



# COMBATING WATERBORNE DISEASE AT THE HOUSEHOLD LEVEL

The International Network to Promote  
Household Water Treatment  
and Safe Storage

**The Network**



**World Health  
Organization**



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# CONTENTS

<b>UNSAFE WATER:</b> Unsafe water, inadequate sanitation and hygiene: how much suffering can be prevented?	<b>7</b>
<b>PART 1</b> HOUSEHOLD WATER MANAGEMENT AND HEALTH	<b>8</b>
The promise	9
The case for managing water in the home	10
Preventing diarrhoea	11
Reaching the vulnerable	12
Contributing to the Millennium Development Goals (MDGs)	13
<b>PART 2</b> THE NETWORK	<b>14</b>
Collaborating to reduce waterborne disease	15
Establishment of the Network	16
Objectives	18
Achievements	21
Moving forward	22
Join us	23
<b>PART 3</b> FINDING OUT MORE	<b>24</b>
Existing low-cost technologies can save lives today	25
Frequently asked questions and answers	27
Acknowledgements	32
Further reading	33
Annex	34





# **UNSAFE WATER, INADEQUATE SANITATION AND HYGIENE: HOW MUCH SUFFERING CAN BE PREVENTED**

## HOW MANY ARE AT **RISK**?

1.1 billion lack access to an “improved” drinking water supply; many more drink water that is grossly contaminated.



## HOW MANY ARE GETTING **SICK**?

4 billion cases of diarrhoea occur annually, of which 88% is attributable to unsafe water, and inadequate sanitation and hygiene.



## HOW MANY ARE **DYING**?

1.8 million people die every year from diarrhoeal diseases, the vast majority children under 5.

## HOW MANY MORE CANNOT **ESCAPE** POVERTY?

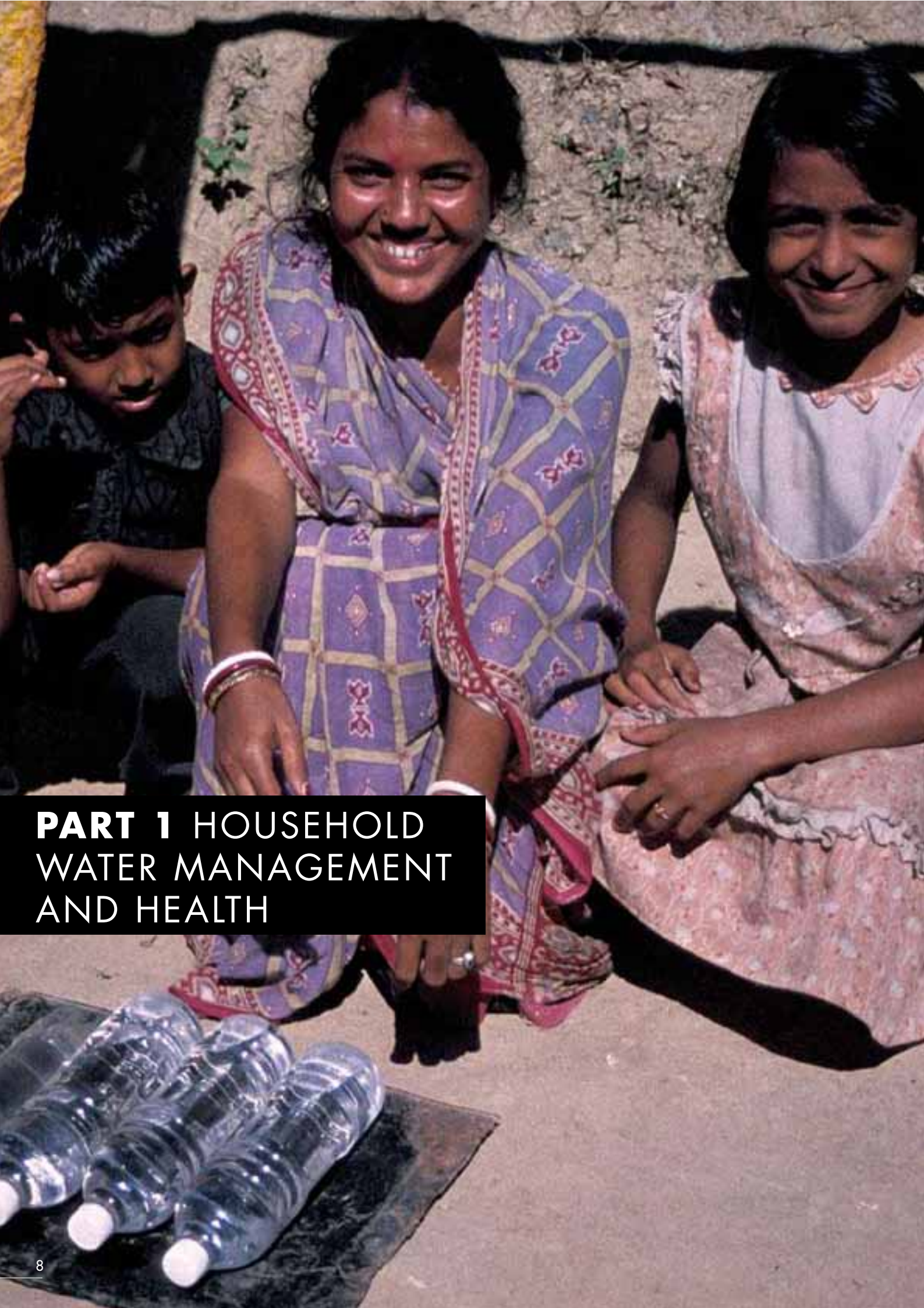
Lack of safe water perpetuates a cycle whereby poor populations become further disadvantaged, and poverty becomes entrenched.



## HOW MUCH OF THIS CAN BE **PREVENTED**?

WHO estimates that 94% of diarrhoeal cases are preventable through modifications to the environment, including through interventions to increase the availability of clean water, and to improve sanitation and hygiene.





**PART 1** HOUSEHOLD  
WATER MANAGEMENT  
AND HEALTH





# The promise

*“Simple techniques for treating water at home and storing it in safe containers could save a huge number of lives each year”*

WHO and UNICEF 2005<sup>1</sup>

...There is now conclusive evidence that simple, acceptable, low-cost interventions at the household and community level are capable of dramatically improving the microbial quality of household stored water and reducing the attendant risks of diarrhoeal disease and death.<sup>2</sup>

...Recent evidence suggests that point-of-use water quality improvements alone result in a one-third or greater reduction in diarrhoeal disease morbidity.<sup>3</sup>

...Self-sustaining, decentralized approaches to making drinking water safe, including point-of-use [treatment]...target the most affected, enhance health, contribute to development and productivity, and merit far greater priority for rapid implementation.<sup>4</sup>

...Safer household water storage may be an appropriate additional intervention to prevent contamination of domestic water.<sup>5</sup>

...A policy shift towards household water management appears to be the most attractive short term water-related health intervention in many developing countries.<sup>6</sup>

# The case for managing water in the home

Lack of access to safe drinking water, together with inadequate sanitation and hygiene, is the overwhelming contributor to the 1.8 million annual deaths caused by diarrhoeal disease.

Providing safe and reliable water services to the 1.1 billion people who currently lack access to improved water sources is an essential long-term goal that will yield great health and economic benefits. Less well known is the large potential contribution that household-level water quality interventions can make to immediately improve the health of the most vulnerable.

Health can be compromised when harmful bacteria, viruses, and parasites contaminate

drinking water either at the source, through seepage of contaminated run-off water, or within the piped distribution system. Moreover, unhygienic handling of water during transport or within the home can contaminate previously safe water. For these reasons, many of those who have access to improved water supplies through piped connections, protected wells or other improved sources are, in fact, exposed to contaminated water.

Therefore, potentially billions of people can benefit from effective household water treatment and safe storage.

A growing body of research suggests household water treatment and safe storage (HWTS):

- 1** *dramatically improves microbial water quality*
- 2** *significantly reduces diarrhoea*
- 3** *is among the most effective of water, sanitation and health interventions*
- 4** *is highly cost-effective*
- 5** *can be rapidly deployed and taken up by vulnerable populations.*

## Terminology:

Household-level approaches to drinking water treatment and safe storage are also commonly referred to as managing the water at the “point-of-use”. This term or its abbreviation “POU” typically describe the same procedures as other abbreviations derived from household water treatment, like “HHWT” or “HWT” or “HWTS”. (The “S” in “HWTS” refers to safe storage.) “Household water management” is also commonly used, and can encompass both treatment and storage. All these terms can refer to a variety of treatment procedures, for example, with chlorine or other chemical disinfectants, sunlight or UV lamps, various filters, or flocculation-disinfection formulations.

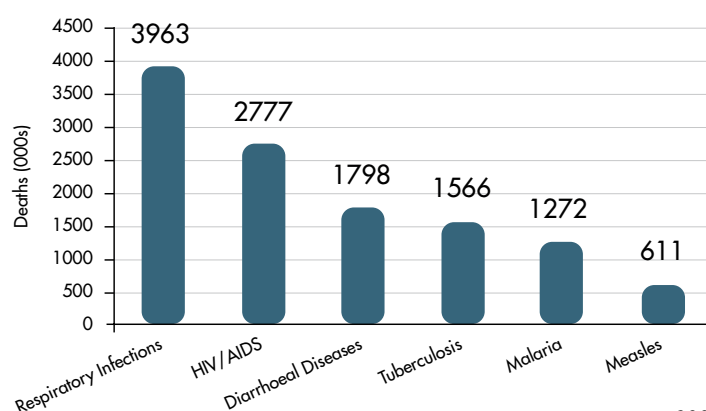
*There is increasing recognition that simple household-based approaches to ensuring drinking water safety should be incorporated into country strategies to reduce waterborne disease.*

## Preventing diarrhoea

Diarrhoea occupies a leading position among diseases as a cause of death and illness, killing 1.8 million and causing approximately 4 billion cases of illness annually. Children suffer the most from diarrhoea, with every episode reducing caloric

and nutrient uptake, setting back growth and development. 90% of diarrhoeal deaths are borne by children under five, mostly in developing countries.

### Leading Causes of Deaths from Infectious Diseases



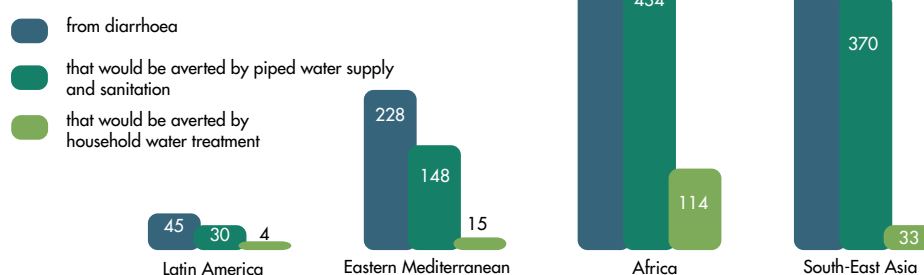
2004 World Health Report

WHO estimates that 94% of diarrhoeal cases are preventable through modifications to the environment, including interventions to increase the availability of clean water, and to improve sanitation and hygiene.<sup>7</sup> In addition, a 2005 systematic review concluded that diarrhoeal episodes are reduced by 25% through improving water supply, 32% by improving sanitation, 45% through hand washing, and by 39% via household water treatment and safe storage.<sup>8</sup>

A more recent (2006) Cochrane review of randomized controlled trials confirmed the key role that point-of-use water quality interventions could play in reducing diarrhea episodes, reporting a reduction in diarrhoeal disease morbidity by roughly half, on average, with some studies resulting in disease reductions of 70% or more.<sup>9</sup>

### Preventing diarrhoea

Annual number of deaths of children under five years  
2002  
thousands



Adapted from *Inheriting the World: The Atlas of Children's health and the environment* © WHO 2004



## Reaching the vulnerable

Point-of-use disinfection can be a low-cost option. Solar disinfection is free, provided plastic bottles are available. Bleach solution costs very little to produce, and according to the US Centers for Disease Control and Prevention (CDC) 10-25 US cents worth can last a family an entire month. Simple ceramic pot filters moulded by local artisans can be used to filter water in the home for approximately US\$ 3 per year, making them sustainable and economical.<sup>10</sup> Boiling is by far the most commonly used approach to disinfect water at household level. At the global level, a recent World Health Organization report suggests that household water interventions can lead to a benefit of up to US\$60 for every US\$1 invested.<sup>11</sup>

Water treatment also needs to be accompanied by safe storage. This can be accomplished by using containers with narrow openings and a dispensing device such as a tap or spigot to protect collected water against recontamination. These measures are particularly important because the microbial quality of drinking water frequently declines after collection.

Reaching the vulnerable, however, implies much more than developing affordable HWTS

products. These interventions are most effective in preventing disease only if they are used correctly and consistently. Identifying and implementing successful approaches to increase uptake HWTS products on a sustainable basis is essential for this intervention to achieve widespread and long-term success.

Field studies show that important considerations in home treatment are taste and other aesthetic properties of the water, convenience of use, price and cultural attitudes. Furthermore, positive attitudes and ideas were better predictors of whether people were likely to consistently treat water than were negative attitudes. Experience suggests that educational and promotional messages should target positive ideas, such as clarity, taste, good health, affordability, and ease of use. Researchers are finding that many householders would be willing to pay for home treatment at an acceptable price (e.g. less than US\$ 10 for water filters in Southern Africa). Payment by installments may be one method of enabling the poor to deal with the relatively high up-front costs of certain technologies.

*Treating and safely storing water in the home would clearly accelerate progress towards meeting the MDGs (Target 10) in situations where families have access to sufficient quantities of water that is of poor or questionable quality.*



## Contributing to the Millennium Development Goals (MDGs)

MDG 7, Target 10, calls for reducing by half the proportion of people without sustainable access to safe drinking water by 2015. Reaching this target implies tackling both the quantity (access) and quality (safety) dimensions to drinking water provision.

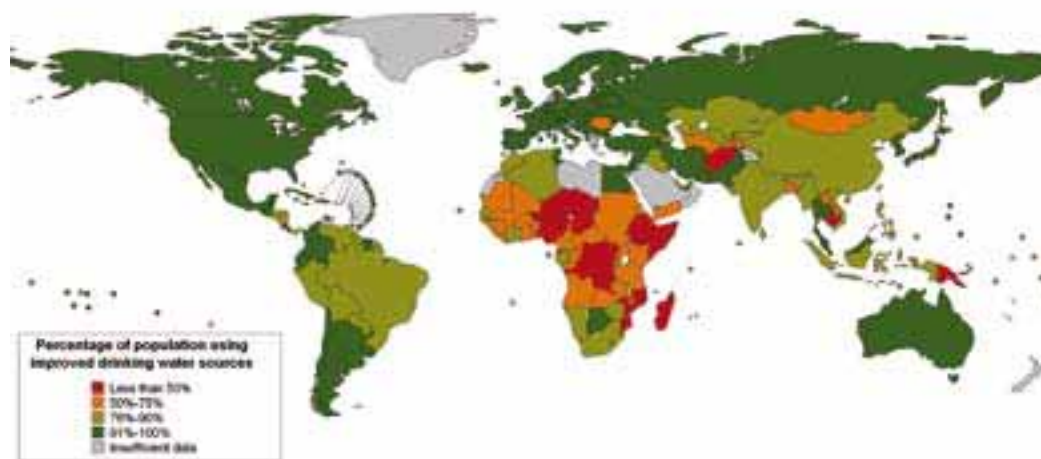
Progress towards this target is indicated by the proportion of households reporting the use of improved water supplies, such as piped household connections or protected wells. Individual studies and a recent six country survey carried out by the WHO/UNICEF Joint Monitoring Programme, however, suggest that depending on local conditions, a significant proportion of water from these sources may be contaminated.<sup>12</sup>

In light of these findings, great efforts are required, not only to extend services to the unserved, but to ensure these services are indeed supplying water that is safe.

Household-level interventions can make an immediate contribution to the safety component of this target, and would significantly contribute to meeting the MDGs in situations where access to water supplies is secure, but household water quality is not assured.

Questions have been included in surveys that will allow HWTS to be captured in future MDG monitoring activities.

Figure 1 – Percentage of population using improved drinking water sources in 2004.



Source: WHO/UNICEF Joint Monitoring Programme for Water and Sanitation. Meeting the MDG drinking water and sanitation target: the urban and rural challenge of the decade, Geneva 2006