

## Focusing on improved water and sanitation for health

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A silent humanitarian crisis kills some 3900 children every day and thwarts progress towards all the Millennium Development Goals (MDGs), especially in Africa and Asia. The root of this unrelenting catastrophe lies in these plain, grim facts: four of every ten people in the world do not have access to even a simple pit latrine; and nearly two in ten have no source of safe drinking water.<sup>1</sup> To help end this appalling state of affairs, the MDGs include a specific target (number 10) to cut in half, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation.

Far more people endure the largely preventable effects of poor sanitation and water supply than are affected by war, terrorism, and weapons of mass destruction combined. Yet those other issues capture the public and political imagination—and public resources—in a way that water and sanitation issues do not. Why? Perhaps in part because most people who read articles such as this find it hard to imagine defecating daily in plastic bags, buckets, open pits, agricultural fields, and public areas for want of a private hygienic alternative (as do some 2.6 billion people). Or perhaps they cannot relate to the everyday life of the 1.1 billion people without access to even a protected well or spring within reasonable walking distance of their homes.

There should be an outcry, from the health community above all, for immediate, concerted efforts to confront the reality that sanitation coverage rates in the developing world barely keep pace with population growth. Sufficient progress has been made with regard to drinking water to place within reach the target of halving the proportion of the population without access to safe drinking water between 1990 and 2015. Even meeting this target, however, will leave hundreds of millions of people without safe drinking water, particularly in east Asia and sub-Saharan Africa.

Diseases related to unsafe water, poor sanitation, and lack of hygiene are some of the most common causes of illness and death among the poor of developing countries (panel 1). According to WHO, 1.6 million deaths every year can be attributed specifically to these health determinants.<sup>3</sup> For every person who dies, many more become ill.

A recent cost-benefit analysis by WHO<sup>4</sup> showed that achieving the global MDG target in water and sanitation would bring substantial economic gains from both health and other benefits: each US\$1 invested would yield an economic return of between \$3 and \$34, depending on region. The benefits would include an average global reduction of diarrhoeal episodes of around 10%. If the goal for water and sanitation were met, the health-related costs avoided would reach

\$7.3 billion per year, and the annual global value of adult working days gained as a result of less illness would be almost \$750 million. Improvement in sanitation, hygiene, and water contributes to improved health, generates savings for households and national health budgets, and contributes to poor households' economies through reduced costs and losses of time. Saving time may enable productive activity and school attendance, especially for girls. Investment in water and sanitation—whether through development assistance at

### Panel 1: Health effects of poor water and sanitation<sup>2</sup>

- Almost half the people in the developing world have one or more of the main diseases or infections associated with inadequate water supply and sanitation: diarrhoea, intestinal helminth infections, dracunculiasis, schistosomiasis, and trachoma.
- More than half the hospital beds in the world are occupied by people who have these diseases.
- 88% of diarrhoeal disease—the second leading cause of death in children younger than five years after respiratory illnesses—is attributed to unsafe drinking water, inadequate sanitation, and poor hygiene. Diarrhoea morbidity is reduced by around 21% through improved water supply and by around 37% through improved sanitation.
- Though not well documented, the trauma of watching a child die from a preventable disease such as diarrhoea—as do one in five in the poorest parts of the world—can have lasting impacts on the psychological and emotional health of surviving parents and siblings.
- Six million people worldwide are blind because of trachoma—the leading cause of preventable blindness—and more than 150 million people need treatment. Improving access to water and better hygiene can reduce trachoma morbidity by 27%.
- Intestinal helminths (*Ascaris*, *Trichuris*, hookworm) affect hundreds of millions of people; 133 million have high intensity intestinal helminth infections, which often have severe consequences such as cognitive impairment, massive dysentery, or anaemia. Safe drinking water and basic sanitation combined with better hygiene can reduce morbidity from ascariasis, for example, by 29%. Overall, healthy people—as opposed to those sickened by helminthiases—are better able to derive nutritional benefit from food.
- More than 160 million people are infected with schistosomes, causing tens of thousands of deaths every year, mainly in sub-Saharan Africa. Basic sanitation can reduce schistosomiasis by up to 77%.

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the national or community levels, or by poor households themselves—makes sound economic sense.

### Managing water resources to improve health conditions

Although access to safe drinking water and basic sanitation can have a strong positive effect on human health, the development and management of water resources as a whole also has significant health implications, usually a combination of negative and positive. The balance between these effects, and protection of the health of vulnerable groups, is in the hands of those who plan and implement interventions, which can be strongly influenced by the health sector and health arguments. A comprehensive health impact assessment (linked to a health management plan) is crucial for development of water resources.

Man-made reservoirs and irrigation schemes, for example, contribute to food security and nutrition, yet can be conducive habitats for intensified transmission of schistosomiasis. Indeed, in sub-Saharan Africa this disease is largely synonymous with irrigation. Irrigation infrastructure and management of irrigation water can be designed to keep transmission risks to a minimum.

Malaria alone kills more than one million people each year, 90% in Africa, the great majority children. Malaria costs Africa more than US\$12 billion annually by its direct effects, but on top of that it has slowed economic growth in the region by 1.3% per year. The compounded effects are a gross domestic product 32% lower now than it would have been had malaria been eradicated from Africa in 1960.<sup>5,6</sup> Improving irrigation to avoid standing or slow-moving water and improving disposal of household wastewater can reduce mosquito breeding and transmission of malaria.

Vector-borne illness like malaria, filariasis, onchocerciasis, dengue, and Japanese encephalitis, which are transmitted between human beings by insects that breed in aquatic ecosystems, are becoming more difficult to manage because of the growing resistance of pathogens to drugs and insects to insecticides. Improved water management practices are therefore increasingly important in combating this category of diseases.

### Scaling-up service delivery

Expanding safe drinking water and sanitation coverage is not complex: it requires neither colossal sums of money nor scientific breakthroughs and technological advances. Although reaching the water and sanitation target will by no means be easy (especially in the very poorest parts of the world) and the worldwide sanitation challenge is indeed daunting, achieving target 10 is possible.

Nevertheless, meeting this target by 2015 will need a dramatic scaling-up of efforts—dramatic in terms of both the extent of action necessary and the speed with which they must be undertaken. The financial,

governance, and capacity constraints faced by low-income countries will make this a complex challenge. Scaling-up service delivery in the poorest countries will

#### Panel 2: Task force recommendations

The UN Millennium Project Task Force on Water and Sanitation sought to answer two questions: what will it take to expand water supply and sanitation coverage dramatically and sustainably; and how can water best be used as a resource to achieve the MDG?

At the conclusion of its 3-year project, the task force was unanimous in its belief that the water and sanitation target will not be reached unless:

- There is deliberate commitment by donors to increase and refocus their development assistance and to target sufficient aid to the least developed countries.
- There is deliberate commitment by governments of low and middle income countries that are not dependent on aid to reallocate their resources to target funding to the unserved poor.
- There are deliberate activities to create support and ownership for water supply and sanitation initiatives for both women and men in poor communities.
- There is deliberate recognition that the basic sanitation in particular requires an approach that centres on community mobilisation and actions that support and encourage that mobilisation.

Furthermore, we are convinced that the MDGs as a whole will not be met unless:

- There is deliberate planning and investment in sound management of water resources and infrastructure.

The task force identified ten crucial actions for achieving the water and sanitation target and fostering the sound management of water resources for all the MDGs:

- Governments and other stakeholders must move the sanitation crisis to the top of the agenda.
- Countries must ensure that policies and institutions for water supply and sanitation service delivery, as well as for management and development of water resources management, respond equally to the different roles, needs, and priorities of women and men.
- Governments and donor agencies must simultaneously pursue investment reforms for improved water supply, sanitation, and water management.
- Efforts to reach the target must focus on sustainable service delivery, rather than construction of facilities alone.
- Governments and donor agencies must empower local authorities and communities with the authority, resources, and professional capacity necessary to manage water supply and sanitation service delivery.
- Governments and utilities must ensure that users who can pay do so to fund the operation, maintenance, and expansion of services—but they must ensure that the needs of poor households are met.
- Within the context of national MDG-based poverty reduction strategies, countries must elaborate coherent water resources development and management plans that will support the achievement of the MDGs.
- Governments and their civil society and private sector partners must support a wide range of water and sanitation technologies and service levels that are technically, socially, environmentally, and financially appropriate.
- Institutional, financial, and technological innovation must be promoted in strategic areas.
- The UN system organisations and their member states must ensure that the UN system and its international partners provide strong and effective support to achieve the water supply and sanitation target and for water resources management and development.

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Still Pictures

need unprecedented short-term action as well as focus on building the management systems necessary to implement large-scale programmes over the medium-term and sustain the gains made over the long-term. It will also need a departure from business as usual on the part of all key actors, and new approaches that focus on decentralisation, transparency in budgetary allocations, and capacity-building efforts right down to the community level. Scaling-up will need substantial investments, both in infrastructure and in institutional strengthening and reform. The UN Millennium Project

Task Force on Water and Sanitation has identified five guiding principles and ten actions that provide the basis for meeting these needs and paving the way to achieving the water and sanitation targets in the MDGs (panel 2).

### Implications for the health community

Appreciation of the linkages between water, sanitation, and health is not new. From Aristotle through C P Snow to the present day, understanding has progressively developed and been applied to improve human wellbeing. If the case is clear and the effectiveness of actions well known, what more is needed? And what more is needed of the health community in particular? Panel 3 summarises our recommendations. Investment in water and sanitation is an efficient and effective way to combat waterborne and vector-borne diseases. In view of the financial constraints and shortages of trained health professionals in the poorest countries of the world, it is a priority that the international health community needs to give the attention it deserves.

#### Contributors

R Lenton and A Wright are coordinators of the UN Millennium Project Task Force on Water and Sanitation, and K Lewis is a senior policy adviser and manager. J Bartram is a permanent observer on the task force for WHO and UN-Water. Parts of this article are drawn from the final report of the UN Millennium Project.<sup>7</sup>

#### Conflict of interest statement

We declare that we have no conflict of interest.

#### References

- 1 World Health Organization and United Nations International Children's Emergency Fund. Joint Monitoring Program. Meeting the MDG drinking water and sanitation target: a mid-term assessment of progress. Geneva: WHO/UNICEF JMP, 2004.
- 2 United Nations/World Water Assessment Programme. UN World Water Development Report: water for people, water for life. Paris, New York, and Oxford: UNESCO and Berghahn Books, 2003.
- 3 WHO. Water sanitation and health. [http://www.who.int/water\\_sanitation\\_health/diseases/en/](http://www.who.int/water_sanitation_health/diseases/en/) (accessed Jan 18, 2005).
- 4 Evans B, Hutton G, Haller L. Closing the sanitation gap: the case for better public funding of sanitation and hygiene behaviour change. Paris: Organization for Economic Co-operation and Development Roundtable on Sustainable Development, 2004.
- 5 World Health Organization. Water, sanitation and hygiene links to health: facts and figures. [http://www.who.int/water\\_sanitation\\_health/publications/factsfigures04/en/](http://www.who.int/water_sanitation_health/publications/factsfigures04/en/) (accessed Nov 12, 2004).
- 6 WHO. Roll Back Malaria. <http://mosquito.who.int/malariacontrol> (accessed Nov 12, 2004).
- 7 UN Millennium Project, Task Force on Water and Sanitation. Health, dignity, and development: what will it take? London, Sterling, VA: Earthscan, 2005.

### Panel 3: Action required from the health community

- Effective action needs multidisciplinary activity. Health sector engagement is crucial, whether in setting policy, investment priorities, and legislation nationally; or in decision-making about service levels or the health impact of a development project in a single community. If health benefits are an aim, or adverse effects are to be prevented, then public-health professionals should be involved from the outset.
- The contribution of water supply and sanitation to overall public health must be recognised in public and health policies, and reflected in budgetary allocations between curative and preventive health services.
- The role of investments in water and sanitation in reducing the physical and financial loads on the health sector must be acknowledged in public-health policies. With that in mind, the health sector must become a vigorous advocate for adequate investments in water and sanitation.
- The health community must join others in creating an intensified public awareness of the importance of water resources development for control of such diseases as onchocerciasis and, hence, for socioeconomic development.
- Individuals, households, and communities might not be driven primarily by health gains in decision-making. Convenience (eg, time savings) as well as peer perception and peer pressure might be more important. Responses should address both what communities want and what will protect and improve health.
- Most of the adverse effect of water-related disease is borne by poor households, especially those without reliable access to basic services. A focus on understanding impact on households helps to ensure that health gains go to the most needy. Otherwise, experience shows that service improvements tend to go to those with a level of service that already substantially protects health. Programmes intended to improve health must be driven by anticipated impact on poor households with inadequate services.
- Open defecation is not readily spoken about in many cultures. Until recently, neither were condoms. Lessons from the successes in galvanising global response to the HIV/AIDS epidemic are important. Only once policymakers, civil society groups, and the ordinary woman and man started speaking openly about how HIV spreads (mainly sexual contact) and how to stop it (condoms, monogamy) did rates of new infection start to decline.
- Securing the maximum health benefits from investments in water supply and sanitation services depends on how they are used. Often, water use for washing will increase once it is available at home. However, in some cases, time and effort are needed to encourage safe practices. In many cultures, for example, the excreta of young children are regarded as benign, and are not treated with the same hygienic concern as the excreta of adults. Washing hands with soap after defecation is another example of a behaviour that does not follow automatically from the provision of hardware, yet has major health benefits. The health sector has a direct role to play on some household actions such as promoting and facilitating appropriate hygienic behaviours and water management in and around the home.