences, coordinate technical assistance, and add a handwashing component to their programs.

Together, country partners implement handwashing programs in three stages:

- Listening to community needs and desires through consumer research.
- Applying research to state-of-the-art promotion programs, making use of a variety of traditional, mass-media, interpersonal, and existing development channels.
- Monitoring, measuring, and improving the handwashing campaign.

The Global Public-Private Partnership for Handwashing Initiative is coordinated by the World Bank and Water and Sanitation Program. Partners include the Academy for Educational Development, the Centers for Disease Control and Prevention, Colgate-Palmolive, the London School of Hygiene and Tropical Medicine, Procter and Gamble, Unilever, and the United States Agency for International Development.

For more information on the global initiative and country programs please see www.globalhandwashing.org.

No single hygiene improvement effort will look exactly like another; different players in different settings will put together their own package of activities. But while the specifics will vary from place to place, the overall strategy should be a comprehensive approach that addresses the three key components—increasing access to hardware, promoting hygiene, and strengthening the enabling environment.

Does the Framework Work? Indicators of Success

The true measure of any intervention is whether it achieves its objectives. The purpose of diarrhea prevention programs is to achieve measurable health impact, commonly evaluated as diarrhea prevalence in small children. Most programs focus on indicators that are relatively easy to measure and closely related to better health outcomes, such as access to improved water sources and improved sanitation and

hygiene behaviors. Besides measuring progress, these indicators also play a crucial role in setting targets for programs, such as increases in the proportion of caretakers of children under five who washed their hands with soap at appropriate times.

Indicators to measure progress in reducing diarrhea, based on years of program experience in hygiene improvement, are set out in EHP's "Assessing Hygiene Improvement: Guidelines for Household and Community Levels."³⁰ The key indicator for measuring hygiene improvement impact is the percentage of children under age 36 months with diarrhea in the past two weeks. Other essential indicators most closely related to impact on diarrhea morbidity are certain key family practices proven to reduce diarrhea. The three essential hygiene practices carried out by households, and specifically caretakers of small children, that have a proven health impact and that should be measured are: (1) handwashing with soap at critical times; (2) disposing safely of feces, especially children's feces; and (3) treating, storing, and handling drinking water safely. Food hygiene should be considered as a fourth essential practice and added as an essential indicator where feasible.

In addition to health impact and essential family practice indicators, priority indicators for each of the three HIF components at the household level (or in the case of the enabling environment, at the community level) have been defined in the hygiene improvement assessment guidelines to help program designers, managers, and participating communities design programs and measure the progress of hygiene improvement activities. Each HIF component has a series of priority and supporting indicators defined by cumulative program experiences.

As illustrated in the Central American project described on the next page and other boxed examples on the following pages, different programs have adapted these and other indicators to fit their strategies and priorities. The outcomes in each case demonstrate that the comprehensive approach laid out in the Hygiene Improvement Framework does indeed deliver on its promise to prevent diarrhea.

³⁰ Environmental Health Project. (2004). Strategic Report 8. Assessing Hygiene Improvement: Guidelines for Household and Community Levels. Arlington, VA: EHP

Central America

The Central American Handwashing Initiative was designed to reduce under five morbidity and mortality through a campaign to promote handwashing with soap to prevent diarrhea. Carried out in five countries, the Initiative consisted primarily of a public-private partnership between a number of public players (including UNICEF and various ministries and NGOs) and four private sector soap producers. The Initiative addressed all three components of the Hygiene Improvement Framework. The “hardware” was handwashing soap, and the Initiative promoted increased access to soap by distributing free samples, conducting promotional and educational events, and sponsoring media activities. The promotion component focused on the use of media to convey information on the link between hygiene and diarrhea prevention. “Clean hands prevent diarrhea” was the theme of the media campaign, and its slogan was “I wash my hands for health.” The campaign stressed proper handwashing behavior at three key times—after going to the bathroom, after changing a baby, and before preparing food—using key techniques: using soap, rubbing hands together three times, and drying hands with a towel or in the open air.

Strengthening the enabling environment took the form of supporting the institutions that made up the public-private partnership. USAID provided technical support to the soap companies and to the market research and advertising agencies involved and helped form a task force to coordinate and direct the efforts of the various players. In the end, the greatest contribution of the program may have been the model it presented for establishing how public health goals can be compatible with business goals.

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

- Ten percent of mothers improved from an “inadequate stage” of handwashing to either the “intermediate” or “optimal” stage
- A 10% decline in the number of mothers who agreed with the inaccurate statement: “Most times washing hands with water is sufficient”
- A 10% increase in the number of mothers who agreed with the statement: “When I don’t use soap, I feel that I am not clean.”

Extrapolating from these and other findings and from literature on the relationship between handwashing and the prevalence of diarrhea, it was estimated that “over the course of the intervention there was a 4.5% reduction in diarrheal prevalence among children under five.”

Source: Bateman, Bendahmane, Saade. (2001). *The Story of a Successful Public-Private Partnership in Central America: Handwashing for Diarrheal Disease Prevention*. Arlington, VA: BASICS, EHP, UNICEF, USAID, World Bank.

A Good Fit: Applying the Hygiene Improvement Framework to Ongoing Programs

While using the Hygiene Improvement Framework can be a program unto itself, starting one from scratch may not be a realistic option for many health program managers. Nor is it necessary. As several of the cases cited in this document demonstrate, the benefits of the Hygiene Improvement Framework can be delivered just as effectively in combination with other ongoing health efforts. Indeed, the case can be made that in the right circumstances, carefully integrating the HIF components into ongoing complementary health efforts can actually combat diarrhea more successfully than implementing the Framework in isolation. Moreover, some existing programs may already include one or even two components of the Framework in their

design, and all that is needed is to add the third. This section briefly sketches five scenarios for implementing the Framework.

Scenario 1: *Expanding an existing child health program to include a hygiene promotion component.* In Haiti, Population Services International (PSI) added a handwashing campaign to an existing nationwide program that promoted ORS to mothers and other caretakers of children under five. The handwashing add-on targeted caretakers (to reach the under fives) and also operated in 50 primary schools to reach first-year school children with its key messages on when and how to wash hands properly. In another example, EHP provided technical assistance to Catholic Relief Services (CRS) to develop a diarrhea prevention module for CRS's facilitator's guide to its *Handbook for Community Integrated Management of Childhood Illness* (C-IMCI). This handbook will eventually be used wherever CRS implements C-IMCI.

Scenario 2: *Integrating hygiene promotion into other existing health programs, such as nutrition, HIV/AIDS, food security, or diarrhea management/ORS.* The link between diarrhea and malnutrition—and between malnutrition and any number of other health problems—has been well established.³¹ Hygiene improvement can play an important role in reducing opportunistic infections and improving child (and maternal) nutritional status. Any health program that has a nutrition component, whether as its sole or partial focus, could easily incorporate diarrhea prevention/hygiene improvement messages into its package of interventions. A control of diarrheal diseases (CDD) program is more complete when it addresses morbidity (through hygiene improvement) as well as mortality (through ORT).

Safe water, effective use of sanitation, and improved hygiene practices such as handwashing will be especially important in communities with high HIV prevalence to reduce the risk of opportunistic infections. Furthermore, safe water for infant feeding and household hygiene practices, such as handwashing, are essential components of a program to prevent mother-to-child transmission.

Scenario 3: *Strengthening the enabling environment to support hygiene promotion.* In the Democratic Republic of Congo, EHP assisted the SANRU III Project in developing a hygiene promotion component as part of a large primary health care project. A \$25 million, five-year project, operating in approximately 60 health zones and serving 8 million people, SANRU provides assistance to health zones in a range of health interventions including water supply and sanitation.

EHP developed a hygiene promotion program within the context of SANRU's broader C-IMCI effort, assisting in the development of hygiene behavior change strategies at scale and creating the capacity to implement the strategy in ten pilot health zones serving 375,000 people. The capacity-building efforts included the training of ten zonal level C-IMCI teams consisting of three people: the chief medical

31 Berkman DS, Lescano AG, Gilman RH, Lopez SL, and Black MM. (2002). Effects of stunting, diarrhoeal disease, and parasitic infection during infancy on cognition in late childhood: a follow-up study. *Lancet*, 359(9306): 542-571; Murray C and Lopez AD, *Global Health Statistics*.

person, the zonal water supply and sanitation coordinator, and the primary health care supervisor. The training focused on the overall C-IMCI strategy, hygiene behavior change strategy and techniques, and training methodologies. EHP and SANRU staff developed a training guide that the zonal teams used to train health center staff. In addition to training, other capacity-building activities included the development of a monitoring and evaluation system, establishing linkages to the Ministry of Health's (MOH) national strategy for hygiene, and the development of a strong capability within SANRU itself to implement this program at scale.

Scenario 4: *Adding a hygiene promotion component to an existing water supply and sanitation program.* The Bangladesh SAFE program described below is an example of this model. Here the infrastructure was in place, but certain unhygienic practices were common and were thus targeted in the hygiene promotion component that consisted of an educational and an outreach initiative.

Bangladesh

The Sanitation and Family Education Project (SAFE) was developed and implemented by CARE Bangladesh with technical assistance from the International Centre for Diarrhoeal Disease Research (Bangladesh). The project was a follow-on activity to an earlier cyclone relief effort to repair damaged tubewells, provide new tubewells, and construct latrines. While the SAFE project did not have its own hardware component, it was in fact designed precisely to *complete* the earlier hardware intervention with the addition of the two "missing" components: promoting improved hygiene and strengthening the enabling environment.

Regarding hygiene promotion, the project developed and implemented education strategies and alternative models for outreach. The project targeted a few unhygienic behaviors, including: drinking pond or open well water, improper storing of tubewell water, mixing pond water with tubewell water for drinking, adding pond water after cooking, using unhygienic latrines, poor handwashing practices, and low use of latrines by children under five. In order to strengthen the enabling environment, the project worked with community-based organizations to design and implement a monitoring system for these behaviors.

By comparing baseline to final survey results in intervention and nonintervention areas, it was possible to attribute improvements specifically to the SAFE methodology. And these improvements were dramatic:

- Two-thirds reduction in diarrhea prevalence in the SAFE areas vs. control areas.
- Sanitary disposal of feces from around the house increased from zero to over 55%.
- Access to a hygienic latrine increased from under 21% to over 53%.
- Knowledge of safe water as a preventive measure increased from 5% to 97%.
- Knowledge of feces disposal as a preventive measure increased from 6% to 77%.

Source: Bateman OM et al. (2002). *Prevention of Diarrhea Through Improving Hygiene Behaviors*. Washington DC: EHP-CARE-ICDDR/B, EHP Joint Publication No. 4.

Scenario 5: Applying the complete Framework. The Jamaica and Congo programs cited below are two good examples of this scenario, as is the Nicaragua Rural Water Supply, Sanitation, and Environmental Health Program carried out by EHP for the Bureau of Global Health/USAID. In just two years, the Nicaragua program—designed specifically around the three HIF components—increased the percentage of Nicaragua’s rural population with access to safe water and sanitation by 13% (more than 200,000 people), and carried out capacity-building efforts in 289 communities. By integrating a hygiene behavior change component, the project also reduced the percentage of homes where children aged four and under were reported to have had diarrhea from 20% to 13%.

Adding a hygiene improvement focus to ongoing programs need not be expensive or complicated. In many cases, it is only a matter of adjusting existing program mechanisms or strategies to accommodate an additional emphasis. Meanwhile, it is important to remember that, in one way or another, improving hygiene strikes at the underlying cause of many of the problems addressed by ongoing interventions and, in so doing, adds the crucial element of sustainability that is missing in many programs.

Jamaica

In Jamaica, USAID supported a local NGO, the Construction Resource and Development Centre (CRDC), to implement a sanitation program as part of a larger Jamaican government program to upgrade house lots in two communities in Montego Bay. CRDC set out to increase access to hardware by arranging for sanitation loans, helping lot owners select appropriate systems, and conducting workshops for public health inspectors and private-sector building contractors to explain how to install and maintain the facilities.

The CRDC also paid close attention to strengthening the enabling environments by:

- Creating a self-sufficient organization to carry on the work of the program when outside funding ended
- Facilitating lot owners’ access to financing
- Training contractors, public health inspectors, community officers, and animators to ensure that the knowledge needed to sustain the program resided in the community
- Establishing a monitoring and information system to track progress and prompt corrective action
- Linking its efforts with those of a number of other development entities in the Montego Bay area.

An EHP evaluation of the program found that one of the keys to success was integrating a hygiene promotion program into the technical component. The program, which targeted women heads of household, trained a cadre of animators and community officers to inform community members about the need for improved sanitation and published locally developed materials to educate people in how to use the hardware and other basic hygiene practices.

The Jamaica program succeeded in a number of areas with either a direct or indirect impact on several of the indicators of diarrhea prevention:

- The proportion of households with an “organized” handwashing place nearly doubled, from 44% to 83%.
- The number of households with a hygienic sanitation facility increased from 28% to 55% with such a facility under construction in an additional 44% of households.

Source: Perez E, Reddaway B. (1997). Designing a Sanitation Program for the Urban Poor: Case Study from Montego Bay, Jamaica. Arlington, VA: EHP Activity Report No. 34.

The Democratic Republic of Congo

USAID/DRC and the USAID Regional Urban Development Office for Southern Africa cooperated with the Environmental Health Project and Action Against Hunger-USA in an urban environmental health activity to reduce diarrhea by improving sanitary conditions in the public markets of Kinshasa. The four key strategies were to: (1) increase the availability of safe drinking water, (2) improve sanitation facilities, (3) establish community management capacity, and (4) improve hygiene practices. Under the project, "sanitation units" (consisting of toilets, showers, water points for washing hands, and water storage tanks) were constructed in seven markets, and 11 drinking water points were established in locations where water was not previously available to vendors and customers. Nongovernmental organizations and private businesses maintain these new facilities, generating funds by charging fees for their use, and the health education specialists use the water points and sanitation units as sites for teaching the market community about hygiene.

The key results of the intervention were that:

- Handwashing practices of market restaurateurs and vendors improved noticeably
- Sanitary display of market goods and waste disposal practices improved significantly
- Diarrheal disease prevalence among young children of restaurateurs and vendors decreased by 50% (from 25% to 12%).

Source: McGahey C. (2001). Urban Environmental Health Pilot Activities: Evaluation of Progress and Lessons Learned. Arlington, VA: EHP Activity Report 116.

Is the Framework Affordable?

In many settings, the question is not whether the HIF will work or how best to apply it to ongoing initiatives, but is it affordable? At UNICEF, WHO, and USAID, water supply and sanitation are now increasingly being regarded as important components of the health agenda, especially in their role in disease control and child survival. But questions still arise as to whether hygiene improvement programs are a cost-effective use of health sector resources. A common belief is that hygiene improvement programs must involve using health sector funds to build expensive physical infrastructure, with the related view that hygiene improvement interventions are not as cost-effective as oral rehydration therapy (ORT) and other lower-cost interventions.

Varley calculated the cost-effectiveness of hygiene improvement³² by analyzing four program scenarios. He found that hygiene promotion "software" added to existing water and sanitation "hardware" was far more cost effective than stand-alone infrastructure projects. The cost per death averted was \$523, and for DALY saved, \$15.71. This compared favorably to ORT costs of \$800 per death averted and \$24 per DALY saved. And a study of the cost-effectiveness of hygiene promotion in Burkina

32 Varley RCG, Tarvid J, and Chao DNW. (1998). A reassessment of the cost-effectiveness of water and sanitation interventions in programmes for controlling childhood diarrhoea. Bull World Health Organization, 76 (6): 617-631.

Faso found that the occurrence of childhood diarrhea was reduced at less than 1% of the MOH budget and less than 2% of the household budget.³³

In fact, the cost of *not* investing in hygiene and infrastructure can be unacceptably high. Consider the fallout from the cholera epidemic in Peru, where losses from the collapse of the fishing industry and tourism were estimated at \$495 million. By contrast, providing safe standpipe drinking water to the 5.9 million underserved Peruvians has been estimated at \$242 million.³⁴ The costs of hygiene-linked disease burden at the household level are also high. A study in India found that treating diarrhea, eye infection, and skin diseases came to an aggregated cost of \$10–\$11 per person per year for rural households in Uttar Pradesh.³⁵

In most cases, physical infrastructure is already in place in many communities, and even in those cases where it is not, it is usually built by public works agencies, not the health sector, and financed by construction grants, operational subsidies, user fees, and other forms of government revenue. The health sector, in short, does not typically have to concern itself so much with the hardware of hygiene improvement as with the software, such as designing projects, promoting hygiene, and regulating water quality.

Finally, as noted earlier, in many cases a hygiene improvement intervention need not be built from the ground up but can be integrated into a pre-existing health effort at relatively little cost.

33 Borghi J, Guinness L, Ouedraogo J, and Curtis V. (2002). Is hygiene promotion cost-effective? A case study in Burkina Faso. *Trop Med Int Health* Nov; 7(11):960-9.

34 Perez E and Reddaway B. (1997). Designing a Sanitation Program for the Urban Poor: Case Study from Montego Bay, Jamaica. Arlington, VA: EHP, Activity Report No. 34.

35 Verma BL and Srivastava RN, Measurement of the personal cost of illness.

The Burden Lifted

The case for hygiene improvement rests on a firm foundation and provides a good fit with new or ongoing health interventions:

- It is accepted that morbidity from diarrhea is a serious health problem for children under five, and preventing diarrhea is a key child health intervention.
- Hygiene improvement strikes at the root causes of diarrhea: the pathways to contamination.
- The comprehensive approach embodied in the Hygiene Improvement Framework has been applied successfully in numerous developing countries.
- The costs of hygiene improvement compare favorably with other related interventions, such as oral rehydration therapy.

Lessons from UNICEF

UNICEF has learned valuable lessons through its WES program experiences.

Programs work best when three related and mutually supportive components are in place: water and sanitation facilities, community participation, and school sanitation and hygiene education.

Experience has shown that:

- Providing safe water and adequate sanitation is fundamental, and from that all things follow.
- Governments must provide, promote, facilitate, and coordinate water and sanitation services through communities with local public and private sectors.
- Grassroots efforts involving the community in the planning, implementing and long-term managing of water, sanitation and hygiene projects foster sustainability.
- Women's knowledge, expertise, and involvement are essential to promote the use of water and sanitation facilities.
- Providing primary schools with safe water, private latrines, and hygiene education unlocks educational opportunities for girls.
- Primary school hygiene education programs can be entry points for changing family and community hygiene behavior.
- Working with partners on the grassroots level engenders trust and cooperation on the regional, national and community levels.

Whether applied alone or in combination with other programs, the Hygiene Improvement Framework offers a proven, cost-effective, and sustainable strategy to combat diarrhea on all its fronts and prevent this condition from menacing the health and lives of children under five around the world. Diarrhea and its consequences are not only a burden on the young children it weakens and kills, but also on their families and local health systems, and they are ultimately a threat to the socioeconomic well being of many developing countries. The Hygiene Improvement

Framework offers a way to lift this crushing burden and make under five morbidity from diarrhea a relic of the past.

References

- Alam DS, Mark GC, Bagui AH, Yunus M, and Fuchs GJ. (2000). *Association between the clinical type of diarrhea and growth of children under 5 years in rural Bangladesh*. International Journal of Epidemiology, 29:916-21.
- Appleton B, Van Wijk C. (2003). *Hygiene Promotion: Thematic Overview Paper*, IRC International Water and Sanitation Centre, The Hague.
- Aziz KMA, Hoque BA, Cairncross S et al. (1990). *Water supply, sanitation and hygiene education: report of a health impact study in Mirzapur, Bangladesh. Water and Sanitation report Series No.1*. Washington DC: The World Bank.
- Bateman OM, McGahey C (2001). Profile: A Framework for Action: Child Diarrhea Prevention, Global Health Council, [HealthLink](#): Issue 111, 28 September.
- Berkman DS, Lescano AG, Gilman RH, Lopez SL, and Black MM. (2002). *Effects of stunting, diarrhoeal disease, and parasitic infection during infancy on cognition in late childhood: a follow-up study*. Lancet, 359(9306): 542-571.
- Black RE, Morris S, Bryce J. (2003). *Where and why are 10 million children dying every year?* Lancet, 361: 2226-34.
- Borghi J, Guinness L, Ouedraogo J, Curtis V. (2002). *Is hygiene promotion cost-effective? A case study in Burkina Faso*. Trop Med Int Health Nov; 7(11):960-9.
- Clasen T, Cairncross S. (2004) *Household water management: refining the dominant paradigm*, Tropical Medicine and International Health, v. 9 n. 2, 187–191, February 2004.
- Cairncross S, O'Neill D, McCoy A, Sethi D. (2003). *Health, Environment and the Burden of Disease; A Guidance Note*. Department For International Development (DFID). United Kingdom.
- Curtis V, Cairncross S. (2003). *Effect of Washing Hands with Soap on Diarrhea Risk: A Systematic Review*. Lancet Infectious Diseases, 3(5): 275-281.
- Dickin K, Griffiths M. (1997). *Designing by Dialogue – A Program Planner's Guide To Consultative Research For Improving Young Child Feeding*. Health and Human Resources Analysis Project.
- Dillingham R, Guerrant R. (2004). *Childhood Stunting: Measuring the staggering costs of inadequate water and sanitation*. The Lancet, Vol. 363.
- Esrey SA, Feachem RG, and Hughes JM. (1985). *Interventions for the control of diarrhoeal diseases among young children: improving water supplies and excreta disposal facilities*. Bull World Health Organization, 63 (4):757-772).

- Esrey SA, Potash JB, Roberts L, and Shiff C. (1991). *Effects of improved water supply and sanitation on ascariasis, diarrhoea, dracunculiasis, hookworm infection, schistosomiasis, and trachoma*. Bull World Health Organization, 69 (5): 609-621.
- Esrey, SA. (1994). *Complementary strategies for decreasing diarrhea morbidity and mortality: water and sanitation*. Paper presented at the Pan American Health Organization, March 2-3.
- Huttly SRA, Morris SS, and Pisani V. (1997). *Prevention of diarrhoea in young children in developing countries*. Bull World Health Organization, 75 (2): 163-174.
- Guerrant R, Kosek M, Lima A, Lorntz B, and Guyatt H. (2002). *Updating the DALYs for Diarrheal Disease*. Trends in Parasitology, Vol. 18 No. 5, May.
- Jones G, Steketee R, Black R, Bhutta Z, Morris S, Bellagio. (2003) *Child Survival Study Group. (2003). How Many Child Deaths Can We Prevent This Year?* The Lancet, Vol 562. July 5
- Kleinau E, Pyle D, Nichols L, Rosensweig F, Cogswell L, and Tomasek A. (2004). Strategic Report 8: *Guidelines For Assessing Hygiene Improvement*. Arlington, VA: Environmental Health Project II (USAID).
- Kosek M, Bern C, and Guerrant R. (2003). *The global burden of diarrhoeal disease, as estimated from studies published between 1992 and 2000*. Bull World Health Organization, 81(3): 197-204.
- Martorell R, Yarbrough C, Lechtig A, Habicht, and Klein RE. (1975). *Diarrheal Disease and Growth Retardation in Pre-School Guatemalan Children*. American Journal of Anthropology; 43:341-6.
- Mata LJ, Urrutia JJ, Albertazzi C, Pellecer O, and Arellano. (1972). *Influence of recurrent infections on nutrition and growth of children in Guatemala*. American Journal of Clinical Nutrition; 25:1267-75.
- Murray C and Lopez AD. (1996). Global Health Statistics. WHO, Harvard School of Public Health, and the World Bank.
- Pelletier DL, Frongillo EA Jr., Schroeder DG, and Habicht JP. (1995). The effects of malnutrition on child mortality in developing countries. Bull World Health Organization, 73 (4): 443-8.
- Perez E, Reddaway B. (1997) *Designing a Sanitation Program for the Urban Poor: Case Study from Montego Bay, Jamaica*. Activity Report No. 34. Arlington, VA: EHP.
- Petrera M, Montoya A. (1992). PAHO Epidemiological Bulletin 13 (3): 9-11

- UNICEF. (1999). *Towards Better Programming: A Manual on Hygiene Promotion*. New York: UNICEF.
- UNICEF, WHO, USAID, and BASICS. (2000). *Communication Handbook for Polio Eradication and Routine EPI*. New York: UNICEF.
- UNICEF. (2001). *State of the World's Children*. New York: UNICEF.
- USAID. (2002). Public Health Nutrition Operational Plan, FY 2003-2008.
- Varley RCG, Tarvid J, and Chao DNW. (1998). *A reassessment of the cost-effectiveness of water and sanitation interventions in programmes for controlling childhood diarrhoea*. Bull World Health Organization, 76 (6): 617-631.
- Verma, B.L. and Srivastava, R.N. (1990). *Measurement of the personal cost of illness due to some major water-related diseases in an Indian rural population*. International Journal of Epidemiology, Vol. 19, No. 1: 169-175.
- Victora CG, Bryce J., Fontaine O, and Monasch R. (2000). *Reducing deaths from diarrhoea through oral rehydration therapy*. Bull World Health Organization, 78 (10): 1246-1255.
- Wagner EG, Lanoix JN. (1958). *Excreta disposal for Rural Areas and Small Communities*. WHO Monograph series No. 39, WHO Geneva
- WaterAid Uganda. (2003). *Sustainable Hygiene Behaviour Change – A study of key determinants*.
http://www.wateraid.org.uk/in_depth/in_depth_publications/default.asp
- World Health Organization. (1997). *Health and Environment in Sustainable Development: Five years after the Earth Summit*. Geneva: WHO/EHG/97.8.
- World Health Organization. (2002). Global Burden of Disease results for the years 2000 and 2001. Estimates for 6 WHO regions of mortality, incidence, prevalence, YLL, YLD and DALYs by sex, age and cause, estimates for 2001 as reported in the World Health Report 2002.
- WHO/UNICEF. (2000). *Joint Monitoring Programme for Water Supply and Sanitation*. Global Water Supply and Sanitation Assessment 2000 Report