



Water, sanitation & hygiene

at a glance

Water and Health — two precious resources linked to one another.

Water for Health, World Water Day, 2001

Water, sanitation and hygiene and the Millennium Development Goals (MDGs)

Better hygiene and access to drinking water and sanitation will accelerate progress toward two MDGs: “Reduce under-five child mortality rate by 2/3 between 1990 and 2015” and “By 2015 halve the proportion of people without sustainable access to safe drinking water and basic sanitation”. Meeting the latter goal will require infrastructure investments of about US\$23 billion per year, to improve water services for 1.5 billion more people (292,000 people per day) and access to safe sanitation for 2.2 billion additional people (397,000 per day). Fewer than one in five countries are on track for meeting this target.

How do water, sanitation and hygiene affect health?

Water supply, sanitation, and hygiene and health are closely related. Inadequate quantities and quality of drinking water, lack of sanitation facilities, and poor hygiene cause millions of the world’s poorest people to die from preventable (primarily diarrheal) diseases each year. Women and children are the main victims.

Water, sanitation and health are linked in many ways:

- contaminated water that is consumed may result in water-borne diseases including viral hepatitis, typhoid, cholera, dysentery and other diseases that cause diarrhea
- without adequate quantities of water for personal hygiene, skin and eye infections (trachoma) spread easily
- water-based diseases and water-related vector-borne diseases can result from water supply projects (including dams and irrigation structures) that inadvertently provide habitats for mosquitoes and snails that are intermediate hosts of parasites that cause malaria, schistosomiasis, lymphatic filariasis, onchocerciasis and Japanese encephalitis
- drinking water supplies that contain high amounts of certain chemicals (like arsenic and nitrates) can cause serious disease.

Inadequate water, sanitation and hygiene account for a large part of the burden of illness and death in developing countries:

- Approximately 4 billion cases of diarrhea per year cause 2.2 million deaths, most—1.7 million—children under the age of five, about 15% of all under 5 deaths in developing countries.
- Diarrheal diseases account for 4.3% of the total global disease burden (62.5 million DALYs). An estimated 88% of this burden is attributable to unsafe drinking water supply, inadequate sanitation, and poor hygiene. These risk factors are second, after malnutrition, in contributing to the global burden of disease.
- Intestinal worms infect about 10% of the population of the developing world, and can lead to malnutrition, anemia and retarded growth.
- 6 million people are blind from trachoma and the population at risk is about 500 million.
- 300 million people suffer from malaria.
- 200 million people are infected with schistosomiasis, 20 million of whom suffer severe consequences.

Water supply, sanitation and hygiene are about more than health. Saved time, particularly for women and children, is a major benefit. Beneficiaries of water and sanitation projects in India reported these benefits: less tension/conflict in homes and communities; community unity, self-esteem, women’s empowerment (less harassment) and improved school attendance (WaterAid 2001).

Effectiveness of water supply, sanitation and hygiene interventions

Improved hygiene (hand washing) and sanitation (latrines) have more impact than drinking water quality on health outcomes, specifically reductions in diarrhea, parasitic infections, morbidity and mortality, and increases in child growth (Esrey et al 1991; Hutley et al 1997). Most endemic diarrhea is not water-borne, but transmitted from person to person by poor hygiene practices, so an increase in the *quantity* of water has a greater health impact than improved water *quality* because it makes it possible (or at least more feasible) for people to adopt safe hygiene behaviors (Esrey et al 1996).

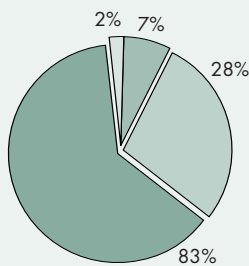
Experience shows that **constructing water supply and**

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Access to Water and Sanitation

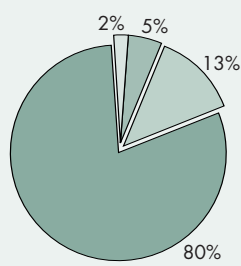
More people have access to safe drinking water and sanitation than ten years ago but population growth has eclipsed these accomplishments. One sixth (1.1 billion) of the world population lacks access to improved water supply, two-fifth (2.4 billion) have no improved sanitation. Most of these people live in Asia and Africa. Rural services lag far behind urban services.

Water supply Distribution of unserved population



Total unserved: 1.1 billion

Sanitation Distribution of unserved population



Total unserved: 2.4 billion

□ Europe ■ Latin America/Caribbean □ Africa ■ Asia

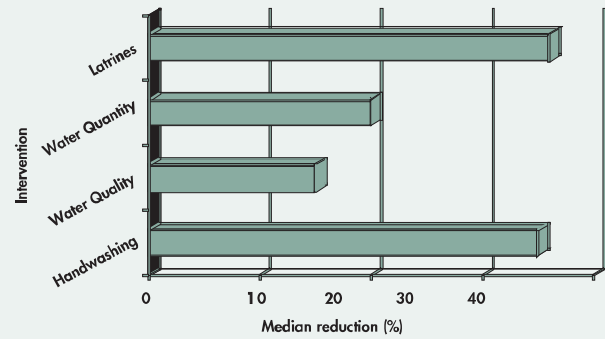
Source: WHO/UNICEF 2000

sanitation facilities is not enough to improve health; sanitation and hygiene promotion must accompany the infrastructure investments to realize their full potential as a public health intervention. Changing hygiene behavior is complex. Hygiene promotion is most successful when it targets a few behaviors with the most potential for impact. Based on extensive research, WHO and UNICEF have identified **hand washing with soap** (or ash or other aid) after stool disposal and before preparing food; **safe disposal of feces and use of latrines**; and **safe weaning food preparation**, water handling and storage as the key hygiene behaviors. A recent review (Curtis) of all the available evidence suggests that handwashing with soap could reduce diarrhea incidence by 47% and save at least one million lives per year. This is consistent with other studies which found that 12 hand washing interventions in

Handwashing is one of the most effective interventions for reducing diarrhea

Based on research findings and lessons learned from the successful public-private partnership "Handwashing for Diarrheal Disease Prevention Project" in Central America, the World Bank, the Water and Sanitation Program, the London School of Hygiene and Tropical Medicine, the Academy for Educational Development and the private sector, in collaboration with USAID, UNICEF, and the Bank-Netherlands Water Partnership developed a global initiative in 2001 to promote handwashing with soap in developing countries. The first pilot project locations are Ghana, Kerala, India, Senegal, Peru, China and Nepal. Results are being monitored and lessons documented and disseminated. Global advocacy events promote handwashing.

Effectiveness of hardware and hygiene interventions in reducing diarrhea morbidity



Source: Esrey et al. 1991; Hutley et al. 1997.

9 countries achieved a median reduction in diarrhea incidence of 35% (Hill, Kirkwood and Edmond, 2001). Many of the most successful interventions provided soap to mothers, explained the oral-fecal route for disease transmission, and asked mothers to wash their hands before preparing food, and after defecation. There are fewer studies of results of interventions to improve feces disposal, but Hill et al. found a median reduction of diarrheal disease of 26% (9 studies, range 0–68%), a median reductions in all-cause child mortality of 55% (6 studies, range 20–80%) and a median reduction in mortality from diarrhea of 65% (3 studies, range 43–70%).

What can the public health sector do?

The public health sector can do several things, in collaboration with other sectors, to help ensure that investments in water supply and sanitation result in greater health impact. **Public health promotion and education** strategies are needed to change behaviors so as to realize the health benefits of improved water supplies. Programs to improve hand washing behavior appear to be feasible and sustainable especially when they incorporate traditional hygiene practices and beliefs. New, better approaches to behavior change are being developed, including a recent project that has shown excellent results through persuading the private sector (soap manufacturers and the media) to transmit health information by advertising soap and its appropriate use to prevent diarrhea (see The Story of a Successful Public-Private Partnership in Central America: Handwashing for Diarrheal Disease Prevention, 2001).

School health programs

School health programs offer a good entry point for improved water supply and sanitation facilities and for community hygiene promotion. It is a realistic goal in most countries to ensure that all schools have clean water and sanitation. This enables schools to reinforce health and hygiene messages, ensure they translate into action, and set an example to students and the community. This can lead to community demands for similar facilities.

The inter-agency partnership for Focusing Resources on Effective School Health (FRESH) aims to increase access to, and improve the quality, of schools and child-friendly learning environments around the world. Guidelines and tools are being developed to help design, implement, monitor and evaluate school sanitation and hygiene components of school, health, and water and sanitation projects.

Additional things the public health sector can do:

- work with other agencies that plan, develop and manage water resources and basic water and sanitation services to advocate and promote these investments, and ensure that activities to promote hand washing, safe disposal of feces and continuous use and cleanliness of sanitation facilities are included;
- work with the agency responsible for monitoring water quality and sanitation to help ensure that this monitoring is carried out;
- provide other sectors with reliable data on water-associated diseases and effectiveness of interventions to facilitate better decisions with respect to water and sanitation projects;
- provide leadership for action in hygiene education, including building coalitions with private sector agencies to achieve better results;
- design, implement, and monitor hygiene education and promotion components of water supply and sanitation projects;

- advocate for including water, sanitation and hygiene interventions in poverty reduction strategies and plans.

Do's and Don'ts in promoting hand washing and hygienic behaviors

DO assess sanitation and hygiene beliefs and practices as the basis for planning, and involve community members/beneficiaries in planning and implementing interventions. Maximize the impact of hygiene promotion and education by using participatory techniques, targeting women and children, and using women as facilitators.

DO identify practices to be changed, targeting the four most critical: hand washing with soap (or ash or other aid) before food preparation and after dealing with feces; latrine use and safe disposal of children's feces; safe weaning food preparation; and safe water handling and storage.

DO offer a range of technology options (e.g., different kinds of latrines) and explain associated costs, maintenance requirements, advantages and disadvantages. Public funds are better spent on promotional campaigns and training/establishing latrine artisan businesses than on subsidies for constructing latrines.

DO incorporate programs to change hygiene practices in water supply, sanitation and health projects. In order for water supply projects to achieve positive health benefits, they need to include sanitation and hygiene components.

Millennium Development Goal	Intermediate mechanism	Target group	Indicator
Reduce infant and child mortality by 2/3 by the year 2015	Reduce diarrhea morbidity and mortality	Children under 5	% children under 5 with diarrhea in the past 2 weeks (diarrhea is defined as more than 3 loose stools in 24 hours)
Key behaviors	Interventions	Target group	Indicator
Hand washing with soap	Demonstrate good hand washing Educate on when to wash Hygiene education Provide soap	People caring for children and preparing food	% child caregivers and food preparers with appropriate hand washing behavior*
Sanitation	Build toilets and pit latrines Promote use of toilets and latrines Promote defecation in designated areas Promote burial of feces Clear feces from homes and yards	Population	% population who use toilet or pit latrine**

*"appropriate" hand washing behavior includes time of washing — after handling feces and before food preparation; and the technique used — using soap, ash or other aid, for long enough, using clean water

**Toilets or pit latrines must be hygienic; that is, no feces on the floor or seat

Data for these indicators are collected in the standardized Demographic and Health Surveys (DHS) conducted in over 100 countries around the world. (DHS website url: <http://www.measuredhs.com/>) A second source of these data are the Multiple Indicator Cluster Surveys (MICS) and modules supported by UNICEF, and used in 100 countries since 1998 (full information and MICS data available at www.unicef.org, search for MICS). Indicators for other water and sanitation interventions are described in "Water and Sanitation Indicators Measurement Guide", Billig et al 1999.

Health sector involvement can contribute to the success of water and sanitation projects. Don't provide hardware (water pipes and latrines) without the software (hygiene promotion) and community training and organization to sustain/maintain services.

DO include education and information to increase community demand for improved sanitation facilities.

DO establish partnerships to stretch resources, e.g. public/private partnerships with private soap manufacturers to achieve complementary goals.

DO monitor and evaluate interventions, and collect baseline data. Don't claim health benefits without measuring and documenting the impact of water and sanitation activities.

DO carry out pilot projects to test new technologies or mechanisms such as cost-recovery.

DO ensure that adequate water and sanitation are provided in schools and health facilities.

For more information

People (World Bank contacts)

- Jennifer Sara and Rita Klees (Water and Sanitation), Joana Godinho (Public Health)

Key Documents and References

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- WHO 2002 *World Health Report: Reducing Risks, Promoting Health Life*. Geneva
- WHO 2000 *Global Water Supply and Sanitation Assessment Year 2000 Report*, Geneva, WHO with UNICEF

Web sites

- Global Applied Research Network in Water Supply and Sanitation (GARNET): <http://info.lut.ac.uk/departments/cv/wedc/garnet/grntnc.html>
- IRC International Water and Sanitation Center: <http://www.irc.nl>
- IRC Community Water Supply Management: <http://www.irc.nl/manage/index.html>
- IRC internet journal: *Women, Water and Sanitation*: <http://www.irc.nl/products/publications/ajw/index.htm>
- Rural Water Supply and Sanitation Toolkit for Multisectoral Projects – a rich set of resources including guidelines for all project stages, numerous best practice examples <http://www.worldbank.org/watsan/rwsstoolkit/index.htm>
- Sanitation Connection: An Environmental Sanitation Network: <http://www.sanicon.net>
- UNICEF water, environment and sanitation (WES): <http://www.unicef.org/programme/wes>
- WaterAid: <http://www.wateraid.org.uk>
- Water Supply and Sanitation Collaborative Council: <http://www.wsscc.org>
- WELL Project, Water and Environmental Health at London and Loughborough: <http://www.lboro.ac.uk/well>
- WHO Water, Sanitation and Health: http://www.who.int/water_sanitation_health/index.htm
- World Bank Water and Sanitation Program: <http://www.wsp.org>

Expanded versions of the "at a glance" series, with e-linkages to resources and more information, are available on the World Bank Health-Nutrition-Population web site: www.worldbank.org/hnp